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## Analysis of Risk in Construction Industry

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**Abstract:** Risk management can be directly related to the successful project completion as it is very much essential. Project management literature describes a detailed and widely accepted risk management process, which is constructed basically from four iterative phases: risk identification, risk estimation, risk response planning and execution, often managing the risk management process is included. Construction project planning is an essential element in the management and execution of construction projects which involves the definition of work tasks and their interactions as well as the assessment of required resource sand expected activity durations. The study, therefore, examined the awareness of professionals in construction industry of the various types of planning techniques and tools used on construction sites, Questionnaires were administered on selected building professionals (Project Managers, Engineers, Architects), and Contractors and Sub-contractors directly involved in construction work on sites in planning and the use of planning tools and techniques as major tools for successful project execution.

**Keywords:** Interaction, Interactive phases, Questionnaire, risk management.

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### I. Introduction

Risk analysis and management are an important part of the decision-making process in construction industry .Risk management is an important field of construction industry and has gained more importance internationally due to the latest researches carried out on a large scale. However, this relatively new field requires more attention to bring some benefit.

Construction projects are facing a number of risks which have negative effects on project objects such as time, cost and quality. Two types of risk management techniques were considered: preventive techniques which can be used before the start of a project to manage risks that are anticipated during the project execution; and remedial techniques that are used during the execution phase once a risk has already occurred. The objective of a well-managed risk management program is to provide a repeatable process for balancing cost, schedule, and performance goals within program funding. This is especially true on programs with designs that approach or exceed the state-of-the-art or have tightly constrained or optimistic cost, schedule, and performance goals. Successful risk management depends on the knowledge gleaned from assessments of all aspects of the program coupled with appropriate mitigations applied to the specific root causes and consequences.

#### 1.1 OBJECTIVE

The following are the points which are going to be discussed:

- To identify risks in construction projects so they could be managed

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while achieving project objectives.

- To identify major risk management techniques practiced in managing risks in the construction industry.
- To find risk ranking and investigate risk-related responsibilities for clients and contractors in order to manage risks effectively.
- To investigate effectiveness of risk management techniques for managers to manage risks more efficiently.

## 1.2 IMPORTANCE

The following are the importance of risk management:

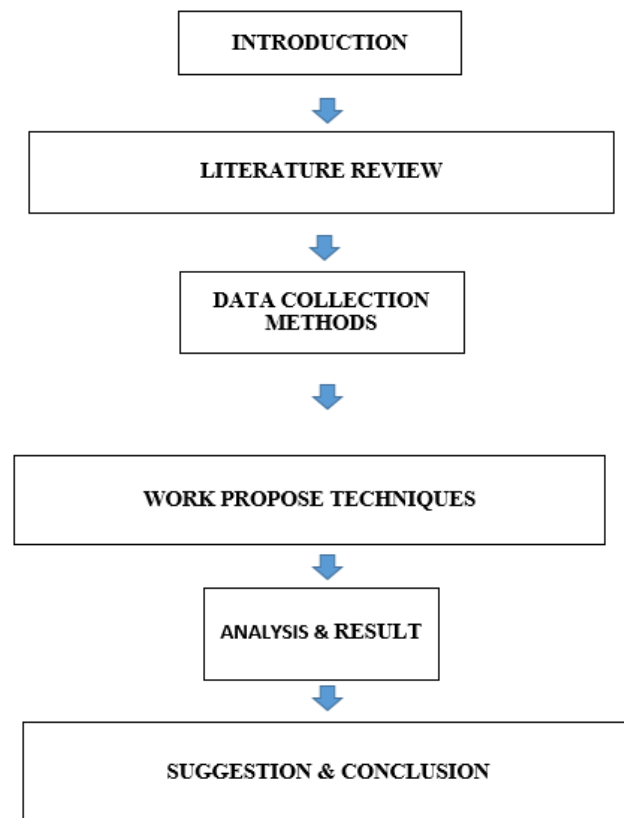
- Creates a safe and secure work environment for all staff and customers.
- Increases the stability of business operations while also decreasing legal liability.
- Provides protection from events that are detrimental to both the company and the environment.
- Protects all involved people and assets from potential harm.
- Helps to establish the organization's insurance needs in order to save on unnecessary premiums.

## II. METHODOLOGY

### 2.1 General

In order to investigate the perception and knowledge management of contractors in regards to risk as well as the implementation of risk management within the construction sector, an application of a comprehensive method is essential. The methodology consists of a thorough literature review on the subject and an empirical data collection comprising of two sources, a survey research in form of a questionnaire and semi-structured interviews.

The process of the project is as follows:



## 2.3 DATA COLLECTION METHODS AND WORK PROPOSED

### (A) Questionnaire and Survey:

The usage of a survey strategy is associated with the deductive approach and tends to be used for exploratory and descriptive research. It allows for the potential collection of a large sum of data from a sizeable population. The purpose of descriptive research is to obtain an accurate representation of persons or situations, thus describing the characteristics of the phenomenon being studied. Questionnaires is one of the most commonly used data collection techniques within the survey strategy. Each individual who is provided with the questionnaire is asked to respond to the same set of questions, enabling a resourceful way of collecting responses from a large sample prior to analysis .

### (B) Interviews:

The categorization of interviews is related to the level of formality and structure, they can be highly structured and formalized or they may be informal and unstructured. The type of interviews chosen in this study is the categorization of semi-structured interviews, i.e. non standardized and often referred to as qualitative research interviews.

### (C) Checklists Analysis :

It is a technique use to systematically review different materials using a list to determine the accuracy and completeness of the project. The checklist analysis provides an avenue in determining the risks involved in a particular project management plan. The checklist is usually developed based on the knowledge obtained from previous projects that are similar to the current one as well as historical information. Checklist analysis is one of the

simplest and quickest ways to identify risks processes. One of its advantages is that it is suitable for team members who have fewer experiences. While it is simple, building an exhaustive checklist can be challenging as projects, albeit similar, can still have their own unique and different risks. It is also crucial for the team members to review and prune the related items when they are no longer appropriate for the checklist. Lastly, the checklist should be reviewed during the closure of the project to improve future projects by incorporating valuable lessons learned.

**(D) Risk Probability & Impact Matrix :**

Probability and Impact Matrix is a tool for the project team to aid in prioritizing risks . Probability and Impact Matrix uses the combination of probability and impact scores of individual risks and ranks/ prioritizes them for easy handling of the risks. In other words, the probability and impact matrix helps to determine which risks need detailed risk response plans. It is vital to understand the priority for each risk as it allows the project team to appreciate the relative importance of each risk.

**Table 1 Impact Matrix**

		<b>Impact</b>				
		<b>Trivial</b>	<b>Minor</b>	<b>Moderate</b>	<b>Major</b>	<b>Extreme</b>
<b>Probability</b>	<b>Rare</b>	Low	Low	Low	Medium	Medium
	<b>Unlikely</b>	Low	Low	Medium	Medium	Medium
	<b>Moderate</b>	Low	Medium	Medium	Medium	High
	<b>Likely</b>	Medium	Medium	Medium	High	High
	<b>Very likely</b>	Medium	Medium	High	High	High

**III. FIGURES AND TABLES**

**RISK IDENTIFY AND THERE PROBABILITY MATRIX**

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	Categories	Likelihood 1 (rare)-5 (very frequent)	Impact 1 (very low)-5 (very high)
<b>Design risks</b>			
D1	Design errors and omissions	4	5
D2	Design process takes longer than anticipated	3	4
D3	Stakeholders request late changes	3	3
D4	Failure to carry out the works in accordance with the contract	3	3
<b>External risks</b>			
Ex1	New stakeholders emerge and request changes	2	4
Ex2	Public objections	1	3
Ex3	Laws and local standards change	1	3
Ex4	Tax change	1	4
<b>Environmental risks</b>			
En1	Environmental analysis incomplete	2	4
En2	New alternatives required to avoid, mitigate or minimize environmental impact	2	4
<b>Organizational risks</b>			
O1	Inexperienced workforce and staff turnover	3	3
O2	Delayed deliveries	3	3
O3	Lack of protection on a construction site	2	4
<b>Project management risks</b>			
PM1	Failure to comply with contractual quality requirements	3	4
PM2	Scheduling errors, contractor delays	4	4
PM3	Project team conflicts	3	3
<b>Right of way risks</b>			
R1	Expired temporary construction permits	1	4
R2	Contradictions in the construction documents	2	3
<b>Construction risks</b>			
C1	Construction cost overruns	4	4
C2	Technology changes	2	4

#### IV. Conclusion

An effective risk management process encourages the construction company to identify and quantify risks and to consider risk containment and risk reduction policies. Construction companies that manage risk effectively and efficiently enjoy financial savings, and greater productivity, improved success rates of new projects and better decision making. Nevertheless, the construction companies need to include risk as an integral part of their project management. In our view, the use of risk management in the varies construction sites. To management the risk effectively and efficiently, the contractor must understand risk responsibilities, risk event conditions, preference, and risk management capabilities.

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