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Analysis of Potential Risks in Construction Project

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Abstract: ***Construction projects can be very complex and full of uncertainties. Construction risks are often seen as factors influencing cost, time, quality and safety objectives. Obviously, risk management is necessary to mitigate problems that arise during the project. Risk management is an essential skill for project success and includes the process of identifying, assessing and managing risks in construction. The aim of the study is to identify and analyze the severity and probability of hazardous events in the construction industry and to understand the risk factors that will control events in the industry. The identified factors can have direct or indirect effects and are analyzed by quantitative and qualitative methods. Use the sequencing process to identify and research key risks during the planning phase, execution phase, and completion phase. Based on expert opinions, personal interviews and document analysis, a questionnaire was compiled to explore the main aspects of the construction project. Participation risks, working time, cost, quality, safety, etc. of the risks associated with it. After identifying and assessing the risks of the project, assign the risks to the right people at the right place and time. Customers, contractors and project management consultants are provided with potential issues. Risk reduction aims to respond effectively to the identification and identification of risks through prevention, mitigation, adaptation and acceptance of risk.***
Keywords: Risk, mitigation, construction, interview and management

I. INTRODUCTION

In simple terms, risk management is the management of all hazardous situations, their possibilities and effects. Risk management should identify opportunities and mitigation strategies to reduce the likelihood of an event occurring and, if it does, its political impact. It is a way to protect the company's resources and revenue from loss so that business goals can be achieved without interruption. Risk management is the formal and legal process of identifying, analyzing and responding to risk situations throughout the life of a project to achieve an acceptable or acceptable level of risk elimination or control. Cost, time, efficiency and safety, the four main objectives of a construction project, will face risks and uncertainties.

Effective risk management is critical to achieving these goals. Therefore, risk management is directly related to the success of the project. Risk management includes the following steps:

Risk Identification - This includes identifying various risk factors and events or actions that may affect the cost, performance, duration or capability of a project. Risk analysis is defined as the process of identifying and regularly classifying construction-related risks and assessing their significance.

Risk Assessment - Assess potential risks and impacts. Risk can be measured through quantitative or qualitative analysis.

Risk Allocation - After identifying and assessing the risk of the business, allocate the risk to the right place at the right time. Some key aspects of the distribution of risk management are reviewed, which managers should consider how risks should be managed and how they should be resolved.

Risk Reduction - Risk reduction aims to provide an appropriate response to the identification and identification of risks. Risk reduction strategies are defined as risk prevention, risk insurance and self-management, risk transfer, risk insurance.

Risk Monitoring - Monitoring and managing risk is essential to the success of the project and to improve the organization's reputation. Effective communication, timely reporting and documentation play an important role in risk management.

Projects in the construction industry are very complex and often require large amounts of capital. Therefore, eliminating risks should be the goal of every project manager. This project introduces the use of risk management at the beginning of a construction project's life cycle.

In addition, based on interviews, the study shows how risk factors change throughout working life. Each analysis is based on a theoretical background on risk, risk management techniques and project lifecycle approach in the construction industry.

The construction industry is inherently complex and involves numerous risks that can significantly impact project outcomes. The primary objective of this study is to conduct a comprehensive analysis of the risks associated with the construction process. By identifying and evaluating potential risks, the study aims to provide valuable insights that can aid in effective risk management and decision-making throughout the construction project lifecycle.

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II. LITERATURE REVIEW

An assessment system of cost overrun risk of Vietnam highway construction was established and the effects of these events were evaluated by regression analysis method. The results clearly confirm that the seven main drivers of construction cost risk are infrastructure operating management risk, assessment and planning risk, land acquisition risk, financing and management risk of construction resources, risk of capital and contractual constraints, risk of changes in the macroeconomic environment, and ethical risk. In addition, appropriate recommendations are made to reduce the risk of project cost overrun (Wang et al., 2004).

A lot of research and analysis from strictly everyday life shows that the risk is significant and therefore predictable. Today, science provides us with many tools and methods to distinguish and measure risk. It is recognized that a well-executed plan and the risks identified at the beginning can turn into a successful project at a later stage. Such measures have become necessary, at least given the delay in the implementation of many important investments.

As a result, management is a complex, long-term and long-term process that begins long before the investment and sometimes continues even after the investment is completed (Abdou et al., 2004).

This article describes the final phase of research to develop risk management software that enables SMEs in the construction industry to manage various risks that may affect their business. Suitable for users of all levels (from inexperienced users to experts), this software client works by starting a risk assessment, identifying key risks and identifying their potential impact on cost, quality and time.

This will enable users to control, mitigate, accept or eliminate high risks before the project begins. Overall, the software developed in this study is user-friendly, cost-effective and reliable, and should guide researchers and business professionals, especially those in the construction industry, in managing the financial, legal, environmental, health and safety, and operational risks they face to improve business (Raj & Wadsamudrakar, 2018).

The traditional concept of risk means loss. However, this perspective has changed. Risk now means not only loss, but also uncertainty regarding the positive impact on the success of the project. Construction projects are complex and unique. Therefore, risk management for construction projects is tedious.

Risk management is carried out with steps such as risk identification, risk assessment, risk assessment, risk classification and mitigation.

III. METHODOLOGY

A. General

This study includes the collection of risk factors for project construction through direct project and research data with on-site survey, mail, research model / semi-structured, interview model / semi-structured business experts. Time, cost, quality and safety risk factors were evaluated. The contribution of risk factors that have a significant impact on construction projects has been determined and divided into six groups. When assessing construction risks, risk, financial risk, construction risk, construction risk, political risk and environmental health and safety are taken into consideration.

Determines and assigns risk factors and events related to working time, cost, quality, safety, opportunity or feasibility and their causes, based on the relationship between work and workers in the three phases of construction (pre-construction, construction, and completion). The factors that directly or indirectly affect the structure are evaluated by quantitative and qualitative methods. Sets the conditions for the different stages of the infrastructure construction process. According to statistical analysis, various factors affecting construction projects are analyzed. Finally, an analytical approach is used for risk mitigation and an analytical hierarchy process/network process for analysis.

B. Method of Data Collection

The overall process of this study is mainly based on field observations, postal surveys and semi-structured interviews with business experts directly on the project. A detailed literature review was conducted to identify risk factors in the construction industry.

C. Methods of Quantitative Analysis

Quantitative techniques are statistical methods and techniques that help decision makers solve various problems. It provides decision makers with efficient and robust data analysis methods. Managers can use many strategies to improve overall decision making. In this study, the risk factors that directly or indirectly affect the construction project are determined and evaluated for analysis. Use quantitative analysis techniques to obtain a risk profile.

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D. Qualitative Measurements

Qualitative measurements are scientific observations made to obtain non-mathematical information. These methods deal with the meaning, definition, properties, examples, symbols, and explanations of things, whether they are counted or measured.

These techniques answer why and how the phenomenon occurs, not how often it occurs. Qualitative research paid particular attention to the humanities of the social and natural sciences. Construction-related quality data is generated using data from on-site surveys, surveys, interviews with industry experts, and research papers. Good methods are judgmental and use methods to determine outcomes. One of the best methods is the pre-map method, where different numbers are used to determine values and results. Another way to be effective is to write a process plan to identify the risks associated with each process and list the controls that exist for each risk. Various methods are used and used to establish relationships to determine the state that is handled and completed in the later stages of the work.

E. Risks Of The Construction Sector

Factors defined as risks in the early stages of the construction sector

1) Risks
2) Financial risks
3) Construction risks
4) Construction risks
5) Health risks
6) Environmental safety and HSE sub-factors.

The selected project collected data about Amravati in three phases: pre-construction, construction and completion.

IV. RESULTS

A. General

The identified risks are evaluated according to their realization and impact probabilities. Risk can be assessed using quantitative or qualitative assessment tools. Identifying and assessing project risk is an essential process for the success of any construction, and the process that includes risk identification and assessment is called the "risk analysis" phase. The risk assessment will provide insight and clarify the status of specific resources at risk, enabling management to develop corrective action plans.

With the analysis of the site, various risks affecting the success of the project and the consequences of the emergence of these risks are determined. For each type of project that occurred in the event, the various risks are sorted by occurrence, and the three biggest risks and their contributions are listed. Tick the sub-factors in each category evaluated in the problem area and those from research papers, experts, and surveys, and calculate their occurrence times to obtain their level, thus identifying key factors relevant to the project. Here it is calculated to see the contribution percentages of the sub-factors related to the economic construction activities in the pre-construction period. As mentioned in the construction sector, the construction sector also carries the same risk.

B. Pre-Construction Phase

Risk management in the pre-construction phase, which affects education, was calculated as 38%, construction risk affected by work and construction risk, inadequate properties and conditions of the construction site, 33.33% and 26.5% workplace construction. Involvement of various risks in the preliminary stage of real estate business.

C. Construction Phase

Management and financial risk, determined by social contract and lack of capital, each contribute 27%, and the contribution of construction risk is 31.25%; The latter condition of the construction site is higher compared to other risks during the construction phase. Inclusion of various risks during the construction of commercial infrastructure.

D. Completion Phase

During the completion phase, EHS risk constitutes the majority, accounting for 40% of potential adverse events in the field. Other risks, such as financial and management risks, have a lower value than EHS risks, where the potential for time loss is up to 33.3% and the time effect is about 37.5%. Involvement of various risks during the execution of real estate business.

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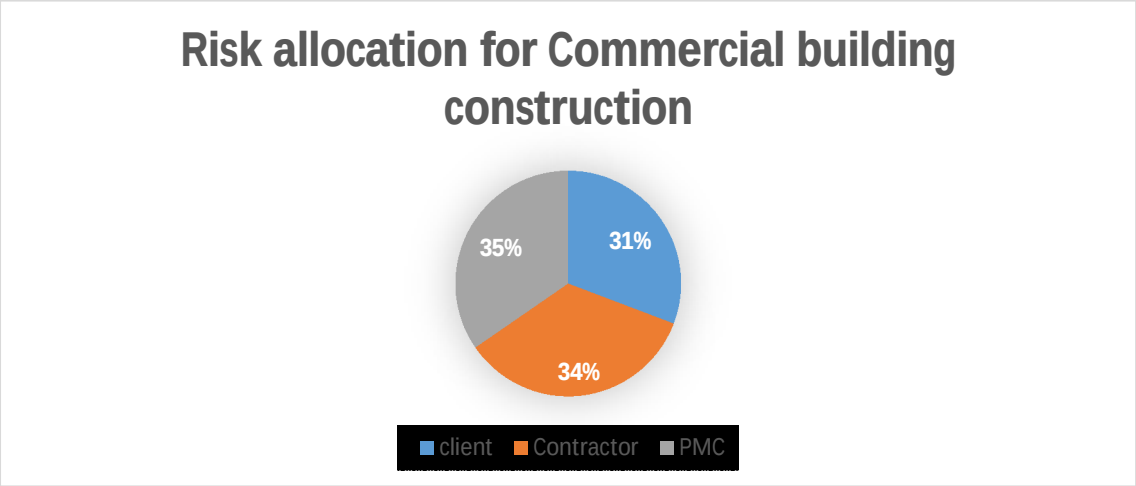


Fig.1: Risk allocation for Commercial building construction

E. Risk Contribution

In this step, the risk contribution of the project in terms of time, cost, quality and safety is given to see if it is relevant to the project. Risks must be monitored and managed at all stages of the project in order to complete the project on time without sacrificing quality and to estimate the cost and thus ensure safety. The contributions of time, cost, efficiency and safety risks were analyzed and grouped into three phases of construction.

F. Risk Breakdown

When starting a business, the parties responsible for the various risks are separated and discussed below. It is clear that the employer is responsible for the delay in the completion of the project due to the delay of the agreement with the participants, the aggravation of the road at the workplace and the completion of the employer's request outside the contract period, the completion of the work documents, the delay of the work due to safety reasons due to insufficient planning and research regarding the performance. Choosing the right vendor can also be frustrating when there is a big difference in communication and employee performance.

G. Mitigation Measures

Mitigation measures for business activities show that many risks can be prevented and reduced. Choosing the contractor and supplier at the first stage will avoid most of the risks at each stage because the delay of the contractor's work due to the delay of the contract will lead to product loss, delay in delivery. drawings can be avoided and avoided. Regular outages due to quality issues will lead to delays that can be avoided by selecting the right suppliers, and better performance monitoring will prevent rework to delay project completion.

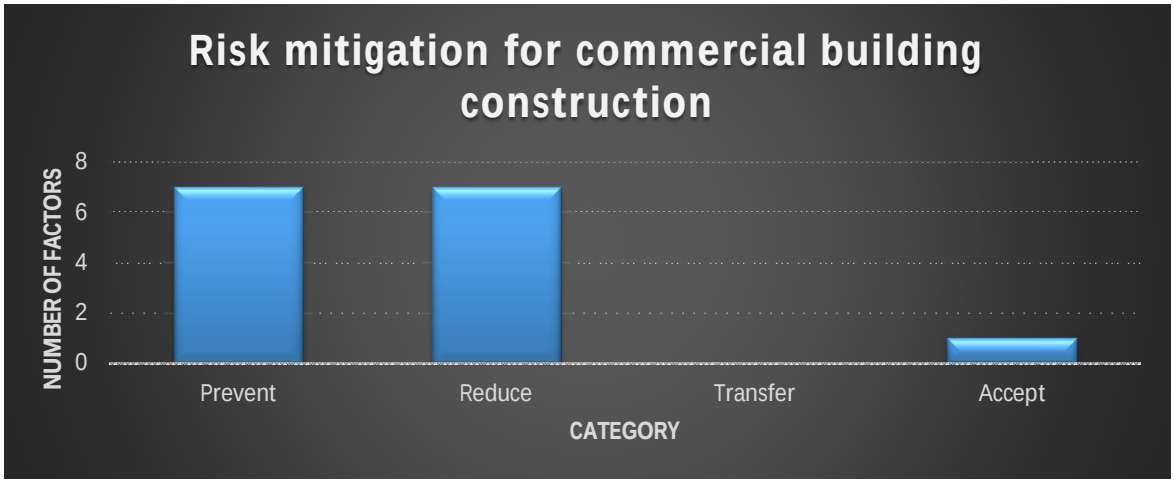


Fig.2 :Risk mitigation for commercial building construction

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V. CONCLUSIONS

In summary, this study demonstrates the importance of considering various possibilities at different stages of a project to minimize their impact. The study provides a comprehensive assessment of the main risks, providing an overview of the probability and level of impact on the objectives of the project. The
analysis identified high-risk groups and identified specific conditions within these groups that had the greatest impact on outcome. These findings highlight the need for risk management strategies to reduce these problems and increase business success.

Overall, the study highlights the importance of addressing issues related to cost, time, quality, environment and safety in project management. By emphasizing risk management and implementing appropriate measures, the project manager can improve performance and achieve desired goals.

Insights from this research can be very useful for groups and stakeholders to make informed decisions, allocate resources effectively, and complete projects successfully.

According to the results of the research, it can be concluded that the political risk group has the greatest impact on the event. Therefore, project stakeholders should pay special attention to this risk group and use appropriate strategies to mitigate its impact.

In addition, the study shows that the sub-factors identified in the study often affect the duration and cost of the project, placing the burden on the client, contractor and project management consultant (PMC). In order for the project to be completed successfully, it is necessary to take precautions against these conditions. This includes the thorough and efficient selection of contractors as they play an important role in the success of the project.

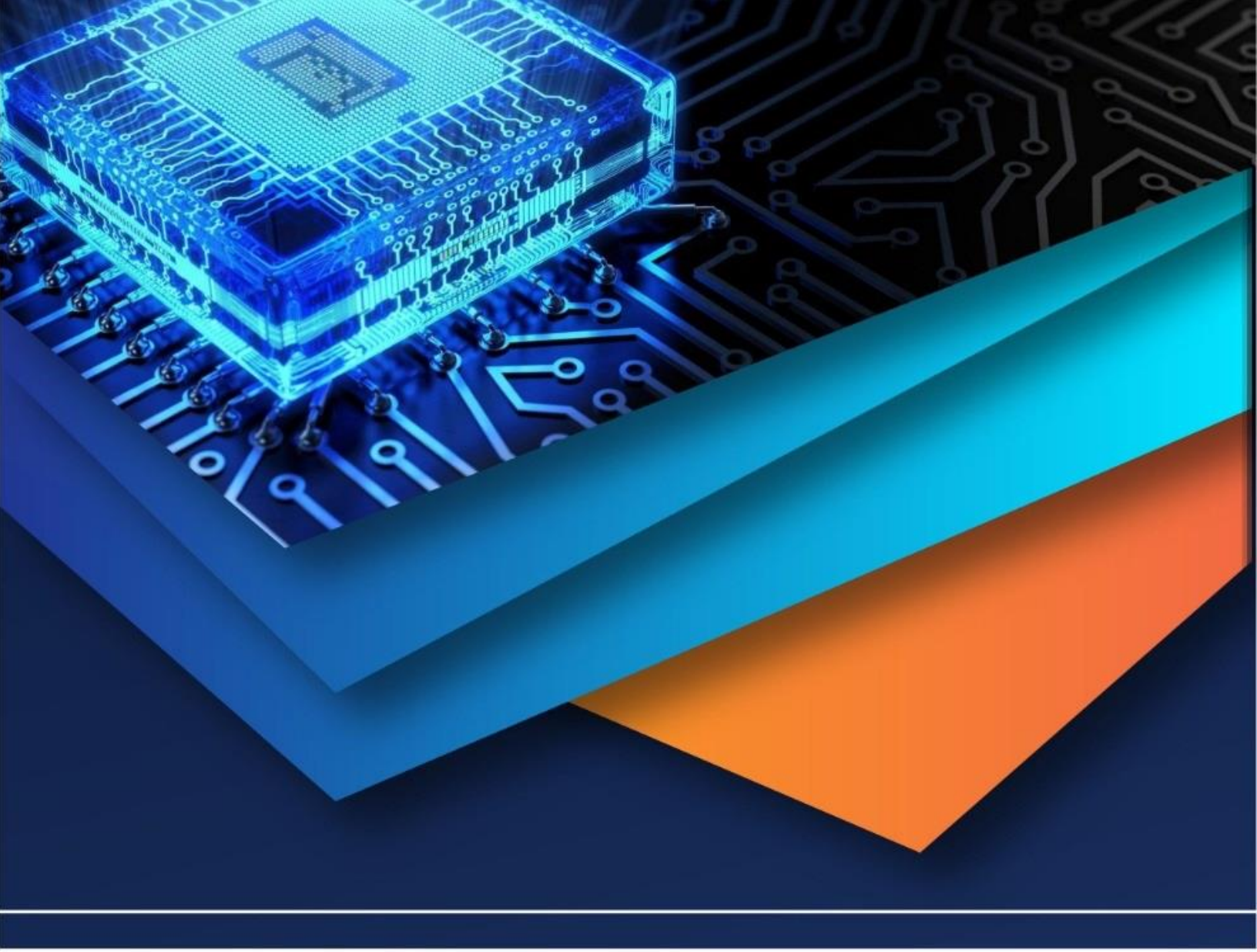
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