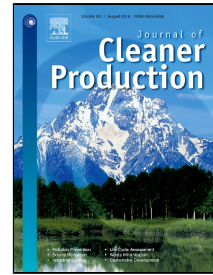


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Third-party Reverse Logistics Provider Selection Approach

Based on Hybrid-Information MCDM and Cumulative Prospect Theory

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Abstract: Growing environmental concerns and potential economic profitability have driven many manufacturers to manipulate reverse logistics (RL). Due to complexity of RL operations and the lack of available resource, outsourcing RL practices to third party reverse logistics provider (3PRLP) is preferred as a strategy. One of the most essential and risky processes for carrying out RL outsourcing is the selection of the optimal 3PRLP from alternatives. The 3PRLP selection is generally recognized as a hybrid-information multi-criteria decision making (HI-MCDM) problem incorporating multiple criteria which are usually in conflict with another criterion and expressed by various formats of information, i.e., crisp numbers, intervals, linguistic terms, and fuzzy numbers, for best retention of original assessment in fuzzy environment. The psychological behavior of decision maker (DM) in selection under environmental pressure has been proved to weigh heavily with decision solution, yet not been properly considered in existing literature. In response to this issue, the main evaluation criteria are investigated in this paper and an integrated cumulative prospect theory (CPT) based HI-MCDM approach is developed to appraise and identify sustainable 3PRLPs. The suggested approach is illustrated by a case study from computer manufacturing industry. Lastly, comparison with FTOPSIS and a sensitivity analysis are performed to confirm the validity and robustness. The results indicate that considering psychological factor in decision making contributes to avoiding potential loss risks. This study will offer informative insights to managers for outsourcing to a capable 3PRLP.

Keyword: Reverse logistics, Third-party reverse logistics provider selection, Cumulative prospect theory, Hybrid-information multi-criteria decision making

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