



Literature review on Risk Assessment & Risk Management in Construction project

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Abstract: Construction projects are known for being extremely complex and uncertain due to a variety of factors. It is challenging to investigate a network when hundreds of stakeholders are involved in construction initiatives. However, these initiatives also provide an excellent setting for network and risk management studies. Furthermore, management research routinely uses construction projects, and numerous tools and methodologies have previously been developed specifically for this kind of project. But there's a disconnect between risk management strategies and how building contractors use them. This essay discusses various approaches to risk identification, the kinds of risks connected to building projects, and various strategies for mitigating those risks.

Keywords: Risk management, Risk analysis, Risk mitigation, Risk transfer, Impact

I. INTRODUCTION-

Identification, evaluation, and preference-setting for risk reduction make up risk management. This could involve monitoring and managing any unfavourable occurrence that might occur in addition to employing materials and resources in a coordinated and economical manner to reduce potential threats. Risk can arise from a variety of sources, including credit risk, natural disasters, mishaps, project failure, and legal concerns. Risk is commonly defined in the construction business as the existence of real or possible dangers or opportunities that impact the project's goals throughout construction, commissioning, or use. Another definition of risk is the exposure to the possibility of an incident that could positively or negatively impact a project. Within the construction sector, risk is commonly understood to be the existence of prospective or real dangers or opportunities that could impact a project's goals while it is being built, put into service, or is being commissioned. Risk can also be described as the possibility of events occurring that could have a positive or negative impact on project objectives due to uncertainty.

II. TYPES OF RISKS –

The following is a listing of many construction industry risks and exposures.

- a. **Financial Risk** - This risk is the totality of all risks that relate to financial developments external to the project that are not in the control of the project developer. This results from consequences that may have adverse economic effects.
- b. **Political Risk** - The project company and the lenders face the risk that the project execution may be negatively affected by acts of the contracting authority (Government), another agency of the government or the host country's legislature.
- c. **Legal Risk** - It is the risk of non-compliance with legal or regulatory requirements. Much of the law is general and will apply to all organizations e.g. employment law, health and safety, environmental legislation, etc.
- d. **Environmental Risk** - These are risks relating to occurrence of environmental incidents during implementation of the project. These risks are generally within the control of the construction and the operation and maintenance consortium. This risk has increased due to the presence of strict legal liability in relation to such environmental incidents, which can result not only in adverse effects on the financials of a project but may also cause a closure of any work or operations of and in relation to the facility.

III. Risk Management in Construction

Construction risk management is the process of evaluating and implementing procedures to reduce the impact of risks in construction projects. This risk management process involves thorough planning to create a risk management plan that allows project managers to identify, monitor and mitigate risks as they arise. A construction risk management plan is developed in the early stages of the construction planning process. It details what project risks might occur and the risk response to resolve them. This includes designating someone on the crew to own the issue and address it.

The Construction risk Management Process - The process of mitigating risk for a construction project is no different than any other project. The only difference is the type of risks you're managing in the construction industry. Here are the five steps of the risk management process.

- a. **Identification:** First, make a list of every possible issue that could arise. Do the research, talk to your crew, and explore historical data from past construction projects that are similar to yours. While this identification list is always open for edits and updates, you should have a set deadline so that you don't get bogged down in analysis. Table shows the techniques, assessment, and categorization of risk in risk identification process.

| Techniques | Assessment | Categorization |
|----------------------|---------------------------|----------------|
| Check list | Potential impact | Unacceptable |
| Interviews | | Critical |
| Expert system | Probability of occurrence | Significant |
| Questionnaire | | Insignificant |
| The Delphi technique | | Acceptable |

Table 1 – Risk Identification

- b. **Assessment:** Not all risks are equal. Some are more likely to occur, others less so. One way to assess your list of risks is to use a risk assessment matrix, which charts the likelihood of each risk and the size of the impact it can have on your project. Creating a risk assessment matrix helps you when addressing the risk if it appears. The table below summarises the various techniques used for risk analysis; all these techniques are used in construction.

| Risk Analysis | |
|----------------------|----------------------|
| Qualitative | Quantitative |
| Direct judgment | Probability analysis |
| Ranking options | Sensitivity analysis |
| Comparing options | Scenario analysis |
| Descriptive analysis | Simulation analysis |

Table 2– Risk Analysis

- c. **Mitigation** - This is where you implement a contingency plan that will reduce the likelihood and impact of the risks you identified earlier. The top priority, of course, is those you defined as highly likely and having the greatest impact. These should be given an owner, who will be responsible for identifying the risk (if it occurs) and managing its resolution.
- d. **Monitoring:** This step is always ongoing, as you attempt to identify these risks when they show up. That includes monitoring the effectiveness of your mitigation plan. Also, stakeholders should be consulted and kept updated on these project risks. Engage other department leaders to help and empower the team to respond to risk. Have them note if a risk has moved to a different spot on your risk assessment matrix.
- e. **Reporting:** Your construction risk management plan should be analysed and shared with the crew and stakeholders. These reports on risk mitigation allow you to evaluate the effectiveness of the contingency plan. While this can be done with an Excel spreadsheet, using project management software is more efficient. Online tools gather the data automatically, create dashboards to illustrate progress and even generate reports that are easily distributed.

IV. RISK MATRIX

Risks in project management are unexpected events that may or may not occur and impact your project outcome in some way. According to the Project Management Institute (PMI), analysing and managing risks is a key practice in project management. It improves the chances of successful project completion while reducing the consequences of any risk that occurs.

Risks can appear related to any aspect of a project, including the budget, resources, processes, or technology, to name just a few. While it can be easy to assume that all risks bring negative consequences to the table, it's essential to understand that positive risks can also occur during the project life cycle.

A risk assessment matrix (sometimes called a risk control matrix) is a tool used during the risk assessment stage of project planning. It identifies and captures the likelihood of project risks and evaluates the potential damage or interruption caused by those risks. The risk assessment matrix offers a visual representation of the risk analysis and categorizes risks based on their level of probability and severity or impact. This tool is a simple, effective way to get a holistic view of the project risks for all team members and key stakeholders.

| | | Impact | | | | |
|------------|---------------|------------|---------|----------|-------------|--------|
| | | Negligible | Minor | Moderate | Significant | Severe |
| Likelihood | Very Likely | Low Med | Medium | Med Hi | High | High |
| | Likely | Low | Low Med | Medium | Med Hi | High |
| | Possible | Low | Low Med | Medium | Med Hi | Med Hi |
| | Unlikely | Low | Low Med | Low Med | Medium | Med Hi |
| | Very Unlikely | Low | Low | Low Med | Medium | Medium |

Table 3– Risk Matrix

V. METHODOLOGY

The work methodology included a literature search. The research was conducted with reference to existing theoretical literature, published and unpublished literature. This research is mainly a literature review and looks at the literature relating to risk identification in the construction industry. This is because the concepts of risk and risk management have been on agenda for many years. To ascertain the aim of the study literature on risk management was embarked which considered subtitles including definition of risk, concept of risk management and methods employed in identifying and analysing risks in constructions.

VI. CONCLUSION

While most studies have focused on some aspects of project management, this paper has examined literature relating to risk management with the accomplishment of all project objectives regarding cost, time, quality, environment, and safety. To achieve the objective of this study, the concepts of risk, RM and methods used in analysing/assessing risk were reviewed. The literature showed that risk identification, risk analysis and assessment, risk response and control are crucial phases in risk management process. Risks must first be identified before they can be controlled or mitigated. Accordingly, this study concludes that risk management should be considered as the most significant activity for successful completion of a project. Risk identification techniques as concluded from this study includes the following: brainstorming, interviews/expert opinion, questionnaires, Delphi technique, expert systems, checklists and documentation review. In the analysis of risk, two categories of methods are developed: qualitative and quantitative methods. Literature revealed risk avoidance, risk reduction, risk transfer and risk retention as techniques mostly used in responding to risk. The study further concludes that issues with possible threats envisaged in a project are not only a means to reduce losses within the project, but also, a means to transfer risks into opportunities, which can lead to economic profitability.

VII. REFERENCE

1. Krantikumar mhetre, B.A Konnur in Risk Management in Construction Industry, International journal of engineering vol.5 8 & 9 jan 2016
2. Mr. N. V. Patil, risk Management in road construction, international journal of modern trends in engineering 2 & 4 ,2015
3. Mr Satish K. Kamane, Mr Sandip A. Mahadik, Risk management in construction industry ISOR Journal of mechanical & civil engineering
4. Nerija b % Audrius B, Risk management in Construction project
5. Creedy, G.D. (2005). Risk factors leading to cost overrun in the delivery of highway construction projects. PhD thesis, Queensland University of Technology, Australia
6. Laryea, S. (2008). Risk pricing practices in finances, insurance and construction. In: COBRA Research Conference, September 4th – 5th, Dublin Institute of Technology 4. Loosemore, M., Raftery, J., Reily, C. & Higgin, D. (2006). Risk management in projects. London: Routledge
7. Edwards, P.J. & Bowen, P.A. (2005). Risk and risk management in construction: a review and future direction for research, engineering, *Construction and architectural management*, 5(4): 339-349.