

An Integrated Framework for Project Risk Assessment Using the Stepwise Weight Assessment Ratio Analysis

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Abstract

Risk quantification is an essential step in risk assessment and management, as it serves as a clear metric for project risk assessment. To quantify the risks of a project, weights for each risk item should be evaluated, which would serve as a percentage of importance of each risk. This study proposes a framework for assessing the weights of risks that might arise during the implementation of their projects. The paper first examines the literature, explains the proposed framework by tackling risk identification, data collection, initial risk ranking, and risk weight calculations, followed by an example applying the proposed framework. A newly designed survey asks the decision makers to provide their experience in their recent projects and losses in terms of total project value by this risk item. By doing so, rather than asking decision makers to evaluate alternative risk items in a comparative way, consequences by the questioned risk item is a dimensionless value. The proposed integrated method uses the Stepwise Weight Assessment Ratio Analysis (SWARA) method, which quantifies the weights/relative importance of the risks, which then allows for their ranking in order of importance and criticality. The main contribution of this paper is that its method of risk quantification solely uses percentages, representing the probability and consequence, rather than a monetary value, which cannot always be applicable, especially for critical cases related to risks on human life and other priceless potential losses.

Keywords

Risk Management, Risk Assessment, Project Management, Stepwise Weight Assessment Ratio Analysis and Multi-Attribute Decision Making.

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