Development of a hybrid AHP and Dempster-Shafer theory of evidence for project risk assessment problem

ABSTRACT

In this paper, a new hybrid AHP and Dempster-Shafer Theory of Evidence is presented for solving the problem of choosing the best project among a list of available alternatives while uncertain risk factors are taken into account. The aim is to minimize overall risks. For this purpose, four groups of risk factors, including Properties, Operational and Technological, Financial, Strategic risk factors, are considered. Then using an L2 4 Taguchi method, several experiments with various dimensions have been designed and solved by the proposed algorithm. The outcomes are then analyzed using the Validating Index (VI), Reduced Risk Indicator (R.R.I%), and Solving time. The findings indicated that, compared to the classic AHP, the results of the proposed hybrid method were different in most cases due to uncertainty of risk factors. It was observed that the method could be safely used for selecting project problems in real industries.