Risk Assessment in BOT Contracts using AHP Technique

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ABSTRACT

The process of risk assessment in the build-operate transfer (BOT) project is very important to identify and analyze the risks in order to make the appropriate decision to respond to them. In this paper, AHP Technique was used to make the appropriate decision regarding response to the most prominent risks that were generated in BOT projects, which includes a comparison between the criteria for each risk as well as the available alternatives and by mathematical methods using matrices to reach an appropriate decision to respond to each risk. Ten common risks in BOT contracts are adopted for analysis in this paper, which is grouped into six main risk headings. The procedures followed in this paper are the questionnaire method to assign the weights of each criterion and each alternative based on the evaluations of 10 experts in BOT contracts after building the questionnaire model. The appropriate decision was reached to respond to each risk, and then the best measures taken were made based on literature reviews of previous research regarding the procedures for risk response plans.

Keywords: BOT, Risk Assessment, AHP Technique, Risk Response

تقييم المخاطر في عقود BOT باستخدام تقنية AHP

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الخلاصة

تعتبر عملية تقييم المخاطر في مشروع البناء والتشغيل ونقل الملكية (BOT) مهمة للغاية لتحديد وتحليل المخاطر من أجل اتخاذ القرار المناسب للاستجابة لها. في هذه الورقة البحثية ، تم استخدام تقنية AHP لاتخاذ القرار المناسب بشأن الاستجابة لأبرز المخاطر التي نشأت في مشاريع BOT ، والتي تتضمن مقارنة بين معايير كل خطر وكذلك البدائل المتاحة والطرق الرياضية باستخدام المصفوفات للوصول إلى القرار المناسب للاستجابة لكل خطر. تم اعتماد عشرة مخاطر شائعة في عقود BOT للتحليل في

هذه الورقةالبحثية ، والتي تم تجميعها في ستة عناوين رئيسية للمخاطر. الإجراءات المتبعة في هذه الورقة هي طريقة الاستبيان لتعيين أوزان كل معيار وكل بديل بناءً على تقييمات 10 خبراء في عقود BOT بعد بناء نموذج الاستبيان. تم التوصل إلى القرار المناسب للاستجابة لكل خطر ، ومن ثم تم اتخاذ أفضل التدابير المتخذة في ذلك القرار ، بناءً على مراجعات الأدبيات الخاصة بالبحوث السابقة فيما يتعلق بإجراءات خطط الاستجابة للمخاطر.

الكلمات الرئيسية:BOT , تقييم الخطر, تقنية AHP , استجابة الخطر .

1. INTRODUCTION

The process of risk assessment is a long and complex process that requires specific procedures to assess each risk in order to prepare the appropriate plan for it. It must first identify those risks, adopt the most important and dangerous ones for evaluation, and then find the necessary plans for each.

The AHP technique is broad and well-known as an analytical tool for decision-making, and the methods and equations used in it can be relied on to reach the appropriate decision in response to risks. Where this method depends mainly on making pair-wise comparisons of matrices to find weights or priorities and based on what was found, statistical equations are used to complete the analysis.A questionnaire was created for the AHP technique and presented to *ten* experts in BOT contracts in different specializations and workplaces to cover as much experience as possible.

Thus, the comparisons between the criteria, on the one hand, and between the standards and alternatives, on the other hand, were transformed into weighted values that depend on the amount of comparison of the importance of each element included in the evaluation and thus those results are the elements of the matrices.Then the priorities were found for each matrix, and then a consistency test for the results was conducted, which should not exceed 0.1 **(SATTI, 1987)**, as some results were found to have exceeded this value, and thus it was necessary to refer to the experts to re-evaluate some provisions to achieve the extent of stability. The geometric mean of the items above the axis was used to find the outcome of the respondents' answers, form a single matrix, and retest its consistency to ensure the stability of the judges' decision. AHP technique equations were used for each new matrix to find its priorities and then make the appropriate decision based on the highest priority. After deciding on the appropriate type of response, I relied on previous research to determine the actions taken according to the type of response.

2. OVERVIEW of the AHP TECHNIQUE

The Analytic Hierarchy Process (AHP) was advanced by Thomas Saaty in the Eightieth of the last Century and then extensively used in decision-making for the compound situation. It is appropriate where people to work together to make a decision when human understanding, judgment, and consequences have a long-term effect **(Bhushanand Rai, 2004)**.**(SAATY, 1987)** also defined this technique: a general theory of measure. It is used to derive rate scales from both separated and continuous paired comparisons. These comparisons may be taken from current measurements or from a fundamental scale that reflects the comparative strength of preferences and feelings. **(Rasheed, 2015)** mentioned that the risk analysis and evaluation stage includes two types of techniques used in the analysis: The probability-impact matrix and (AHP).**(SAATY, 2008)** has previously identified a set of steps to reach a decision using this method by prioritizing alternatives that can be summarized:

1- Define the issue and determine the kind of knowledge research.

2- Temple the decision hierarchy from the top with the target of the decision, then the objectives from a wide sight through the intermediate levels (criteria on which the following elements depend) to the lowest level (usually a group of alternatives).

3- Structure a set of pair-wise comparison matrices. Each element in an upper level is used to contrast the elements in the level beneath with respect to it.

4-Use the priorities gained from the comparisons to weight the priorities in the level immediately below. Do this for every element. Then for each element in the level below, add its weighted values and obtain its overall priority. Continue this process of weighing and adding until the final priorities of the alternatives in the lowermost level are obtained.

Thus, the AHP technique consists of three levels:

- Level one: The Goal for which the decision is to be made.
- The second level: The Criteria that will be adopted for preference between the different alternatives.
- The third level: The Alternatives represent the responses to reach a decision regarding the goal. They depend on the best prioritiesgot from the matrices of the pairs for the weights of the elements included in the evaluation.

It can be represented as shown in **Fig. 1** :
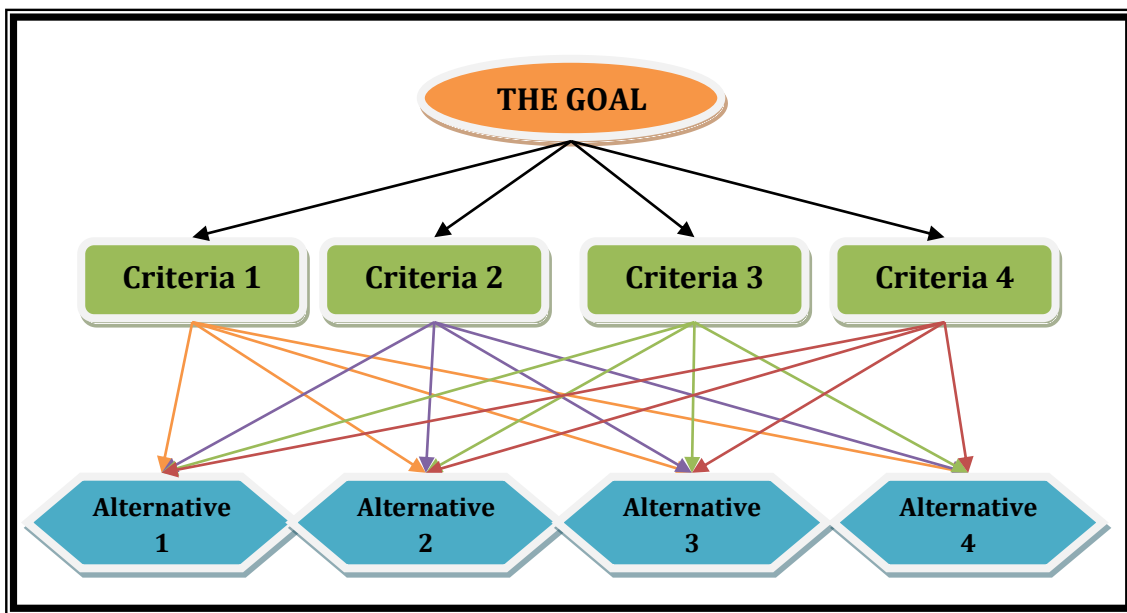
Figure 1. The Structure of AHP Technique.

(SAATY, 1990) developed a scale for each pair of comparisons, as in **Table 1.**

Table 1. The Primary Scale

The intensity of importance on an absolute scale	Linguistic definition of that importance
1	Equal importance
3	Moderate importance
5	Strong importance
7	Very strong importance
9	Extreme importance
2, 4, 6, 8	Intermediate values between adjacent scale values

There are seven main pillars laid out by **(Satty and Vargas, 2012)** that represent the overall architecture of the AHP technique, explain the philosophy of that approach, and the main considerations taken in that analysis. The seven main pillars of the AHP solution are:

[1]Ratio Scales, Proportionality, And Normalized Ratio Scales - [2]Mutual Paired Comparisons - [3]Sensitivity Of The Principal Right Eigenvector - [4]Homogeneity And Clustering - [5]Synthesis That Can Be Extended To Dependence And Feedback- [6]Rank Keeping And Reversal - [7]Group Judgments.

3. METHODOLOGY AND QUESTIONNAIRE ANALYSIS

The work methodology was built on a special questionnaire with AHP techniqueto determine priorities by experts, and it was in two parts: [1] Evaluation of Criteria and [2] Evaluation of Alternatives.

A questionnaire was conducted that included specialists in BOT contracts only, where the total number of participants in the questionnaire was 10 experts distributed according to what is shown in **Table 2**. The main objective of this questionnaire is to make comparisons of risk criteria and alternatives that will be an appropriate response decision to risk depending on the level of importance for the comparison between those elements and, as explained previously, using the AHP Technique.Here, the top 10 impact risks were taken and categorized according to their basic type in terms of (Market And Returns Risks - MR, Financial - FR, Economic - ER, Construction - CrR, Legal–LeR, and Operational Risks - OR).

Table 2. Distribution of The Experts

Number Of Experts	Affiliation
2	Baghdad University
1	Al-Nahrain University
1	Al-Karkh University of Science
1	Ministry of Transportation / Head of Contracting Department
4	Private Sector
1	Najaf International Airport / Engineering Department
The Total	**10**

3.1 Evaluation of Criteria

There is a list of criteria upon which the decision to take the response is based in terms of the availability of those criteria by the institution or the franchised company, as well as the comparison between the importance of each criterion in relation to the other criterion, and that these criteria were found from historical information of previous studies in risk management for companies and different institutions.

(ISO GUIDE 73:2009)has outlined the most important criteria adopted in risk analysis, which are four:

- Organizational Objectives (OO)
- Internal Context (IC)
- External Context (EC)
- Some Laws, Regulations and Requirements(LR)

Table 3 shows the evaluation of these criteria.

Table 3. Evaluation of Criteria in The Questionnaire

EVALUATION OF THE MAIN CRITERIA				
Criteria	More Important Than	Equal	Less Important Than	Criteria
Organizational Objectives	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Internal Context
Organizational Objectives	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	External Context
Organizational Objectives	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Some Laws, Regulations and Requirements
Internal Context	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	External Context
Internal Context	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Some Laws, Regulations and Requirements
External Context	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Some Laws, Regulations and Requirements

3.2 Evaluation of The Alternatives

As for the alternatives, the evaluation method is similar to the criteria evaluation method, but a comparison is made between each alternative and the other (risk response decisions) by the availability of one of the criteria in that risk, and the risk response decisions are four (avoid - mitigate - accept - transfer) as concluded from previous studies, as shown in **Table 4**.

Table 4. Evaluation of Alternatives in The Questionnaire

Risks (Market and Returns)				
Exchange Rate Volatility Risk - Risk Of Default On Interest Payments				
Alternative	More Important Than	Equal	Less Important Than	Alternative
Avoidance	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Mitigation
Avoidance	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Transfer
Avoidance	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Acceptance
Mitigation	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Transfer
Mitigation	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Acceptance
Transfer	9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9	Acceptance

So, the structure of the questionnaire for AHP analysis is shown in **Fig. 2**:
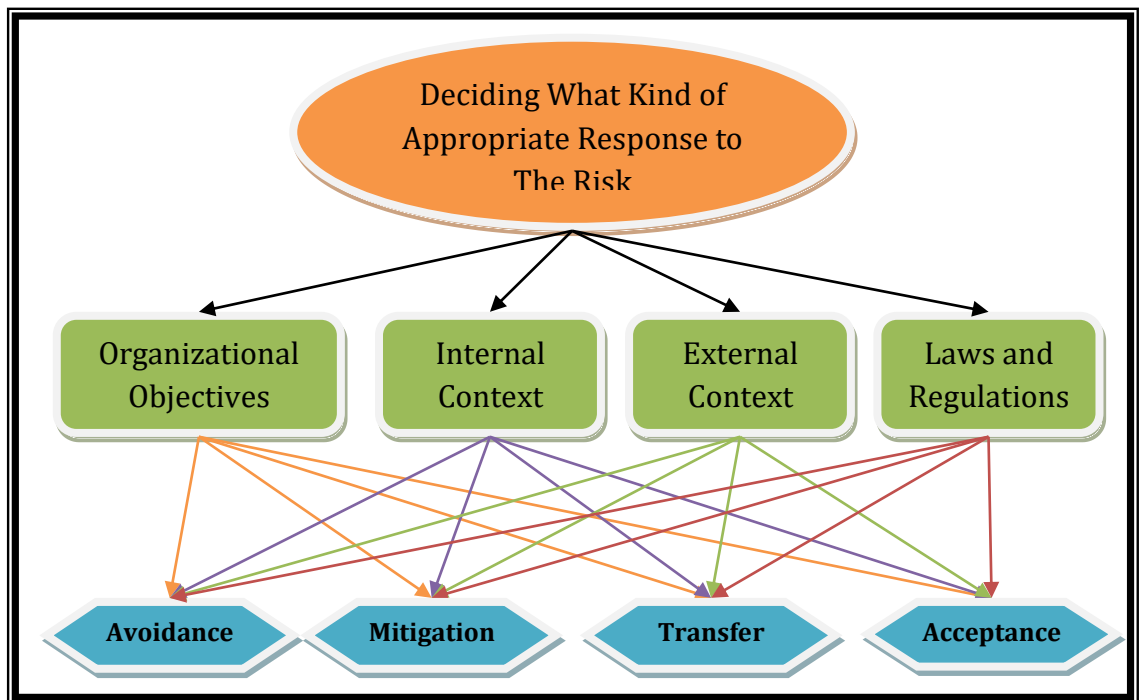
Figure 2. The Structure of AHP Questionnaire.

3.3 Analysis of The Questionnaire

After collecting the questionnaire forms for AHP technique, the obtained information was organized in the form of binary matrices for each questionnaire form and the priority will be extracted for each matrix and then finding the rate of priority for the matrices resulting from the answers of experts so that the analysis is done according to the technology depending on the priority rate of those answers.

Where one form can be taken from these forms, as shown in **Matrix1**,noting that the symbols were used for criteria and alternatives using the initials of each criteria or alternative (such as organizational objective - OO and so on) :

Matrix1. The Answers of The First Responder to The Evaluation of The Criteria

The Criteria	OO	IC	EC	LR
OO	1	4	5	7
IC	1/4	1	3	6
EC	1/5	1/3	1	3
LR	1/7	1/6	1/3	1

Then the geometric mean is found using Eq.(1) and (2):

Geometric Mean (GM) for Row1 = $\sqrt[n]{a * b * c * d}$(1)

Where (n) is the no. of elements in that row (here equal to 4)

***Total GM** = GM1 + GM2 + …. + GMn*(2)

Row1 = $\sqrt[4]{1 * 4 * 5 * 7}$ = 3.44

Row2 = $\sqrt[4]{(\frac{1}{4}) * 1 * 3 * 6}$ = 1.456

Row3 = $\sqrt[4]{(\frac{1}{5}) * (\frac{1}{3}) * 1 * 3}$ = 0.67

$Row4 = \sqrt[4]{\left(\frac{1}{7}\right) * \left(\frac{1}{6}\right) * \left(\frac{1}{3}\right) * 1} = 0.298$

$Total\ GM = 3.44 + 1.456 + 0.67 + 0.298 = 5.864$

Then finding the priority using Eq.(3):

$$P1 = {GM1}/{GMT} \text{ , Then } Pn = {GMn}/{GMT} \tag{3}$$

$P1 = \frac{3.44}{5.864} = 0.586$, $P2 = \frac{1.456}{5.864} = 0.248$

$P3 = \frac{0.67}{5.864} = 0.114$, $P4 = \frac{0.298}{5.864} = 0.051$

After that, it is possible to display the priorities for all respondents regarding the evaluation of criteria, as shown in **Table 5**.

Table 5. Priorities of Criteria for All Respondents

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
OO	0.587	0.678	0.621	0.465	0.544	0.488	0.419	0.153	0.224	0.212
IC	0.248	0.153	0.199	0.334	0.216	0.185	0.140	0.098	0.105	0.099
EC	0.114	0.088	0.100	0.112	0.164	0.141	0.369	0.063	0.058	0.050
LR	0.051	0.080	0.080	0.090	0.075	0.185	0.071	0.686	0.613	0.638

In the same way as the above work, it is also conducted byevaluating alternatives and analyzing the results of the respondents' answers.

4. CONSISTENCY CHECK

A consistency check is performed after the pair-wise comparison matrices are formed to ensure that the judged decision is consistent.

Here, the priority vector is used, or the so-called (Eigen Vector), which is symbolized with the symbol ($\lambda\ max$), and it is found by applying Eq. (4)

$\lambda\ max$ = [Sum of elements in column 1] * P1 + .. + [Sum of elements in col. n] * Pn   (4)

In this case, we need some measures that will be used for the final evaluation of consistency, and one of these measures is to find the consistency index (CI) developed by **(Saaty, 1990),** and it can be deduced through the application of Eq. (5):

$$Consistency\ Index\ (CI) = \frac{\lambda \max - n}{n-1} \tag{5}$$

Then resort to deducing a value **RI** (Average random consistency index) which can be taken from **Table 6**, which is a (**CI** average of 500 randomly filled arrays) **(Saaty, 1990)**.

<div align="center">**Table 6**. Average Random Consistency IndexRI</div>

N	RI
1	0
2	0
3	0.52
4	0.89
5	1.11
6	1.25
7	1.35
8	1.40
9	1.45
10	1.49

And then calculate the value of the consistency ratio **CR** through the application of Eq. (6) :

$$CR = {CI}/{RI} \qquad (6)$$

where the value of **CR** must be less than 0.1 to consider that the judges' decision is fixed and can be adopted in the analysis. Thus, if **CR** values greater than 0.1 appear, they must be excluded from the analysis or modify it. As **(Frankie Cho, 2019)** indicated, values greater than 0.1 mean that the judgment is not constant, and therefore either exclude it or adopt some adjustment method. Here, some of the respondents' decisions appeared inconstant, which necessitated referring them to amend some of their answers to be in the logical direction of the decisions and thus achieve the required stability.

After finding the value of **$\lambda\ max$**, the **CI** values were found by applying Eq. (5) and then finding the **CR** values by applying Eq. (6).The **RI** value used here is (**0.89**) from **Table 6**.

The results can be clarified as shown in **Table 7 :**

<div align="center">**Table 7.** The (CR) Values for All Matrices</div>

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
CRCriteria	0.014	0.097	0.093	0.069	0.067	0.068	0.077	0.097	0.079	0.099
CR (MR – OO)	0.099	0.086	0.085	0.086	0.090	0.092	0.090	0.031	0.099	0.097
CR (MR – IC)	0.093	0.090	0.082	0.058	0.048	0.076	0.094	0.031	0.095	0.095
CR (MR – EC)	0.068	0.094	0.053	0.086	0.088	0.021	0.091	0.029	0.086	0.084
CR (MR – LR)	0.074	0.081	0.046	0.095	0.087	0.027	0.095	0.089	0.097	0.075
CR (FR – OO)	0.084	0.092	0.080	0.092	0.031	0.027	0.086	0.091	0.100	0.094
CR (FR – IC)	0.081	0.091	0.066	0.081	0.039	0.045	0.099	0.093	0.070	0.082
CR (FR – EC)	0.073	0.090	0.098	0.060	0.032	0.027	0.081	0.083	0.094	0.097
CR (FR – LR)	0.049	0.036	0.057	0.064	0.087	0.081	0.090	0.098	0.099	0.078
CR (CrR – OO)	0.090	0.086	0.088	0.076	0.090	0.031	0.088	0.099	0.093	0.080
CR (CrR – IC)	0.061	0.063	0.063	0.089	0.100	0.027	0.089	0.090	0.086	0.092
CR (CrR – EC)	0.005	0.086	0.070	0.090	0.075	0.023	0.078	0.061	0.096	0.079
CR (CrR – LR)	0.059	0.086	0.071	0.032	0.092	0.023	0.079	0.096	0.085	0.081
CR (ER – OO)	0.005	0.079	0.099	0.086	0.018	0.045	0.099	0.032	0.093	0.100
CR (ER – IC)	0.047	0.097	0.097	0.090	0.087	0.045	0.093	0.018	0.100	0.086

CR (ER – EC)	0.020	0.067	0.098	0.075	0.095	0.087	0.096	0.018	0.094	0.090
CR (ER – LR)	0.045	0.071	0.092	0.096	0.094	0.085	0.099	0.018	0.086	0.076
CR (LeR– OO)	0.045	0.094	0.087	0.062	0.030	0.045	0.099	0.081	0.094	0.079
CR (LeR – IC)	0.963	0.097	0.094	0.091	0.012	0.023	0.089	0.091	0.100	0.089
CR (LeR – EC)	0.009	0.003	0.012	0.087	0.089	0.096	0.093	0.100	0.096	0.089
CR (LeR – LR)	0.048	0.067	0.060	0.069	0.082	0.059	0.099	0.000	0.093	0.091
CR (OR – OO)	0.093	0.013	0.074	0.091	0.084	0.031	0.088	0.093	0.076	0.077
CR (OR – IC)	0.086	0.047	0.089	0.086	0.084	0.058	0.079	0.094	0.084	0.089
CR (OR – EC)	0.096	0.098	0.094	0.094	0.066	0.024	0.088	0.087	0.089	0.097
CR (OR – LR)	0.077	0.076	0.096	0.086	0.098	0.100	0.043	0.096	0.065	0.075

Since the values of (**CR**) from **Table 5**are all less than or equal to **≤ 0.1**, these decisions can be adopted by the experts as being fixed, and all the results can be taken towards completing the analysis.

5. COMPLETE THE ANALYSIS AND MAKE A DECISION

Then the expert matrices group's geometric mean (GM) is found so that the final result is One Matrix for the criteria and One Matrix for each alternative with the criterion.The geometric mean is found by taking the elements above the axis for each respondent matrix and then finding the geometric average for the column of that element and thus creating new elements in one matrix that represent the geometric rates of the elements of the respondent group matrices and in the same way complete the analysis of the alternatives.
Table 8. shows the final results of the elements of the criteria matrix using the geometric mean:

Table 8. Criteria Matrix Elements Using The Geometric Mean

R1	4	5	7	3	6	3
R2	8	6	6	2	3	1
R3	5	5	6	4	2	2
R4	2	5	3	4	4	2
R5	4	3	5	2	3	3
R6	2	6	2	1	1	1
R7	4	1	5	1/4	4	3
R8	3	2	1/7	3	1/7	1/7
R9	3	4	1/4	3	1/7	1/6
R10	3	5	1/5	3	1/7	1/7
GM	3.501	3.743	1.750	2.048	1.176	0.905

After creating the new matrices, the results are tested by finding their **CR** values, which will be CR for (Criteria) = 0.047, CR for (MR – OO) = 0.012, CR for (MR – IC) = 0.003, CR for (MR – EC) = 0.007 and CR for (MR – LR) = 0.047

Where they are all less than or equal to **≤ 0.1**, therefore they can be accepted and adopted as fixed results.

The previous equations were used to find the priority values for each alternative with the presence of each criterion and they are arranged as in **Matrix 2** so that the decision is made based on the highest priority of the alternative.

Matrix 2. Priorities for Criteria and Alternatives to Market andReturns Risk

	P Av.	P Mi.	P Tr.	P Ac.	$P_{Cr.}$
OO	0.309	0.399	0.207	0.085	0.482
IC	0.242	0.429	0.246	0.083	0.201
EC	0.349	0.325	0.232	0.094	0.129
LR	0.342	0.304	0.265	0.088	0.189

Then we find the best alternative for the specified risk by applying Eq. (7) :

P_{Alt1} = $P_{Alt1\ at\ Cr1}$ * P_{Cr1} + $P_{Alt1\ at\ Cr2}$ * P_{Cr2} + …. + $P_{Alt1\ at\ Crn}$* P_{Crn}(7)

The algebraic addition of the product of the priority of that alternative with the priority of the criterion, is shown in the equation below:

$P_{Av.}$ = $P_{Av.\ at\ Cr1}$ * P_{Cr1} + $P_{Av.\ at\ Cr2}$ * P_{Cr2} + ….. + $P_{Av.\ at\ Cr4}$ * P_{Cr4}

$P_{Av.}$ = 0.309 * 0.482 + 0.242 * 0.201 + 0.349 * 0.129 + 0.342 * 0.189 = 0.307

$P_{Mi.}$ = 0.399 * 0.482 + 0.429 * 0.201 + 0.325 * 0.129 + 0.304 * 0.189 = **0.378**

$P_{Tr.}$ = 0.207 * 0.482 + 0.246 * 0.201 + 0.232 * 0.129 + 0.265 * 0.189 = 0.229

$P_{Ac.}$ = 0.085 * 0.482 + 0.083 * 0.201 + 0.094 * 0.129 + 0.088 * 0.189 = 0.086

Since the highest priority was the alternative (Mitigation), the appropriate decision to respond to market-oriented risks and returns is (*Mitigating Them*). This can be represented as shown in **Fig. 3:**
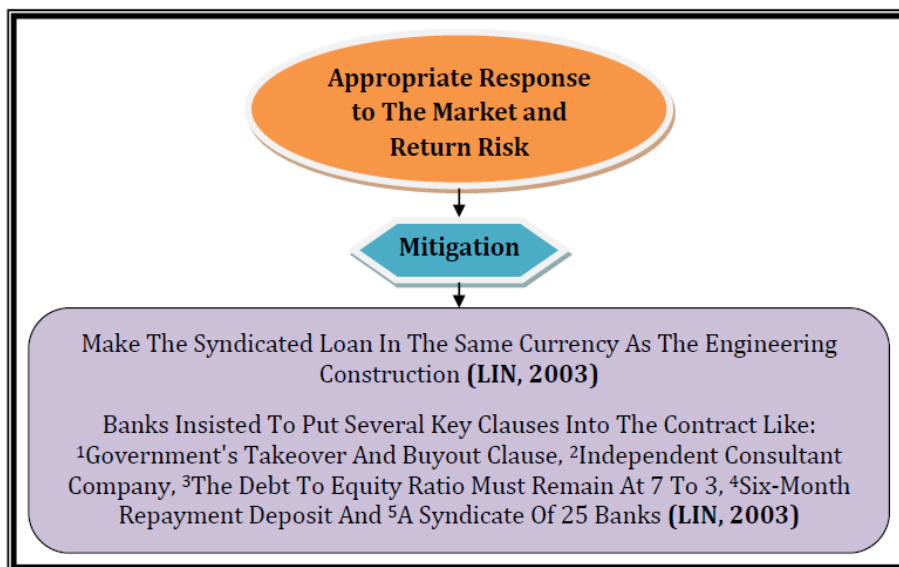
Figure 3. Decision Regarding Appropriate Response to The Market and Returns Risk

In the same procedure, it is possible to deduce decisions regarding the type of appropriate response to each risk, whose results can be summarized in the figures below.

The Financial Risk involves many risks that can be classified as financial risks, including *(Risk of Defaulting on Loans), (Risk of Financing Failure)* and *(Risk of An Inappropriate Financial Structure)*, and the decision to respond appropriately to those risks,as shown in **Fig.4** :
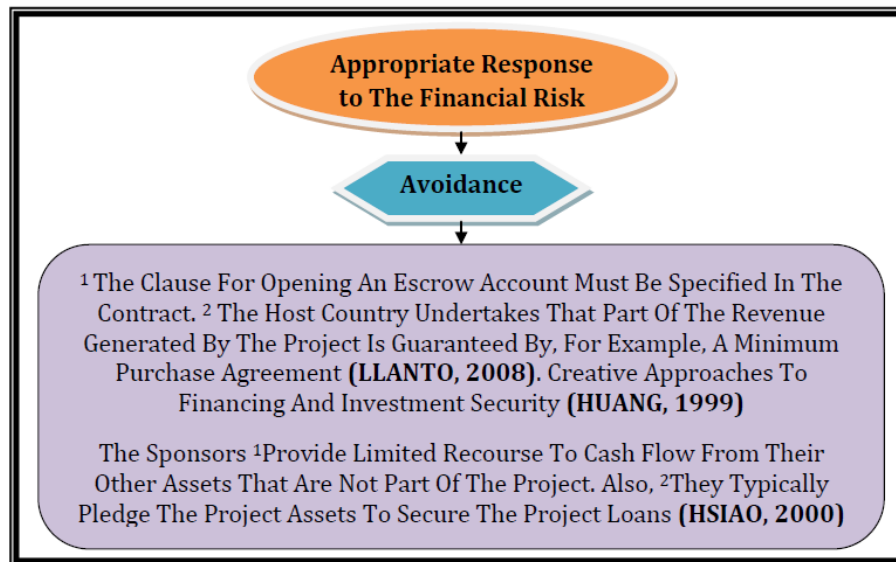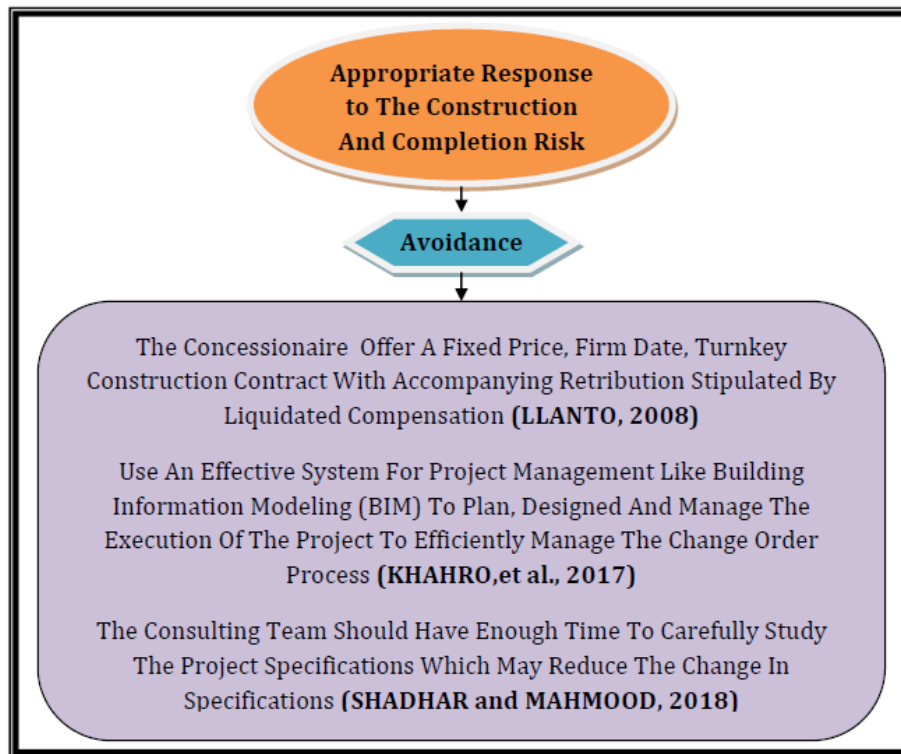

Figure 4. Decision Regarding Appropriate Response to The Financial Risk

The Risks of Construction and Completion in BOT projects include risks *(The Risk of Delaying The Completion of The Project)* and *(The Risk of Continuous Change in Work and Specifications)*, and the decision to respond appropriately to them can be shown in **Fig. 5**.
Economic Risks contain risk *(The Risk of A Change in Economic Policies)*, as the appropriate response decision is shown in **Fig. 6**.
As for the Legal Risks, they are many and directly affect any project, and the risk *(The Risk of Changing Laws and Regulations)* has been taken here, showinghow to respond to it as in **Fig.7**.
Many risks also accompany the project operation phase, and among those risks is the risk *(Risk of Error in Forecasting Service Requirements)*, which can be shown as the best decision to respond to it, as in **Fig. 8**.
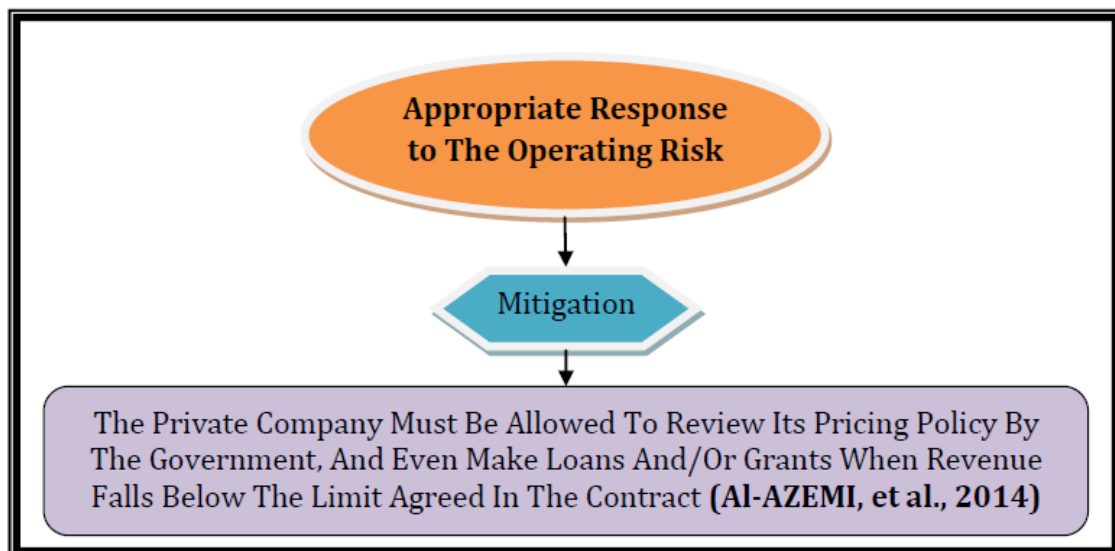
Figure 5. Decision Regarding Appropriate Response to The Construction And Completion Risk
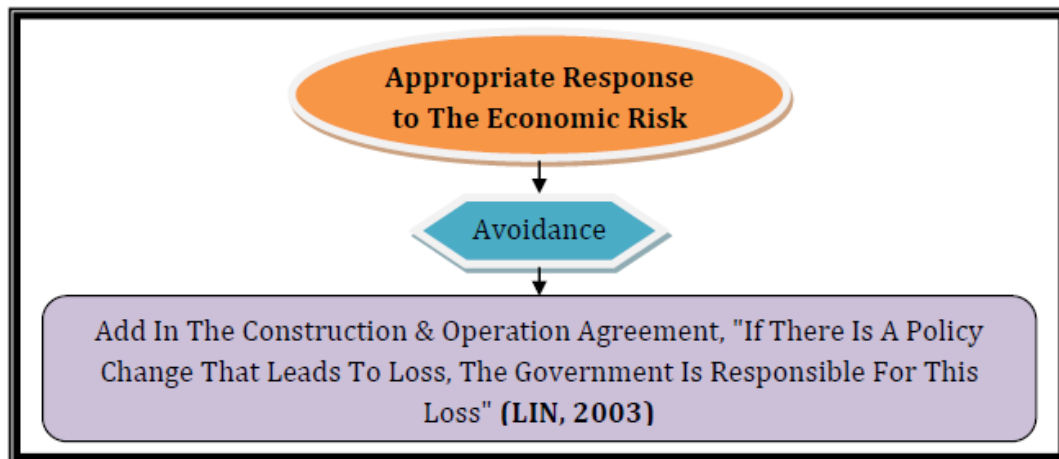
Figure 6. Decision Regarding Appropriate Response to The Economic Risk

Figure 7. Decision Regarding Appropriate Response to The Legal Risks

Figure 8. Decision Regarding Appropriate Response to The Operating Risks

6. CONCLUSIONS

Making the appropriate decision for the best response to the risk is a very important and critical step in dealing with the danger or preparing for it before it occurs. Thus, the AHP technique adopted the evaluation, which provides a way to decide with appropriate and accurate mechanisms as this technique depends on deriving the priority or weight for each element of the decision, which enables analysis and comparisons between the various alternatives easily and by mathematical methods, after they were alternatives that could not be linked or measured between them. It was concluded that the best decision regarding responding to market and returns risk is to mitigate it by adding contractual terms, for example, making loans in the same currency in which the project was built, purchasing service

by the government, or keeping debt-to-ownership ratios at specific ratios.While concerning financial risk, the best decision reached is avoidance, such as adding a clause in the contract that includes opening an escrow account or contracting a minimum purchase amount, as well as relying on assets to guarantee loan payments.As for the construction and completion risks, the appropriate decision to respond to them was also avoidance, which is through that the prices and dates are fixed during the project or the use of the BIM system to be effective management of the project, as well as there must be enough time to plan the project to avoid change orders. The response to the economic risk was also avoided by adding a contract for construction and operation and adding clauses that hold the government responsible in the event of changing economic policies that lead to loss. The decision to respond to legal risks was to mitigate through various measures such as political risk insurance, monitoring of political developments, and ongoing communications with government agencies.As for the operating risk, the decision to respond to it is to mitigate it by allowing the government to continuously review pricing policies and have soft loans in the event that returns fall below a certain limit.

7. NOMENCLATURE
Abbreviations
BOT = build operate transfer
AHP = Analytic Hierarchy Process
OO = Organizational Objectives
IC = Internal Context
EC = External Context
LR = Laws, Regulations and Requirements
MR = Market And Returns Risks
FR = FinancialRisks
ER = EconomicRisks
CrR = ConstructionRisks
LeR = LegalRisks
OR= Operational Risks
GM = Geometric Mean
P= Priority
CI = Consistency Index
RI = Random Index
CR = Consistency Ratio

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