

Analysis of Risk Management for Construction Projects

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Abstract:

The length of the implementation period in the construction of projects may lead to a change in circumstances which expose them to many risks because of the length of the implementation period and multiple stages, beginning with the start-up phase and even phase of the project, and this leads to increased circumstances of uncertainty and increasing the probability of the occurrence of risks, and this is reflected negatively on the construction contracting and construction economy. In this research questionnaire was developed to identify the risks encountered in construction. Projects have been distributed to some local and foreign construction companies in Libya, having been identified the risks that may face the projects. Through questionnaires and interviews with engineers and project managers of companies, and making risk analysis qualitatively, there was a need to prepare a checklist of the risks facing projects in Libya, and know the benefit of the contractor and the owner based on the results. This paper examines the most important risks faced by construction projects in Libya, which is difficult and how they are able to implement these projects and housing companies, the research explains a formulated model to evaluate companies before being contracted to know the financial and technical capabilities.

Keywords — Risk management, construction of projects, evaluating the risks, risk analysis

INTRODUCTION

The sector of construction is one of the key economic sectors and is the main force the Libyan economy, in the last has witnessed in noticeable expansion activities. This has resulted in the recovery of the construction profession and subsidiary industries, therefore, the construction sector has taken the foremost position among the other, mainly in the attraction of investments and creation of new jobs. The management of risks is very important in the planning and management of the projects, construction industry is subject to more risks and uncertainty than several other industries. The take off process of project from initial investment assessment to completion and into use is a difficult process. The construction industry in Libya Strip is suffering from the misunderstanding of risk management including risk identification, analysis and assessment.

I. PROJECT RISK CONCEPT

Risks can be defined in any of the projects an event is uncertain which results from the occurrence or negative impact positively on the goal of the project (PMBOK, 2002, P127). Every risk of reason leads to a result, for example, the reason may be the qualified labour force limited for the project and that the result clear will appear in the additional cost or imbalance in scheduling work and the length of the implementation period or the quality of implementation. There are some known risks that have been identified, analysed and can now be planned. On the contrary the unknown Risks cannot be managed, although the managers of the project can deal with it by applying General Contingency Plans based on past experience gained during the implementation of previous projects. A risk is anything that threatens the success of the project but accepted

when undergoing budget in return which will result.

II. THE RISK MANAGEMENT PROCESS

Overall risk management is the process of identifying and evaluating the risks and developing strategies to manage it. These strategies include the transfer of risks to other parties and to avoid and minimize the negative effects and to accept some or all of its consequences. Traditional risk management focuses on the risks arising from physical or legal reasons (example: natural disasters, fires, accidents, death and lawsuits) on the other hand, financial risk management focus on those risks that can be managed using financial barter. Regardless of the type of risk management, all the big companies and small businesses have a dedicated team of risk management.

The risk management process should include the definition of risk identification, risk analysis, risk mitigation, monitoring and control of risk as show in Figure (1)

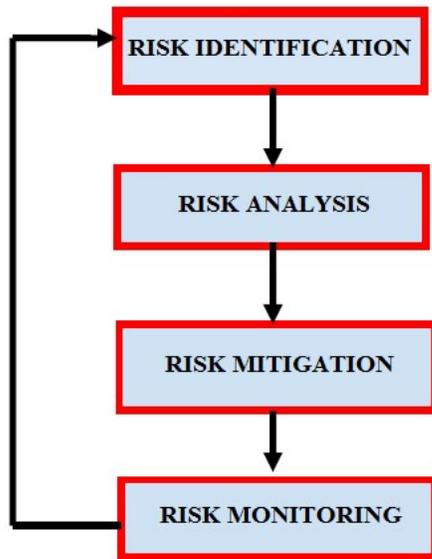


Figure (1). The Risk Management Process

1. RISK IDENTIFICATION

The aim of this phase is to identify all the potential risks that may face the project and

threaten its goals, and this requires methods to identify risks such as questionnaire, interviews with project managers or officials in companies, checklists, brainstorming, or Delphi Technique. Risk identification can depend on goals, any risk impedes the achievement of project goals considered risk.

2. QUALITATIVE RISK ANALYSIS

Qualitative analysis of risks is most common in the risk analysis process. On part, uses qualitative risk analysis to prioritize risks that affect the goals of the project, and must be done on qualitative analysis of the risks at the beginning of the project and reviewed during the implementation to keep pace with changes in the level of risk.

The ranking of risks:

Each project has different risks associated with its processes, risk implementation, all of which affect the activities of the project. A technique used in risk arrangement is Probability Impact Risk Rating Matrix(ward·1999) as shown in Table (1), which expresses the value of all the risk in numbers 1,5,10 to signal risk arrangement (low, Medium, High). Risk = Possibility x impact.

Impact	Probability		
	low 1	Medium 5	High 10
low 1	1	5	10
Medium 5	5	25	50
High 10	10	50	100

Table (1), Probability Impact Risk Rating Matrix(ward·1999).

3. RISK MITIGATION

The goal of this strategy is to mitigate the consequences of the risk to an acceptable level. Taking some of the actions that mitigate the risks for the best to take action to address the consequences of that risk. Examples of actions taken before the start of implementation of the projects during implementation, or the engineering or seismic tests or the selection of suitable suppliers, These procedures may include

changing the conditions to mitigate the potential for danger, such as adding resources or time to the activities of the project.

4. RISK MONITORING AND FOLLOW UP

It is monitor and follow up of the effectiveness of the actions taken or any other deviations can occur in the project.

III. CHECK LIST

Questionnaire was developed to identify the risks faced by projects in Libya. Financial and economic impact of projects on the distribution of the questionnaire section for 32 the company implemented housing projects in Libya to get to know some of the risks faced by projects in Libya with an estimate of the probability of occurrence and the resulting impact.

Table 2 shows the checklist risks that could have faced the owner or contractor in the construction projects. The list of these risks that have been identified from the companies in the study sample had a negative impact on the project in terms of (time, cost and quality).

N	The risk
1	Lack of companies ability to implement
2	Delays in the payment of payment certificates
3	Political factors.
4	Lack of security and stability.
5	Design errors.
6	Errors in the calculation of quantities.
7	Obtaining permits and approvals.
8	The lack of experience of supervising engineers.
9	The inexperience of the offices of the National Advisory.
10	Centralised decision-making.
11	Technical specifications change during the execution of the project.
12	Lack of experience and financial and technical capacity of the contractor
13	Lack of labor experience.
14	Lack of materials.

Table (2) the checklist risks

Most of the participating companies in the study questionnaire reported that the risks from 1 to 7 have very high probability of occurrence .All of these risks are described in Figure 2 and impact are as follows: -

- 1-Lack of companies ability to implement
- 2-Delays in the payment of payment certificates

- 3-Political factors.
- 4-Lack of security and stability.
- 5- Design errors.
- 6-Errors in the calculation of quantities.
- 7- Obtaining permits and approvals.

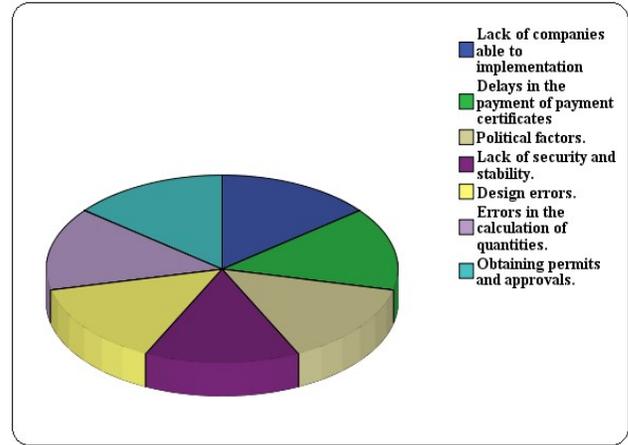


Figure (2). The risks very high probability of occurrence.

Lack of companies ability to implement:-

Lack of companies able to implement projects due to three reasons must be considered when contracting and these reasons are: -

- 1- Organizational ability
- 2- Financial ability
- 3- Financial and technical ability and experience in the implementation of projects.

Delays in the payment of payment certificates:

Delays in the payment of payment certificates for the executed works, and can reduce these risks through the following actions: -

- 1- Must submit payment certificates timely.
- 2- Must prepare preparation payment certificates before submission it to owner.

Political factors:

The worry of foreign financiers and domestic companies from the collapse of the political regime in the country where the result in the collapse of the security and economic level and the lack of the rule of law. In this case, one of the main parties in the contract is unable to fulfil its contractual obligations.

Lack of security and stability:

The risks security have a negative impact on the projects. The companies face a big problem in terms of the inability to bring in workers from

abroad to work to the project. Also many of the projects turned to a military barracks of the armed militias, and some subjected to breaking in from the citizens.

Design errors and Errors in the calculation of quantities:-

There are technical risks amendments to the designs and construction methods of execution during the implementation, in addition to the wrong estimate for quantities necessary to implement the projects in contracts.

Obtaining permits and approvals:-

The difficulty in obtaining permits and approvals before and during the implementation of projects is one of the most important risks that affect the project duration as these procedures may take months before the completion of its cycle of administrative between the owner and the contractor.

Rehabilitation of construction companies before contracting with them

One of the most important risks facing construction projects in Libya is the ability of companies implementing projects on time and at cost and specifications agreed upon. So it was a study for the rehabilitation of these companies before contracting with them and suggests forms for the rehabilitation of these companies so as to know the financial, technical and managerial its potential before being contracted. And classification of companies should be in accordance with the several criteria such as the share capital and years of experience as well as volume of technical manpower and the cadres of administrative and equipment and machinery.

1. Suggested form for evaluating construction companies.

After seeing the economic laws in Libya, which identifies and assesses companies activities and most recently the Council of Ministers Resolution No. (171) of 2006, Issuing the executive regulations of Law No. (21) Of 2001 concerning the practice of economic activities in Libya. It has been proposed as a form for evaluating construction companies, through a questionnaire which was distributed to 32 of the companies that implement projects in Libya. The

aim is to identify the main criteria that should be used in the assessment of the construction companies.

2. The criteria that must be provided in the proposed form

A- Financial situation: This includes aspects related to the financial status of the company and the documents to be submitted and knowledge of monetary flowability and financial ability.

B- Material resources file: A file that includes all the machinery and equipment available to the company to implement the project.

C- Years of experience of the company: The company's experience in the implementation of projects as well as the professional reputation of the company.

D- Technical File: A file that includes all the technical possibilities available to the company.

E- Human Resource file: A file that includes all administrative and technical cadres available to the company to implement the project.

F- Planning and Follow-up: Is the company's ability to management, planning and control work on the project.

G- Safety and Insurance: Includes the industrial safety of the project and the safety of labourers and insurance on the project.

3. The questionnaire results in the proposed form

It created a form for evaluating companies and write all the basic criteria format questions with the use of economic laws in Libya and that define and assess the activities of construction companies. With included questionnaire on 7 basic criteria, each of which contains several secondary standards were the result of many questions to illustrate different aspects and to evaluate construction companies before contracting with them, were distributed to the project managers and contractors and consultants, and the table 3 major shows the results of the questionnaire ratios basic standards.

the basic criteria	Secondary criteria
Financial situation 28.1%	Having current accounts in banks
	Cash flow of the company
Material resources file	Owning machines and equipment required for the work

15.6%	Owning construction materials required for the work
Years of experience of the company 15.6%	The lack of previously unsuccessful projects
	The absence of a lawsuits against the company
	A number of similar projects for the current project
	Quality certificates in the implementation of previous projects.
Technical File 12.5%	Providing cadre trained in project implementation
Human Resource file 12.5%	Having integrated engineering specialities for the project wanted implement
	Having the entire organisational structure of the company
Planning and Follow-up 9.4%	Having research and development department
	Having of control system and follow-up work carried out in the project
Safety and Insurance 6.3%	Having certificates of insurance project
	The existence of previous incidents of death for workers
	Provide a cadre of industrial security company
	Provide training programs for the prevention of accidents
	Provide protection from natural disasters system

Table (3) the basic criteria and Secondary files in the proposed form

Results from the survey shows that the financial situation of the companies is the most important factor in the proposed model for the evaluation of construction companies. Where the percentage rate of 28.1% of the companies participating in the survey, and then followed by materials resources file and years of experience of the company by percentage rate of 15.6% , and then comes to the files in the order as follows:-

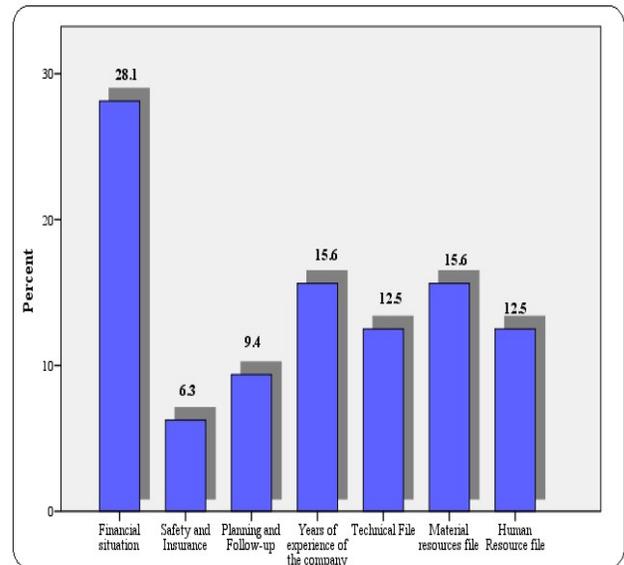
Technical File 12.5%

Human Resource file 12.5%

Planning and Follow-up 9.4%

Safety and Insurance 6.3%

Figure 4 shows the proportions of these files in suggested form.



Figur (4). Files used in suggested form.

Depending on the obtained results of the questionnaire, the companies were ranked according to their potential and capabilities, and so the candidate is notified for the tender, while the companies that did not get the required grades are excluded. That the reality of companies in Libya indicates the presence of a large deviation in the success of these projects and the reason for the deviation is due to many factors, including those related to Implementing the company or the royal institution. The evaluation of companies is a key factor in the success of the project by making sure their potential financial and technical capabilities and administrative and its previous experience in the projects implemented.

VI. CONCLUSION

Construction projects are always associated with risk and uncertainty because of the length of the implementation period that change the conditions making it contain multiple risks. The most important risk facing the projects in Libya are the presence of companies not able to implement projects on time and in the required quality and the approved budget and specifications agreed upon. Valuation of companies is a key factor in the success of the project by making sure the financial, technical and administrative capabilities and expertise in the implementation of previous projects. Therefore this field study was to determine suggested form for the

rehabilitation of the construction companies before contracting with them, and the purpose of this model is to ensure the ability of companies financial, technical and administrative capabilities and expertise in the implementation of projects. The definition of criteria that must be available in these companies in the suggested form to be invited to the auction. These companies in the project and these standards are (financial situation, material resources file, years of experience of the company, technical file, human resource file, planning and Follow-up, safety and Insurance). using this suggested form to evaluate companies before contracting with them is recommended. The preparation checklist contains the risk of the projects to be a reference point for any owner or implementer of projects to be taken into account when hiring or implementation of projects. These risks have the greatest impact on the time, cost and quality.

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