Application of Multi-Criteria Decision Making to Evaluate Structural Performance Projects in Amman

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Authorization Form

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Dedication

I dedicate my work to my parents who helped me reach this remarkable stage of my education and who stood by until my successful completion, I also dedicate my work to my friends and family members who supported and encouraged me until the end.

Acknowledgment

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Abstract

The construction sector is the main pillar of the national economy, on the other hand, it is facing many obstacles affecting its performance, because of merging several problems at the same time due to the complicated nature and uncertain environment of the project, and the multiplicity of factors that lead to the occurrence of a time delay in implementation and high cost of the project, and to address these challenges; it requires good project management methods in this area, in addition to smart and distinctive capabilities in making the right decisions.

The main aim of this thesis is to analyze the application of Multi-Criteria Decision Making (MCDM) to evaluate the structural performance of projects in the Capital Amman, using Analytic Hierarchy Process (AHP) and Analytic Network Process (ANP) to evaluate the structural performance of the projects. A list consisting of four construction projects were selected in Amman, in order to choose the project optimization of this study area, by selecting a list of primary and secondary evaluation criteria. To achieve the objectives of this thesis, the data has been collected from the literature reviews that related to MCDM methods (AHP and ANP), and the structural performance, and finally, through interviews, a questionnaire was distributed on

professional engineers and project managers who implemented these four projects and then analyzed the results.

The results of data analysis for the study sample showed that (quality criteria, criteria of factors related to owner satisfaction, cost, and time), are the most important criteria for pairwise comparisons between projects, respectively, and that the quality criteria is the most important criteria in the projects. Finally, by calculating the relative importance and priorities and of the projects, the results showed that the project which received the highest priority and importance among the other construction projects through the evaluation is the "The Jordan University Hospital expansion project".

In the end, its recommended to accelerate the application of techniques of Multi-Criteria Decision making (AHP and ANP) in the evaluation of projects performance, in addition to expedite the application of the proposed systems for Structural Performance by the researcher to help project managers make efficient decisions, which will lead to an effective control operation on the construction projects and enhance its performance.

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AHP	Analytic hierarchy process
ANP	Analytic network process
BSC	Balance Score Card
CI	Consistency index
CR	Consistency ratio
IC	Intellectual capital
KPIs	Key Performance Indicators
MCDM	Multi-criteria decision making
RI	Random consistency index
SEM	Structural Equation Model