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WEB CONFERENCE

PROJECT MANAGER SELECTION BY ANALYTIC HIERARCHY PROCESS

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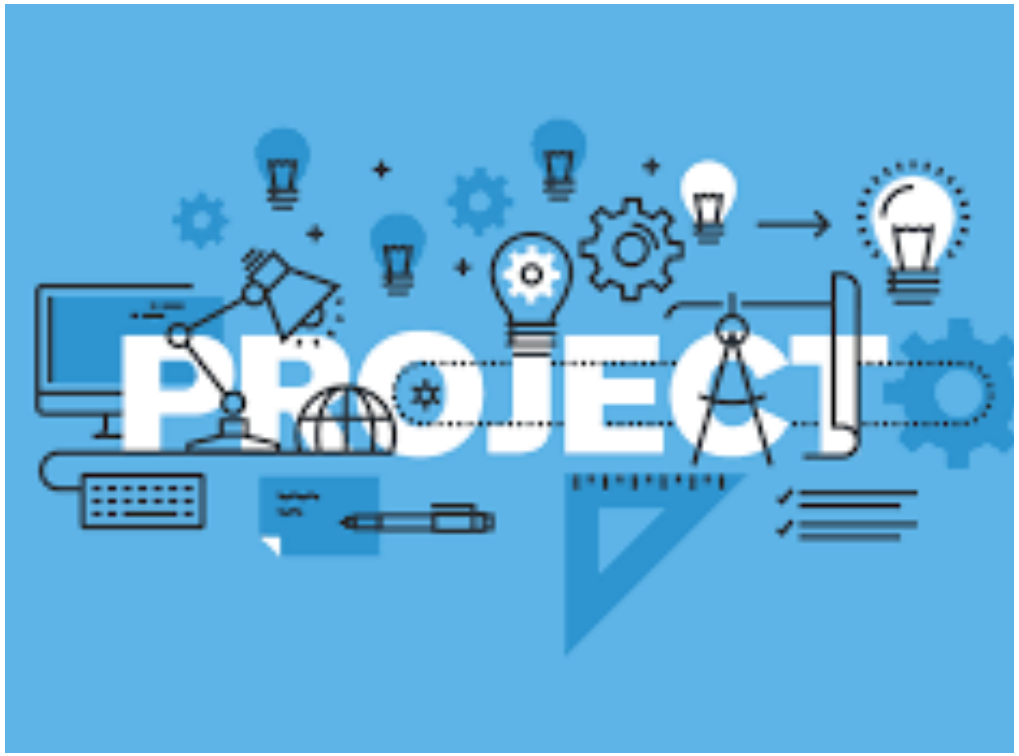
Topics

- Introduction
- Literature Review
- Application
- Conclusions

Introduction

- A project is a unique process that is independent from the organization in which it is involved, has a limited scope and a certain start and finish time with a limited budget.



Introduction

- The aims of a project are related to the strategic goals of the organization, the contents of these aims are clear and qualitative

Introduction

- Project management uses the knowledge, skills, techniques, and tools together by trying to achieve the results determined as the goal at the expected time of the project without exceeding the planned budget.

Introduction

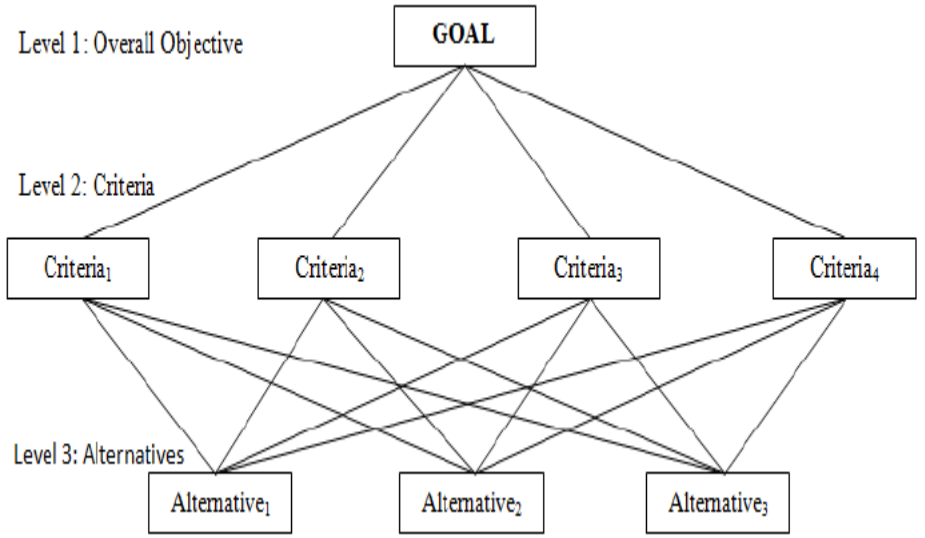
- There are many components involved in the realization of a successful project, and the competence of the project manager is a very important factor (Fortune and White, 2006). Project managers play a very important role in every stage of the project, especially the project managers are expected to be completed at the desired time, with the desired quality and with the allocated budget

Introduction

- Selecting a project manager for a project is a fundamental decision. Traditionally, the project manager is selected by the top managers of the relevant organization with interviews and references.

Introduction

- Selection of project manager consists different criteria and needs to use a suitable decision method. In this study, AHP (Analytic Hierarchy Process) is used as a MCDM (Multiple Criteria Decision Making) method for selecting project manager. AHP is a technique that can be used to deal with complexity when decisions are complex



Literature Review

- Al-Harbi (2001) used the AHP method as a potential decision-making method to be used in project management, he used prequalification of contractor as a problem.

- Keren et al., (2014) by using Data Envelopment Analysis and the AHP methods together, aimed to rank the project manager candidates according to the criteria.

- Torfi and Rashidi (2011) used AHP and Fuzzy TOPSIS methods together for selection of a project manager to be assigned to a construction company in their article.
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- Varajão and Cruz-Cunha (2013) proposed the combined usage of the AHP and the ICB as a tool to make decisions in the selection of the project managers.

- Çelikbilek (2017) proposed the Grey-AHP method for selecting a project manager to be assigned to a software project in an energy company.

Application

- In the application section, a project manager selection problem is handled by AHP.

The criteria are:

Basic criteria(C_1)
education($C_{1.1}$)
experience($C_{1.2}$)
demographic features($C_{1.3}$)

criteria of authority(C_2)
leadership criteria($C_{2.1}$)
managerial criteria($C_{2.3}$)

technical criteria(C_3),
knowledge ($C_{3.1}$),
ability($C_{3.2}$),

certification criteria(C_4),
certificate on the project management ($C_{4.1}$)
certificate on the subject($C_{4.2}$)

human criteria(C_5)
communication ($C_{5.1}$)
attitude ($C_{5.2}$)
character ($C_{5.3}$)

Application

After hierarchical structure are organized, experts from human resources department, set up pairwise comparison matrices of the hierarchy and importance of the criteria and the alternatives are calculated. Three different experts evaluated the hierarchical structure by joint decision.

Table 1. Pairwise comparison matrix of the main criteria

	C_1	C_2	C_3	C_4	C_5	Weights of the criteria
C_1	1	4	3	5	7	0.457
C_2	1/4	1	1/3	3	5	0.150
C_3	1/3	3	1	6	5	0.273
C_4	1/5	1/3	1/6	1	3	0.077
C_5	1/7	1/5	1/5	1/3	1	0.041

Consistency Ratio: 0.09

Application

The other relative importance of the main criteria and sub criteria can be computed as seen in Table 2.

Table 2. Relative importance of the main criteria and sub criteria

C_1=0.457	$C_{1.1}$=0.109	$C_{2.2}$=0.309	$C_{3.1}$=0.581
C_2=0.150	$C_{2.1}$=0.333	$C_{2.2}$=0.666	
C_3=0.273	$C_{3.1}$=0.250	$C_{3.2}$=0.750	
C_4=0.077	$C_{4.1}$=0.250	$C_{4.2}$=0.750	
C_5=0.041	$C_{4.1}$=0.163	$C_{4.2}$=0.297	$C_{4.3}$=0.538

Application

At the last step, final decision matrix is established, and the overall importance weights are computed of alternatives. The overall importance weights of alternatives are calculated as seen in Table 3.

$$\begin{bmatrix} 0.633 & 0.142 & 0.246 & 0.309 & 0.201 & 0.643 & 0.538 & 0.201 & 0.724 & 0.200 & 0.666 & 0.309 \\ 0.106 & 0.714 & 0.685 & 0.109 & 0.680 & 0.282 & 0.297 & 0.680 & 0.193 & 0.600 & 0.222 & 0.581 \\ 0.260 & 0.412 & 0.068 & 0.581 & 0.117 & 0.07 & 0.163 & 0.117 & 0.083 & 0.200 & 0.111 & 0.109 \end{bmatrix} \begin{bmatrix} 0.050 \\ 0.141 \\ 0.0265 \\ 0.050 \\ 0.100 \\ 0.068 \\ 0.205 \\ 0.019 \\ 0.057 \\ 0.006 \\ 0.012 \\ 0.022 \end{bmatrix} = \begin{bmatrix} 0.370 \\ 0.486 \\ 0.143 \end{bmatrix}$$

According to the overall importance weights of alternatives, the ranking of alternatives is $A2 > A1 > A3$.

Table 3. The overall importance weights of the alternatives.

Conclusions

- In this paper we handled the project manager selection problem with AHP. We determined five main criteria and 12 sub-criteria to evaluate three different alternatives. To this aim, we established a four-level hierarchy to identify the problem in more detail. Then, the pairwise comparison matrices are established, and the relative importance of the main criteria and sub criteria are computed.

- In the last step, the overall importance weights of the alternatives are calculated, and alternatives are ranked in descending order. We conclude that AHP can easily the handle the project manager selection problem.