

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 12, December 2016

A Survey on Risk Assessment and Management in Construction Projects

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ABSTRACT: The Study investigated to acquire an overall idea about risk and its consequences in construction field and the process required for its management. The effect of risk on assessment of a project is discussed along with the tools and methods adopted to manage risk in construction industry. The objective of the research topic “Risk Management in Construction Industry” is to explore the effective way for implementation of risk management in construction industry, to consider the different types of risk management techniques applied to alleviate risk, to identify the use of implementation of the risk management, to determine the factors that can influence the applications of risk management in the project life cycle, wherein to categorize the principles adopted in Risk Management. I have conducted a survey on the following aspects of it, a) Identify, characterize, and assess threats involved in the construction industry b) Assess the vulnerability of critical assets to specific threats. c) Determine the risk (i.e. the expected consequences of specific types of attacks on specific assets). d) Identifies ways to reduce those risks. e) Prioritize risk reduction measures based on a strategy. Construction of Commercial projects are initiated in complex and dynamic problems resulting in circumstances of high uncertainty and risk, which are compounded by demanding time and cost constraints. The general methodology is to study relies largely on the survey questionnaire which will be collected from the various Commercial project construction contractors and project manager of different sizes by mail or personnel meeting. The questionnaire prepared for the survey was formulated by seeing the relevant literatures in the area of construction management.

KEYWORDS: Risk Management, Construction Management, Risk Factors, Risk Assessment Techniques, Construction Projects

I. INTRODUCTION

Risk management has become an increasingly challenging activity. According to a global study by Ernst and Young, only 13% of audit committee members classified the risk management of a company as effective. This same study emphasizes the need for the function of risk to be more than simply compliance with a bureaucratic exercise. This situation is also apparent in the construction industry. The launch of a new project is considered a bet on a future often regarded as uncertain. The conception of a new venture project is considered the riskiest step because at this step, the ideal aspects of the project are defined, including its architectural and construction features, its target audience, and the marketing strategies used to reach this target audience. At this step, all necessary planning for the proposed aims is carried out and achieved. The decisions made at this stage have a significant impact on the achievement of the project goals. The other features of a construction project must also be considered, including: 1) its non-homogeneous character and no serial production, a result of the uniqueness of the product, which is typically custom; 2) the implementation of the project in a dynamic, uncertain, and complex environment; 3) different stakeholders with positions that are not always convergent; 4) dependence on climatic factors during the construction process; 5) long period of development; and 6) the division of responsibility among various companies. These various factors illustrate the actual and high degree of risk involved in the success of a project. Managing risk is an integral part of good management, and fundamental to achieving good business and project outcomes and the effective procurement

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of goods and services. Risk management provides a structured way of assessing and dealing with future uncertainty. Suppose take the example of real estate the real estate and construction industry has changed significantly over the past several years. It is an industry driven primarily by private investors; the presence of securitized real estate has increased considerably. Real estate is vulnerable to the numerous other business risks that often represent greater exposures than those that are traditionally insurable. For example, there are regulatory and legislative risks, professional, contractual, competitive and human resource/cultural risks, reputational, strategic, customer, operational, political, legal, financial, and technological risks.

II. BACKGROUND

There is uncertainty in everyday life, in organizations and projects (Olsson, 2007), representing a clear threat to the business, but also in itself is a significant opportunity that must be taken (Hillson, 2011). There is a connection between uncertainty and risk as Hillson (2004) indicates: "The risk is the uncertainty measured, and uncertainty is a risk that cannot be measured". Risk is a multifaceted concept (Wang et al, 2004), which is defined as the probability of a damaging event occurring in the project, affecting its objectives (Yu, 2002; Baloi and Price, 2003) however not always associated with negative results. Risk may also represent opportunities, but the fact that most of the risk usually has negative results has led individuals to only consider the negative side of risk (Baloi and Price, 2003; Hillson 2011). Today, risk management is an integral part of project management (Olsson, 2007; delCaño and de la Cruz, 2002), where one of the most difficult activities is determining what are the project's risks and how should they be prioritized (Anderson, 2009). This is a key process and most of project managers know that risk management is essential for good project management (Baloi and Price, 2003; Perera and Holsomback, 2005; Alali and Pinto, 2009).

III. SCOPE AND OBJECTIVE

1. To identify the various risk factors in construction of Commercial projects.
2. To analyze the sources of risk factors arising in the Commercial projects.
3. The pilot studies were conducted from various reputed companies.
4. Using the pilot study the questionnaire is prepared.
5. The survey will be conducted to the construction industries through questionnaire.
6. The result will be analyzed from the questionnaire.
7. The risk will be solved using the software like SPSS.
8. The result and discussion about the risk factors solving in the construction projects.

IV. LITERATURE SURVEY

In Covelo and Manpower's (1985) article, and according to Grier (1981), the first signs of risk management go back as far as 3200 BC in the Tigris-Euphrates valley with a group of people called the Asipu. One of their functions was to act as risk consultants. Their procedure would be to identify the important dimensions of the problem, propose alternative actions, and collect data on the likely outcomes.

1. Li Bing and Robert L. K. Tiong (1999):

Based on their study categorized the risk factors and their mitigating measures, the most effective risk mitigating measures were categorized into eight groups. Those are partner selection, agreement, employment, control, subcontracting, engineering contract, good relationship, and renegotiation. They proposed a risk management model incorporating measures. Three cases of international construction JVs were analyzed from the perspectives of the execution of these measures.

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2. Shen L Y (1997) :

Identified the most serious project delay risks and the effective actions for managing these risks. Practitioners' risk management actions and their effectiveness have been investigated through a questionnaire survey. It revealed that methods where practitioners' experience and subjective judgment are used are the most effective and important risk management action, and that methods using quantitative analytical techniques have been rarely used due to limited understanding and experience. The findings also suggest a need to promote the application and awareness of various analytical techniques for risk management in a proper context in the Hong Kong construction industry.

3. Akintola S Akintoye and Malcolm J MacLeod (1997) :

Studied the construction industry's perception of risk associated with its activities and the extent to which the industry uses risk analysis and management techniques with the help of a questionnaire survey of general contractors and project managers. The authors concluded that risk management is essential to construction activities in minimizing losses and enhancing profitability. Construction risk is generally perceived as events that influence project objectives of cost, time and quality.

Risk analysis and management in construction depend mainly on intuition, judgement and experience. Formal risk analysis and management techniques are rarely used due to a lack of knowledge and to doubts on the suitability of these techniques for construction industry activities.

4. Daud Nasir et al (2003):

Developed a method to assist in the determination of the lower and upper activity duration values for schedule risk analysis by program evaluation and review technique analysis or Monte Carlo simulation. Probabilities for various combinations of parents for each risk variable were obtained through an expert interview survey and incorporated into the model. Finally, sensitivity analysis was performed. The model was tested using 17 case studies.

5. Artem Aleshin (2001):

Studied the problem of risk management of international and joint venture projects with foreign co-operation in Russia. The author identified, classified and assessed risks inherent to joint venture projects in Russia and practical recommendation for risk management.

6. Alfredo del Can et al (2002):

Presented a generic project risk management process that has been particularized for construction projects from the point of view of the owner and the consultant who may be assisting the owner. First, the authors explain a complete or generic project risk management process to be undertaken by organizations with the highest level of risk management maturity in the largest and most complex construction projects. After that, factors influencing possible simplifications of the generic process are identified, and simplifications are proposed for some cases. Then the application to a real project is summarized. As a final validation, a Delphi analysis has been developed to assess the project risk management methodology explained here, and the results are presented. The appropriate contracting method and the contract documents for any construction project depend on the nature of the project, but an appropriate contracting method coupled with clear and equitable contract documents do not by themselves ensure project success where people work together in the face of uncertainty and complexity with diverse interests and conflicting agendas. The attitudes of the contracting parties and the co-operative relationships among the project participants are important for successful project delivery. These are examined in the light of transaction cost economics and relational contracting (RC) principles. It is found that RC may well be a useful route towards reduced transaction costs, while also fostering co-operative relationships and better teamwork that in turn facilitate joint risk management (JRM). The usefulness of the latter is reinforced by relevant observations from a recent Hong Kong-based survey, followed by a case study in Mainland China.

7. Darrin and Mervyn K Lewis (2002):

Analyzed the principles involved, on practical experience of evaluating projects to form a framework for assessing the risk, with a help of waste water treatment facility in Scotland as a case study which is a typical PPP project.

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8. Hyun-Ho C.H.N Cho and J. W. Seo (2004):

Presented a risk assessment methodology for underground construction projects. A formalized procedure and associated tools were developed to assess and manage the risks involved in underground construction. The suggested risk assessment procedure is composed of four steps of identifying, analyzing, evaluating, and managing the risks inherent in construction projects. The main tool of the proposed risk assessment methodology is the risk analysis software. The risk analysis software is built upon an uncertainty model based on fuzzy concept. Other tools developed in this study include the survey sheets for collecting risk-related information and the detail check sheets for risk identification and analysis. They finally discussed a detailed case study of the developed risk assessment methodology performed for a subway construction project in Korea.

9. El-Diraby.T. A and Gill S.M (2006):

Developed taxonomy for relevant concepts in the domain of privatized-infrastructure finance. The taxonomy is an attempt to create information interoperability between the construction and financial industries. The taxonomy models the concepts of privatized-infrastructure finance into six main domains: processes, products, projects, actors, resources and technical topics (technical details and basic concepts). The taxonomy was designed to be consistent with Open Financial Exchange (OFX). It was developed through the analysis of 10 case studies and involvement in project development and interaction with industry experts. The taxonomy was validated through interviews with domain experts, and through the analysis of two independent case studies. A prototypical semantic web-based portal for communicating project risks was developed to in order to illustrate the use of the taxonomy.

V. PROPOSED SYSTEM ARCHITECTURE

In proposed system approach the Project Risk Management includes the processes concerned with identifying, analyzing, and responding to project risk. It includes maximizing the results of positive events and minimizing the consequences of adverse events. Figure 1 provides an overview of the following major processes:



Figure 1. Risk Management

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Explanation

The processes shown in figure 1 interact with each other and with the processes in the other knowledge areas as well. Risk response development is sometimes called response planning or risk mitigation. Risk response development and risk response control are sometimes treated as a single process, and the combined process may be called risk management. Each process may involve effort from one or more individuals or groups of individuals based on the needs of the project. Each process generally occurs at least once in every project phase. Risk identification and risk quantification are sometimes treated as a single process, and the combined process may be called risk analysis or risk assessment.

Advantages of Risk Management

1. Less uncertainty
2. Achievement of objectives
3. Reliability
4. Reduction of capital cost
5. Creation of value

Limitations of Risk Management

1. If risks are improperly assessed and prioritized, time can be waste in dealing with risk of losses that not likely to occur
2. Spending too much time assessing and managing unlikely risks can divert resources that could be more profitably.
3. Unlikely events to occur, but if the risk is unlikely enough to occur, it may be better to simply retain the risk & deal with the result if the loss does in fact occur.

VI.CONCLUSION

In India the big companies are accepting that there are few environmental effects because of their project, but says that it is a global phenomena and it cannot be nullified. Qualitative methods of risk assessment are used in construction companies most frequently, ahead of quantitative methods. In construction project risk management, risks may be compared by placing them on a matrix of risk impact against a probability. The loss of workers is the major risk faced by all the companies. Because; the workers are migrating between companies very often because of their high demand in the market. And also huge vacuum is created by the workers who move to Middle East countries where they are offered very high packages when compared to India. Risk management in the construction project management context is a comprehensive and systematic way of identifying, analyzing and responding to risks to achieve the project objectives. To management the risk effectively and efficiently, the contractor must understand risk responsibilities, risk event conditions, risk preference, and risk management capabilities. To manage the competition from other companies is the big problem to the small & medium sized companies. The Indian government allowed 100% FDI in the construction sector for foreign companies to enter the market, created a stiff competition to the local companies both technically and financially. Sub-contractor related risks are also high, since most of the sub contractors are not able to meet the standards of the main contractor and the client due their size of work. Thus from the above points the management risk has been found to be the critical risk from this survey If you go to the government rule then you will face the very low risk, but the implementation of court directive is not proper; this was the complaint seen from this survey.

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