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Reverse Logistics End of Life Products Acquisition and Sorting

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Abstract : The emerging of reverse logistics and product recovery management is an important concept in reconciling economic and environmental objectives through recapturing values of the end of life product returns. End of life products contains valuable modules, parts, residues and materials that can create value if recovered efficiently. The main objective of this study is to explore and develop a model to recover as much of the economic value as reasonably possible to find the optimality of return acquisition and sorting to meet demand and maximize profits over time. In this study, the benefits that can be obtained for remanufacturer is to develop demand forecasting of used products in the future with uncertainty of returns and quality of products. Formulated based on a generic disassembly tree, the proposed model focused on three reverse logistics activity, namely refurbish, remanufacture and disposal incorporating all plausible means quality levels of the returns. While stricter sorting policy, constitute to the decrease amount of products to be refurbished or remanufactured and increases the level of discarded products. Numerical experiments carried out to investigate the characteristics and behaviour of the proposed model with mathematical programming model using Lingo 16.0 for medium-term planning of return acquisition, disassembly (refurbish or remanufacture) and disposal activities. Moreover, the model seeks an analysis a number of decisions relating to trade off management system to maximize revenue from the collection of use products reverse logistics services through refurbish and remanufacture recovery options. The results showed that full utilization in the sorting process leads the system to obtain less quantity from acquisition with minimal overall cost. Further, sensitivity analysis provides a range of possible scenarios to consider in optimizing the overall cost of refurbished and remanufactured products.

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