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RECYCLING AGENT SELECTION FOR MANUFACTURER AND COORDINATION IN AN E-CLOSED-LOOP SUPPLY CHAIN WITH DOWNSTREAM COMPETITION

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Abstract

This study addresses the critical challenge of recycling agent selection and coordination in an e-commerce closed-loop supply chain (E-CLSC) to enhance sustainability and operational efficiency. In contrast to existing literature focusing on single-agent or competing-e-tailer models, we propose a novel framework involving a manufacturer, two competing e-tailers, and a third-party platform, analyzing three reverse channel models: third-party collection (TC), one-e-tailer collection (ORC), and two-e-tailer collection (TRC). Employing a Stackelberg game-theoretic approach with the manufacturer as the leader, we derive equilibrium decisions through backward induction and introduce a combined cost-sharing and revenue-sharing contract to align channel incentives. Our findings reveal several key insights. First, Model TC demonstrates suboptimal performance and should be strategically avoided by the manufacturer. Second, the manufacturer should adopt Model TRC under low-intensity collection competition but switch to Model ORC when collection competition intensifies. Last, our proposed "cost-sharing and revenue-sharing" contract can effectively coordinate channel members, ensuring a mutually beneficial outcome for all parties involved. These findings provide theoretically grounded decision support for structuring efficient E-CLSC networks in competitive e-commerce marketplaces.

Key words: collection competition, circular economy, e-closed-loop supply chain, remanufacturing, supply chain coordination

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