

# Study on Critical Factors Affecting the Post Assessment Projects

A. Shyamala<sup>1</sup>, K. Mukilan<sup>2</sup>

<sup>1</sup>P.G Student, Construction Engineering and Management, Department of Civil Engineering, Kalasalingam University, Krishnankoil, Tamilnadu, India

<sup>1,2</sup>Assistant Professor, Department of Civil Engineering, Kalasalingam University, Krishnankoil, Tamilnadu, India

**Abstract:** *In the construction industry the project manager's responsibility is to monitor cost, time and quality. Because of various risks involved in construction, it is difficult to maintain time, cost, and quality as planned. The main purpose of this dissertation is not only to identify the list of risks involved in construction industry but also to find the key risks that can be significantly influence the construction and mitigation measures. Risk management (RM) comprises of risk identification, risk analysis, response planning, monitoring and action planning tasks that are carried out throughout the life cycle of a project in order to ensure that project activities are met. Although the methodological aspects of RM are well-defined, the philosophical backgrounds are rather vague. For identifying the list of risk involved in construction industry Post project appraisal method is used in this thesis. Post project appraisal determines the extent to which a project met the budget, timetable and the key deliverables. The questionnaire survey had been carried out in many companies, after the completion of the survey, the results were analyzed. By the result analysis the risks are found and the recommendations were provided.*

**Keywords:** Risk management, Post project appraisal method

## 1. Introduction

Construction industries in the Indian market have to be competitive and efficient, in order to return value to the stakeholders. Presently construction represents one of the most relevant sectors of the Indian economy. Completing project faster than the normal duration is always challenging task to management as it often demands many paradigm shifts. For too long construction projects have failed to achieve the time, cost and targets that clients and their consultants aim for. It is widely acknowledged that there are and always will be difficulties in meeting every project objectives and some degree of compromise is nearly always inevitable. Innovative construction techniques and material can take time whilst budget constraints reduce overall quality. The project manager is described as that person or body responsible for the overall delivery of the project to time, cost and quality targets required by the client or end user.

Common causes of risk include:

- Lack of understanding project objectives, all alternatives and issue that are to be considered during design and construction.
- Lack of timely resolution of issues as raised by project stakeholder.
- Lack of knowledge of poor tracking.
- Lack of compliance with project requirements.
- Insufficiently skilled staff.
- Poorly defined or understood roles and responsibilities.

In the construction business, success is typically measured by three basic performance criteria often called the triple constraint: cost, schedule, and quality. The last years, safety has also been playing an important role, because deficient safety performance on site reduces the project economic revenues. Moreover, accidents have some intangible liability effects in the project participants, namely contractors, owners, project managers and

designers. Project risk includes the process concerned with identifying, analyzing and responding to project risk. It includes maximizing the results of positive events and minimizing the consequences of adverse events.

### Scope of the project

- This study helps to identify the key risks and possible measures to deal with risks the construction industry is facing. All risks observed in the questionnaire can happen to any construction projects.
- The primary goal of this thesis work is not to list out risks that the construction industry is facing but to find out the key risks by ranking that can significantly influence the delivery, quality and safety of construction project.

### Objective of the Study

- To prepare the questionnaire survey for identifying the data about risks in construction industry by Post Project assessment Method.
- To identify the key risk based on the data collected by the questionnaire survey.
- To evaluate the identified risks by analyzing and finding the possible measures to the construction industry in order to avoid the identified risks in the future projects

### Need for study

Construction projects involve great deal of time and capital, so effective construction project risk management skills are required if the projects are to be completed within the established timeline to meet cost elimination and quality requirements. Risk is inherent everywhere especially in construction projects. The activities that are present in the construction industries could result in fatal injuries, financial disasters, disruption and delayed operation, etc. There are many reasons for using risk

management, but the main reason is that it can provide significant benefits far in excess of the cost performing it.

## 2. Methodology

Risk management may be described as “a systematic way of looking at areas of risk and consciously determining how each should be treated”. It is a management tool which aims at identifying sources of risk and uncertainty, determining their impact, and developing management response.

Among various methods involved in risk assessment and management, have selected the method of Post Project Assessment identify the risks involved in the construction industry.

Post Project Assessment is the method is the documentation method performed by external post project appraisal unit usually after the project completion that covers all project information and results of strategic decisions to learn from mistakes and transfer knowledge.

The steps involved in the assessment procedure are listed below

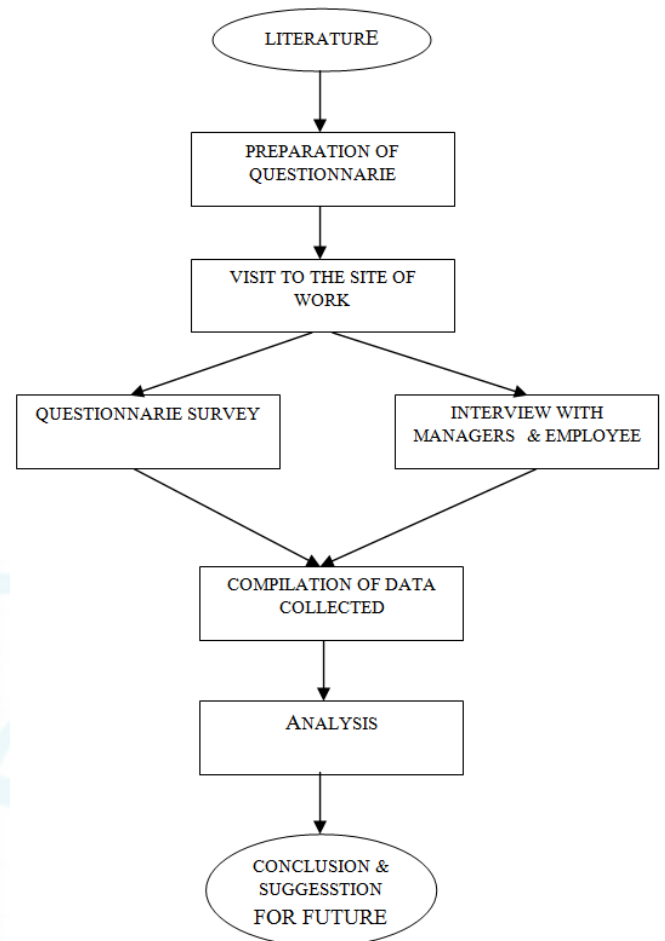
- Study of literature related risk analysis and risk management capabilities.
- Preparation of questionnaire.
- Site visit to major construction project site.
- Questionnaire survey and personal interviews with in charges and managers and collection of data from site.
- Analyzing the questionnaire.
- Qualitative analysis of data obtained from site.
- Remedial measures to be suggested and the present data to be recorded for future references.
- Conclusion, recommendation and suggestion for future study.

### Questionnaire structure

The questionnaire was tested with a pilot survey for clarity, ease of use and value of information that could be gathered. The questionnaire survey is divided into two parts. The first part consist of general information like type of company, experience value of their project etc and the second part consist of the construction risk factors for evaluation.

Risk factors for this study are classified into eight categories namely,

1. Financial risk
2. Legal risk
3. Management risk
4. Policy and political risk
5. Technical risk
6. Environmental risk



3.1 Flow chart illustrating methodology for identifying risks

### Questionnaire design

The survey questionnaire is designed to probe the cross sectional behavioural pattern of the construction risks in construction industry. The questionnaire was prepared for the pilot survey was formulate by seeing the relevant literature in the area of construction risk. The interviewer was free to ask additional question that focused on issues during the course of interview. The freedom to follow the interview to ask for clarification and the focus on specific projects, risk practices and knowledge made the interviews insightful.

### Risk rating

A Likert scale of 1-5 was used in questionnaire. A Likert is a type of psychometric response scale often used in questionnaire and is the most widely used scale in survey research. When respond to a Likert questionnaire item respondents specify their level of agreement of statement. The scale is named after Rensis Likert, who published a report describing its use. The respondents were required to indicate the relative critically, effectiveness of each of the probability of risk factor and their impact to the management.

### 3. Results and Discussion

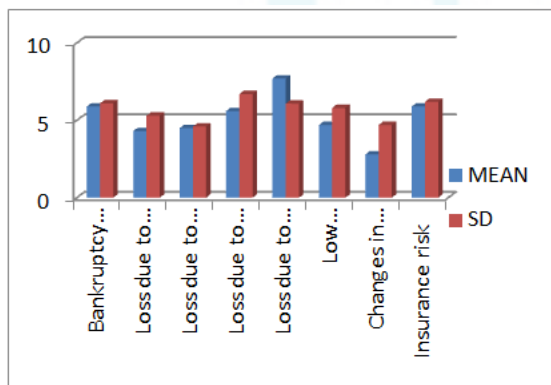
All the questionnaire survey was done from project manager of the project or engineer at the site. In some cases consultant gave answer on the behaviour of their clients, both from the owner and the contractor side.

#### Financial risk

The Survey results of the financial risk are tabulated below with their rankings according to their mean values,

**Table 4.1:** Results of Financial Risk Survey

S No	Financial Risk	Mean	SD	Rank
1	Bankruptcy of project partner	5.9	6.1	2
2	Loss due to fluctuation in inflation rate	4.3	5.3	6
3	Loss due to fluctuation of interest rate	4.5	4.6	5
4	Loss due to fluctuation of exchange rate	5.6	6.7	3
5	Loss due to rise in fuel prices	7.7	6.08	1
6	Low creditability of share holders and lenders	4.7	5.8	4
7	Changes in bank formalities and regulations	2.8	4.7	7
8	Insurance risk	5.9	6.2	2



**Figure 4.1:** Bar chart indicating Financial Risk Survey

According to the survey results the factors that have more impact financially are listed below,

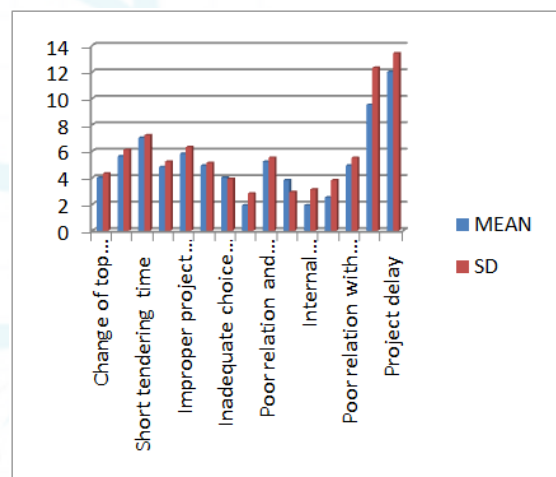
- Loss due to rise in fuel prices
- Insurance risk
- Bankruptcy of project partner
- Loss due to fluctuation of exchange rate

#### Management risk

The Survey results of the Management risk are tabulated below with their rankings according to their mean values,

**Table 4.2:** Results of Management Risk Survey

S No	Management Risk	Mean	SD	Rank
1	Change of top management	4	4.3	9
2	No past experience in similar project	5.6	6.1	5
3	Short tendering time	7	7.2	3
4	Subcontractor related problems	4.8	5.2	8
5	Improper project feasibility study	5.8	6.3	4
6	Improper project planning and budgeting	4.9	5.1	7
7	Inadequate choice of project partner	4	3.9	9
8	Improper project organization structure	1.9	2.8	12
9	Poor relation and dispute with partner	5.2	5.5	6
10	Poor communication between clients	3.8	2.9	10
11	Internal management problems	1.9	3.1	12
12	Team work	2.5	3.8	11
13	Poor relation with government department	4.9	5.5	7
14	Time constraint	9.5	12.3	2
15	Project delay	12	13.4	1



**Figure 4.2:** Bar chart indicating Management Risk Survey

According to the survey results the factors that have more impact financially are listed below,

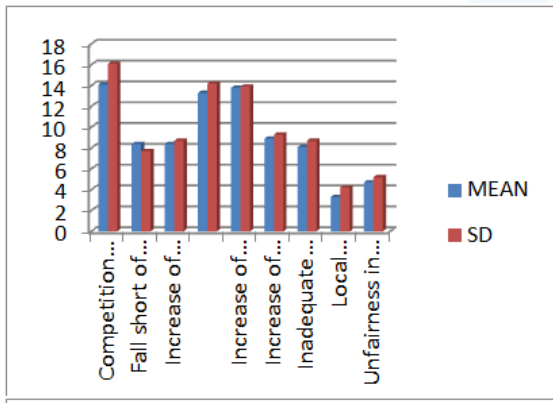
- Project delay
- Time constraint
- Short tendering time

#### Market risk

The Survey results of the Market risk are tabulated below with their rankings according to their mean values,

**Table 4.3:** Results of Market Risk Survey

S No	Market Risk	Mean	SD	Rank
1	Competition from other companies	14.1	16.1	1
2	Fall short of expected income from project	8.4	7.7	5
3	Increase of accessory facility price	8.4	8.7	5
4	Increase of labour cost	13.3	14.2	3
5	Increase of material price	13.8	13.9	2
6	Increase of resettlement cost	8.9	9.3	4
7	Inadequate forecast about market demand	8.1	8.7	6
8	Local protectionism	3.3	4.2	8
9	Unfairness in tendering	4.7	5.2	7



**Figure 4.3** Bar chart indicating Market Risk Survey

According to the survey results the factors that have more impact on market are listed below,

- Competition with other companies
- Increase of material price
- Increase of labour cost

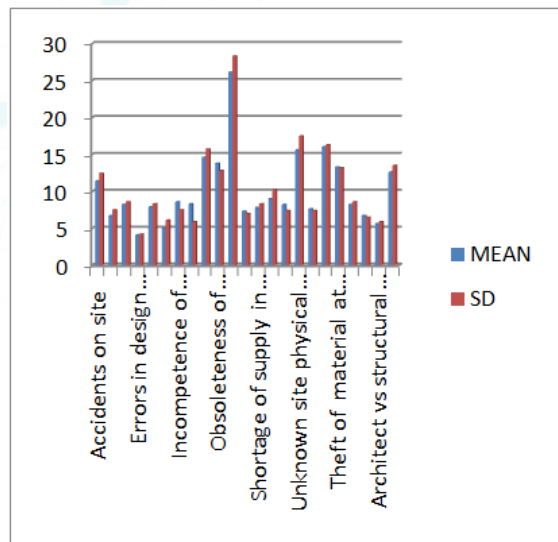
**Technical risk**

The Survey results of the Technical risk are tabulated below with their rankings according to their mean values,

**Table 4.4** Results of Technical Risk Survey

S No	Technical Risk	Mean	SD	Rank
1	Accidents on site	11.4	12.4	8
2	Design changes	6.7	7.5	17
3	Equipment failure	8.2	8.6	12
4	Errors in design drawings	4.1	4.2	20
5	High degree of difficulty of construction	7.9	8.3	14
6	Stiff environmental regulation	5	6.1	19
7	Incompetence of	8.6	7.5	10

	transportation facilities			
8	Industrial disputes	8.3	5.9	11
9	Material shortage	14.6	15.7	4
10	Obsolescence of building equipment	13.8	12.8	5
11	Poor quality of procured material	26.1	28.3	1
12	Problems due to partner different practice	7.3	7	16
13	Shortage of supply in water	7.8	8.3	15
14	Shortage in supply fuel	9	10.2	9
15	Shortage in supply electricity	8.2	7.4	12
16	Unknown site physical condition	15.6	17.5	3
17	Following government standards and codes	7.6	7.4	12
18	Wastage of materials by work	16	16.3	2
19	Theft of material at site	13.3	13.2	6
20	Site distance from urban area	8.2	8.6	11
21	Surplus material handling	6.7	6.5	17
22	Architect vs structural engineer disputes	5.6	5.9	18
23	Shortage of skillful workers	12.6	13.5	7



**Figure 4.4** Bar chart indicating Technical Risk Survey

According to the survey results the factors that have more impact technically are listed below,

- Poor quality of procured material
- Wastage of materials by workers
- Unknown site physical condition

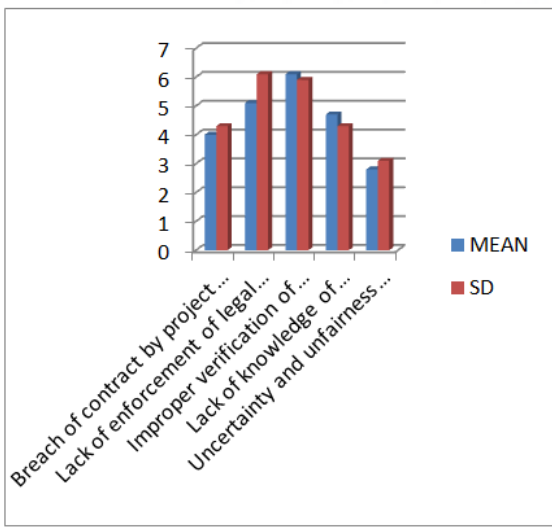


**Legal risk**

The Survey results of the Legal risk are tabulated below with their rankings according to their mean values,

**Table 4.5** Results of Legal Risk Survey

S No	Legal Risk	Mean	SD	Rank
1	Breach of contract by project partner	4	4.3	4
2	Lack of enforcement of legal judgement	5.1	6.1	2
3	Improper verification of contract document	6.1	5.9	1
4	Lack of knowledge of arbitration	4.7	4.3	3
5	Uncertainty and unfairness of court justice	2.8	3.1	5



**Figure 4.5** Bar chart indicating Legal Risk Survey

According to the survey results the factors that have more impact legally are listed below,

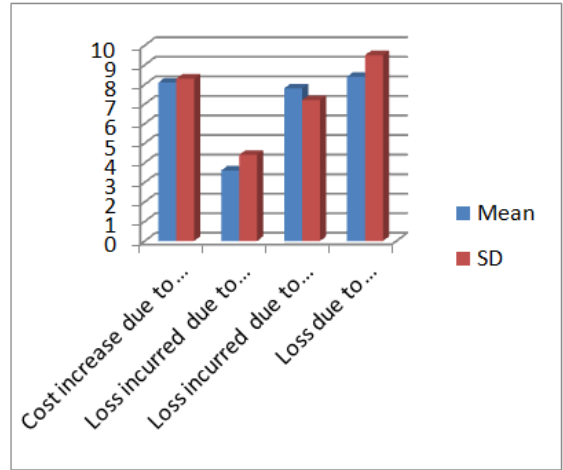
- Improper verification of contract document
- Lack of enforcement of legal judgement
- Lack of knowledge of arbitration

**Political risk**

The Survey results of the Political risk are tabulated below with their rankings according to their mean values,

**Table 4.6** Results of Political Risk Survey

S No	Political Risk	Mean	SD	Rank
1	Cost increase due to changes of government policies	8.1	8.3	2
2	Loss incurred due to correction and bribery	3.6	4.4	4
3	Loss incurred due to political changes	7.8	7.2	3
4	Loss due to bureaucracy for late approvals	8.4	9.5	1



**Figure 4.6** Bar chart indicating Political Risk Survey

According to the survey results the factors that have more impact politically are listed below,

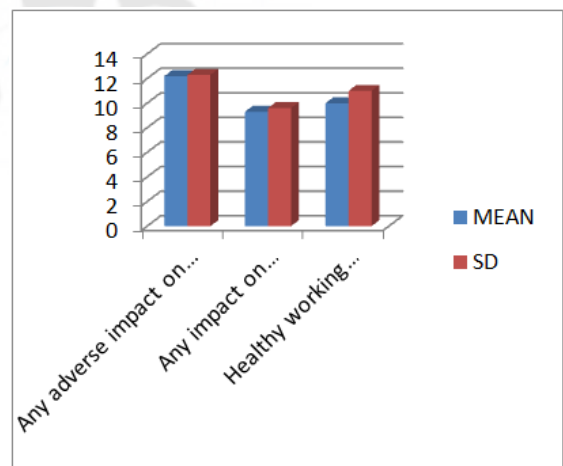
- Loss due to bureaucracy for late approvals
- Cost increase due to changes of government policies
- Loss incurred due to political changes

**Environmental risk**

The Survey results of the Environmental risk are tabulated below with their rankings according to their mean values,

**Table 4.7** Results of Environmental Risk Survey

S No	Environmental Risk	Mean	SD	Rank
1	Any adverse impact on project due to climatic changes	12.2	12.3	1
2	Impact on environment due to the project	9.3	9.6	3
3	Healthy working environment for workers	10	11	2



**Figure 4.7** Bar chart indicating Environmental Risk Survey

According to the survey results the factors that have more impact to the Environment are listed below,

- Any adverse impact on project due to climatic changes
- Healthy working environment for workers

#### 4. Conclusion

The following are the recommendations from this thesis work,

- Shortage of skilful workers is the major risk faced by almost all companies. This is because the skilled workers migrating between companies very often due to high demand in the market.
- Though inflation rate in India remains much lower than in many other developing countries this causes construction industry a hefty price. Rising fuel prices have also be behind rising inflation in India. There is no single window entry for the investors and developers like in other developing and developed countries, which causes great time delay. Thus both the state and central government should make a single window system for the approvals.
- Delay in the project is also the main risk, but this delay is looped with various factors and risks directly or indirectly. The delays in projects are caused because of lack of communication, shortage of supply of materials and design errors. The delays may also be caused by slow decision making and financial issues.
- The risk of competition from other companies constitutes major problem to the small and medium sized companies. Due to the policy of Indian government that 100% FDI is allowed in the construction sector while allowed foreign companies to enter the market, created a stiff competition to the local companies both technically and financially.
- Political risk is substantially very low for the large firms when compared to other risk. Legal risk is also very low. Large companies are accepting that there are few environmental effects due to their project says that it is a global phenomena and it cannot be nullified, but only can be reduced.
- Overall market Management and financial risk are high when compared to other risks.

#### References

- [1] AhmetOztas and Onderokmen, (2004) “judgemental risk analysis process development in construction projects” Civil Engineering Department,University of Gaziantep.
- [2] DaudNasir, Brenda Mccab, and Loesie Hartono “Evaluating Risk in Construction Schedule Model” “Journals of Construction Engineering and Management ASCE/September/October 2003/527.
- [3] Edward J. Jaselskis , Associate member , ASCE and Jeffrey S. Russell, Associate member, ASCE “ Risk analysis approaches to selection of contractor evaluation method” “Journals of Construction Engineering and Management ASCE/June 2005/635
- [4] D.K. Ahadzie and D.G. Proverbs (2008) ‘Critical success criteria for mass house building projects in developing countries’, 675–687
- [5] G. Sweis and R. Sweis (2008) ‘Delays in construction projects: The case of Jordan’, 665–674.
- [6] Kyoo-jinyil and David Langford “Scheduling Based Risk Estimation and Safety Planning for Construction

- Project” “ Journals of Construction Engineering and Management ASCE/June2006/635.
- [7] Mohamed SayedBassiony Ahmed Abd El-Karim and Omar AlyMosa El Nawawy (2015) ‘Identification and assessment of risk factors affecting construction projects’
- [8] M.Pilar de la Cruz, P.E, Alfredo del Cano. P.E, m ASCE and Elisa de la Cruz “Downside Risk in Construction Projects Developed” by civil service the case of Spain”Journals of Construction Engineering and Management ASCE/june2006/635.
- [9] Osama Ahmed Jannadi and Salman Almishari “Risk Assessment in Construction” “ Journals of Construction Engineering and Management ASCE/September/October 2003.
- [10] RutaCiutiene and EvelinaMeiliene (2015) ‘Main Factors Influencing Efficient Planning Of International Projects: Sample Of High Schools International Projects’, 1506 – 1516
- [11] ShouQuing Wang , Robert , Tiong , member ASCE , SengKiong Ting , “ Political Risk Analysis of Key Contract Clauses in China’s BOT project” Journals of Construction Engineering and Management/may/June 1999.
- [12] Tien-ChoonToh and Connie Ting (2013) ‘Critical cost factors of building construction projects in Malaysia’, 360 – 367
- [13] Wenzhe Tang, MaoshanQiang, Colin F, Duffield, David M,Young and Youmeilu “Risk management in Chinese Construction Industry” “Journals of Construction Engineering and Management ASCE/December2007.
- [14] Prashanth Kapila and Chris Hentricson (2001) “Exchange rate risk management in international construction ventures” journals of management in engineering,vol 17, no 4, ASCE, p 186;191.
- [15] Ralf L Kleim and Irvin S Ludin (1998) “ Project management practitioners hand book” ISBN AMACOM BOOKS: 0814403964.
- [16] Rizwan U.Farooqui, SaroshH.Lodi and FarhanSaleem (2007) “ Risk management perceptions and trend among contractorsin Pakistan” , Fourth international conference on construction in th 21<sup>st</sup> century accelerating innovation in engineering, management and technology, Australia paper 25, p 197-216.
- [17] Rolf Olsson, (2006) , “ Managing project uncertainty by using an enhanced risk management process”, Department of innovation, Design and Product Development Malardalen University press. ISBN Number 91-85485-27-6