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A Framework for Risk Assessment, Management and Evaluation: Economic Tool for Quantifying Risks in Supply Chain

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ABSTRACT

Nowadays risks become a critical part in our life since they are involved in everything we do and participate. Some people do not want to do anything which associated with risk and others flourish on risk. In both types of people, they must relieve their risk through utilizing safety measures such as flame retardant suits and helmets for race car drivers, and safety ropes for rock climbers. All risks can be minimized to a manageable level by employing the proper mitigation strategy. In supply chain, the decision-making process contains risks which can be influential on the company's progress in introducing a new product, expanding in various markets, and outsourcing manufacturing operations. Companies will be likely to perform well via considering risks in their decisions and employing the proper mitigation strategy for responding to the unexpected events. The subjectivity, uncertainty and vagueness which exist in reality are the key factors to make risks difficult to handle. Hence, risk analysis, mitigation and control provide recommendations for making suitable decisions. In order to quantify risks in supply chain, an integrated method with a neutrosophic analytical hierarchy process (N-AHP) and neutrosophic technique has been demonstrated for this purpose. It is aimed for matching similarity to the ideal solution (N-TOPSIS) by order preference. The neutrosophic values in our research can deal effectively and efficiently with vague, uncertain and in incomplete information which has a significant impact on risk management. For illustrating the suggested methodology, a real case study is illustrated.

Keywords: Supply chain risk management (SCRM); Cognitive map; Multi-criteria decision making (MCDM); Neutrosophic AHP; TOPSIS.

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