Factors influencing financial risk management in construction projects

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Abstract. The infrastructural and economic development of a country merely depends on the construction industry and its growth. There are many risk factors involved with the construction industry during planning, execution and commissioning of the projects. Dealing with the risk factors in construction industry have been known as a crucial management process in order to achieve the overall objectives of the industry in terms of cost, time, safety, quality and environmental sustainability. This report is related with the financial aspects which directly take part in the industry for which studies have been conducted with various engineers, contractors and labors in and around north-western districts of Tamilnadu. The perspectives at different levels of management have been concluded with the standard questionnaire format that has been investigated and their results are analyzed based on the current scenario. With the help of these surveys and data analysis by Relative Importance Index (RII), the most related factors among the identified factors were found to be labour risk, material risk, credit risk, planning risk, execution and environmental related factors. The suggestions and recommendations have been expressed to overcome those risk moderations.

1. Introduction

Construction industry is a complex, effective and very challenging aspect in the growing world. It requires extra care and conditions to adapt in the considerable resource management, labor necessities, equipments, techniques, contract management and various advisories with the acceptance of ownership to achieve the major goals and objectives of the industry. Apart from various complex tasks involved in construction, risks and uncertainties involved in various processes are an expected part of this vast serving industry. The development in terms of economic aspects depends on the growth of construction industry by overcoming the uncertainties.

This is an action research project from the literature survey and direct interviews with field persons involved in construction industry. The problems and issues in the financial risk management were identified through questionnaire survey based on the feedbacks and recommendations from the various people involved in construction industry including labors, contractors, and engineers. These data were scrutinized and analyzed for finding the major risks that leads to financial risk in construction industry. It also involves framing the suggestions and recommendations for an effectively reducing the financial risk in the construction industry.

2. Factors related to Financial risk in Construction projects

As per the reports and feedbacks collected from the engineers, contractor, labours, owners and the common people about the common risks happened in the construction site, many factors that are related to the financial risks were identified in the construction projects. They include,

- Inappropriate construction programming takes place.
- Reason for emergence of conflicts and disagreement.
- Sponsor bankrupt.
- Political changes.
- Economic crisis.
- Market inflation.
- Variation rate of exchange.

- Taxation risk.
- Material price fluctuations .
- Delay in sponsor decisions.
- Interference between sponsors.
- Work permit by sponsor.
- Short contract duration made by sponsor.
- Clients' financial stability.
- Delay in payment process by client.
- Tax regulation change.
- Industrial regulation change.
- Unstable government.
- Poor financial market.
- High financial cost.
- Unavailability of competent staff.
- Quality of equipment and raw material.
- Profit rate.
- Cash flow.
- Cost of materials.
- Liquidity of organization.
- Cost of variation order.
- Project over time cost.
- Motivation cost.
- Improper construction method by subcontractor.
- Project complexity.
- Unclear and inadequate detail drawing.
- Mistakes/errors during construction.

The factors mentioned above were grouped in order to focus the unique factors relating to the identified factors influencing financial risk involved in construction projects as:

- Labour risk
- Material risk
- Credit risk
- Execution risk
- Environment risk
- Planning risk

3. Data Analysis

The data collected through questionnaire survey from various respondent profiles are then consolidated and analyzed for ranking them in order to find the factors with higher degree of impact to materials management in construction projects. Various statistical tools were available to test the data and here we implemented a tool named Relative Importance Index (RII).

3.1. Relative Importance Index (RII)

The relative index of inequality (RII) is a regression-based index which summarizes the magnitude of socio-economic status (SES) as a source of inequalities in health. RII is useful because it takes into account the size of the population and the relative disadvantage experienced by different groups.

$$\mathbf{RII} = \sum \mathbf{W} / \mathbf{A}^{*}\mathbf{N}$$

Where,

W - Weightage given to each statement by the respondents ranging from 1 to 5.
A - Highest response integer.
N - Total number of respondents

3.2. Questionnaire Summary

This survey includes the professionals like project managers, supervisors, contractors, project engineers and quantity surveyors. Proceeding with 80 questionnaires, 67 were answered and those 67 questionnaire responses have been used for the result analysis.

Table 1. Questionnaire Summary

Questionnaires Proceeded	80
Questionnaires Received	67
Response Rate	83.75%

4. Results and Discussion

The data collected through questionnaire survey from various personnel involved in the various construction projects were consolidated and analyzed using Relative Importance Index (RII) method and the subsequent formula was used to interpret the responses received from various sources of data. The results obtained by using Relative Importance Index (RII) method were given below.

Table 2. RII Results

	Factors	RII	Rank
1	Labour Risk	0.936	1
2	Material Risk	0.914	2
3	Credit Risk	0.847	3
4	Execution Risk	0.732	4
5	Environment Risk	0.731	4
6	Planning Risk	0.637	6

The results from RII method shows that among the identified factors, the financial management in construction projects greatly relies on the following five factors with highest values of Relative Importance Index (RII) as follows: labour risk (0.936), material risk (0.914), credit risk (0.847), execution risk (0.732), environment risk (0.731) and planning risk (0.637).

The results revealed that the majority of the respondents considered labour related issues as a major factor in financial risk management of construction projects followed by other factors as material related risks, credit risk, execution risk and environment risk. The shortage of labour availability is raising a big threat to construction industry especially in Tamilnadu where the contractors depend on labours from northern region of our country to execute the construction activities. The another major factor being the material risks that need to be monitored right from the planning and procurement stage and maintaining proper inventory must be ensured for timely execution of the scheduled works. The credit risk must be evaluated during the planning stage and proper monitoring structure will help to eliminate planning, execution and environment related risks.

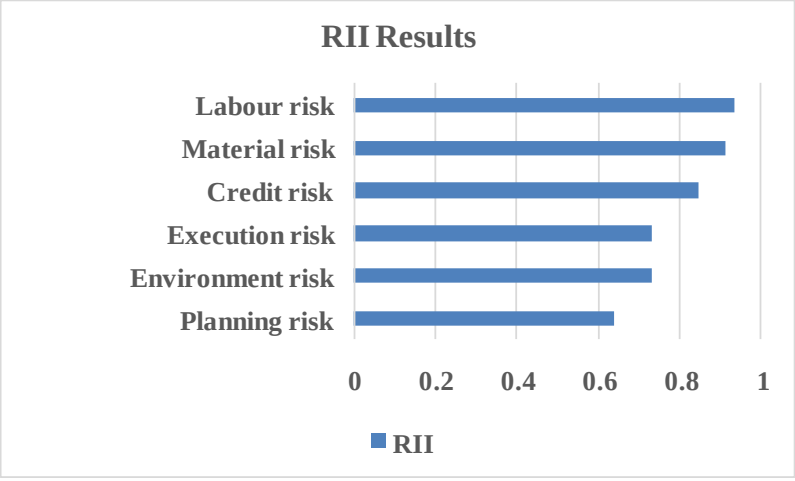

Figure1. RII Value chart

5. Conclusion

The data analysis helped to identify the factors that are to be closely monitored to minimize the financial risk in construction companies. The entire Indian construction industry faced the financial risk during the

pandemic in various aspects. This paper focussed the risks concepts of financial aspects in and around north-western parts of Tamilnadu which may lead to loss of money for the personnel involved in construction projects. Based on the questionnaire survey and data analysis, it is suggested to recognise the miscommunication between labour and other management authorities to avoid employee related issues to ensure efficient workmanship. Proper inventory management helps to resolve material related issues in advance such that it does not pose any financial risk to the project involved. Well established credit details can enable smooth transactions to eliminate credit risks. Execution and environment related risks can be controlled by declaring proper hierarchy levels for executing the tasks by the supervisor, site engineer, labour, contractor and other personnel involved in the project to have the appropriate structure to track the project progress and eliminate the financial risks that may occur in construction projects.

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