



COMPARATIVE STUDY ON FACTORS INFLUENCING RISK MANAGEMENT USING SPSS IN CONSTRUCTION PROJECT

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Abstract—The construction industry is characterized by its high level of dynamism, risk, and challenge. Given the intricate and exceptional nature of the construction project, the quantity of hazards involved surpasses those typically encountered in other businesses. This project seeks to examine the risk management process in construction projects and establish a foundation for future research in order to produce a risk management framework that can be utilized by potential investors, developers, and contractors.

Projects within the construction sector are characterized as fragmented, temporary and complex which inherently brings upon risk exposure. Decision makers within the industry need reliable access to information and knowledge in order to manage risks in a sufficient and systematic way. Thus, the implementation of an effective risk management in relation to managing associated project risk knowledge may facilitate successful construction project endeavors.

Introduction

The purpose of this thesis is to explore and evaluate project risk management within the Indian construction industry, with the emphasis on the perspective of Indian contractors. The objective of this study is to conduct a comparative analysis of ongoing building construction utilizing the IBM SPSS program. The aim is to examine the recognition and practical adoption of risk management in order to investigate how project knowledge is utilized in the process. A survey will be performed and distributed to gather feedback regarding the different hazards that arise on building sites. Consequently, individuals involved in the projects encounter diverse hazards, including operational demands, excessive expenses, and numerous forms of mishaps during the project.

Risk management is a branch of construction management. 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. The benefits of the risk management process include identifying and analysing risks, and improvement of construction project management processes and effective use of resources.

The construction industry is heterogeneous and enormously complex. There are several major classifications of construction that differ markedly from one another: housing, non-residential building, heavy, highway, utility, and industrial [Keoki, 2008]. Construction projects include new construction, renovation, and demolition for both residential and non-residential projects, as well as public works projects, such as streets, roads, highways, utility plants, bridges,

tunnels, and overpasses. The success parameters for any project are in time completion, within specific budget and requisite performance (technical requirement). The main barriers for their achievement are the change in the project environment. The problem multiplies with the size of the project as uncertainties in project outcome increase with size [Dey PK., 2002, Dey PK., 2010]. Large construction projects are exposed to uncertain environment because of such factors as planning, design and construction complexity, presence of various interest groups (owner, consultants, contractors, suppliers, etc.), resources (manpower, materials, equipment, and funds) availability, environmental factors, the economic and political environment and statutory regulations.

Construction projects can be unpredictable. Managing risks in construction projects has been recognized as a very important process in order to achieve project objectives in terms of time, cost, quality, safety and environmental sustainability [Zou.,2007]. Project risk management is an iterative process: the process is beneficial when is implemented in a systematic manner through- out the lifecycle of a construction project, from the planning stage to completion. In the European Union construction is the sector most at risk of accidents, with more than 1300 people being killed in construction accidents every year. Worldwide, construction workers are three times more likely to be killed and twice as likely to be injured as workers in other occupations. The costs of these accidents are immense to the individual, to the employer and to society. They can amount to an



appreciable proportion of the contract price.

Risk management is an essential component of construction projects, playing a central role in guaranteeing the successful and timely completion of the project. Construction projects inherently entail a multitude of variables, encompassing environmental considerations, regulatory modifications, and unforeseen site conditions. Efficiently controlling these risks is crucial to reduce any interruptions and avoid financial losses. An essential element of risk management in building projects involves the early detection and recognition of potential problems. This entails a thorough evaluation of project specifications, site circumstances, and external variables that may influence the construction procedure. Through the identification of potential hazards in advance, project managers can formulate proactive plans to effectively tackle and minimize these difficulties before they worsen.

In addition, the evaluation of project hazards goes beyond simply identifying them and includes both qualitative and quantitative analysis. Qualitative analysis entails assessing the influence and probability of each identified risk, whereas quantitative analysis evaluates the potential financial consequences. By using this dual strategy, project teams are able to properly prioritize risks and deploy resources to address the most serious concerns. After identifying and analyzing risks, the subsequent phase entails creating a comprehensive risk response plan. This strategy delineates precise measures to be implemented in response to recognized risks, encompassing risk mitigation, risk transfer, risk acceptance, or a blend of these approaches. Effective dissemination of the risk response plan to all stakeholders is crucial to establish a cohesive comprehension of potential difficulties and the associated measures to minimize them.

Consistent surveillance and re-evaluation of hazards during every stage of the construction project's lifespan have similar significance. As the conditions of the project develop, new risks may arise and the severity of existing risks may vary. Continuous risk monitoring enables prompt modifications to the risk management plan, guaranteeing its pertinence and efficacy throughout the project's duration. Ultimately, efficient risk management is essential for achieving favorable results in building projects. Through a methodical process of identifying, examining, and addressing potential risks, project teams can improve their capacity to manage uncertainties, reduce interruptions, and eventually complete construction projects according to schedule and budget.

FACTORS OF RISK MANAGEMENT

Risk management in construction projects is a crucial process that involves identifying, assessing, and mitigating potential risks to ensure the successful completion of a project within scope, time, and budget constraints. Here are key aspects of risk management in construction projects:

1. Risk Identification:

Project-specific Risks: Identify risks unique to the project, such as site conditions, weather, and regulatory requirements.

External Risks: Consider external factors like economic conditions, political stability, and market trends.

Internal Risks: Evaluate risks related to project management, team dynamics, and communication.

2. Risk Assessment:

Quantitative Assessment: Assign numerical values to risks based on probability and impact.

Qualitative Assessment: Use expert judgment to assess risks based on their potential severity and likelihood.

Risk Categorization: Classify risks into categories like technical, financial, legal, or environmental.

3. Risk Mitigation:

Risk Avoidance: Modify the project plan to eliminate the risk entirely.

Risk Transfer: Shift the risk to another party through contracts, insurance, or warranties.

Risk Reduction: Implement measures to decrease the probability or impact of identified risks.

Risk Acceptance: Acknowledge the risk without taking active steps to mitigate it, often appropriate for low-impact risks.

4. Risk Monitoring and Control:

Regular Monitoring: Continuously monitor the project environment for changes that could affect identified risks.

Contingency Planning: Develop contingency plans for

high-priority risks to address them promptly if they occur.

Communication: Maintain open communication channels to ensure that all stakeholders are aware of potential risks and mitigation strategies.

5. Documentation:

Risk Register: Maintain a comprehensive risk register that includes details of identified risks, their assessment, and mitigation plans.

Lessons Learned: Document lessons learned throughout the project to improve risk management processes in



future projects.

6. Stakeholder Involvement:

Engage Stakeholders: Involve all relevant stakeholders in the risk management process to benefit from diverse perspectives.

Risk Ownership: Clearly assign responsibility for managingspecific risks to individuals or teams.

Legal and Regulatory Compliance:

Stay Informed: Be aware of and comply with relevant laws,regulations, and industry standards.

Contractual Agreements: Ensure that contracts clearly define risk responsibilities and mechanisms for resolution.

7. Technology and Data Analytics:

Risk Modeling: Use technology and data analytics to model and simulate potential risks, helping in better decision-making. Project Management Software: Implement project management tools that facilitate real-time tracking of risks and mitigation actions.

8. Insurance:

Risk Transfer: Consider purchasing insurance policies to transfer certain risks, such as property damage or liability, toan insurance provider.

9. Continuous Improvement:

Post-Project Review: Conduct a thorough review after project completion to analyze the effectiveness of risk management strategies and identify areas for improvement.

Risk management in the construction project includes identifying, analyzing, and responding to various risks to achieve the project objective. Hence, the risk is considered a negative term in construction projects. In theory, the risk is usually defined as a positive or negative deviation of a variable from its expected value. In general, the risk is understood only as a loss. The definition of risk, in the meantime, not least, takes into account the chances. The business owner must first know their risk sufficiently well to turn risks into chances. Risk management constitutes a strategy to avoid losses and use available chances or risks potentially arising from risks. The strategy demands

from the person taking action a precise "consideration" and "assessment" of the situation and the scenarios probably occurring in the future. On this basis, decisions are made in the hope of having eliminated all risks and used all chances. This means recognizing potential risks and circumventing a threat by averting, evading, or reducing their negative effects. This project aims to investigate the risk management process in construction project

SCOPE AND OBJECTIVE OF THIS RESEARCH WORK

To identify the different risks involved with the project, such as construction, labour, material, machine, and financial concerns. To analyze the variables associated with different types of risks.

To gather data through questionnaire survey from different respondents in construction industry.

To analyze risks using the statistical approach, utilize the evaluation form to provide ratings.

SUMMARY FROM LITERATURE SURVEY

Perceiving risk management as a constructive procedure is crucial, regardless of the negative connotation associated with the term "risk". Construction organizations should incorporate risk as an essential component of their project management. We have comprehended that there exist multiple techniques for the identification and analysis of risks. Construction firms should implement risk management strategies to enhance efficiency and achieve higher success. Professionals in the construction business employ risk management approaches outlined in the literature, albeit without conscious awareness.

By implementing a straightforward approach, it is feasible to readily detect potential hazards. Furthermore, it is capable of identifying the specific risks that have the most significant influence on time, cost, and quality. The identified hazards should be completely removed or reduced through the implementation of appropriate measures. The following conclusions were arrived based on the literature studies made; the success of a construction project is significantly influenced by the performance of the project management team. Among the unintentional hazards connected to subpar project management are Uncertain or unreachable project goals

Poor scoping; Poor estimation;

Budget based on incomplete data; Contractual problems;

Insurance problems;Delays

Quality concerns; insufficient time for testing

METHODOLOGY

Conducting research on contractors' risk perception, effectively managing their comprehension of it, and implementing risk management practices within the construction industry all require the implementation of a comprehensive strategy. A comprehensive literature review and the collection of empirical data from two



sources—questionnaire-based survey research and semi-structured interviews—comprise the procedure. Four phases comprise the process of risk management: risk identification, risk monitoring, risk assessment, and risk response. Risk monitoring is the methodical surveillance and evaluation of risk levels within a given organization. In addition to supervising and assessing the efficacy of risk management strategies, this field of study closely monitors the risk itself. Risk identification is the procedure by which potential threats that could hinder the accomplishment of objectives in a program, organization, or investment are recognized.

It requires communication and documentation of the issue. A risk assessment entails the methodical identification of potential dangers and the evaluation of the repercussions that could result from their actualization. The response or action of a leader when confronted with a possible threat. Alternative approaches may be employed, including avoidance, which entails eradicating the circumstances that facilitate the presence of the hazard. Reduce the likelihood and/or probability that the risk will materialize by implementing measures to mitigate or reduce its impact. In order to identify risks associated with this thesis, questionnaires are distributed and responses are gathered. The matrix method is employed to perform risk assessment, which is subsequently followed by the delivery of solutions.

RISK

Risk is the expression of potential consequences resulting from a lack of understanding. Risks are areas of uncertainty that we perceive as posing a potential danger to the endeavour.

RISK MANAGEMENT

Risk management is the process of identifying, evaluating, and managing any risks that could impact an organization's financial resources and profits. The risks arise from diverse origins, encompassing financial uncertainties, legal responsibilities, technological challenges, strategic management mistakes, accidents, and natural calamities. A standard risk management approach comprises the following essential components.

Risk identification involves identifying potential risks or hazards that may arise in a given situation or project.

Risk assessment involves evaluating the likelihood and potential impact of each identified risk.

Risk mitigation refers to implementing measures or

strategies to reduce or eliminate the identified risks.

Risk monitoring involves continuously monitoring and evaluating the effectiveness of the implemented risk mitigation measures.

RISK CLASSIFICATION

Risk categorization in project management involves classifying risks according to their origins, the specific parts of the project they impact, and other relevant categories. This process helps identify the project areas that are most vulnerable to the consequences of risks or uncertainties. Risk categorization can also be accomplished by employing the shared fundamental causes. The primary objective of risk categorization is to mitigate the occurrence of any unforeseen and undesirable events. Additionally, it offers a methodical and organized technique to regularly recognizing hazards. Another advantage is that it enhances management's ability to recognize a diverse array of hazards with greater precision.

Construction risk refers to the potential hazards and uncertainties associated with the construction process.

Financial risk pertains to the potential financial losses or uncertainties that may arise throughout a project.

Labour risk involves the potential challenges and uncertainties related to the availability and performance of the workforce. It includes health and safety of construction labours

Technical risk refers to the potential issues and uncertainties associated with the technical aspects of a project. Potential danger or hazard

METHODS OF DATA COLLECTION

The primary components of this research methodology comprise site observations, a mail-order questionnaire survey, and structured/semi-structured interviews with industry experts who have direct involvement in the aforementioned project. In the beginning, a comprehensive literature evaluation was undertaken to ascertain the elements that contribute to the overall risks encountered in the industrial construction project. The data collection approaches are enumerated below. Site observation Questionnaire survey through mail Structured/semi-structured interview with industrial experts Literature survey.

CONCLUSION

On the basis of previous research and site observations, numerous risk factors have been identified.

Various risk factors are identified, including those associated with project planning and risk identification,



labour, safety, and the environment.

The questionnaire survey queries are formulated in advance for subsequent quantitative analysis.

A statistical analysis will be conducted on the data collected and supplied. In accordance with the research studies, risk factors will subsequently be enumerated.

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