

AN OVERVIEW OF RISK MANAGEMENT IN THE CONSTRUCTION PROJECTS

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ABSTRACT

Risk can be defined as a trackable aspect of uncertainty that enables the prediction of the amount of damage. Like any other measurable quantity, either risk falls on the negative or the positive side of the graph, the latest being more likely to occur. As measurable factors, risks are of high importance to the analysis done in the phases that take place prior to commencing with the construction work. The task of evaluating the risk is usually assigned to experienced managers, as there should be no room for error that might accumulate in the future. This paper aims at highlighting the major steps followed to execute a proper risk management evaluation.

Keywords: Management, risk management, construction, project.

INTRODUCTION

According to research papers, the process of risk management took a wrong turn in construction projects, barely studying the aspects of money versus time. However, this is a serious issue that needs to be addressed, as it directly affects the outcome of any project. A well-planned structure and a well-put risk management study go hand in hand, as risk management plays the role of assurance to the project on both the long run and on the initial stages of the execution of the project. With the continuous development and unsteadiness of the market, complications occur to the risk management process. Therefore, to reduce the possibility of damage, sufficient measurement of all the possible risks are obligatory. Despite the uniqueness each project possesses, some aspects of the risk management process are considered main points in the evaluation phase. This shows the importance of risk management's presence throughout the processes of planning, design, and execution of any project.

Risk Management Background

Uncertainty accompanies every aspect of life (Olsson, 2007), it is a two-edged sword (Hillson, 2011). The risk is proportional to uncertainty, Hilston (2004) states: "The risk is the uncertainty measured, and uncertainty is a risk that cannot be measured". The definition of risk is complex (Wang et al, 2004). However, it is considered to be the threat that the occurrence of damage imposes on the project (Yu, 2002), (Baloi and Price, 2003). As stated earlier, the misconception of risk always having a negative effect on projects resulted in neglecting the positive side of its impact, which is the opportunity (Baloi and Price, 2003), (Hillson 2011). It is no secret that risk management has become a vital part of any project management (Olsson, 2007) and (Del Caño and De la Cruz, 2002), representing the most challenging task to any project, identifying the risks and their magnitudes (Anderson, 2009). This does not take away any of its effect or importance and managers still rely on its results

as an assurance to their projects (Baloi and Price, 2003), (Perera and Holsomback, 2005), (Alali and Pinto, 2009). As risk management is a means of identifying the risk and reducing its damage by offering suitable solutions (Lee et al, 2009) . It was only recently that risk management proved its importance to the construction market (Forbes et al, 2008), taking into consideration the threat that construction work is constantly being put under (Schieg, 2006), along with the threat that the multiparty nature of the contract imposes to the project in the case of subcontracting (El-Sayegh, 2008). The two main points of view of the evaluation of the risk are those of the owner of the project, as he is the decision maker, and the contractors (Bryde and Volm, 2009). The old days of contractors covering up the risks or sugarcoating them are long gone as risk management demolished randomness in projects (Baloi and Price, 2003). The approaches made by the owners and contractors of any project are completely opposite to each other (Kartam and Kartam, 2001). The flaw of risk management techniques is that they do not document the results obtained, leaving us with the only option of starting the process from zero when planning for a new project (Tah, 2001). Although risk varies with the difference of time and place, it was found that most contractors and owners apply the same risk management techniques to all their projects across the world, as stated by Forbes et al. (2008). Lyons and Skitmore (2004) claimed that brainstorming, a technique followed in Queensland, is the most commonly used. Forbes et al (2008) agreed to this: developing a systematic approach to choosing the adequate method of risk management, taking into account the different circumstances faced by the construction work throughout its stages. His approach is considered reliable as it utilizes state of the art technologies along with mathematical and statistical analysis to come up with a final decision on the magnitude and on the remedy to the resulting damage.

Definition of Risk

From the information provided above, risk can be defined to be either a negative or a positive impact that curves any project from its assigned goal. However, the negative impact showed dominance over the understanding of the risk concept by the vast majority of individuals and organizations. Opportunity is also considered a risk. Provided a detailed risk report, owners also have a glance at their opportunities, as opportunity generates from risk. This is due to the clear vision risk management provides to the owner, portraying all the possible scenarios that might occur as results of different decisions. With such knowledge, the negative impact resulting from decisions can be considerably reduced.

Risk Management

Despite the addition cost that the risk management imposes to the initial cost of the project, it is still an essential process as it reduces expenses in the long run. As risk reports also predict the costs of the maintenance of the project, hence, gaining us more time to come up with the best solutions to problems predicted in the report. The identification of risks is the launching step in risk management processes (Diederichs, 2004). The steps of risk management processes are as follows:

Identification of Risks

Identifying risks is of high importance as the first step of solving the problem is finding it. However, the risks found during the planning phase of the project do not conclude the list of risks, as the construction process brings along a set of unexpected and unplanned events that may alter the initial risk report. This leads to the conclusion that risk management is a continuous process that commences at the early stages of the project, and carries on until it is completed. Furthermore, it is essential to the quality assurance post-construction stages of the

project. The checklist method yielded astonishing results when used in initial phases of projects. It is a method that basically lists all expected risks then begins crossing them out as remedies are found to each one. The following risks were found to occur the most in construction projects :

Quality Risks

- Inaccurate interim reports
- The lack of application of project methodology
- Insufficient tests

Personnel Risks

- Inexperienced labor
- Lack of teamwork

Cost Risks

- Altering plans
- Complex project conditions
- Failure to make payment by customers

Deadline Risks

- Failure to meet deadline
- Completion date extended

Risks of Strategic Decisions

- Not recognizing opportunity
- Failure to grasp opportunities

External Risks

- Nature
- Political decisions
- Social impact
- Market instability
- Law changes
- Changes in demand
- The development of technology

RISK ANALYSIS

After identifying the risks likely to occur, the list of the group of risks is rearranged giving more priority to those being most likely to occur and having the biggest impact on the project. The list is then broken down to individual risk assessment, in which the risk is considered to have a certain degree of damage. The damage calculated affects the cost of the project directly. Hence, the analysis of risks gives two major results, the possibility of the occurrence and its impact on the project. The following examples are methods of risk management:

- Possibility and impact of error:

This method puts all the possible errors in a list starting with the ones that impose the largest threat to the project and ending with the least. Then the possibility of occurrence is calculated to each risk and assigned to it in the same list. The list is then analyzed and causes of risks are found. Finally, adequate remedies are suggested based on the data gathered.

- Risk portfolio:

This method is not far from the one previously discussed. Risks are grouped in accordance with the impact they might leave on the project, then the possibility of their occurrence. Managers then react according to the results calculated.

- Risk team analysis:

A major responsibility to the project managers is performing a risk evaluation task. The risk team gathers and analyzes data on risks in accordance with the types and possibilities of their occurrence. Results are obtained from the gathered data and an evaluation team is formed.

RISK ASSESSMENT

Assessing risks, helps comprehend the impact of risk on the financial and executive aspects of the project. It was mentioned earlier in this paper that documenting the outcome of the risk management process is of high importance. This allows organizations that are similar to each other in nature, such as banks and insurance companies, to learn from their previous mistakes, hence, improving the approach to risk management and to management as a whole. As for construction companies, a different set of risk management methods was found to lead to better results. Those methods are:

- Key performance indicators

Key performance indicators deal with quantity and market shifts easing the process of comparison. The data gathered is used to compare a large number of input data then the risks are determined and dealt with.

- Qualitative assessment

In the case of data insufficiency, an estimation is made and the list of risks is made, prioritizing those risks possessing a high possibility of occurrence and great impact on the project.

- Probable maximum loss

After the possibilities of risks' occurrences were established in a list, the damages that come because of the risks are calculated and the highest possible impact is regarded to as the main priority. A suitable remedy to the risk is then found and applied to reduce the impact of damage on the project.

- ABC analysis

In this method, the parts of the project are broken down and each assigned to its value, the parts are then ordered and more priority is given to the ones having the highest impact on the project as a whole.

- Risk map

Risk maps provide the organization with a clear view of the risk they might encounter at any stage. (Diederichs, 2004). The risk map indicates and prioritizes the risks endangering the organization's continuation. Generally, the objective of risk maps is to display the possibility of occurrence of risks and their impact.

Risk Control

Risk control is the amount of damage caused by risks indicated in the risk management report. The two types of risk control are cause-related and effect-related risk controls. In the case of cause-related control, risks are reduced, while effect-related control reduces the damage caused by the risks. (Romeike, 2004). Strategic approaches to risk control would be avoiding risk, reducing it, passing the risk on or handling it.

Risk Monitoring

Risk monitoring is the process of observing the results of the risk control. This process examines the chart of risk and alters it to obtain the closest results possible to the desired amount of risk. The main objective this procedure fulfills is the documentation of risks that have occurred throughout the timeline of the organization, along with the impact they have had on it. This creates a reliable historical record that could be very useful in the assessment of the organization and in avoiding the risks' reoccurrence.

Controlling Goals

The final step of risk management is controlling goals, which mainly consists of target value determination, actual value determination and a comparison between the two. The process ensures that the previous steps are performed adequately. If a deviation is present between the actual and the desired risk, the project is then reevaluated, and new data is gathered to identify the new risks.

Risk Management in the Progress of the Project

The project manager is the one responsible for the correct implementation of the risk management task. The documented and categorized group of risks are referred to whenever a new risk is detected. Project control's main points are services planning, budget planning, meeting deadlines and contract discussion.

An easy way to introduce the risk management concept to the construction industry is to provide a checklist with the major risks that may be faced during the execution of projects. The manager of the project then simply goes through the list and crosses out the risks that they might have managed to sort out. By doing so, a more practical way of applying risk management to projects is achieved. However, this method does not guarantee the full benefits of risk management, as new risks might arise along the execution of the construction and even after the construction phase is finalized. The three major project phases are, start-up phase, manage phase and the closing phase.

Risks occurring along the line of these three phases must be dealt with instantaneously to prevent the prolonging of the execution of the project. Failure to do so may result in extending the deadline, as the time taken to deal with damages will be added to the total execution time of the project. This will also lead to an addition to the budget initially set by the owner to complete the project, therefore, leaving an unsatisfied client. The following principles prevent this from occurring:

- Project managers may be held responsible for the process of risk management in the project.

- Risks taken should not exceed the power of the team executing the project and the budget assigned to it.
- Externally suggested risks are not of high importance as they were not done by the assigned team and no reliable data was provided.
- Documenting and publishing risks taken during the execution of the project.
- Including in the report the risks faced along with the opportunities.

To see the environmental and natural factors influencing the risk management of onshore and offshore structures as examples, refer to the following references: (Sadeghi, 1989, 2008), (Nouban and Sadeghi, 2013, 2014, 2016), (Nouban, 2015, 2016), Nouban et al., 2016), (Muyiwa and Sadeghi, 2007), (Sadeghi and Babolian, 2016).

conclusion

Risk management's objective is to detect, evaluate and demolish risks. A properly performed risk management technique uplifts the organization and develops it with all its aspects. However, this cannot be achieved without the participation and cooperation of the organization's members with a full commitment to the program. It also helps show the way towards the goals of the organization with great transparency as the risks ahead are all expected if not cleared. Nevertheless, to achieve this, a fully devoted team should be assigned to carry out the tasks of risk management, and have the data at exposure whenever needed. The implementation of risk management could be a little less complicated if the previously mentioned checklist method is followed. If chosen to do so by the manager, extreme caution must be applied as new risks may be introduced along the phase of construction and after its completion. For this precise reason, it is advised that a team be assigned to perform the task of risk management. The manager will then be left with the task of monitoring the team and intruding in the phase of decision making, after consulting the owner of the project. Applying the above, the manager should succeed in completing the project with the minimum amount of damage caused by miscalculations of risks.

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