

MANAGING CONSTRUCTION PROJECT RISKS; CASE STUDY:  
CONTRACTORS IN JOHOR BAHRU

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To my beloved father, mother, siblings and friends

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## ABSTRACT

Risks are unavoidable in almost every construction project whether if it is building projects, civil works, or any other type of construction projects. Risk is inherent in all human endeavours, including construction activities, and the risk factors involved are diverse and varied. Managing construction project risks is considered as compulsory for any project to be successful. Thus, this study aims to identify and classify the types of construction project risks, to evaluate the level of construction project risks and finally, to identify the methods available to reduce or mitigate the construction project risks. The main methodologies used in data collections for this study are literature reviews, open interviews, and questionnaires. While for data analysis, the methods used are likert scaling using mean index formula, risk matrix analysis, reporting, discussion and elaboration. The questionnaire survey was self-administered on construction practitioners in contractor organisations. Survey responses were analysed using the mean index method and matrix analysis. Upon finishing this study, there are several findings gathered. The types of risks found are classified into few categories which are physical risk, construction risks, design risks, political risks, financial risks, legal – contractual risks and environmental risks. The level of risks for each category is then shown using qualitative risk matrix analysis tables. The survey result showed that the major risk factors inherent in construction are financial risk followed by construction risk. Finally, methods available to reduce or mitigate construction project risks are identified in which ten best practices have been recognized.

## ABSTRAK

Risiko adalah sesuatu yang sukar dielakkan dalam kebanyakan projek pembinaan sama ada ianya projek bangunan, kerja awam, atau lain-lain jenis projek pembinaan. Risiko boleh wujud dalam apa jua aktiviti manusia, termasuk aktiviti pembinaan, dan faktor-faktor risiko adalah pelbagai dan berlainan antara satu projek dengan yang lain. Menguruskan risiko projek pembinaan adalah dikira sebagai amat penting bagi memastikan sesuatu projek itu dapat dilaksanakan dengan jayanya. Oleh itu, kajian ini bermatlamat untuk mengenalpasti dan mengklasifikasikan jenis-jenis risiko projek pembinaan, menilai tahap risiko tersebut dalam projek pembinaan, dan seterusnya mengenalpasti kaedah yang boleh digunakan untuk mengurangkan dan mengelakkan risiko projek pembinaan tersebut. Metodologi utama yang digunakan bagi mengumpul data dalam kajian ini ialah kajian literatur, temubual terbuka, dan borang soal selidik. Manakala bagi analisis data pula, kaedah yang digunakan ialah skala liket dengan menggunakan formula indeks purata, matriks analisis risiko, laporan, perbincangan dan huraian. Borang soal selidik diedarkan kepada pengamal pembinaan yang terdiri daripada organisasi-organisasi kontraktor. Maklumbalas daripada borang kajian dianalisis dengan menggunakan kaedah indeks purata dan analisis matriks. Setelah menyiapkan kajian ini, beberapa hasil kajian dapat dikumpulkan. Jenis-jenis risiko yang dikenalpasti diklasifikasikan kepada beberapa kategori iaitu risiko fizikal, risiko pembinaan, risiko rekabentuk, risiko politik, risiko kewangan, risiko perundangan – kontrak, dan juga risiko ke atas alam sekitar. Tahap risiko bagi setiap kategori kemudiannya ditunjukkan dengan menggunakan jadual matriks analisis berbentuk kualitatif.

Keputusan soal selidik menunjukkan faktor risiko utama yang terdapat dalam projek pembinaan adalah yang berkaitan dengan risiko kewangan diikuti dengan risiko pembinaan. Akhir sekali, kaedah yang boleh digunakan untuk mengurangkan seterusnya mengelakkan risiko projek pembinaan dikenalpasti di mana sepuluh amlan terbaik untuk mencapainya telah diambil kira.

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**LIST OF ABBREVIATIONS**

CIDB	-	Construction Industrial Development Board
PKK	-	Pusat Khidmat Kontraktor
UTM	-	Universiti Teknologi Malaysia
RII	-	Relative Importance Index

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction**

Risk is an inevitable aspect of most projects, but even the most proficient managers have difficulty handling it. They use decision milestones to anticipate outcomes, risk management to prevent disasters and sequential iteration to make sure everyone is making the desired product, yet the project still ends up with an overrun schedule, overflowing budget and compromised specifications (Arnoud De Meyer *et al.*, 2000).

The need to identify and manage risks in a project delivery became crucial as the concepts of project management had evolved into a new dimension in which the project teams are constantly looking forward to establish ways and methods to deliver a project by focusing into customers' and end users expectation and satisfaction. In order to do so, the common problem in construction projects such as delays in completing the project, over budget, unsatisfactory product quality, unsafe working environment and so on needs to be eliminated as far as possible. One way to achieve this is by managing risks throughout the production of a project.

Project managers can't predict the future, but accurately gauging the degree of risks inherent in their projects can help them quickly adapt to it (Arnoud De Meyer *et al.*, 2000). Any project decision-making without regard to risks will lead to unexpected outcome.

Before exploring further on this topic, first the definition of risk need to be understood precisely. Risks are considered as the probability of an unfavourable outcome arising from a decision. (Wood, Ernest, 1977). In the construction management domain, Perry and Hayes (1985) defined risk as an exposure to economic loss or gain arising from involvement in the construction process. Risk management comprises of risk identification, risk analysis and risk control. In this study, a comprehensive examination of the different types of risks can improve management's capability in decision-making and handling construction projects.

## **1.2 Issues and Problem Statements**

In construction projects, project stakeholders face the risk of cost overruns, schedule delays, and even waste, fraud, or abuse. Environmental, quality, and safety factors also represent sources of risks. And further in some projects, managers run the risk of generating political controversy at the federal, state, or local level. An absence of concern on risk assessment and management could lead to several serious problem, resulting in unachievable goals and unmet expectations.

Although it is common in our country and even in other places for problems such as delays to occur in project completion, it is necessary for managers and project teams to ensure such common problem can be eliminated in future by applying the theoretical concepts of project management such as managing risks into practice despite of numerous limitation and pressures. Delays, incompleteness, cost

overrun, unsafe site condition and poor quality in construction projects resulting from lack of awareness on risk aspects are intolerable excuses.

Thus, managing risks effectively requires implementing a structured, well-thought-out risk management plan. Although managers cannot eliminate risk entirely, they can minimize it by monitoring project's risks, developing strategies to mitigate them, and establishing fallback positions and contingencies. Managing risks also can lead to more creative and efficient management techniques, such as innovative financing, new methods of accountability and control, and increased options for contractual arrangements.

### **1.3 Research Objectives**

After considering the related issues and problems, the aim of this study is to provide sound and comprehensive discussion on concepts of managing risks in construction projects, also to address the practical concerns of it in real projects. To achieve the above aims, the following objectives have been identified:

- 1.3.1 To identify and classify the types of risks in construction projects.
- 1.3.2 To evaluate the level of construction project risks.
- 1.3.3 To identify available methods to reduce or mitigate risks in construction projects.



#### **1.4 Research Scopes and Limitations**

This research focuses on managing construction project risks; case study: contractors in Johor Bahru. Therefore, the area of research is limited to only Johor Bahru district in which the respondents are randomly being selected from this boundary.

Furthermore, for the purpose of this study, the respondents consist of only contractors in Johor Bahru that registered with Construction Industrial Development Board (CIDB) in Grade 7 and Grade 6. This is because the classifications of grade of the contractor represent the size of the firm and the approximate size of the project they carry out. Contractors that are registered in Grade 7 and Grade 6 are considered as quite large organization with bigger size of project. The risks they faced varied with the size of project and the size of their organization. Thus, to ensure the reliability of the data gathered, it is essential to limit the lists of respondents according to the size of the organization and the size of the project.

#### **1.5 Literature Reviews / Previous Related Studies**

There are numbers of research projects that focuses on managing risks in construction projects. However, there are significant differences between this paper project and other research projects. In order to ensure this research project is unique, the researcher had referred to previous related studies to identify the similarities and differences.

For the purpose of critical discussion on those previous related studies, several research project reports that have similar topics and concepts as this research

topic has been identified. One of it is '**Risk and Uncertainty in Construction : An Overview**' by S. Abou Rizk. The similarity with this research paper is that both research projects focuses on identification of risks in construction projects to find solution on handling and managing those risks to reduce and mitigates construction problems.

In the other hand, the differences between the two projects are quite easy to be point out as in this research project, the researcher had narrowed down the scope of projects in which the study consider only point of views from contractors while S. Abou Rizk on his research paper look thoroughly on risks without focusing to any particular party in construction industry. Other than that, S. Abou Rizk gave an overview of risk and uncertainty in construction, whereby, for this research project, the researcher concentrates the effort to study the types of risks and even the level of those risks. Thus, the outcomes of both paper projects are different from each other.

There are also several other research works on this area of topic. But all those papers have different scopes and approaches; therefore the findings and outcomes of the project are substantially varied from this study.

## **1.6 Research Significance**

There are several valuable benefits expected by implementing this study. One of it is to increase awareness among the project players to deliver a project responsibly by also focusing into aspects such as risk management in handling projects. This can be achieved by applying theoretical concepts discussed in many literatures into practice in real projects. It can ensure good practice of project management in an effort to avoid common problems in construction project such as delays, cost overruns and poor quality of products.

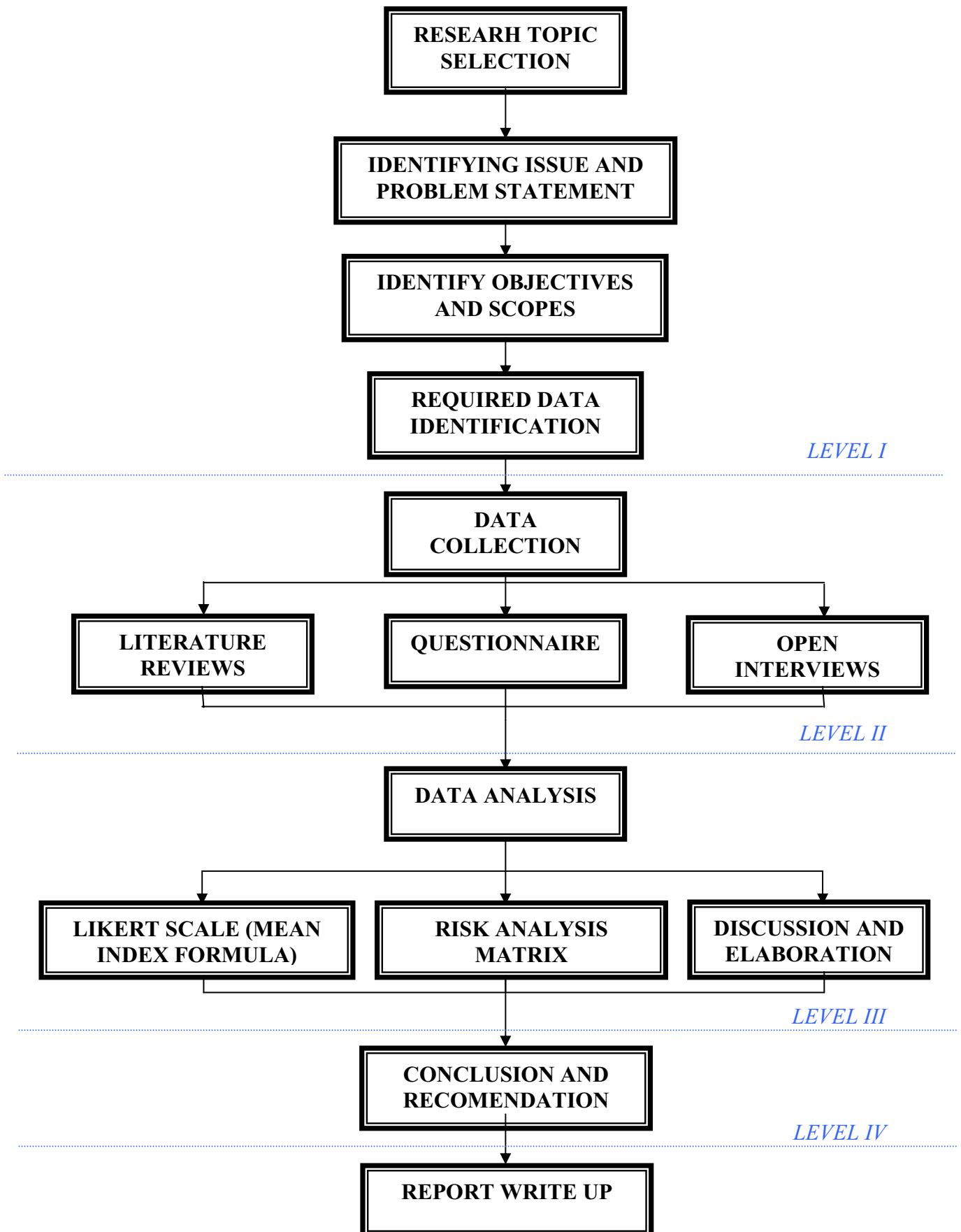
Other than that, this study is expected to provide a better ways and methods in delivering construction projects by considering risk aspects throughout project delivery to produce successful projects by identification of risks and reduction or mitigation of risks factors. It also aims to reduce the recurrence of similar risks in the execution of other construction project in the future.

## **1.7 Research Methodology**

The purpose of this study, the research methodologies are used in order to collect data, analysis data and report on findings and results. For data collection, the methods used are literature reviews, followed by open interviews and distributing questionnaire surveys to the contractors.

For data analysis purposes in this study, methods used are likert scaling using mean index formula, risk matrix analysis, reporting, elaboration, and discussions. Figures 1.1 shows the research methodology flow chart as used for this study.

Figure 1.1: Research Methodology Flow Chart



## **1.8 Chapters Organization**

The followings are the summary of each chapter on this research project paper. This project paper contains 6 chapters as follows:

**a) Chapter I : Introduction**

The first chapter of this research project report is on background of the study and it comprises of introduction, issues and problem statements, research objectives, research scopes and limitations, literature reviews / previous related studies, research significance, research methodology and the chapters organisation.

**b) Chapter II : Risks in Construction Project**

This chapter is based on literature reviews. The topics in this chapter include current situation of construction industry, risk management, risks elements in construction project, risk management activities as applied to project management, risk identification and analysis, risk management process, construction project – know the risks, and classification and types of construction project risks.

**c) Chapter III : Risk Reduction and Mitigation in Construction Project**

This chapter discusses on risk mitigation and reduction overview, risk reduction and mitigation planning, risk response, risk management strategies, ten ways contractors can avoid or mitigate construction project risk, benefits of proper risk allocation, and contingency plan.

**d) Chapter IV : Research Methodology**

This chapter concentrate on the methodologies used to carry out this study. The subheadings are data collection, and data analysis.

**e) Chapter V : Analysis and Findings**

This chapter focuses on analysing collected data and discussing the findings. Various suitable techniques and methodologies are used in analysing the data gathered appropriate with the information needed and the types of data collected. Analysis and discussion in this chapter is carried out with regards to fulfilling the objectives of the research.

**f) Chapter VI : Conclusion and Recommendation**

This chapter is on the conclusions and summary of the study. There are also several recommendation discussed in this chapter regarding the study. Beside that, the limitation and problems that exists during the study are also stated in this chapter.