RISK MANAGEMENT IMPLEMENTATION IN THE IRANIAN CONSTRUCTION INDUSTRY FROM CONTRACTORS' PERSPECTIVE

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To my beloved parents and siblings

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ABSTRACT

One of the most significant and integral part of project management is risk management. Depending on the adopted risk management approach, the construction project may fail or succeed. Despite the paramount importance of risk management as one of the subfields of project management, unfortunately less attention has been paid to risk management in Iran. In very few organizations, employers or contractors can be seen who have a proper insight into risk management. Whereas risk management is a new field, there are only several seminars, university projects, and a few researches have taken place in this field in Iran. This study aims to improve the implementation of risk management within contractor companies in the Iranian construction industry through the evaluation of the contractors' perception of risk management. The main methodologies considered for this study starts with preliminary interviews with construction practitioners followed by comprehensive literature review. The data collection stage conducted through interview sessions using semi-structured questions and questionnaire surveys. Moreover, the methods considered for analysis of data are Frequency Analysis and Likert scale using mean index, Risk Analysis Matrix, and Single Sample T-Test. All in all, fifty four (54) risk factors were identified through conducting comprehensive literature review, classified into five (financial, technical, design and construction, policy and political, and weather and environmental risks) groups and their level of risk were evaluated and ranked. The results of study showed that the most critical risk group is financial risks followed by weather and environmental risks. Through questionnaire survey, fifteen out of fifty four risk factors identified from literature were found to have the high level of risk, while the remainder have moderate risk level. Furthermore, the survey results showed that there are eleven barriers in the Iranian construction industry preventing contractors from implementing risk management, seven of which evaluated as important, whereas the rest had average importance. Among identified barriers, unsupportive culture in construction industry evaluated as the most important barrier. Finally, a theoretical risk management strategy was proposed on the basis of the outcomes of literature review and questionnaire survey. The proposed theoretical strategy is composed of seven main stages.

ABSTRAK

Pengurusan risiko merupakan salah satu perkara yang perlu dan penting di dalam pengurusan pembinaan. Projek pembinaan berkemungkinan gagal atau berjaya bergantung kepada pengaplikasian pendekatan pengurusan risiko. Meskipun pengurusan risiko merupakan kepentingan utama dalam sub-bidang pengurusan projek, malangnya pengurusan risiko kurang mendapat perhatian di Iran. Hanya segenlintir organisasi, majikan atau kontraktor dilihat mempunyai kecenderungan ke arah pengurusan risiko. Oleh kerana pengurusan risiko merupakan bidang baru, hanya terdapat beberapa seminar, projek universiti, dan penyelidik terlibat dalam bidang ini di Iran. Kajian ini bermatlamat untuk mempertingkatkan pelaksanaan pengurusan risiko dalam syarikat kontraktor di industri pembinaan Iran, menerusi penilaian persepsi kontraktor terhadap pengurusan risiko. Metodologi utama yang digunakan untuk kajian ini bemula dengan temu bual awalan dengan ahli pembinaan kemudian diikuti dengan kajian literatur yang komprehensif. Peringkat pengumpulan data temu bual menggunakan soalan semi-struktur dan tinjauan soal selidik. Manakala kaedah untuk analisis data adalah Analisis Frekuensi, *Likert Scale* yang menggunakan indeks min, Matriks Analisis Risiko, dan *Single Sample T-Test*. Secara keseluruhannya lima puluh empat (54) faktor risiko telah dikenal pasti melalui kajian literatur komprehensif yang diklasifikasikan kepada lima kumpulan (risiko kewangan, teknikal, reka bentuk dan pembinaan, polisi dan politik, dan cuaca dan persekitaraan) dan tahap risiko telah dinilaikan dan diberi pangkat. Keputusan kajian menunjukkan kumpulan risiko yang paling kritikal adalah risiko kewangan diikuti dengan risiko cuaca dan persekitaran. Melalui tinjauan soal selidik, lima belas daripada lima puluh empat faktor risiko yang dikenal pasti melalui literatur dijumpai mempunyai tahap risiko yang tinggi, manakala selebihnya mempunyai tahap risiko yang sederhana. Selain itu, keputusan tinjauan menunjukkan terdapat sebelas halangan yang menghalang kontraktor di industri pembinaan Iran melaksanakan pengurusan risiko dimana tujuh daripadanya dinilai sebagai penting dan selebihnya sederhana penting. Di antara halangan yang dikenal pasti adalah budaya tanpa sokongan di industri pembinaan yang telah dinilai sebagai halangan yang paling penting. Kesimpulannya, strategi teori pengurusan risiko telah dicadangkan berasaskan kajian literatur dan tinjauan soal selidik. Strategi teori yang telah dicadangkan ini dibentuk dengan tujuh peringkat utama.

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APRAM	-	Advanced programmatic risk analysis and management model
AS/NZS	-	Australian and New Zealand standard
CII	-	Construction industry institute
CQ-SET	-	Cost, quality, safety, environmental and time
KBDSS	-	Knowledge-based decision support system
MAGDM	-	Multi-attribute group decision making technique
NGT	-	Nominal group technique
OB	-	Organizational behavior
OL	-	Organizational learning-based
PERT	-	Project evaluation and review techniques
PMBOK	-	Project management body of knowledge
PMI	-	Project management institute
PRAM	-	Project risk analysis and management
PRBS	-	Potential risk breakdown structure
RAMP	-	Risk analysis and management for projects
TOPE	-	Technical, organizational, project and external
WBS	-	Work breakdown structure

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CHAPTER 1

INTRODUCTION

1.1 Introduction

One of the main subfields of project management is risk management. Risk management is a technique that whose application will result in reduction of costs in the long-term and also correct decision-making by the manager.

Risk management refers to a series of processes which are required for the identification, analysis, and reaction vis-à-vis the project's risk in order to maximize the effects of positive incidents and minimize the consequences of unfavorable incidents. This can influence the time, cost, quality, productivity and performance of the project.

Risk management is organized and regulated in developed countries. Hence, the risk management is better applied in developed countries. Comparing with other countries with various situations, Iran is a developing country in which the business environment, laws, and regulations have made specific risks especially

related.Unfortunately, in Iran, risk management is not systematic and requires more studies and investment.

Iran is a developing country; as a result, the demand for founding infrastructures is highly increasing. Currently, the government of Iran is enforcing the fifth development plan. Falling behind this plan will impose financial burden on national economy. Therefore, it is important to recognize the barriers through deeper understanding of the risks that endanger the program. Since a major portion of Iran's budget is spent on investment in the construction industry, identifying the risk-generation factors in the construction process and having information about the extent and types of effects and analyzing them will result in reducing the losses caused by such possible incidents. The application of risk management will result in taking correct, regulated, and prompt decisions through being informed about the environment despite the complications and swift changes in the construction industry.

1.2 Problem Statement

In today's world where changes rapidly take place and risks are imminent, the prerequisite for survival and success is knowing the environment and being capable of decision-making in a correct and prompt manner. In case of not recognizing both internal and external risk factors of the project, the managerial decision-making errors take place. Moreover, time and cost assessment forecasts also go wrong. Risk management can identify the risk-generating factors. Furthermore, risk management can control or remove such risk factors through analyzing and choosing suitable strategies.

Despite the paramount importance of risk management as one of the subfields of project management, unfortunately less attention has been paid to risk management in Iran. In very few organizations, employers or contractors can be seen who have a proper insight into risk management. Based on the official statistics in Iran, there is a substantial progress in OIL, GAS, AND PETROCHEMICAL industry about risk management, in case of issued researches, and implementation. While in construction industry, except for some articles in conferences, there are not any practical guidelines to be properly implemented for risk management in this industry. Furthermore, as a result of lack of binding regulations, current regulations cannot force construction parties to undertake risk management.

Therefore, adopting a scientific approach to risk management, introducing its process and eventually its compliance with the existing realities in urban development plans, particularly construction projects are a necessity.

The issue of risk management was for the first time raised in mid-1990s in the US. Laws and regulations for applying risk management in the projects have now been adopted. Since risk management is a new field, except for several seminars and university research projects, applied research has not taken place in this field in Iran.

1.3 Research Questions

The questions raised in this research are as follows:

i. What kinds of risks threaten the construction projects and what are their effects?

ii. Can application of risk management at studies and contract stages determine the type of risks and conditions of risk management in the best possible manner?
iii. How can risk management be institutionalized in the construction sector in order to bear positive results similar to those of time management and cost management in projects?

1.4 Aim and Objectives

This study aims to improve the implementation of risk management within contractor companies in the Iranian construction industry through the evaluation of the contractors' perception of risk management. In order to accomplish the aim of this study, following objectives have been recognized:

i. To identify and classify the risks in construction projects,
ii. To identify the barriers of implementation of risk management in construction projects,
iii. To propose a theoretical strategy to improve the implementation of risk management in construction projects.

1.5 Scope of the Study

This research focuses on the implementation of risk management in the Iranian construction industry. Therefore, the scope of study is only limited to Iran where respondents have been chosen randomly out of this area.

Moreover, the respondents comprised of contractors registering with Management and Planning Organization in Grade 1 and Grade 2. The reason for being such is that the categorization of the grade of contractors reflects, to a great extent, the size of the projects being executed in the company and the size of company. Grade 1 and 2 of contractors are regarded as big companies with large-size projects. Depending on the size of their projects and their company, the risks they encounter will differ. As a result of this, to make sure the data obtained could be reliable, it's necessary to limit the respondents based on the size of project and company.

The interview session will be carried out with the key personnel of Iranian construction companies. The questionnaire will be distributed among professionals who worked with these contractor-organizations and have direct involvement in construction projects.

1.6 Research Methodology Flow Chart

For the purpose of this study, through conducting library research, the reference works in the field of risk management will be studied, and after conducting the required field studies through reviewing the existing records and documents on the project, as well as preparing the checklists, questionnaires and evaluation forms will be prepared, and interviews with project managers will be conducted. Figure 1.1 will outline the main steps in research methodology.

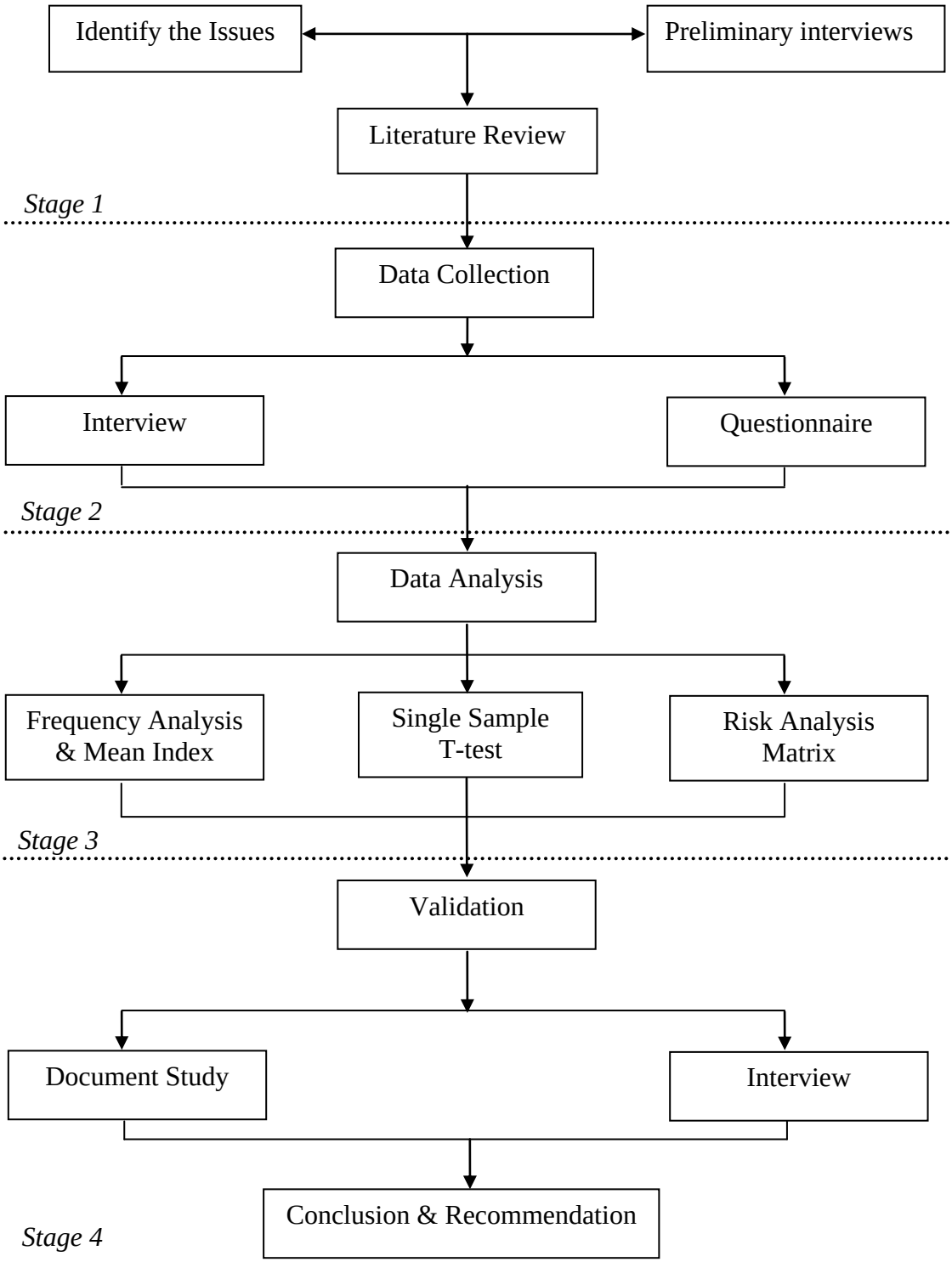

Figure 1.1: Research Methodology Flow Chart

1.7 Expected Findings

Some precious advantages anticipated to be achieved by conducting this research. One of which is to enhance the consciousness of different key personnel of project resulting in performing the project reliably while considering issues like risk management in the general management of project. To accomplish this, it's essential to implement theoretical concepts mentioned in numerous literatures in reality. This can guarantee a well project management through attempting to prevent from normal issues in projects like poor quality of products, cost overruns, and delays.

Moreover, it's anticipated that this project can furnish contractors with improved procedures of project execution regarding risk management issues within the lifecycle of project with recognition of risk groups and decrease or resolution of risk factors. Besides, it's expected that similar risks can be prevented in future as a result of conducting this study.

Furthermore, results and findings of the research can be used by those responsible for urban development projects, for risk management and prevailing costs of projects. The proposed techniques of this thesis can help organizations to successfully implement projects within a specific cost and time framework with an acceptable quality and meeting the expectations of beneficiaries of a project.