

RISK ANALYSIS AND MANAGEMENT IN CONSTRUCTION INDUSTRY (TIME, COST AND QUALITY)

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ABSTRACT

Construction industry is exposed to a high risks which mean it is difficult to predict the effects of it which are internal risks, external risks and project risks and each one has many factors. Working in construction industry has not been very good to defence this risks, outcome of this failure to defence this risks the team working on the project take responsibility of failures, such as failure in the cost of the project, the delivery date and the quality expected. This paper aim on the identification and the evaluation of the risks which that effect on the aim of the project including the time, cost and quality. Risk analysis and management in construction industry depends on the intuition, judgment and experience. Formal risk and management techniques are rarely used due to a lack of knowledge of these techniques for construction industry activity.

Keywords: Risk analysis, risk management, internal risks, external risks, project risks

INTRODUCTION

Project management is a structured application for the implementation of project activities step by step of equipment, tools, techniques and skills of work or to overcome the change in the views of stakeholders. Risk management is an important part of project management which in turn determines the expected risks of the project and how to deal with these risks, we can't avoid environmental risks should be expected to occur and Predicting the extent of their impact, uncertainty in predicting risks affects the outcome of achieving project objectives and Risk should be expected in all project activities. Risk uncertainty in the construction industry requires the planning and maintenance of risk damage and its implementation in project activities and this takes time which affects the delivery date. Project management should coordinate the activities of the associated activities and provide diverse skills. The track record in the construction industry gives poor results in how to deal with risks due to many complex external factors and this affects the project schedule and quality reduction because the implementation of activities becomes faster to make up for the time lost. As a result of contractual risks, this affects contractors and hard workers in increasing the work pressure on them and also stakeholders.

Risks are part of activities in the construction industry that adversely affect the project objectives required of time, quality and cost. Some easy risks can be identified in risk management, but some can be unexpected from external factors such as social, political, administrative and environmental factors, and risks may affect the project in terms of time and cost increase on contractors. Current studies focus on understanding risk management, developing risk management practices and literature survey in the construction industry.

Understanding of Risk Analysis and Management affected on time, cost and quality

Risk Identification

Risk identification is the first goal in the risk management, there is always a possibility to find a harm factors affected on the project in the construction industry. There are groups of the project risks:

A. Project Risks

Cost Risk

The primary goal of the clients is the overall profitability of project, cost risk analysis is the primary goal of project risk analysis. Working on cost risk analysis should be considered the different costs in a project (materials cost, labor cost, equipment's cost, etc), everything related with the cost of project for that reason it should be focus on the risks resultant that costs which affect the cost of the project. There are some activities which has a cost impact are not always clear and we do not know about it in that case we need to learn how to handle them when they be clear.

Time Risk

The contractors, clients and consultants see that the competition to finish the work in a project on time it is very important to success the project, there are a lot of universal criticism of the failure in the construction industry that the project did not finish on time more time need more money. For that reason the time risk management is important to finish the construction project on time this management it will help the control on the cost and quality of the project with that management effort the objectives of the client will be achieved

Work Quality Risk

For the client that the quality of goods is the most important thing, which is what makes a profit for investors and contractors and that the integration of all functions and possibilities in order to achieve the required quality is the best way to the success of the project with the required quality and achieve the main objective of customer satisfaction and profitability. Hence it can be said that the exposure of the project to quality risk causes failure to achieve the main objective, which means losses and this means that the lack of communication between all those responsible for work, workers and contractors will cause the failure of the project.

Construction Risks

This risks contains construction delay, construction plan change and site differences.

Technological Risk

Design errors, management errors, inexperienced workers and old machines.

B. External Risks

External risks are the risks that are no responsibility on the project management team. The internal risks are dependent on the originator of risk such as the (designer, stakeholders, contractor...). In case the project risks dependent on the project requirement and the possibilities available.

Social and Political Risks

- The laws and fees imposed on the expatriate staff
- Customs duties on raw materials and supplies used in construction industry

- Difficulty getting the license to start working in the project
- Political competition can be negatively affected on the economic cycle and create tension in the society in that case the cycle of any project will be affected (the project will take more time than it is expected which is cost more than the expected cost and create problems between the company and the costumers

Economic Risks

Those risks comes from the economic disasters and collapse of the economy in that case the contractor could not put the probability of collapse of the economy or what is the cost impact of those risks on the construction of the project.

Environment Risks

Those risks could not evaluate and analyze it in that case it should be did an insurance to the project because that risks are unavoidable.

C. Internal Risks

Finding Resource Risks

The availability of the materials and the machine necessary to the construction it is very important to finding in time to check the action plan or it will be a serious time and cost risks, in that case finding a resource to that materials and machine make the project in save.

Team project Risks

Lack of communication between the members of construction team lead to make the project in different risks for example that poor communication skills affectedto many problems such as delay of project delivery in addition that delay cost the company more than the expected amount (over time than the expected lead to more pay) and also that because of that risk probably gives the project bad quality or not in the expected zone.

Designer Risk

In the designer side, sometimes mistakes happen in the design or in the specification that lead problems, in that case the architect must take the responsibility of this failure.

Risk Analysis

It comes after the risk identification process, and it is based on two obvious types:

Specific Risk Analysis

It is the processes that determine the priority risk which the project maybe will be exposed by assessing the probability of occurrence and their impact on the project, that helps the project that helps the project manager to make more analysis to determine the necessary steps to handle with risks and the priority the interest of operation is the empowerment of project managers to reduce uncertainty and focus on priority risks.

Perceptible Risk Analysis

A process by which risks that have a significant impact on the project are identified and regulated. This is done by allocating an expected value to the risks that have already been classified in a previous process such as qualitative risk analysis. Include these tactics: sensitive analysis that helps determine risks that have a potential impact on the project, and analysis of expected financial value, which helps in calculating the average of possible results in this case of more than one possible scenario in the future in addition to modelling and simulation usedto represent cases of uncertainty and clarify the expected impact on the project.

The major topics of this section are materials properties, frames, loads used, and pushover analysis.

Risk Evaluation

Risk evaluation based on the comparison of possible risks level with the pre-established criteria. Then we try to build a balance between the negative results with the possible benefits that are considered to enable a decision to appear about the nature and the level of treatment required.

Risk Treatment

Risk treatment built on the development and implementation strategies and planning have a cost-effective. To minimize the negative probability cost and increase the probability benefits.

Monitoring and Review

Monitoring and review is an important function and an essential component of the administrative process, based on examining the results of actual performance and comparing them firstly with the objectives set by the project management from the beginning, the monitoring and review consider the last process in the administrative process after planning, organization, direction and leadership.

Establishing the context

Establishing the context assigns the framework of the risk management approach and builds the criteria against which the risks will be assessed this framework should be determined within the context of the company's main goals.

RESEARCH SIGNIFICANCE AND OBJECTIVES

There are several factors affect the success of the project and therefore, research is done before the start of project through which the objectives of project are identified, and the research has objectives and importance.

Objective

Identify and evaluate the factors affecting the success of the project, classify factors according to their important in the project, improve the quality of project performance, planning for activities, ways to control objectives of the project, project scheduling, how to provide materials during the project period and how to manage the factors affecting and addressing risk.

Important

One of the most important research factors is the focus on risk management, which is important in the success of the project. That studying the relationship between risk management and projects success is important. It identifies threats in the project from influential external factors and unexpected environmental conditions. Where this research is important for the directors of risk management because it gives them a background on how to manage and evaluate and identify the tools and equipment necessary for risk management.

STRATEGIES IN RISK MANAGEMENT

Risk Execution

The first, best and most likely way to handle the risk is execution if you can execute the risk don't hesitate.

Avoid the Risk

In many cases and different project the level of risk be very serious and it should remove it in this special case it can avoid the activity or it can another path this path it can when the particular type of high level of risk.

Risk Mitigation

this action is taken to reduce risks, and make risks acceptable, reduce risks mean to reduce the probability and the impact of these risks. Take these actions, in the beginning, be more efficient than trying fixed after they happened.

Transfer Risks

Transferring is an appropriate procedure to handle risks by buy an insurance policy and transfer the risk to an insurance company. When things have gone wrong, the insurance company will bear the loss.

Sharing Risks

Sharing risks make it in a good position to facing this risks, it should share this risks by distribution the works on subcontractors, in this way subcontractors will take risks instead the company.

Accept the Risk

Risk management brings benefits, avoiding activity risk means constricting the company's activities and losing some benefits. Reducing risk may contain costly new system and ponderous process and controls, transferring risk needs a cost, for example, an in insurance policy. In the case which contains a simple risk, preferably accept the risk, look for a low-cost solution and if find the solution is not possible, the best way is accept the risk and go.

LITERATURE SURVEY

Literature survey in the project report is that section which presents the various analyzes and researches conducted in your field of interest and the results already published, taking into account, the different criteria of the project size and extent. This section is the most important in your report because it enables you to determine your direction in your search and helps analyze your goals. When you do the literature survey, you have to commit to mention the number of research conducted by the number of analysis and their conclusion.

According to Akintoye and Uacleod (1997) risk analysis and management in the construction industry based on three elements experience, judgment, and the institution of team members.

Hastak and Shaked (2000) made a study contain three cast categories of construction risks, project market and country-level risks country risks are associated with macroeconomic stability of the country is linked with the monetary and fiscal policy of the country and the resistance of the country against economic variability.

The study of Berenger Y., Renault and Jestus N. Agumba (2016) showed that risk identification, risk analysis, assessment, and risk responses and control are critical stages in the risk management process. Risk must be defined first before they can be controlled or mitigated, this study concludes that risk management is the most important activity to complete a project successfully. Risk identification techniques as concluding from this study include the following: brainstorming, interviews/ expert opinion, questionnaires, dells technique, expert system, checklists, and documentation review. The study further concludes that issues with possible threats envisaged in a project are not only a means to reduce losses

within the project, but also means to transfer risks into opportunities, which can lead to economic profitability.

ANALYSIS OF SURVEY RESULTS

This section is concerned with the research results of the project, which analyses the information and data obtained from the research.

Through analysis, it is known that tools and techniques are used by companies in the best way in risk management, through analysis, companies can determine the percentage of risk.

Analyses evaluate practices and respond to risks through contracts provided by companies, for example: some contracts provide projects with all solutions to eliminate the possibility of risk and usually such contracts are high cost, there are companies that place the transfer and removal of risks within the project period, so most companies are less experienced. The analysis of other projects revealed that there is a lack of quality and creativity in the transfer and removal of risks, and this leads to delays in the project period and low quality, in doing so, these mistakes should be avoided in other projects by putting workers with experience in dealing with risks, but there are few skilled workers at high cost and For this reason, most companies turn to less skilled workers.

Table 1. Comparison of risks with analysis and without analysis (advantages and disadvantages)

Risks	Advantages of analysis	Disadvantages without analysis
Environment risks Earth quick and storm	It is difficult to expect this risks but we must take all measures to reduce the effects.	It will maybe damage some activity of the project.
Project Team Risks	Good relationship between the management department and the site worker. The worker must have good experience.	Mismanagement of the project Skills lack for worker.
Economic Risks	Follow the changes in the country's economy reducing the possibility of losses.	Possibility of a heavy loss or stopping the project.
Social politic Risks	Prepare a good team works on work license.	The lack of this team affected negatively on the activities of project.
Finding Resource Risks	Securing all materials and supplies requires finding a resource of it which make the project in the safe said.	Lack in materials Lack in the spare parts.
Designer Risks	Excellent work and no error occurred.	It is effects on project safety and requires-maintenance and design.
Cost Risks	Determined the budget and the gain of the project	Losing the profitability of the project.
Time Risks	Finish at the expected duration.	Increase the amount of the project duration. Fee impose.
Quality Risks	Achieve the high level of quality.	Poor in the quality level. Fee impose.

CONCLUSION

Risk analysis and management methods are seldom using in project construction industry because of the decrease of the level of experience and knowledge in project managers, these tactics which we included earlier are appropriate to be used in project management. The observations are shaped for risks management by contractors and staff of consultants is often established on the anticipation and experience of the contractors and staff consultants. The common risks tactics used to deal with this risks during the project duration, risk mitigation and risk transfer. In the end the most important thing in project management, it is not just saving on expenses, or just reducing time, or just maintain the quality of project outputs. Successful project management depends on keeping balance between the time, cost, and quality, and dealing with these factors as single bloc.

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