ASESSMENT OF RISK MANAGEMENT IN GOVERNMENT CONSTRUCTION PROJECT

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ABSTRAK

Kejayaan mengurus risiko mempengaruhi dalam kejayaan projek pembinaan. Masalah penangguhan dalam industri pembinaan yang merupakan fenomena global dan industri pembinaan di Malaysia juga tidak terkecuali. Salah satu punca adalah kontraktor yang tidak cekap. Tujuan utama kajian ini adalah menilai pengurusan risiko yang wujud dalam perolehan kontrak. Kajian ini mengambil pendekatan dengan menganalisis kriteria pemilihan kontraktor utama untuk projek pembinaan. Penilain dibuat keatas dokumen berikut, iaitu; Garis Panduan Penilaian Tender MOF, Sumber Kuasa, Prinsip dan Dasar Perolehan Kerajaan (PK 1) dan Pentadbiran Kontrak dalam Perolehan Kerajaan untuk mengenal pasti pengurusan risiko yang sedia ada sebelum pembinaan bermula bagi mengurangkan risiko di dalam kerja-kerja pembinaan. Hasilnya menunjukkan bahawa pengurusan risiko sudah berlaku pada peringkat proses tender untuk memilih kontraktor yang kompeten untuk sesuatu projek.Terdapat tindakan yang boleh mengawal risiko kegagalan projek pembinaan seawal pemilihan kontraktor. Tindakan tersebut disusun didalam bentuk polisi, prosedur dan amalan. Tindakan tersebut dapat mengawal risiko-risiko berikut: (1) kesulitan aliran tunai, (2) birokrasi, (3) kelewatan kelulusan projek dan permit, (4) variasi kontrak yang berlebihan, dan (5) pengawasan yang lemah. Kesemua tindakan ini adalah dibawah kategori kewangan dan peruntukan politik dan kontrak.

ABSTRACT

The success of managing the risks affects the success of construction projects. The problem of delays in the construction industry is a global phenomenon and the construction industry in Malaysia is no exception. One of the reason is due to incompetent contractor selected. The main purpose of this study is to assess the risk management that exists in contract procurement. This study takes an integrated approach by analyzing the criteria for selection of main contractors for construction projects. Analysis is made on the following documents, namely; MOF Tender Assessment Guideline, Power Source, Principles and Government Procurement Policy (PK 1) and Contract Administration in Government Procurement to identify existing risk management before construction commences to minimize risks in construction work. The results show that risk management has already occurred at the tender process stage to select a competent contractor for a project. There are actions that can control the risk of failure of the construction project as early as the selection of contractors. The action is structured in the form of policies, procedures and practices. Those actions can control the following risks: (1) cash flow difficulties, (2) bureaucracy, (3) delays in project approval and permits, (4) excessive contract variations, and (5) poor supervision. All of these actions are under the finance category and politic and contract provisions category.

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LIST OF ABBREVIATIONS

GDP	Gross Domestic Product
MOF	Ministry of Finance
PLC	Project Lifecycle
PK 1	Perolehan Kontrak 1

CHAPTER 1

INTRODUCTION

1.1 Introduction

The construction sector was the main contributor to the GDP at 9.9%, followed by manufacturing (7.3%), agriculture (7.1%), private consumption (6.5%) and petroleum and mining (2.1%) (Thestar.com.my, 2014). Based on figure 1.1, Malaysia GDP from construction graph is fluctuated but it is increased to 14093 MYR Million in the first quarter of 2018 from 13352 MYR Million in the fourth quarter of 2017. GDP from Construction in Malaysia averaged 10269.76 MYR Million from 2010 until 2018, reaching an all-time high of 14093 MYR Million in the first quarter of 2018 and a record low of 6464 MYR Million in the first quarter of 2010.

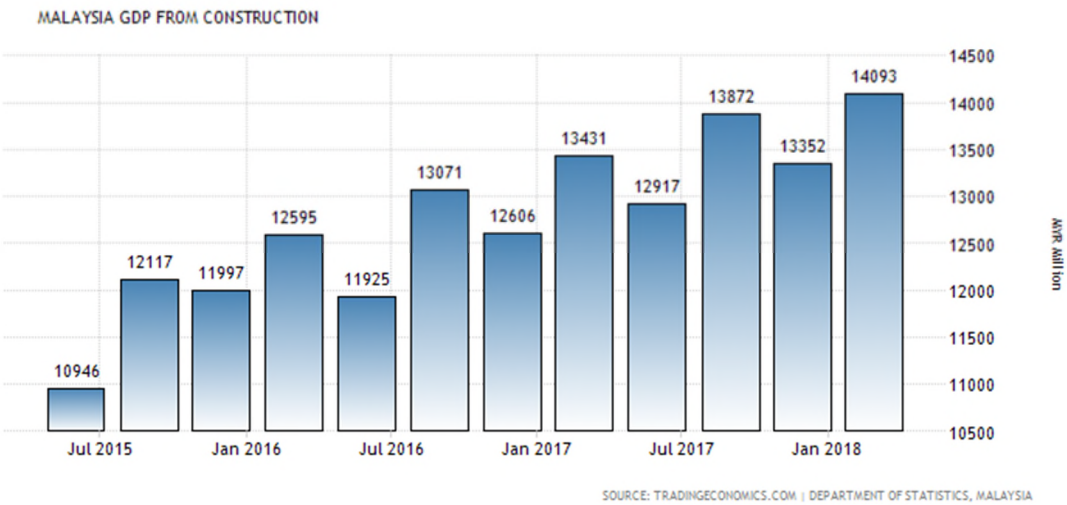


Figure 1.1 Bar chart of Malaysia GDP from construction

Source: Tradingeconomic.com (2018).

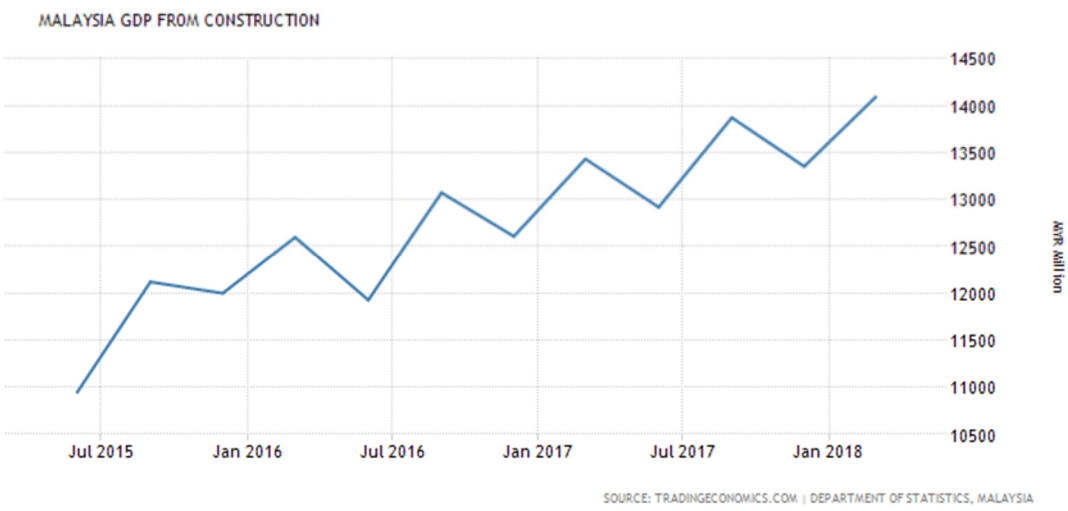


Figure 1.2 Line graph of Malaysia GDP from construction

Source: Tradingeconomic.com (2018).

However, the failure of the construction project to achieve targeted time, cost and quality that has been stated in the contract especially for government project has become an issue. Changes in material price, changes in exchange rate, inflation, weather changes, inappropriate and inadequate procurement, inadequate client's finance and payment for completed work, problems with subcontractors, faulty contractual management system, equipment availability and failure, mistakes during construction stage and contractor's poor site management can be the main factors for the failure of the project.

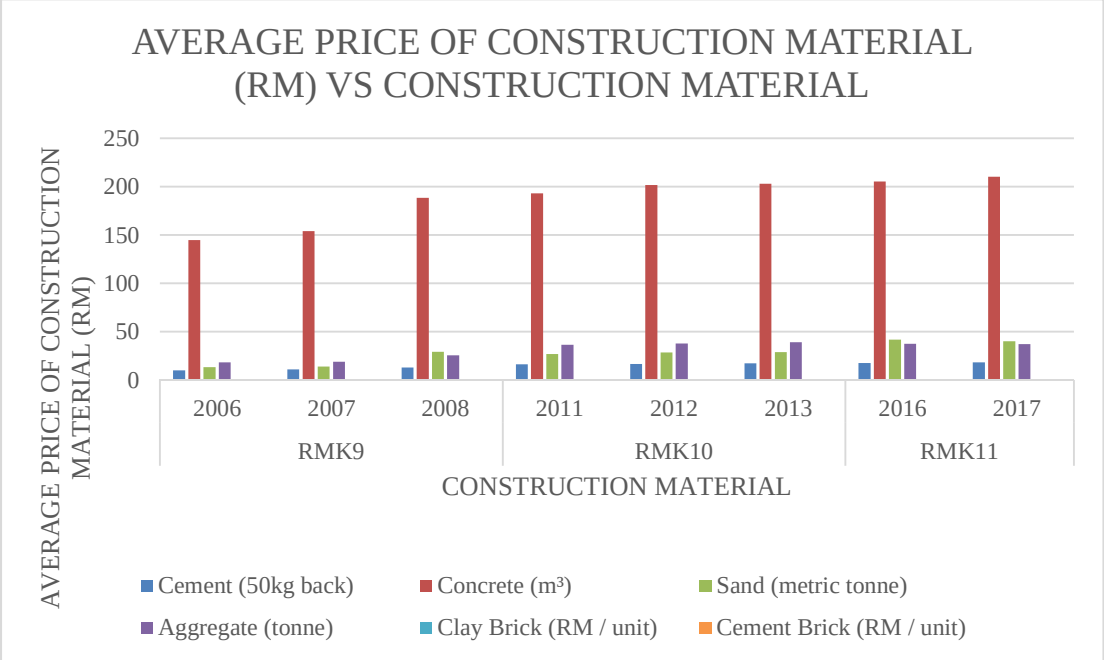


Figure 1.3 Average price of construction material (RM) vs construction material

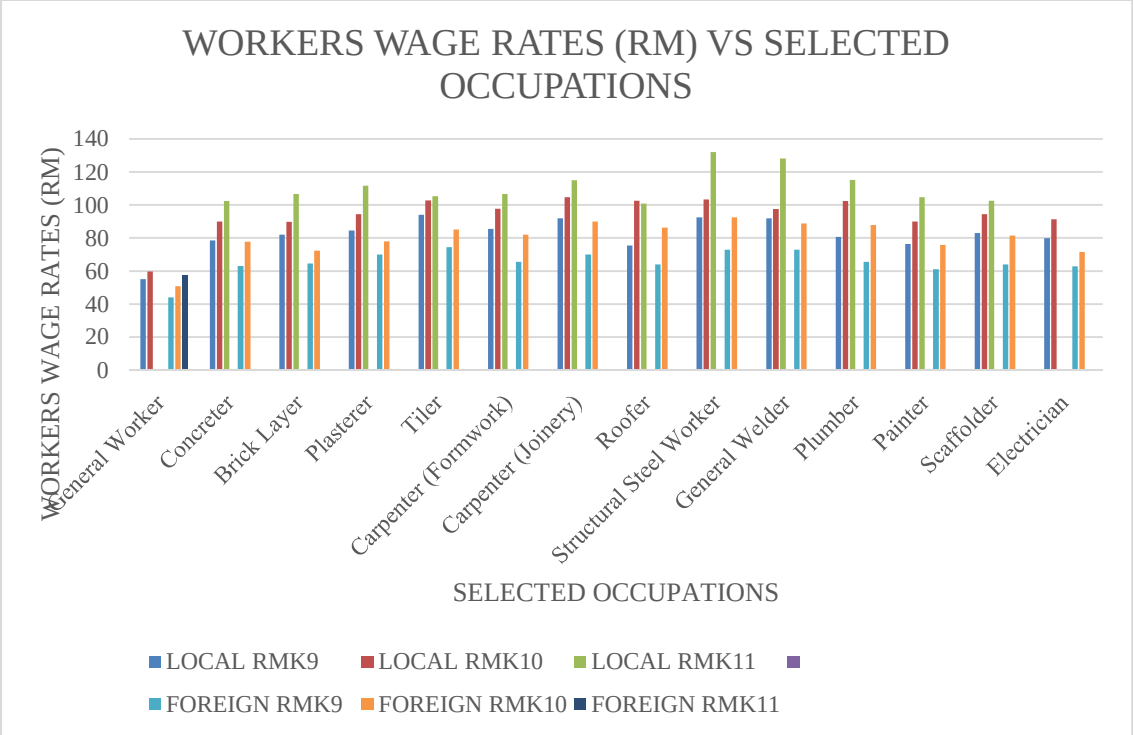


Figure 1.4 Workers wage rates (RM) vs selected occupations

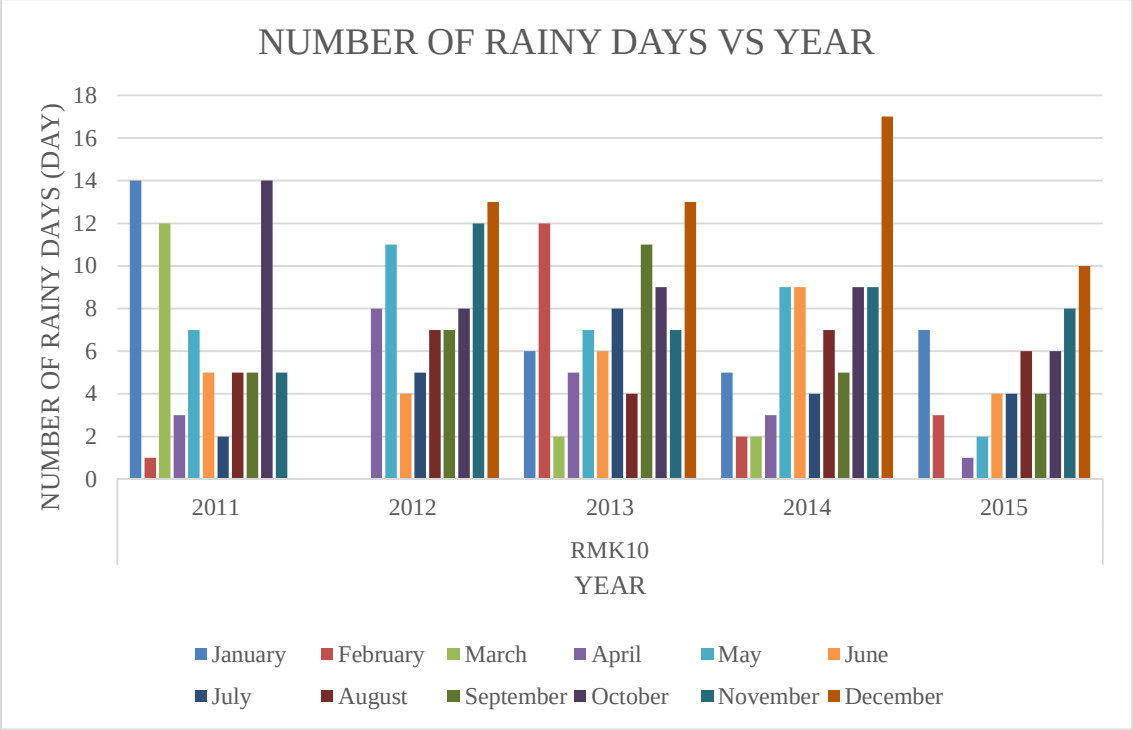


Figure 1.5 Number of rainy days vs year

For example, Pahang State Assembly (Dun) conference was told that the construction of the Bera Hospital could not be completed due to the inability of the contractors to complete the construction work (Sinarharian.com.my, 2017). Chairman of the State Committee on Basic and Environmental Affairs, Datuk Seri Ir Mohd Soffi Abd Razak said besides major floods in 2014, the main problem was the delay in the project due to the failure of contractors to complete the task of completing the work. He said, following that, the Notice of Termination of Contractor Contracts was issued on Dec 8 2016 and the contractor received the notice on the next day. The hospital, expected to be completed on Nov 29 2016, has commenced project development work on July 10, 2012. Mohd Soffi said to address the problem, the state government had appointed rescuers contractor as well as restructured the organization at the site and re-planned the implementation and submitted a new job scheduling contractor. He said the Bera Hospital development project was approved in the Ninth Malaysia Plan Mid-Term Review (RMK9) at a cost of RM88 million and as of February 2016 RM49.9 million has been spent on the implementation of the project which has achieved physical progress until the 57 percent.

While in Audit report (2017), the hospital that worth RM88 million which purpose to give services to 92,000 people in Bera district and reducing congestion at the Temerloh Hospital, which is located approximately 45km, should be completed on 9 January 2015, but only 57 percent completed in December 2016. Health Minister Datuk Seri Dr S. Subramaniam (2017), said Hospital Bera is only expected to be completed in 2019, after a new contractor was appointed. According to the audit report, Maju Jaya Prasarana Sdn Bhd (MJPSB) was appointed as the first hospital contractor, from the list of seven companies provided by the Ministry of Finance. This is behind at least three warnings raised by JKR that all seven companies do not qualify, and repeatedly recommend to the finance ministry for an open tender. Efforts to open tender for the Bera Hospital project began with conflicting results from the finance ministry. For example, the finance ministry, during a procurement committee meeting, agreed with the JKR proposal for an open tender for the construction of the Bera Hospital, but later issued a conflicting direction.

Other example than can be relate to the factor of project delay is Institut Latihan Islam Malaysia (ILIM) eastern region in Besut, Terengganu. This project is among the nine projects allocated to the Department of Islamic Development Malaysia (Jakim) under the 9th Malaysia Plan (9MP) and the Second Economic Stimulus Package, involving a total of RM232.78 million worth of projects. According to the report of the head of state audit (2011), the contractor for ILIM Besut was instructed to complete the construction on June 14, 2009. However, the actual date completed on 31 December 2009 which is more than six months from the date of origin. The report noted that the contractor had applied for an extended period of time to complete the project twice as a result of the rise in price of building materials, changes in work and repair damage from storm and heavy rain.

1.2 Problem Statement

Nowadays, risk management has been used widely in government and private sectors. Risk management is one of the areas of project management practiced by most organizations in the work process to increase success rates and reduce the impact of risk events in the operation of an organization. Starting 2012, the Malaysian Public Work Department (JKR) has officially issued the letter of instruction to implement risk management for development project under the responsibility of JKR and it is a must for

project that cost RM50 million and above to ensure that key risks are effectively managed by project managers and project team members by taking proactive measures against risk factors that may negatively affect the achievement of project objectives.

A lot of research has been done regarding risk management in construction industry to improve the existing risk management, but the construction still be the business of second highest failure rate. One of the most important tasks encountered by a client who hopes for successful project outcomes is selecting a capable construction contractor (Plebankiewicz, 2010).

Therefore, this research is carried out to assess the risk management in government project construction planning to identify risk factors that give high impact in construction by assessing risk management of contract procurement in government project.

1.3 Objective of the Study

The main objective of this study was to assess the risk management in government construction project.

Specific objectives of the study were:

- To identify risk factors that give high impact in construction
- To analyse risk management of contract procurement in government project
- To identify the risk response for each risk

1.4 Scope of Study

The scope of this research was focusing on risk management and management policies, procedure and practices of procurement in government project to manage the risk issues. The research investigated the implementation of risk management in the Tender Evaluation Guideline of MOF, Source of Power, Principles and Government

Procurement Policy (PK1) and Administration of Contracts in Government that control the existed risk.

1.5 Significance of study

It is indisputably true that the construction sector is positively related to the success of any economy. It can be defined as some sort of an economic engine for developing and developed economies. The construction sector plays a significant role in producing wealth and providing a better quality of life to the nation that is essential for development of the nation. Furthermore it contributes in generation of huge employment iFn the economy (Khan et al,. 2014). To make a better construction industry, the failure of the construction project need to be reduced. It has become an urge for researchers to develop an efficient risk management that can help improving the existing risk management in construction industry. By this, the organization can use it as a guidelines so that the top management's commitment to risk management can be translated and disseminated to the attention and action of all involved.

1.6 Thesis Structure

This research comprises of five chapters. First chapter contains introduction, problem statement, objectives, scope of study and the significance of the study. In chapter two, the risk management related topic were discussed. For chapter three, methodology, research data collected and method of data analysis to be employed were explained. While in chapter four, the results obtained from study area were presented and the analysis from the result was discussed. Lastly, chapter five concluded the overall chapter and contains some recommendations for future study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Risk management plays a very crucial role in construction industry. Risk is the basis of uncertainty in any organization. To prevent more losses in the future, most of the companies put more focus on identifying the risk and managing them before it affect the business. As can be seen, risk management is widely used in government and private sectors which covering a broad range of risk in construction industry.

From government views (Jkr.gov.my, 2016), project risk management purpose is to ensure that key risks are managed effectively by project managers and project team members by proactively taking action on risk factors that can negatively impact the achievement of project objectives.

2.2 Project Lifecycle

Every construction project will have project life cycle to provide an organized method or procedure for the delivery project. This will help everyone that involved with the project knows the progress of the project and clearly defined each phase of activities and output. It also help to define each roles in the project organization and understand their responsibility accordance the project phase. Project life cycle has been illustrated by (Larson and Gray, 2011) with four stages which includes:

- Defining stage
- Planning stage
- Executing stage

- Closing stage

However, Larson and Gray merged the monitoring and controlling stage with the executing stage. Whereas it has been separated and presented the project lifecycle by (PMBOK, 2004) and (OIT, 2005) in five major stages:

- Initiation
- Planning and design
- Execution
- Monitoring and controlling
- Closing

Table 2.1 Project Life Cycle Phase

Project Life Cycle Phase	Explanation
Initiation	The initiation stage establishes the preliminary scope of the project by understating the project environment and incorporates all the required resources in the project by developing a preliminary scope statement. It should include an organised plan that covers contracting, equipment and budget requirements, in addition to costs, tasks and the time schedule
Planning and design	The purpose of the planning and design stage is to show how the project will be managed during the executing, monitoring and controlling processes. In this stage, activities are grouped together by defining tasks and their sequences, in addition to their resources. It should ensure that the project satisfies the end-user and can be achieved within the constraints of time and budget
Execution	The execution stage is the phase in which the activities defined in the project management plan (PMP) are performed in order to achieve the project's aims. Furthermore, it involves coordinating people and resources, in addition to integrating activities, in order to produce the final result identified in the project management plan (PMP)
Monitoring and controlling	The monitoring and controlling stage involves observation of the project execution phase to identify difficulties and to take actions to correct problems. The monitoring and controlling stage includes the ongoing activities, in addition to monitoring the actual cost, time and effort expended against the project management plan (PMP). Moreover, it involves monitoring the project performance baseline, addressing risks and taking actions

Closing	The closing stage is the period in which the construction project is handed over to the end-user with formal acceptance. It has two phases: the project closure stage, where all 48 activities across the project are finalised, and the contract closure stage, where each contract related to the project is completed and closed

Source: PMBOK (2004).

2.2.1 Risk in Project Lifecycle

Risks are associated with every project and should be identified in order to avoid negative impacts on the overall performance. Many problems which are faced in later phases of the PLC result from unmanaged risks from the earlier stage (Chapman and Ward, 2003). This shows that it is important to fulfil accurate analysis at the beginning of stage especially. Risk management is a process which starts from project definition and continues through planning, execution, control and closure phase. However, it is proven by Lyons and Skitmore (2002) in their study that planning and execution are the two phases where risk management is most widely used. In contrast, Elkington and Sallman (2002) found that the conceptualization phase is the most important in the risk management project.

In the initiation phase, the feasibility study is attempted where a detail analysis of a project proposal. At this stage, a few solution are identified and assessed for the potential risks correlated with proposed solutions. Then, a risk plan can be designed in the planning phase where potential risks related to project planning are identified and all the stakeholders should contribute in this so that there is no single potential risk would be missed. Besides, the risk plan assigns the type of action which should be taken in order to respond to a particular problem. Carrying out this stage in the planning phase aims at mitigating risk before the execution phase, during which any occurring risk is very pricey if no action is taken in advance. While in the execution phase, monitoring and controlling are performed in order to ensure that the process is going according to the plan and all identified risks are being handled. The whole project process should be monitored, starting with the point in time when the risks were recognized. At the project closure, where the whole project is summarized, the project's objectives, benefits and deliverables

are evaluated. All parties then have a chance to list all activities or risks which were not fully managed within the project. Those unmanaged risks can be a subject of further discussion and be used as warning for next projects (Westland, 2006)

2.3 Definition of Risk

In construction, risk can be any factor or something that can affected the project from being completed successfully in term of time, cost and quality. These three terms can cause the project to delay from its scheduled completion date specified in the contract. In perception of the client or the owner, the delay of the project means the revenue loss when unable to use the scheduled project facilities and needed to depend new facilities or rent new facilities. However, for contractor, delay means the increment of costs due to increasing of labour wages and material costs caused by inflation. Additional costs also incur either the project is extended or accelerated when delay happened.

2.4 Risk Management Overview

Risk management can be defined as a systematic application of management policies, procedure, and practices to the task of analysing, evaluating, control and communicating about the risk issues. Risk management is an important part of the decision-making process in construction project management (Tang et al., 2007), particularly regarding the project's integration, scope, time, cost, quality, human resources, communications and procurement. Risk management improves the future prospects of a project as it identifies uncertainties and probabilities (Borge, 2001); it is defined as 'a system which aims to identify and quantify all risks to which the project is exposed so that a conscious decision can be taken on how to manage the risk' (Zou et al., 2007).

For many years, construction organisations in developing countries have approached risk management in building construction projects by using a set of practices that are normally insufficient, producing poor results most of the time, and limiting the success of project management (Serpell et al., 2015). These will indirectly lead to the impediment of work and privation of activity, completion of project behind schedule and termination of contract. The poor growth of construction dimensions especially in managing risks in Malaysia is a problem that need to be faced especially in government

sector. In general, it can be said that risk management in developing countries is inadequate, lacks a systematic and formal approach, and its performance is not measured (Serpell et al, 2015). Known risks include minor changes to the project, known unknown risks are the predicted event either by their probability or by the likely effect, and unknown unknown risks are those events with unknown probability attached to it and unknown likely effect (Smith et al., 2014).

2.4.1 Risk Management Process

Risk management can be defined as the systematic process of analysing, identifying, and responding to projects risk. It consists of maximizing the chances and the impact of positive events while minimizing the probability and the impact of negative events, in other to meet the project objectives. Risk management can be thought of as a decision-making process, and it entails having a full understanding of a known risk and/or necessary actions to reduce the effect and chances of the event of such risks, in other to reduce its complications and increase the chances of success.

Most of the project in Malaysia experience project failure in terms of time, cost and quality. Indeed, some of risk management have been proposed. Risk management is the effort to optimize decisions in order to reduce uncertainty about future events when the information is incomplete, unclear or under discussion (Jafari et al., 2011) .Risk management helps to minimize delays, and in turn reduces contractual disputes. One of the main findings of the existed methodologies for analysis delays in construction projects from the perspective of clients and consultants was the use of simple methodologies instead of the complex one in delay analysis although it is known for its less reliability (Braimah and Ndekugri, 2009). At the planning and construction stage, various risk types may start to be identified, assessed and analysed by using the probability theory or the relative importance index theory in order to evaluate the risks and control their influence on the construction project (Paek, 2009).

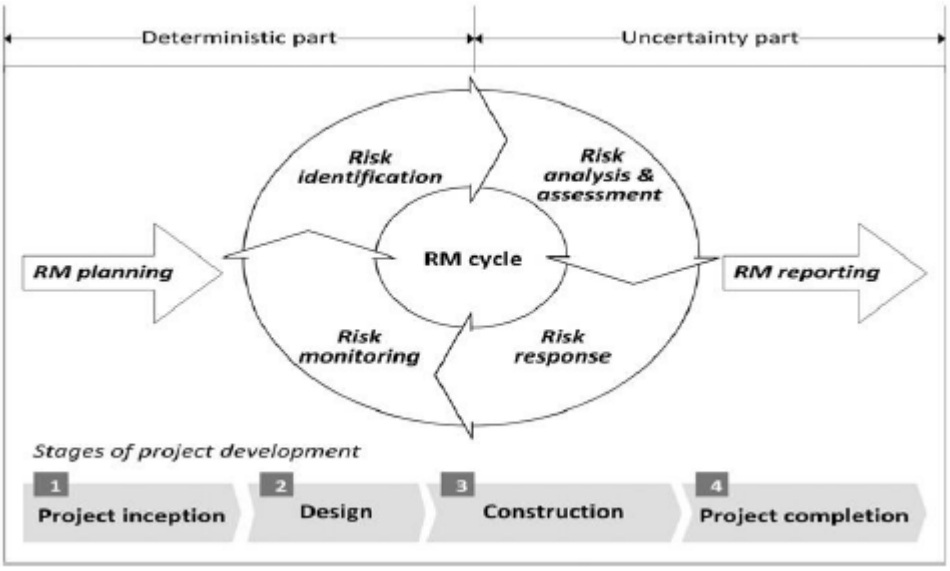


Figure 2.1 Risk Management Process

Source: Jia et al (2013).

2.4.1.1 Risk Identification

Risk management process begins with risk identification and continues with risk assessment, control and monitoring. If the cycle of the process is done correctly, it will ensure the effectiveness of risk management. Risk identification can be defined as the process of analytically and constantly identifying, assessing and categorizing the initial importance of the risks related to construction projects and the interrelationships that exists among these risk. The idea of risk identification seems to be very popular and practiced. It is of substantial value as the process of response management and risk analysis may only be implemented on recognized potential risks. It could have effects on project development and its success. Failure in identifying potential risks can result into inadequacy in the whole process. This can in turn have critically effects on the resources available to the organization. Risk identification however helps organizations involved in risk management to: (a) identify the best and most crucial input data (b) have a better knowledge of the relevance of the process (c) identify risks and the effects they can have (d) provide information for those who make decisions.

Table 2.2 Risk Factors

Risk group	Risk factors
Physical risk	• Supplies of defective materials • Fluctuation of material prices • Low productivity of equipment • Shortages of materials required • Insecurity and Theft • Bribery and Corruption • Vandalism
Environmental risk	• Environmental factors (flood, earthquake, etc.) • Rain effect on construction activities • Hot weather effects on construction activities • Difficulty to access the site (very far, settlements)
Design risk	• Defective design (incorrect) • Not coordinated design (structural, mechanical, electrical, etc.) • Inaccurate quantities • Lack of consistency between bill of quantities, drawings and specifications • Rush design • Shortages of qualified firms • Awarding the design to unqualified designers
Logistics risk	• Shortage of skilled labour • Low productivity of labour • Fluctuation of labour prices • Delay in equipment delivery • Shortage of equipment required • Failure of equipment and unavailability of spare parts • Undefined scope of working • High competition in bids • Poor communication between the home and field officers (contractors side) • Inaccurate project program
Financial risk	• Delayed payment in contracts • Incomplete or inaccurate estimates • Incomplete documentation for the delivery of the project • Financial attraction of project to investors • Financial failure of the contractor • Unmanaged cash flow • Exchange rate fluctuation • Monopolizing of materials due to closure and other unexpected political conditions • Difficulty to get permit • Inflation and sudden changes in prices
Legal risk	• Legal disputes during the construction phase

	• Delayed dispute resolutions • Requirement to use local labour • Ineffective enforcement of rules and regulation • Frequent changes and modification in law • No specialized arbitrators to help settle fast
Construction risk	• Rush bidding • Lack of experienced people involved in technical studies, estimating, and scheduling • Lack of database in estimating activity duration and cost • Lack of coordination and communication between various parties • Ineffective use of information technology and decision making techniques • Inadequate overall company structure • Improper construction methods • improper quality, health, and safety management • Insufficient understanding and use of insurance policy • Low salaries and lack of incentives and motivations • for project personnel • Unsuitable leadership style • Shortage of qualified and specialised companies • Unavailability of specialised companies for sophisticated work packages • Gaps between the implementation and the specification due to misunderstanding and specification • Undocumented change orders • Lower work quality in presence of time constraints • Design changes • Actual quantities differ from the contract quantities
Political risk	• Unqualified decision makers • Instability in project governance • Lack of transparency • Political orientation • New governmental acts or legislations • Unstable security circumstances (invasion) closure
Management risk	• Ambiguous planning due to project complexity • Resource management • Changes in management ways • Unavailability of contractors pre-qualification system • Unqualified owners representatives • Slowness of the owners decision making process causing suspension of work • Information unavailability (include uncertainty) • Failure to provide documents and information on time • Poor site management and supervision • Poor communication between involved parties

Source: Odimabo Otobo, O. (2016)

2.4.1.2 Risk Analysis

Risk analysis are divided into two groups which are qualitative and quantitative methods. The potential risks are analysed using a qualitative or quantitative method to evaluate their potential impacts (Zou et al., 2007). Another way of defining risk analysis is estimating what could happen if an alternative action or response were selected (Smith, 1999).

From the point of view Gray and Larson (2003), analysing risks could be qualitative or quantitative. Qualitative analysis represented in experts opinion and it could bring extreme mistakes based on the respondents or the selection maker judgment abilities. On the other hand, the qualitative approach is more dependable and it calls for critical information collection and extra certain analysis.

There are many ways to identified risks such as risk avoidance, risk reduction or risk transfer. All projects are at risk to potential problems in the form of events or factors called risks, and it is known that they influence the time frame, budget and quality of projects (Santoso et al., 2003), however, all risks involve both threats and opportunities (Chapman and Stephen, 2002). Thus, the field of risk management (RM) has developed to analyse and manage these uncertainties and risks (William, 1995), Although evaluating the risk and opportunity can be affected by uncertainty, however it is important to know that both have different mind-sets and different data (Smith, 2008) . According to El-Sayegh (2008), there is a need for risk management processes to be used to manage construction risks. The impact of risk can be reduced by several ways such as obtaining more information, running more tests, allocating more resources, improving communications and allocating risk to parties who can control it (Smith, 2008).

Table 2.3 Ranking of Risk Factors

Risk Factor	RII	Rank	Group
Shortage of material	0.735	1	Construction
Late deliveries of material	0.733	2	Construction
Shortage of equipment	0.721	3	Construction
Poor quality of workmanship	0.720	4	Construction
Cash flow difficulties	0.712	5	Finance
Insolvency of subcontractors	0.700	6	Construction
Inadequate planning	0.700	6	Construction
Insolvency of suppliers	0.691	7	Construction
Change in law and regulation	0.688	8	Politics & Contract Provision
Bureaucracy	0.688	8	Politics & Contract Provision
Lack of financial resource	0.682	9	Finance
Site safety	0.674	10	Construction
Delay in payment for claim	0.671	11	Finance
Change scope of work	0.671	11	Design
Poor supervision	0.657	12	Politics & Contract Provision
Weather	0.647	13	Construction
Compliance with government	0.629	14	Politics & Contract Provision
Delay in project approval and Permits	0.624	15	Politics & Contract Provision
Land acquisition	0.618	16	Construction
Inconsistencies in government Policies	0.612	17	Politics & Contract Provision
Pollution	0.606	18	Environmental
Excessive contract variation	0.594	19	Politics & Contract Provision
Ecological damage	0.589	20	Environmental

Compliance with law and regulation for environment issue	0.577	21	Environmental
Improper design	0.463	22	Design

Source: Karim, N. A., Rahman, I. A., Memmon, A. H., Jamil, N., & Azis, A. A. (2012).

Table 2.4 Ranking of Risk Category

`Risk Category	Mean	Rank
Construction	0.714	1
Politic & Contract Provision	0.713	2
Design	0.712	3
Finance	0.706	4
Environment	0.583	5

Source: Karim, N. A., Rahman, I. A., Memmon, A. H., Jamil, N., & Azis, A. A. (2012).

2.4.1.3 Risk Control/Response and Risk Monitoring

Numerous paths may be accompanied to control to risks, based totally at the diploma of severity. To avoid boundaries project goals may be modified if the difficulties are intense sufficient, discover opportunity techniques for managing the project, increase management strength, lessen dependence of one task on another, rise up resources or increase flexibility. Risk response is the process of developing strategic options, and determining actions, to enhance opportunities and reduce threats to the project's objectives. A project team member is assigned to take responsibility for each risk response. This process ensures that each risk requiring a response has an owner monitoring the responses, although the owner may delegate implementation of a response to someone else. Risk response consist of four which are avoid, transfer, mitigate and accept.

Risk can be avoided by removing the cause of the risk or executing the project in a different way while still aiming to achieve project objectives. Not all risks can be avoided or eliminated, and for others, this approach may be too expensive or time-consuming. However, this should be the first strategy considered.

Transferring risk involves finding another party who is willing to take responsibility for its management, and who will bear the liability of the risk should it occur. The aim is to ensure that the risk is owned and managed by the party best able to deal with it effectively. Risk transfer usually involves payment of a premium, and the cost-effectiveness of this must be considered when deciding whether to adopt a transfer strategy.

Risk mitigation reduces the probability and/or impact of an adverse risk event to an acceptable threshold. Taking early action to reduce the probability and/or impact of a risk is often more effective than trying to repair the damage after the risk has occurred. Risk mitigation may require resources or time and thus presents a tradeoff between doing nothing versus the cost of mitigating the risk.

For risk acceptance, this strategy is adopted when it is not possible or practical to respond to the risk by the other strategies, or a response is not warranted by the importance of the risk. When the project manager and the project team decide to accept a risk, they are agreeing to address the risk if and when it occurs. A contingency plan, workaround plan and/or contingency reserve may be developed for that eventuality.

According to Vose (2008) the responses for threats are:

- Risk avoidance changing some aspect of the project so that the threat either cannot have an impact anymore or can no longer happen.

- Risk transfer is another form of “reduce” response for reducing the impact only, and it is mostly only the financial impacts (a third party takes this responsibility). Common practice in risk transfer is to sign contracts that guarantee a certain level of performance and set penalties for when the contractor fails to meet it. Insurance is an attractive option when the adverse event that will happen is above the expected cost of insurance.

- Risk reduction is a proactive action taken to either reduce the probability of the event occurring or to reduce the impact of it. However, this needs to be done at the strategic level because relevant high level of cost is involved. This

option is suitable for any level of risk that is not severe (high probability and high impact) by trading off between benefits and costs.

- Risk reserve/flexibility aims to increase responsiveness by adding some reserve (buffer) to cover risks or using redundancy policy. This risk reserved option is suitable for small or medium impact risks.

- Risk retention/absorption/acceptance can be called self-insurance, because some risks are not critical so the cost of insuring against those risks may be higher than the cost of the loss if the adverse event happens. In other words, it is a conscious decision taken for retaining the threats. This option is suitable for risks that are not significant because they have both low likelihood and impact, compared with the cost of control.

And the responses for opportunities are:

- Exploit: greedy an opportunity to make sure it's going to occur and its impact will be found out.

- Enhance: A proactive motion taken to decorate the possibility of the occasion occurring or to enhance the effect of it.

- Reject: A planned decision taken for now not exploiting or enhancing the possibility.

- Share: Parties sharing the benefit (inside pre-agreed limits), usually whilst the value is much less than the price plan.

The risk control phase comes after the risk assessment phase. The main act of risk control is to either reduce or accept risk. Activities included in the risk control phase (Cretu et al., 2011) are:

1. Track risk on risk register

2. Identify new risks

3. Adjust risk responses or develop new responses strategies

4. Monitor the implementation and effectiveness of the responses strategies

To control risk, identification of specific strategy response will assist in controlling risk. For example, in case of negative risk (threats) it is preferable to accept, avoid, mitigate or transfer risk, however, if the risk is positive (opportunity), it is preferable to enhance, exploit or share risk. Identification of risk responses will provide the best solution (Cretu et al., 2011).

According to Smith (2002), all construction parties carry risk at some point, and since every project combines risk and uncertainty, contracts between parties should allocate responsibility for risks during the project's life.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter represents the methodology used to manage the risk. The methodology and procedure that going to be applied in order to obtain all the data needed in this study will be discussed in detail for this chapter. The research methodology provides important guidelines in order to a research can be implemented more systematically to achieve its objective. Planning at this point is very important to ensure smoothness this research. Table 3.1 below will shows the flow for the research methodology in aspect of how the data will be collected, the sources of data be obtained.

This section of study will focus on the method of study to be carried out to achieve the objectives of the study. This chapter consists of two parts which are data collection and data analysis. Therefore, every measure taken must be appropriate and relevant to the related topic of study.

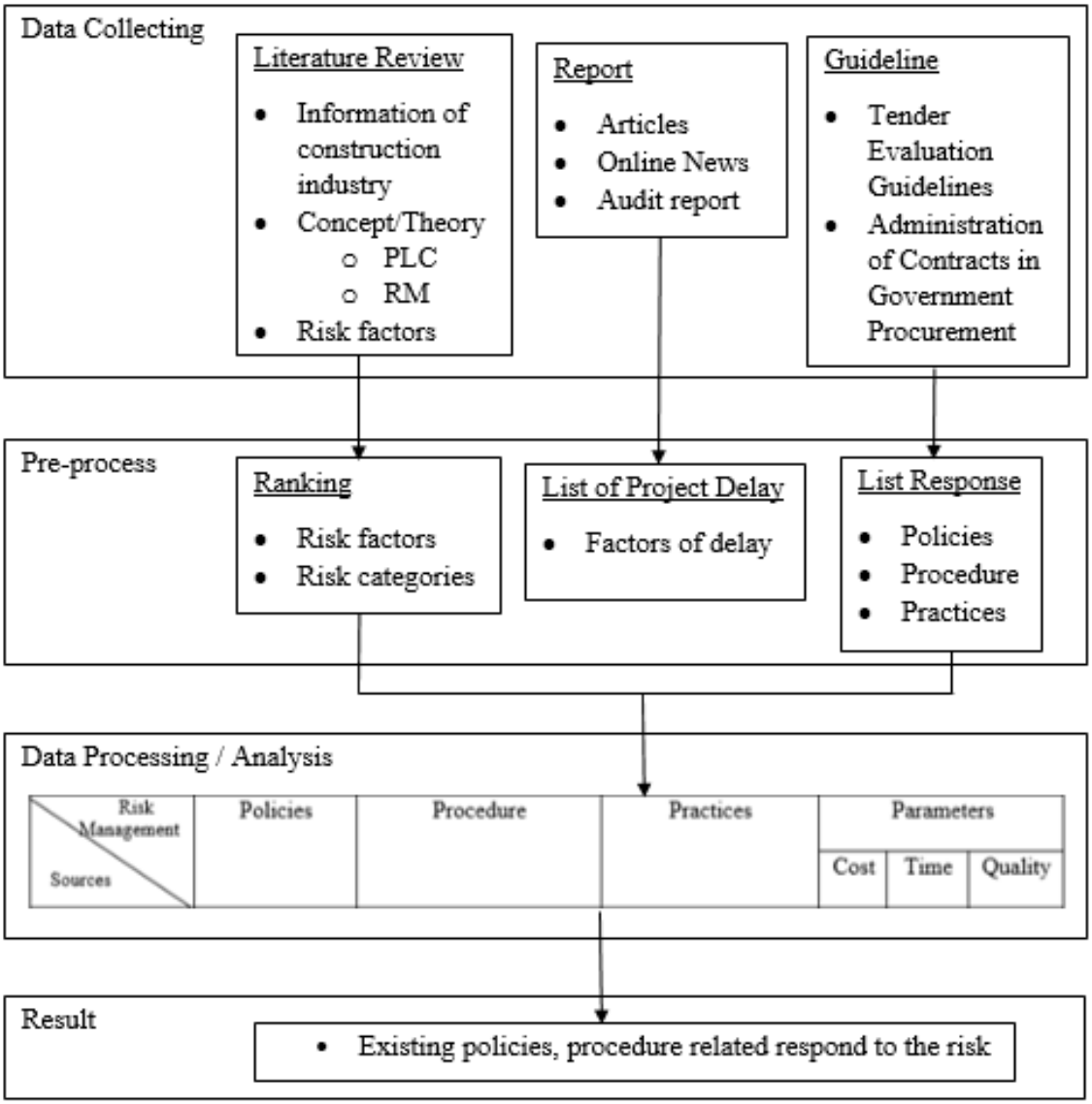


Figure 3.1 Research Methodology Flowchart

3.2 Method of Data Collection

Data collection is the important stage in obtaining all required information from the fundamental to achieve objectives of the research. There two phases use in this research.

3.2.1 First Phase

The first stage of the research was a preliminary study. This level involves discussions with lecturers, friends and references to books, journals and Internet resources. The results of this activity have contributed to the idea of the title which can be made. After that, the research title is determined. Reading furthermore have been made to obtain an overview of the field of study, scope and objective research. In this stage, data and data sources have also been identified to please the data collection process.

3.2.2 Second Phase

The second stage of the research is the stage of data collection. There are two types of data that can be collected which are primary data and secondary data. However, for this research only use primary data.

Primary data is data obtained from the analysis has been created by another party. Research and study must be carried out to collect information and data to achieve the objectives of the research. It can be obtained through website, article, journal, newspaper, reference book and magazine. These sources will help to get a better understanding of the whole process in construction activities especially risk management. All related data have been collected in accordance of objectives as which risk give the high impact in construction and what are the policies, procedure and practices that used to choose a main contractor or after choosing contractor.

3.3 Pre-process Data

In pre-process data, the risk factors and its ranking are identified from the previous study. However, based on related approach, project delays and its factor are listed.

3.4 Analysing Data

After obtained all data, the existing ranking of risk factor are compared with the new list of factors. The processed data then will transferred into tables, figures and charts with the explanations. The result will come out to fulfil the objectives of this research.

3.5 Result

Based on the risk identification that gives high impact in the previous chapter, the contract procurement will be analysed and highlighted on contractor requirement either to win tender or after winning tender. The policies, procedure and practices will be extracted out. Then, the risk response will be determined after matching the risk with the policies, procedure and practices.

3.6 Summary of the Chapter

In the nutshell, different methodologies based on different research to ensure the research run smoothly and successfully. In general, this research consists of two parts which are data collection and data analysis. Therefore, every measure taken must be appropriate and relevant to the related topic of study. To gather all the dependent data, literature review is taken into consideration as approach.

The primary data in this study were collected by reading the literature review of journals, articles, newspapers and other theses that related to risk management.

Based on data collection, data analysis was done to analyse for the research outcome. With appropriate methodology, all processes and procedures of completing this research can be managed neatly and a good methodology will gives an excellent result for the research.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This chapter will analyse and discuss all the data collected. The data was obtained from Tender Evaluation Guideline of MOF, Source of Power, Principles and Government Procurement Policy (PK 1) and Administration of Contracts in Government Procurement. The collected data will be compiled along with the parameters which are cost, time and quality to form a result. The existed risks from previous chapter also will be included.

In this study, the policies, procedure and practices during tendering process are gathered. The data is chosen based on the existed risks of contractor. The existed risks also been analyzed based on tender guideline which risk that involves the contractor only. The parameter that contain cost, time and quality will be checked based on policies, procedure and practices that match. The table will depicted the existed risks that involve contractor of the construction project and the policies, procedure and practices that can be risk management include in tendering process, also its parameters. While the timeline shows the link between the policies, procedure and practices with the parameters which are time, cost and quality.

4.2 Result

Table 4.1 Policies, Procedure and Practices with Existed Risk

Risk Management / Source	Policies	Procedure	Practices	Parameters			Existed Risk
				Cost	Time	Quality	
Tender Evaluation Guidelines	Public accountability	All procurements of work, supplies or services of more than RM200,000 per year shall be tendered		✓	✓	✓	• Bureaucracy • Cash flow difficulties
	Transparently managed	Distribute at least 50% of work worth over RM200,000 to RM350,000 to be matched among Bumiputera contractors	The tender evaluation process includes all documentation work such as the preparation of tender documents and contract documents conducted by the appointed quantity surveying consultant		✓	✓	• Bureaucracy
	Best value for money	Referring to the Department of Engineering (JKR/JPS) in advance to get a discharge prior to self-projecting a project which costs more than RM5 million. Furthermore, if the agency needs to use a consulting	The client will appoint consultants comprising consultants architects, civil engineering consultants and structures, engineering consultants mechanical	✓	✓	✓	•

	service to implement a project, the agency shall make the appointment of consultants based on the procedures and rules of procurement of consultant services in force	and electrical, as well as material measurement consultants, to advise them on the implementation of construction projects			
Open competition	Tender of estimated work worth not more than RM30 million shall be invited to a company which is one percent (100%) owned by a citizen			✓	•
Fair and equitable	Evaluations only need to be implemented on the lowest tender to the several tenders that are within reasonable price. Tenders whose prices are considered to be too high compared to the Department's Budget may be exempt from evaluation.		✓		• Bureaucracy • Cash flow difficulties
Assessment is made objectively, fair and equitable	Only complete and free tenders of any legal and contractual defects that may affect their eligibility according to current practice, are eligible to be considered			✓	• Bureaucracy • Inconsistencies in government policies
Evaluation is based on uniform evaluation	Only tenderers who can produce evidence that they have capital in the form of liquid assets at		✓		• Cash flow difficulties • Bureaucracy

		least three (3%) percent of the value of the builder's works according to the Department's Estimates are eligible to be considered		
	Free from outside influences	Review financial information, data, working experience, technical staff and Ownership of plant / equipment based on the tenderer contained in the Information Forms	✓	• Cash flow difficulties • Bureaucracy
Administration of Contracts in Government Procurement	If the owner intend to accept an offer but with some conditions that must be complied with by the tenderer in advance, the Letter of Intent shall be issued	Spending all of the allocation by the end of year is not allowed	✓	•
	The Letter of Acceptance shall be issued to the successful contractor as soon as possible after the decision of the Procurement Board is obtained and within the validity period of the tender	Only complete and free tenders of any legal and contractual defects that may affect their eligibility according to current practice, are eligible to be considered	✓	• Delay in project approval and permits

The contract shall be signed as soon as possible after all terms and conditions agreed by both parties and not later than four (4) months from the date of issue of the Letter of Acceptance			✓	• Delay in project approval and permits
The current contract should be monitored carefully and regularly arranged to detect and identify the problem of contract execution from the earliest stage		✓	✓	• Excessive contract variation
The Finance and Accounts Unit shall check with the relevant Bank / Finance Company / Islamic Bank / Insurance Company / Takaful Company about the validity of the Performance Bond filed by the contractor		✓		• Cash flow difficulties
For major contractors, advance payments can be given up to 25% of		✓		• Cash flow difficulties

	the builder's work or the maximum of RM10 million whichever is lower			
	The Project Unit / Project Leader shall set the date of site proprietorship not exceeding four (4) weeks after the date of the Letter of Acceptance signed depend on the value and complexity of the project.		✓	• Delay in project approval and permits
	If the contractor does not commence the initial work within two (2) weeks after the date of the designated site, the owner have the right to terminate the contract taking and the action may be taken against the contractor		✓	• Poor supervision

4.3 Discussion

Risk response is the process of developing strategic options, and determining actions, to enhance opportunities and reduce threats to the project's objectives. A project team member is assigned to take responsibility for each risk response. This process ensures that each risk requiring a response has an owner monitoring the responses, although the owner may delegate implementation of a response to someone else. Respond risk consists of avoid, transfer, mitigate and acceptance. In contract provision, only avoid and mitigate can be accepted in risk respond since the construction still not involved yet. Based on Table 2.4.3, some of the risk can be managed by the policies, procedure and practices during contract provision.

Risk of cash flow difficulties can be avoided during the evaluation process of tender where only tenderers who can produce evidence that they have capital in the form of liquid assets at least three (3%) percent of the value of the builder's works according to the Department's Estimates are eligible to be considered and all procurements of work, supplies or services of more than RM200,000 per year shall be tendered since the contractors show that they not have cash flow difficulties currently. Evaluations only need to be implemented on the lowest tender to the several tenders that are within reasonable price. Tenders whose prices are considered to be too high compared to the Department's Budget may be exempt from evaluation. To avoid cash flow difficulties, the evaluators of the tender need to review financial information, data, working experience, technical staff and Ownership of plant / equipment based on the tenderer contained in the Information Forms in order to make sure that the contractor have good record that can help to avoid or reduce any cash flow problem in new project. Other than that, the Finance and Accounts Unit shall check with the relevant Bank / Finance Company / Islamic Bank / Insurance Company / Takaful Company about the validity of the Performance Bond filed by the contractor. Performance bonds will protect the owner from potential loss in case the contractor fails to perform or cannot deliver the project as specified and contract provisions. Sometimes the contractor fails to breach or declares himself bankrupt, and then in that situation, the guarantor is liable to compensate the owner for the loss. Such compensation is defined as the amount covered under performance bonds. For major contractors, advance payments can be given up to 25% of the builder's work or the maximum of RM10 million whichever is lower within three

months of the Date of Possession of Site. Payment is the transfer between parties of some form of value (such as funds, services, assets) in an agreed exchange. This can be for goods, services or to fulfil a legal obligation such as a debt. The most common form of payment involves money although it can also take the form of other benefits, and is typically preceded by a bill or invoice specifying the amount due. An advance payment, sometimes referred to as a down payment, is when part of a contractual sum is paid in advance of the exchange, in example, before any work has been done or goods supplied. Advance payments are typically recorded as prepaid expenses by the payer and recorded as assets on the balance sheet. On a construction project, a contractor may request an advance payment to help them meet significant start up or procurement costs that may have to be incurred before construction begins. For example, where they have had to purchase high-value plant, equipment or materials specifically for the project. In these instances, the client should require an advanced payment bond. This secures the payment against default by the contractor.

Projects are commissioned by public and private client organisations, which have different organizational cultures and structures that dictate the rules and procedures to be followed in project procurement. It has long been perceived that public organisations are more bureaucratic than private organisations, yet empirical evidence is not entirely conclusive. Risk of bureaucracy can be avoided and mitigated by the policy of assessment is made objectively, fair and equitable during tender evaluation. It also can be avoided and mitigated by the policy of free from outsider influences and the policy of public accountability. Only complete and free tenders of any legal and contractual defects that may affect their eligibility according to current practice, are eligible to be considered is one of the procedure in the tender evaluation guidelines that helps to mitigate bureaucracy risk.

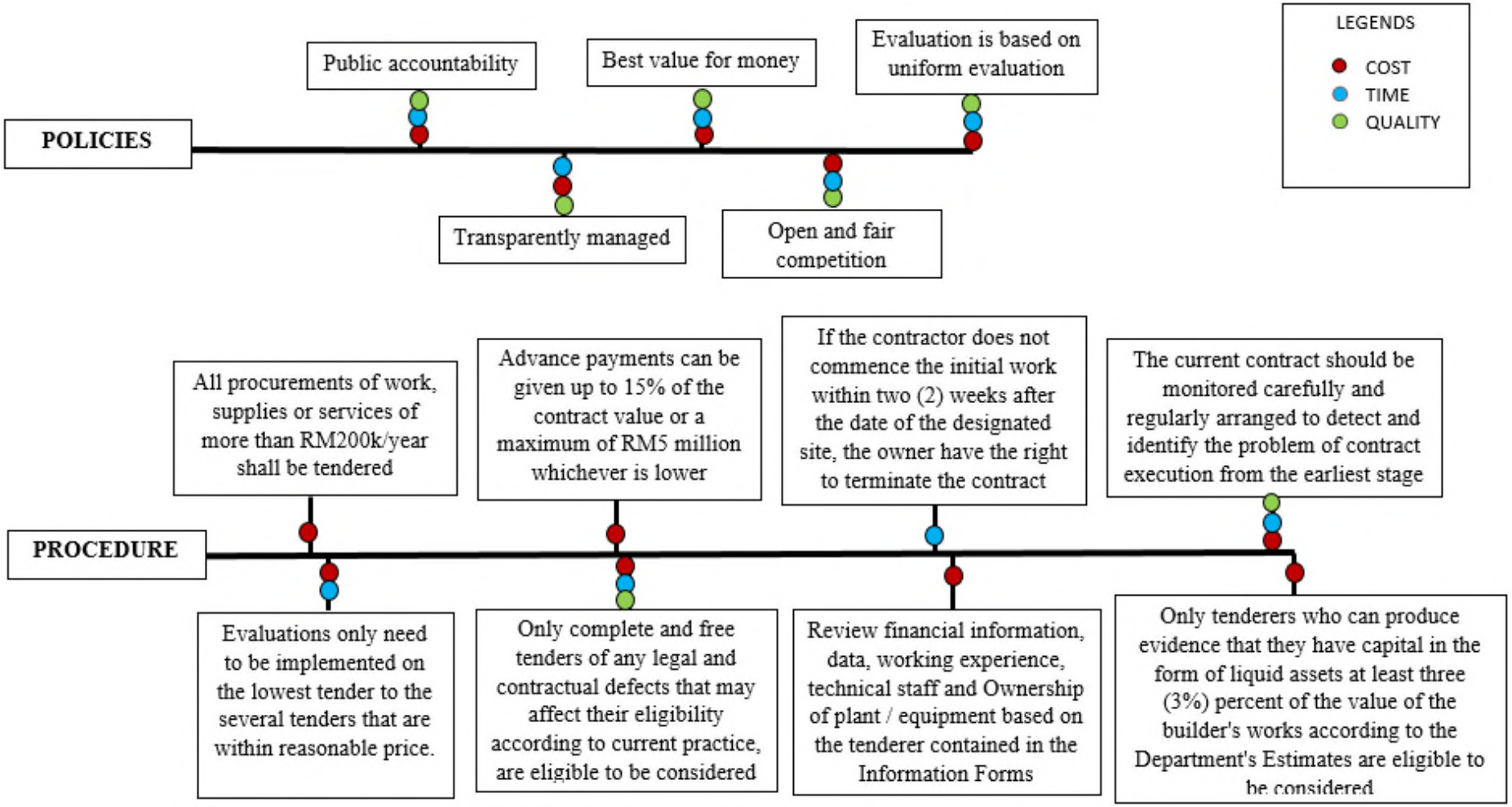
Delay in project approval and permits is one of the risk that happened in politics and contract provision. Approval is required at various stages in the procurement process. It depends on the monetary value and complexity of the procurement requirement, and is stipulated in the procurement rules. The approving authority may be different levels of tender boards such as central, ministerial and departmental. This is a common cause of delay because tender boards usually have specific dates on which they convene, so procurements need to be scheduled accordingly in order to avoid delaying the process. If

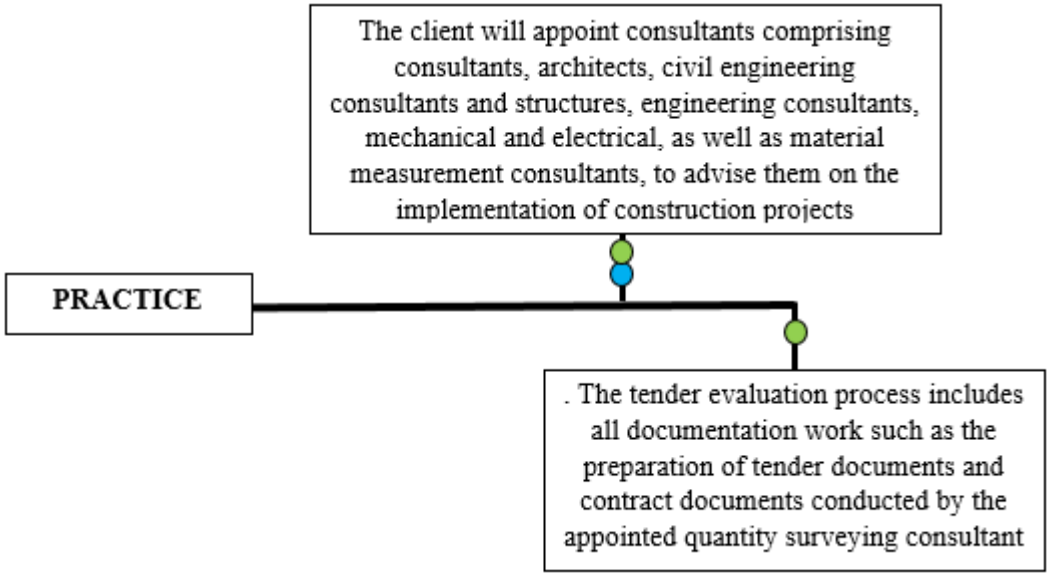
the tender board meeting is cancelled or they don't have enough time to address all issues, approvals are delayed until the next tender board meeting. When procurements are donor funded, there may be need for donor approval at different stages of the procurement process. Delays caused by tender boards and donors are difficult to control. So they need to be anticipated and considered during procurement planning and scheduling. However, this risk cannot be avoided but can be mitigated by issuing The Letter of Acceptance to the successful contractor as soon as possible after the decision of the Procurement Board is obtained and within the validity period of the tender so that the delay time can be reduced. The contract also need to be signed as soon as possible after all terms and conditions agreed by both parties and not later than four (4) months from the date of issue of the Letter of Acceptance. Other than that, The Project Unit / Project Leader shall set the date of site proprietorship not exceeding four (4) weeks after the date of the Letter of Acceptance signed depend on the value and complexity of the project so that the contractor can do the work as soon as possible.

To mitigate the risk of excessive of contract variation, the current contract should be monitored carefully and regularly arranged to detect and identify the problem of contract execution from the earliest stage.

If the contractor does not commence the initial work within two (2) weeks after the date of the designated site, the owner have the right to terminate the contract taking and the action may be taken against the contractor to avoid and mitigate the poor supervision risk.

4.4 Timeline


LEGENDS
COST
TIME
QUALITY
POLICIES
Public accountability
Best value for money
Evaluation is based on uniform evaluation
Transparently managed
Open and fair competition
PROCEDURE
All procurements of work, supplies or services of more than RM200k/year shall be tendered
Advance payments can be given up to 15% of the contract value or a maximum of RM5 million whichever is lower
If the contractor does not commence the initial work within two (2) weeks after the date of the designated site, the owner have the right to terminate the contract
The current contract should be monitored carefully and regularly arranged to detect and identify the problem of contract execution from the earliest stage
Evaluations only need to be implemented on the lowest tender to the several tenders that are within reasonable price.
Only complete and free tenders of any legal and contractual defects that may affect their eligibility according to current practice, are eligible to be considered
Review financial information, data, working experience, technical staff and Ownership of plant / equipment based on the tenderer contained in the Information Forms
Only tenderers who can produce evidence that they have capital in the form of liquid assets at least three (3%) percent of the value of the builder's works according to the Department's Estimates are eligible to be considered


The client will appoint consultants comprising consultants, architects, civil engineering consultants and structures, engineering consultants, mechanical and electrical, as well as material measurement consultants, to advise them on the implementation of construction projects
PRACTICE
. The tender evaluation process includes all documentation work such as the preparation of tender documents and contract documents conducted by the appointed quantity surveying consultant

4.5 Summary of the Chapter

In this study, the data were identified and extracted from Tender Evaluation Guideline of MOF, Source of Power, Principles and Government Procurement Policy (PK 1) and Administration of Contracts in Government Procurement. The data then being analyzed and the result are presented in the table and timeline with further related explanation.

The results demonstrated that the risk management already occurred in the tendering process in order to choose the competent contractor for the project. From the list of ranking of risk factors, only 5 of them are selected to be matched with the policies, procedure and practices table which are cash flow difficulties, bureaucracy, delay in project approval and permits, excessive contract variation and lastly poor supervision. Most of the risks selected are in politics and contract provision group. The timeline shows how the policies, procedure and practices can be linked with cost, time and procedure. All the aims and objectives of this study are achieved.

CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter will conclude the overall study related to assessment of risk management in government construction project. The conclusion will include the objectives achievement and the analyzed result. This chapter also discussed the recommendation for further study.

5.2 Conclusion

In conclusion, the objectives of this study are achieved where the rank of risk factors that give high impact in construction are identified based on the group. In past studies, different sources of construction risk have being identified. Various approach for classifying risk has been recommended in the literature. Management can understand better the nature of risks by categorizing the risks. There are various ways for categorizing risk to achieve different goals. To some, in construction projects, risk can be categorized largely into external risks and internal risks while others classify risk in more elaborate categories. These categories depend on the situation of the project and the surrounding environment. The risk management of the government construction project is able to be assessed by analysing the current Tender Evaluation Guideline of MOF, Source of Power, Principles and Government Procurement Policy (PK 1) and Administration of Contracts in Government Procurement. Risk response which are avoid, transfer, mitigate and acceptance also able to be identified based on the policies, procedure and practices of contract procurement where only two are being able to identified in the risk management which are avoid and mitigate since transfer and acceptance response are usually used during risk in construction at site. This shows that the government construction project is

already has initial risk management before construction started by avoiding of choosing incompetent contractor.

This study has successful provides an overview of the policies, procedure and practices via tender evaluation and contract procurement that related to why the incompetent contractor should have not been an issue especially when the project delay since the government has evaluate their tender thoroughly.

5.3 Recommendation

This study is not enough to show all the risk management in the contract procurement since only a few of the sources are selected. Therefore, it is useful to conduct further study for more details of risk management existed in contract procurement.

Hence, these are the recommendations for the future study:

i) Study on the factors that cause the risk first and also the government steps or solutions to avoid or mitigate the risk. This could help to have better understanding on the risk before analyze the risk management. Government risk management also can help to compare with the risk management existed in contract procurement and whether it is necessary or not to have it.

ii) Enlarge the scope to conduct the study by doing both public and private sector of construction industry. The public and private sector could have slightly different way in contractor appointment. Knowing the difference and comparison can help to improve the study better.

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