

Advanced risk assessment in reverse supply chain processes: A case study in Republic of Serbia

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ABSTRACT

Management of a reverse supply chain (RSC) often takes place in an uncertain environment, so it is supposed to be analyzed through the proactive approach for avoidance/elimination of risks. Management initiatives based on the assessed risk level and priority of potential failure mode (PFM) should lead to the increase of business effectiveness, the competitive advantage and sustainability of the RSC. Therefore, the focus of this research is set to proposing the reliable method that would be user-friendly and suitable for the determination of risk level and priority of PFMs in RSC. Uncertainties related to the severities of Potential Effect(s) of Failure (PEF) and their frequencies, as well as detection of PFMs are described by pre-defined linguistic expressions and modelled by the interval type-2 trapezoidal fuzzy numbers (IT2TrFNs). The assessment of the relative importance of risk factors is set as a fuzzy group decision-making. The weights vector is calculated based on the procedure of fuzzy number comparison. The value of each risk factor at the level of each PFM is assessed through the predefined linguistic expressions modelled by IT2TrFNs. The rank is obtained by modified Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method. The proposed model is tested on a real-life data from RSC that operates in Serbia. In the domain of practical implications, it may be noticed that the application of the proposed model could decrease the influence of potential causes of failures modes on the overall RSC business activities especially in the terms of strategic management and human resource practices. The novelty of the proposed model may be underlined as it is used for the analysis of different RSC activities and many interconnected issues may be solved by the proposed management measures after conducted analysis.

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