



AN INTEGRATED APPROACH TO A CRITICAL ANALYSIS OF RISK MANAGEMENT IN CONSTRUCTION PROJECTS

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ABSTRACT

The story has been focuses to analysis of risk factors in construction projects, in that case to first identifying the risk types based on that condition of to collect the data from different case study data and also conduct the questionnaire survey related to risk and previews date from the projects completions of past years. The survey will be directly conducted through project managers, site engineers and contracts, this paper mainly focused on 5 phases; Risk identification, risk assessment, risk responses, risk monitoring and analysis and finally risk control. To identifying the risk factors mainly focus financial, technical, legal, management, material, environment, political and social risks. In that case to conduct the questionnaire survey in that total questions 50 and 47 questions related to risk and three questions personal details and risk facing in site work and also to collect the date related to risk management in construction projects. And to analysis the date and questionnaire survey by using the rating system to mention the high rating risk factor and low risk factors must be identifying to the end of report.

Key words: Risk management; construction projects; risk classification; analysis of risk factors; Risk analysis method.

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1. INTRODUCTION

Risk management define as to minimize the negative outcomes and maximize the positive results, to avoiding the risk factors mainly on analysis the previews projects facing any risk problems and to analyze the date related to risk, risk management is mainly to identifying the risk, assessment the of the risk and finally analysis the risk. The word of risk is the 17th

century. Risk can be mainly form in construction projects based on financial, legal, management, market, policy and political risk, technical, environment and social risks. The construction industry is very complicated and strategic nature. So in that case to must be minimize the risk factors in projects by analysis of previous problems. Due to involvement of different stakeholders related with the construction project, sometimes external and internal factors the changes of risk are very high. To compare the risk factors with other construction companies. Risk can be affect productivity, quality, performance and budget of construction projects. In Construction sector everyone required a high integrated risk management, integrated risk management (IRM) means continuous, proactive and systematic process to identifying the risk, communicate and manage risk from a standard point of view. IRM requires an ongoing assessment of risk for a project at every level and then aggregating the results at comparative level, IRM does not focus only on minimize of risk, but it also supports activities in the projects, in that case to achieve with up to standard results, with in time and budget.

1.1. Determination of Risk

Risk mainly determine in two ways in that quantitative and qualitative approach, risk mainly calculation by statistical method, risk determination can mainly three phases, they are risk identification, risk assessment, risk analysis and control.

1.2. Risk Identification

Risk identification is the process of determination of risk, this one is first and main step in construction risk management, so many ways to identifying risk data base of the previews project documentations are very helpful and in addition to technical experience and expertise personal contacts are the keys to risk identifications, in construction industry risk identification has no formal method, this mainly based on knowledge.

1.3. Risk Assessment

Risk assessment is main case in risk management; it is a key tool for risk management in both contexts of health and safety management. It should be first address at design stage to address any potential risk before start the project, the project managers should be identify the any risk before start the work at site and also to follow the methods to monitor the risk at the starting stage of project, risk assessment consider the following area like contractual risk, occupational risk, project risk, natural risks, financial risks, stakeholder risks, competition.

1.4. Risk Analysis and Control

Risk rating identify the sources of risk about the outputs of projects. Risk assessment is mainly focus on the probability occurrences and level of risk impact. More details available in project process can be effectively used for traditional risk management, risk control establishes a plan, it can reduces the risk and uncertainty impact on the project deployment, this can be mainly follows some steps like identification, analysis, evaluation, response and monitoring.

1.5. Risk Classification

Risk factors for this study are classified into eight categories

- financial risk
- technical risk
- material risks

- policy and political risk
- environmental risks
- social risks
- management risk
- legal risk

1.5.1. Financial Risk

financial risk mainly analysis by the company experience based, main aim to minimize the cost of construction work and maximize the profit of construction project, main risk in financial fact that the company offers a high price the tender will be loss and an excessively low price may the results in the financial loss at the project end. It is major risk on construction project, if any government can change the tax regarding the materials and rising the fuel prices, based on some conditions the project cost will be increased. In that analysis financial risk has focus on delayed of payment, fluctuation of exchange rate; fuel cost will be increases, fluctuation of inflation rates and change of bank formalities and regulations.

1.5.2. Technical Risk

technical risk is mainly formed by improper planning, budgeting, and feasibility study; no past experience in similar projects any construction project has some technical risk, such as equipment failure design failure

Some technical failures are

- Equipment and system failure
- Estimation errors
- Accident /collision
- Site location and access
- In adequate program
- Design changes and design variation by client
- Poor quality material procuring
- Storage of supple water, gas, electricity

1.5.3. Material Risk

If any construction can be success mostly is determine by the ability of the construction project team to minimize the risk factors and implementation of project proper, it mainly based on proper material management is one important factor. material treatment is to procurement of material for proper planning and material cost will be increase the total cost of project will be increase material cost will be increase mainly suffers is the middle class people.

1.5.4. Political Risk

Political risk is varies states to states, the government changes the policy of government has not change but has improved very much, but common approval for the new projects is present which causes delays and even financial loss for the companies.

1.5.5. Environment Risk

If any construction project facing the environment risk, many environmental risks are typically disqualified or severely limited by standard commercial general problem policies and that can leave contractors without dedicated, project can during in rainy season

inundation of water in foundation in the starting stage of project, for the project workers working under the sunlight are difficult.

1.5.6. Social Risk

This type of risk does not effect on project directly, it effects of the project cost, time, and quality of project. Social risk influence to project performance is indirect and significant. This type of risk can must follow the proper predicted or regulated their consequences should be serve, social risk facing mainly Resettlement and Rehabilitation of people, problems due to adjacent or nearby project and local people support for the project.

1.5.7. Management Risk

Management risk means mainly to manage the risk in project, to manage the risk by ranking or rating of risk, identification of project risk and to assess the risk in each probability of risk in that project, in that case identification of risk to give the ranking rate of risk, first to manage the top or high rate ranking risk can salve and least or low risk rating can salve during project or after salving the main risk factors. Management risks are mainly shortage of skilful workers, material storage, unknown site conditions and design changes and any errors.

1.5.8. Legal Risk

Legal risks are mainly formed in contract type project, in that mainly settlement of disputes takes time and money. Legal problems are mainly in improper verification of documents and local enforcement of legal judgment.

2. OBJECTIVE

The main objective is to identifying the risk rating factor and analysis of the risk in construction project

3. METHODOLOGY

3.1 Data Collection

The data collection mainly two ways first one is gain from books, specialized international journals, publications and World Wide Web and second way is developed by questionnaire survey conducted in construction companies and collection of date from site. The survey mainly focus on risk Facing on project recently and how they are facing and how to analysis the risk. The collection of data from construction project companies and also to collected recent research papers related risk in construction projects.

3.2 Data Analysis

- Identifications of different types of risk based on the collection of different case studies data
- Prepare the questions related to construction
- Questionnaire survey conducted in construction companies and personnel interviews with projects in charge and construction project managers
- Analysis of date and questionnaire

Table 1 Questions related to risk factors

S.no	Questions	Low risk (1,2,3)	Medium risk (4,5,6,7)	High risk (8,9,10)
1	What is the risk rating based on financial?			
2	What is risk rating based on legal risk?			
3	What is risk rating based on management risk?			
4	What is risk rating on material risk?			
5	What is the risk rating on political risk?			
6	What is risk rating on technical risk?			
7	What is the risk rating on environmental risk?			
8	What is risk rating on social risk?			
9	If any other risk please mentions that type of risk?			
10	Delayed payments on contract based on financial conditions			
11	What is risk rating in Loss due to fluctuation of inflation rate			
12	When the fuel cost will be rise so what is risk level based on financial risk?			
13	What is risk level in loss due to fluctuation of exchange rate			
14	Risk rating in changes of bank formalities and regulations			
15	What is risk level in regulations and permits			
16	Risk level in lack of knowledge of arbitration			
17	Risk level in uncertainty and unfairness of court justice			
18	What is risk rating on labor disputes?			
19	Risk rating in delays dispute resolutions			
20	Risk level on third-party delays			
21	Risk level on no experience in past similar projects			
22	Risk level with government department			
23	Risk level in improper planning and budgeting			
24	Risk level in organization and change management			
25	Risk level in resource management			
26	Risk level based on coordination with sub contractors			
27	What is the Risk level when the cost increases due to change of govt policies?			
28	Risk level on loss due to bureaucracy for late approval			
29	What is risk level due to government acts			
30	Risk level on corruption			
31	Errors in design changes and design changes			
32	Material storage and poor quality of procuring materials			
33	Shortage of water, fuel ,electricity			
34	Risk level based on site conditions			
35	Risk level based on equipment failures			
36	Risk level in act of god			
37	Risk level on weather conditions			
38	Risk level on Difficult to access the site			
39	What is risk level on changes of environment			
40	Risk level in problems due to resettlement and re habitation of people			
41	local people not supports for the project			
42	Risk level on nearby project			
43	Risk level based on increase of material cost			
44	Procuring of material			
45	Risk level in Poor quality of material			
46	Accident on site due to poor safety procedures			
47	Design changes and errors in design			

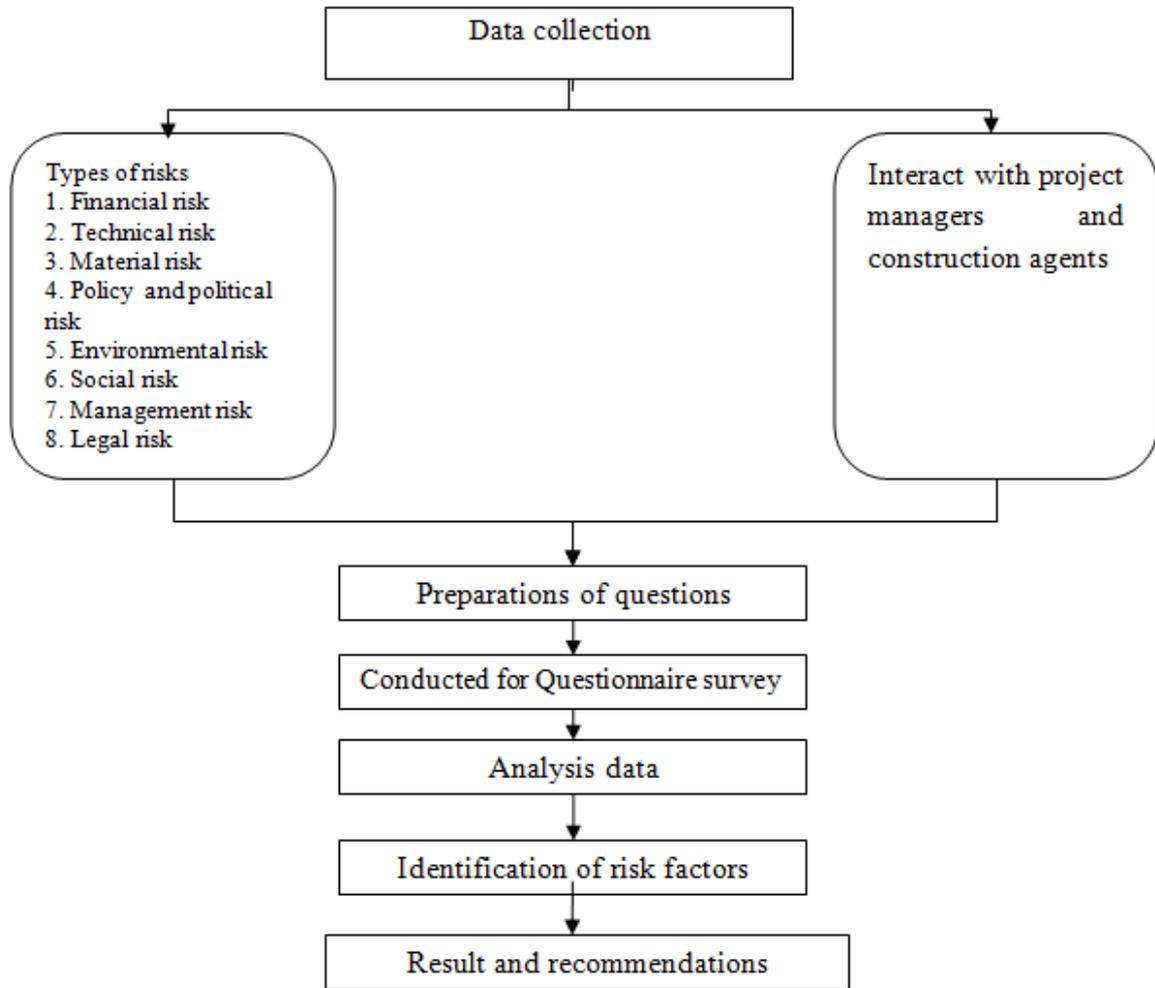


Figure 1 Step by step processing of methodology

4. RESULT AND DISCUSSIONS

To conduct the questionnaire survey related to risk in construction, in that mainly financial has high rating or more risk compare to other risk 7.2 out of 10 points and least has social risk has 4.3 out of 10, in that process to conduct questionnaire survey to site engineers and project managers, in that case 51 responses to the questionnaire survey out of 62. 8 project managers, 39 site engineers along with contractors and one project vice director. They are explain about facing the risk on their own project and mainly financial has high risk and second has political problems also high in Andhra Pradesh and telangana states.

$$\sum_{i=1}^{10} \frac{[(X_i * Y_i)]}{N}$$

The calculation of the is Risk Rating =

X_i= response rating

Y_i=number of point (values from 1 to 10)

N= number of response

Table 2 Questionnaire survey example and calculations model

Different types of Risks	Low risk (1,2,3) (A)	Medium risk(4,5,6,7) (B)	High risk (8,9,10) (C)	Total points (A or B or C)*no of points	Risk rating level $\sum_{i=1}^{10} \frac{(x_i * y_i)}{N}$
1.Financial risk		7(2)	8(1)	(7*2)+(8*1) =22	22/3=7.33
2.Legal risk		4(1),7(2)		(4*1)+(7*2) =18	18/3=6

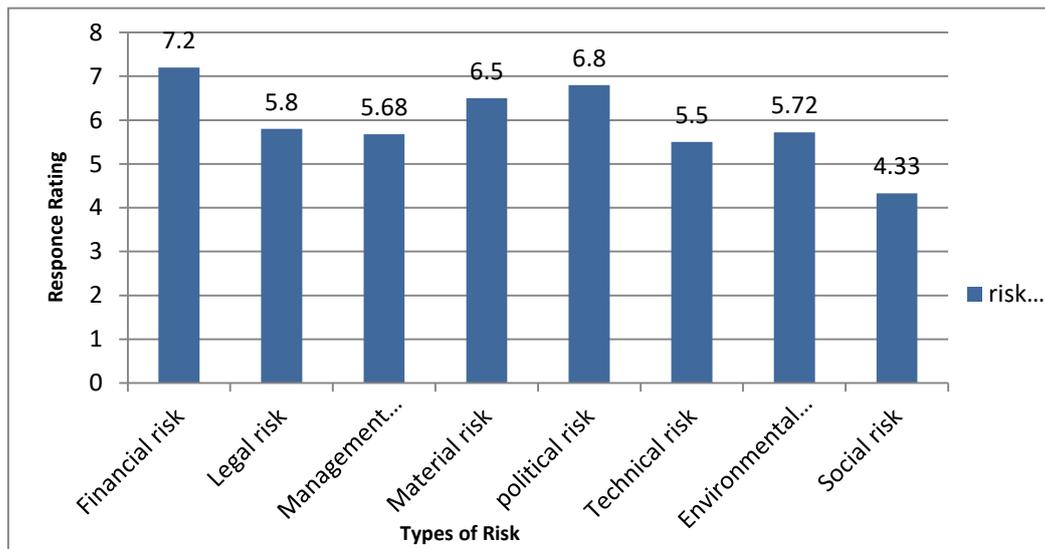


Figure 2 Risk Rating

Some other risks facing in site work based on experience like projects managers and site engineers or contractors

- Risk due to crisis
- Risk associated with time management, inter department coordination, safety management
- Safety less guidance
- Unskilled Operators are maintain in the work
- Mechanical ,machinery and manpower
- Perfect safety precautions are not use
- Delay of material and acquisition of skilled labor
- Perfect safety precautions are not use
- Accommodations, material, machinery forest problems in agency area and radicals
- Mutually changing of drawings and not clarity conformation top the clients

In this study and analysis of the risk factors mainly focused on 8 risk factors, they are financial risk, legal risk, management risk, material risk, environment risk, political risk and social risks. In those risks mainly financial has high rating risk; second have political risk and next material risk, least social risk and other risks are almost same rating. Some other risks like manpower, machinery and time management this risk are mentioned by site work experience by site engineers and projects mangers. In that case of analysis risk factors are

slightly focused other like design and safety procedures, and some projects mainly focused on design, in that design any errors the total project getting more risk, in that total analysis risk rating in building sectors are some decrease and in road and high construction projects are facing the risk factors.

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