

# MULTI-CRITERIA DECISION SUPPORT OF PROJECT RISK ASSESSMENT

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## Abstract

Risk is an inherent property of each project, because a project life cycle is subjected to different nature's risks, such as internal or external origins. The aim of this paper is to rank the pipeline installation project construction's risks in order of importance, taken into account the two multi-criteria approaches of decision support which are Analytic Hierarchy Process (AHP) and Weighted Product Model (WPM). The project construction's risks have been estimated using the cost, delay and quality criteria. The weighted criticality of each risk was determined according to the project characteristics, the probability of occurrence, aggregate impact and the non-detectability factor.

**Keywords:** Risk assessment, AHP, WPM, multi-criteria decision analysis, project Risks

## Introduction

Algeria's economy mainly depends on hydrocarbons exportation as many third world countries. Pipelines are often used to ensure the conveying of gas and oil from extraction wells to operating workshops. Thus, pipeline installation projects are necessary for effecting the transportation operation. Risk management is a very important task that is considered as an integral part of project management. Any new creation generates uncertainties and shadows. It is therefore important to master the potential threats to achieve the objectives set. The project risks become more important than the project during their life cycle which was increasingly complicated, either by their technical nature or by the multiplicity of project team (Marle, 2012; Jolanta *et al.*, 2013 and Nahal and Khelif, 2019).

Saaty has developed a structured technique for analyzing and organizing complex decisions, which Known as the Analytical Hierarchy Process, based on mathematics and psychology (Brebbia, 2014; Kumar and Dash, 2016). The aim of AHP is to quantify the relative priorities of an alternative given set on a ratio scale, based on a decision-maker judgment, and emphasizes the importance of a decision-maker intuitive judgments as well as the consistency of comparing alternatives in decision-making process (Singh and Harwinder, 2018).

In fact, a decision maker judgment is based on knowledge and experience, and then the decisions can be made accordingly, the AHP approach fits well with a decision-maker behavior.

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