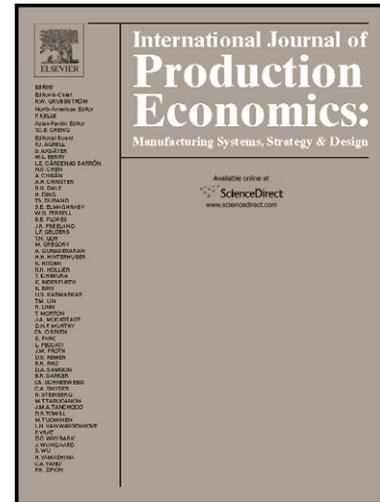


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Remanufacturing with RFID item-level information: Optimization, waste reduction and quality improvement

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Remanufacturing with RFID Item-Level Information: Optimization, Waste Reduction and Quality Improvement

Abstract

We consider RFID tags and their applications from a recycling/remanufacturing perspective and propose a novel framework to assist such process based on item-level information visibility and instantaneous tracking/tracing ability enabled by RFID. The incorporation of RFID in the reverse supply chain results in cost reduction, service & production quality improvement and pollution & waste reduction. With RFID in a reverse supply chain, we observe the power shift from waste-driven to market-driven system. Moreover, RFID's value increases with uncertainties in reverse operations as well as individual products and components.

Keywords: knowledge-based system, RFID, manufacturing, decision support system, closed-loop supply chain

1. Introduction

The process of remanufacturing include the collection of defective (due to manufacturing) and end-of-life goods as well as manufacturing byproducts and re-engineering of products back to new or as-new or refurbished condition. Although remanufacturing is not new, it is still largely undervalued with respect to its economic, environmental and social benefits as well as from a strategic business perspective.

Due to its inherent properties and the need to integrate the remanufacturing processes with the regular manufacturing plan, product remanufacturing management has been faced with challenges that arise mostly as a result of uncertainty from a supply chain perspective. For instance, uncertainty from the market, inventory, processing time and materials recovered have direct impact on the manufacturing plan. As a result, the complex tasks in a remanufacturing process are generally significantly different from those in a traditional manufacturing setup. Rather than tackle a part of the problem, we find it more beneficial to optimize the remanufacturing pro-

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