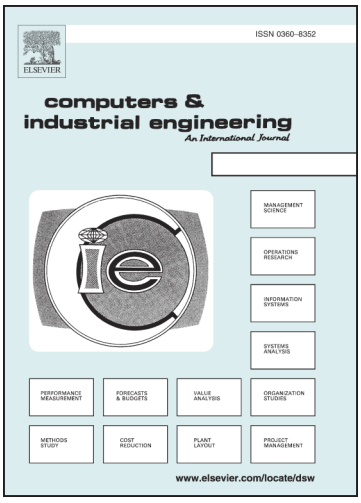

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Coordinated Dispatching and Acquisition Fee Decisions for a Collection Center in a Reverse Supply Chain

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Abstract

Collection centers play an important role for sustainable development in closed-loop supply chains by managing the collection activities of end-of-life (EOL) products and presenting them back to the economy. In this study, we focus on a collection center which collects EOL products that are composed of multiple components, disassembles the collected products, checks the quality of their components and sends the reusable parts to a remanufacturer at a certain price. The collection center needs to decide when to dispatch the collected products to the remanufacturer as well as the optimal acquisition fee in order to collect the right amount of EOL products from the end users and maximize its profit. We develop a dynamic programming model to maximize the long-run average profit of the collection center per unit time and analyze the optimal dispatching and acquisition fee decisions. We analyze quantity-based and time-based dispatching heuristics, which are widely used in practice, and compare their performances with the optimal dispatching decisions. We also compare static and dynamic acquisition fee models. We finally present a sensitivity analysis in order to analyze the effects of the parameters in our model. Computational results allow us to observe important managerial insights in this system regarding the optimal decisions depending on system parameters.

Keywords: Reverse supply chain; Collection; Pricing; Dispatching; Dynamic programming