

POOR PERFORMANCE OF PUBLIC CONSTRUCTION PROJECT IN
MALAYSIA

NURUL ALIFAH BINTI JATARONA

A thesis submitted in fulfilment of the
requirements for the award of the degree of
Doctor of Philosophy (Civil Engineering)

School of Civil Engineering
Faculty of Engineering
Universiti Teknologi Malaysia

NOVEMBER 2018

DEDICATION

To my beloved husband;
Mohd Afdhal Mohd Shariff,

My Daughters;
Nur Damia Najihah, Mohd Afdhal
Nur Hannah Haziqah Mohd Afdhal
Nur Raisya Dzahin. Mohd Afdhal

My parents;
Encik Jatarona Mohd Nor and Puan Zainab KM Nasir.

My siblings;
Nurul Najwa Jatarona and Mohd Afiq Jatarona

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my supervisor, Assoc. Prof. Dr. Aminah Md Yusof, Assoc. Prof. Ir. Dr. Syuhaida Ismail and Dr Chai Chang Saar for their invaluable advice, guidance and enormous patience throughout the development of the study. Thanks to my husbands, Mohd Afdhal bin Mohd Shariff, who has been always supporting me in term of energy sharing and financially. To my children, Najihah, Hannah and Raisya, thank you for understand me, loving me and continues to support Ibu.

I would like to thanks my parents Mr. Jatarona bin Mohd Nor and Pn Zainab binti KM Nasir for their support and love. Their trust on me in completing this thesis is highly appreciated. Not forgetting my siblings Nurul Najwa and Mohamad Afiq for supporting my journey. My gratitude also goes to my best friend Michelle Zainab Baird who always be part of my support system and not forgetting all of my friends who had contributed to the successful completion of this study. I am blessed to have each one of you whom had given me encouragement in making this dream a reality.

ABSTRACT

The performance of public projects has always been a frequent topic of discussions. There are many cases of abandoned, delayed, cost overrun and poor quality of construction works. These problems can be observed in the Annual National Audit Reports. This study intends to propose a framework of Poor Performance Management of public construction projects in Malaysia. To achieve this, the study identifies what are the factors leading to poor performance, how these factors affect the performance and what would be the appropriate mitigation measures. A document analysis on the Auditor General Report from year 2003 to 2014 has been carried out to identify factors reported as poor performance factors. The analysis coupled with the literature review, has identified 75 factors and each was classified according to the stages of development and a set of questionnaires was prepared to calibrate these factors. A survey was conducted among 137 respondents who have sufficient experiences in project development. The study discovered that the most occurred or mentioned factors in the audit reports are not perceived as significant contributors to poor performance due to the respondents' contradicting perceptions. Factors like lack of planning and incompetent team members are among the agreed factors of poor performance and these factors vary from one stage to another. The Statistical Packages for Social Studies (SPSS) is used to analyse the data and findings from the analysis found out that actor, process and institution related factors are equally responsible for poor performance. As a result, a framework for Public Project Performance Management has been suggested and it emphasises the involvement and commitment from all team members of a project. This framework focuses on 5Cs; Competent, Commitment, Communication, Comfort and Collaboration among team members. Since the performance management is in place and supported by good team environment, the performance of the project can be enhanced and improved. Thus, this addresses and helps solve the poor performance issues in public project development.

ABSTRAK

Isu pencapaian projek pembinaan sektor awam sering diperkatakan. Banyak projek sektor awam yang menghadapi masalah tidak siap, lewat, disiapkan dengan kos yang lebih tinggi sedangkan kualiti tidak sepadan. Masalah ini kerap ditimbulkan dalam Laporan Tahunan Audit Negara. Kajian ini dijalankan untuk mencadangkan rangka kerja bagi menangani masalah prestasi pembangunan projek sektor awam di Malaysia. Untuk mencapai matlamat ini, satu kajian telah dibuat untuk mengenal pasti apakah faktor yang menjejaskan prestasi pembinaan projek disektor awam, sejauhmanakah kesan yang didatangkan oleh faktor ini dan apakah langkah penyelesaian yang boleh diambil. Analisis dokumen Laporan Audit Negara 2003 hingga 2014 telah dijalankan bagi mengenalpasti apakah faktor yang dilaporkan menjejaskan prestasi projek sektor awam. Kajian literatur dan analisis dokumen telah mengenalpasti 75 faktor penyumbang. Faktor ini dikelaskan mengikut fasa pembinaan dan borang soal selidik disediakan bagi mengkalibrasi faktor-faktor ini. Soal selidik dibuat keatas 137 responden yang terdiri daripada mereka yang berpengalaman dalam menjalankan projek awam, bagi mendapat pandangan dan penilaian akan kepentingan faktor dalam pembangunan projek awam. Kajian ini mendapati terdapat faktor yang kerap ditimbulkan dalam Laporan Audit, bukanlah yang dianggap penyebab penting kepada prestasi rendah projek. Faktor seperti kurangnya perancangan, pemilihan pasukan projek yang tidak kompeten adalah antara masalah yang dianggap penting oleh responden. Masalah ini berbeza daripada satu tahap ke tahap lain. Pakej Statistik untuk Kajian Sosial (SPSS) digunakan untuk menganalisis data kajian dan dapatan daripada analisis tersebut mendapati faktor aktor, proses dan insituisi adalah bertanggungjawab kepada masalah projek. Oleh itu, rangka kerja yang dicadangkan menitikberatkan penglibatan dan komitmen semua pihak. Rangka kerja pengurusan prestasi ini menekankan kompetensi, komitmen, komunikasi, keselesaan dan kolaborasi. Dengan adanya pengurusan prestasi yang teratur serta disokong oleh persekitaran pasukan kerja yang baik, tentunya prestasi projek akan dapat ditingkatkan dan masalah yang dihadapi dapat diselesaikan.

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LIST OF ABBREVIATIONS

IDR	-	Iskandar Development Region,
NCER	-	Northern Corridor Economic Region,
ECER	-	Eastern Corridor Economic Region
SCORE	-	Sarawak Corridor for Renewable Energy
SDC	-	Sabah Development Corridor
CIDB	-	Construction Industry Development Board
BEM	-	Board of Engineers Malaysia
GDP	-	Gross Domestic Product
IEM	-	The Institution of Engineers' Malaysia
PKK	-	Pusat Khidmat Kontraktor
SPSS	-	Statistical Package for Social Sciences
GNI	-	Gross Net Income
GNP	-	Gross National Product
ETP	-	Economic Transformation Plan
GTP	-	Government Transformation Plan
NKEA	-	National Key Economic Area
NKRA	-	National Key Results Area
KPI	-	Key Performance Index
MBAM	-	The Builders Association of Malaysia
NTP	-	National Transformation Plan
MRT	-	Mass Rapid Transit
RII	-	Relative Importance Index
AGR	-	Auditor General's Report

EOT	-	Extention of Time
CSFs	-	Critical Success Factors
PWD	-	Public Work Department
MoH	-	Ministry of Health
RFT	-	Request for Tender
ITT	-	Invitation for Tender
BQ	-	Bill of Quantity
CFO	-	Certificate of Fitness
CPMS	-	Construction Project Management System
PO	-	Project Owner
CSC	-	Construction Supervision Company
CC	-	Construction Contractor
LSFBQ	-	Lum Sum Firm Bill of Quantities
LSABQ	-	Lum Sum Approximate Bill of Quantities
LSDS	-	Lum Sum Drawing and Specification
D&B	-	Design and Build
BOT	-	Built, Operate, and Transfer
PMC	-	Project Management Consultant
PFI	-	Private Finance Initiative
MOW	-	Ministry of Work
CNC	-	Certificate of Non-Compliance
LAD	-	Liquidated

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CHAPTER 1

INTRODUCTION

1.1 Background of Problem

Success is the ultimate goal of construction projects. Nonetheless, there is a lack of consensus on what is considered as a project's success, thus resulting in difficulties to assess whether a project is successful or not (Gudienė *et al.*, 2013). Successfully delivered projects require effective management of various types of constraints among participants. Mamman and Omozokpia (2014) stated that the construction industry is complex in nature because it involves a large number of project stakeholders such as consultants, clients, contractors, shareholders, and regulators. However, the concept of success is ambiguous due to the various and differing perceptions among stakeholders. In some research, success is said to be related to performance, thus the focus should be on measuring performance in order to describe success.

Performance measurement is a current issue in academia as well as in the business community (Elnihewi *et al.*, 2014). As competition in construction business increases daily, it is important for organisations to measure their performance as the

measurement of performance has become the language of progress for organisations (Sweis *et al.*, 2014). Construction companies must continue to focus on improving their productivity and performance due to the current conditions in the construction industry where slower economic growth, higher competition, and construction industry restructuring have emerged (Ali *et al.*, 2012). On top of that, the construction industry's role as the main contributor and determinant of performance in an economy reconfirm its need to continue showing excellent achievements (Ibrahim *et al.*, 2010).

Therefore, the idea of using performance measurements to determine an organisation's level of performance has attracted many construction companies, the public sector, various clients, and construction stakeholders to use this management tool (Takim *et al.*, 2004). Previously, organisations measured performance using financial measures. Data on cost accounting in traditional performance measurements did not support organisations, especially in terms of quality and improvement as seen by customers. In successful organisations, the measurement of performance is based on improvements seen by customers as well as results delivered to other stakeholders such as shareholders (Elnihewi *et al.*, 2014).

In Malaysia, the construction industry has been reported to experience poor performance issues, especially in public construction projects (Riazi *et al.*, 2013a). The poor performance reported is due to several factors such as the adoption of inaccurate methods, failure in determining critical success factors, failure in identifying elements of success, and failure in adopting systematic performance measurement systems (Takim *et al.*, 2004). Hence, exploring the performance of public construction projects is essential to ensure that the construction of facilities is of high quality and meets the requirements in providing a better life for the public. Generally, there are two types of clients in the construction industry which are public and private clients (Jaafar and Nuruddin, 2012). Public clients depend on the government to provide facilities and other developments such as the construction of highways, hospitals, low cost residential, community halls, sports facilities, and water and sewerage projects (Jaafar and Nuruddin, 2012; Al-khalil and Gha, 1999). On the other hand, private clients are more concerned with income-generating projects. In Malaysia, Bank Negara (2015)

classifies construction activities into four categories, namely residential, non-residential, civil engineering, and special trade. This classification clearly reflects who the clients of the construction activities are, and statistics show that the government undertakes most of the construction activities in Malaysia (Bank Negara, 2015). Time and cost performance are the fundamental criteria for the success of any project. Unfortunately, the construction industry in Malaysia is regarded as an industry with poor performance, leading to failures in achieving effective time and cost performance. As a consequence, most projects face huge amounts of time and cost overruns. This study intends to assess the time and cost performance of construction projects in Malaysia using a structured questionnaire survey. The findings of the study revealed that 92 percent of construction projects were overrun, and only 8 percent of projects achieved completion within the contract duration. The amount of time overrun was between 5 percent-10 percent as agreed by respondents. In terms of cost performance, only 11 percent of respondents mentioned that their projects normally finished within the budgeted cost, while 89 percent of respondents agreed that their projects faced problems of cost overrun, with an average overrun of 5 percent-10 percent of the contract price. The major contributors to this poor performance include design and documentation issues, financial resource management, and project management and contract administration issues. A qualitative study was also carried out using semi-structured interviews with experienced personnel involved in managing construction projects. The interviews resulted in the development of 13 mitigation measures to improve the time performance and 15 mitigation measures to improve the cost performance of construction projects. This study will help practitioners to implement mitigation measures at the planning stage in order to achieve successful construction projects (Memon *et al.*, 2012).

The government as a public client is concerned with the welfare of the public as public construction projects are important and funded using public funds via tax payments. Therefore, it is important for the government to spend wisely as the government is accountable to all stakeholders (Jaafar and Nuruddin, 2012). Encouraging performance improvement while satisfying control and compliance to requirements involve people's trust in the government in order to ensure that people will continue to give the ruling government the mandate to continue leading the

country (*Crawford et al.*, 2003). Malaysia aims to elevate itself to the developed nation status by 2020 with a gross national income (GNI) per capita target of US\$15,000. To be recognised as a developed and high-income nation, a country must have a high income per capita, high gross domestic product (GDP) per capita, high gross national product (GNP), high level of industrialisation, widespread infrastructure, and high standards of living.

This development plan has a positive impact on the construction industry as many mega projects are designed under the programme. A total of 149 projects have been announced with committed investments of RM212 billion which are expected to generate a gross national income of RM137.6 billion and create 410,892 jobs by 2020 (BERNAMA, 2012). The Builders Association of Malaysia (MBAM) said that construction works will continue to come from projects under the 10th Malaysia Plan, the Economic Transformation Programme (ETP), the Initial Project, the Greater Kuala Lumpur project, the Rural Transformation Programme, and the Urban Transformation Programme. With a lot of projects coming in, it is important for the government to ensure that these projects are implemented in a timely manner as costs will increase if they are deferred. To remain competitive, local contractors need to improve their skills and knowledge, including having internationally recognised accreditation schemes and meeting world-class standards, using new and more efficient construction methods, and practicing the latest technologies to achieve projects with quality that is comparable or better than those by foreign contractors.

However, public projects have been reported to present poor performance issues. These include low quality, late decision-making, lack of communication, and delays. Al-Khalil and Al-Ghafly (1999) posited that 70 percent of public projects in Saudi Arabia have experienced delays. Public project delays in Jordan are also extensive and warrant further investigation (Odeh and Battaineh, 2002). It is also observed that other than delays, public projects also experience other issues such as cost overrun (Endut *et al.*, 2005; Shehu *et al.*, 2014), payment issues such as unpaid contractors (Lim, 2005), and low workers' productivity and safety (Yong and Mustafa, 2012).

The abovementioned problems are also faced by the construction industry in Malaysia. It can be said that the Malaysian construction industry is plagued with poor performance issues (Sambasivan and Soon, 2007). Low profitability, lack of training, lack of trust among stakeholders, and lack of communication are examples of the problems faced by the construction industry in Malaysia (Yong and Mustaffa, 2012). Furthermore, the Malaysia National Audit Department (2009) showed that public projects struggle with various problems or poor performance issues during its project duration. Therefore, to overcome the weaknesses and gain a better insight, there is a need to explore the factors of poor performance in Malaysian public construction projects so that the industry can tackle these issues and continue to grow.

1.2 Problem Statement

Malaysia is moving towards becoming a developed and high-income nation by the year 2020. The government of Malaysia has aggressively developed and introduced several plans and programmes to make sure that the country is on the right track to achieve its aim. Therefore, the government had introduced the National Transformation Plan (NTP). Under NTP, the Economic Transformation Plan (ETP) and the Government Transformation Programme (GTP) were introduced. The concept of the ETP is to focus on the strategies needed to boost the economy, while the GTP focuses on areas concerning the people of the country. Both programmes are expected to contribute to making the country a developed and high-income nation as per its Vision 2020.

The construction industry is one of the most important industries that contribute to the Malaysian economy and is the key generator of skilled jobs for Malaysians. As such, various initiatives have been carried out by the government to spur growth in the construction sector from time to time. Under the Economic Transformation Plan (ETP), a total of 149 projects have been announced, with

committed investments of RM212 billion, an expected gross national income of RM137.6 billion generated by 2020, and the creation of 410,892 jobs (BERNAMA, 2012).

The construction industry is crucial to the Malaysian economy and its growth. The industry provides significant employment opportunities with a registered workforce of 1.2 million representing 9.5 percent of Malaysia's total workforce. 75 percent of the workforce in the construction industry are Malaysians. Employees in the industry include professionals such as engineers, architects, planners, and surveyors, together with skilled and non-skilled construction workers. Each year, thousands of young Malaysians enrol in technical and vocational institutes as well as universities to undertake courses relevant to the construction industry. The significance of the industry will continue to evolve, and the industry will become increasingly critical as Malaysia becomes a developed nation (CIDB, 2007).

Malaysians will require more energy-efficient and higher quality buildings, infrastructure and cities. Today, this country is already seeing intense demand for infrastructure development such as in Sabah and Sarawak with the Pan-Borneo Highway as well as the need for more efficient urban transportation such as the Mass Rapid Transit (MRT) project in the Klang Valley. This rise in demand will in turn require construction players and the workforce to continually raise their capabilities. Despite the many initiatives and programmes implemented over the years, real and substantial issues still persist in the construction industry. These include limited emphasis on quality in workmanship and quality assessments, limited levels of safety awareness and enforcement, added constraints to the industry due to regulations and bureaucratic procedures, and the public's negative perception towards the industry.

What is more troubling is the problems faced by public projects. According to statistics, even though more private projects are being developed at present, the problems faced by government projects cannot be taken for granted. On average, from the number of projects carried out from 2010 to 2016, 20 percent of them are

government projects with a total investment of RM183.2 billion (CIDB Malaysia, 2014). In 2005, 17.3 percent of the 417 government projects were considered as sick projects (Sambasivan and Yau, 2007). A project is classified as a sick project if it is delayed or abandoned for three months. A study by Endut *et al.* (2005) had identified that the time overrun for public projects is more critical than for private projects where only 20.5 percent of public projects had managed to be completed within the specified contract time compared to 33.35 percent of private projects.

Based on the Malaysia National Audit Department (2009), a total of 11 public projects were incomplete/non-completed, had overrun costs, of low quality, and had failed to comply with contract specifications. Nine projects encountered delays, six were not constructed according to contract specifications, and seven projects were affected by quality issues. Based on a preliminary review on the Malaysia National Audit Department, a similar pattern of repeated problems can be identified. It can be said that there seems to be no improvement made by the accountable or relevant ministry. Why do problems persistently recur in the Malaysian construction industry, especially in public projects? There is a need to identify the parties that contribute to the problems in public projects and how severe do these problems affect the owners, consultants, contractors or the public as end users? These problems affect the construction industry's performance; hence, they must be analysed so that appropriate actions can be taken. The effects of these problems on people, especially the taxpayers need to be taken into consideration as eventually, they are the ones who will suffer the effect of facility projects' late delivery as the end users of public facilities. Public projects are supposedly constructed to bring ease to the public; on the contrary, these problems cause burden to them. For example, the late completion of a hospital may affect people in terms of cost as people have to bear the cost of transportation by travelling to distant hospitals in order to seek for treatment and medication. This is an example where the public has to suffer due to poor performance in the construction of public projects.

Several recommendations have been highlighted by auditors to the accountable ministry as improvement measures such as engaging good planners, understanding the

need of end users and the authority before a project's implementation, making sure the instructions for work amendments are approved by the committee before the commencement of works or before making payments, as well as increasing supervision and monitoring of works on site (Malaysia National Audit Department, 2009; Malaysia National Audit Department, 2010). Nonetheless, the recommendations made by auditors have not been seriously considered by the ministry involved, thus public construction projects continue to struggle to meet the so-called success criteria in terms of having timely schedules, being within budget, and producing high quality products. Other issues mentioned are the late approval of extension of time (EOT), incomplete specifications and drawings, as well as changes by owners during project execution (Malaysia National Audit Department, 2009; Malaysia National Audit Department 2010).

Since these problems are often said to be the causes of poor construction performance as frequently reported in the audit reports, there is a need to explore the causes behind the poor performance of construction projects, especially public construction projects. Poor performance is related to unsatisfactory work in terms of quality and breaches of work practices, procedures, and rules. Public project performance receives less attention in Malaysia. The scarcity of public work success has also been highlighted in other countries such as those marked by Koops *et al.* (2014). A typical example is projects highlighted by Yong and Mustaffa (2012) who examined the critical success factors (CSFs) of private construction projects in Malaysia. Other researchers have focused on related issues also faced by the Malaysian construction industry such as delays (Kwang, 2010; Sambasivan and Soon, 2007), cost overruns (Shehu *et al.*, 2014; Toh *et al.*, 2012), and low labour productivity (Riazi *et al.*, 2013a; Rajagopal, 2012).

However, not many studies have been conducted on the overall problems encountered by public construction projects in Malaysia; therefore, a study should be carried out to address this issue by focusing on the poor performance of public projects in Malaysia. The high incidence of poor performance in public construction projects suggests the existence of underlying critical success factors which are yet to be

explored by researchers. Therefore, this study needs to be carried out to assess the factors leading to the poor performance of public construction projects in Malaysia. The finding of this research is expected to assist in the development of a framework that can be used to improve the successful delivery of public projects in Malaysia.

1.3 Aim and Objectives

Performance evaluation of construction projects is essential to identify whether a project is successful or vice versa. Additionally, improvements can be made based on the findings from the evaluation. However, a performance evaluation must have some criteria or performance indicators through which the performance of a project can be measured and considered to be the rule of the game (Lim and Mohamed, 1999). Nonetheless, there is no certain standard of success criteria that can be adopted to represent all projects. This is because each project is unique and different (Chan and Chan, 2004).

The aim of this study is to develop a framework to improve the performance of public project delivery in Malaysia. It is important to identify factors that contribute to the poor performance in the construction industry, especially in public projects. As public projects are funded using public funds, a successful project delivery is defined by its compliance with public expectations. The study elicits on the perception of their relative importance. The aim is achieved via the following objectives:

- i. To identify and establish the factors of poor performance of public construction projects.
- ii. To analyse the severity of poor performance factors.

- iii. To formulate improvement measures to address poor performance in public project delivery.
- iv. To develop a framework of public project performance management in Malaysia.

1.4 Scope and Limitation of the Study

The construction industry, unlike other industries, has peculiar problems as far as project management is concerned. With the arrival of large projects involving multiple designers, contractors, subcontractors, construction managers, consultants, and specialists, project management has hence become more complex. In the last few decades, construction projects have become more challenging to contractors and clients due to tough budgeting and scheduling requirements. Projects must be completed as planned within the prescribed budget as well as the quality stated in the contract. However, many poor performance issues have been reported in the construction industry such as delays, cost overruns, and low workmanship quality.

Most of the issues highlighted concern general construction projects (Ali and Rahmat, 2010; Doloi *et al.*, 2012; Chan, 2009; Iyer and Jha, 2005). Others focus on problems faced by private projects (Yong and Nur Emma, 2012). Nevertheless, not many studies have been conducted on public or government projects due to researchers' lack of interest in examining the problems as these projects are funded or provided for by the government for the people. The main focus of public projects is generally to complete the project regardless of its cost. Nevertheless, the trend has changed. In the very challenging economic situation today, costs play an important role. In addition, people have begun to evaluate and criticise the government in the event of maladministration. Thus, it is important for the government to ensure that every public development is completed within the stipulated time and budget, and has

good workmanship quality. Therefore, this study will focus on public construction projects.

What is public construction project? Traditionally, a public project is known as any project that is funded by a government and is meant to be owned or operated by that government. Most public projects relate to work a government does to fulfil a public purpose, and they commonly include things such as road repair and construction, public building construction, schools, and even public parks. These projects are funded by taxpayers' money and therefore, are subject to more open procedures than many other projects. For example, a public project may need to publish requirements and request bids. Those bids must be opened at a public place and then considered publicly.

However, the trends have changed. Policies have been introduced by the government as an effort to reduce the financial and administrative burden of managing the governmental sector through encouraging the involvement of the private sector in the development of the country. Public Private Partnership (PPP) is used to help the government in developing the country. PPP is a form of collaboration between the government and private parties to develop public projects. Private parties fund the projects with own funds and in return, own the right to collect the benefits during the concession period (Economic Planning Unit (EPU), 2006). The facility will then be transferred at no cost to the government at the end of the concession period which is normally long enough for the private sector to recoup its investment and pay back the project's debt (Naidu and Lee, 1997). From the above, this research definition of public projects are projects that are initiated for the public and are no longer considered based on the party funding the projects.

In order to identify the factors that lead to poor performance in public construction projects, a critical analysis is needed on the documents that report on public construction activities. The documents used are the Auditor General's Reports (2003 - 2014). The reports show that the public projects in Malaysia are struggling to

deal with issues that affect the quality of construction such as not completing it on time (delays), over-budgeting, lacking in terms of materials and workmanship, unclear contract documentation, and payment issues. Public projects consist of many kinds of development projects such as the constructions of highways, expressways, bridges, light rail transit, airports, and public facilities including hospitals, clinics, public low-cost houses, community centres, and government buildings.

This study focuses on analysing the performance of public construction projects. Performance looks at whether a job which an employee is paid for is done properly. Poor performance results in investigation, counselling, meeting and discussion with the employee, training and so on before dismissal is even contemplated. Non-performance according to the Business Dictionary means the failure of a party to abide by or fulfil the terms of a contract and is considered a failure which may lead to a breach of contract. A contract is breached (broken) when a party refuses to perform its promises under the contract. In construction projects, contracts are written agreements signed by the contracting parties which bind them and define the relationships and obligations of a particular project (Chong *et al.*, 2011). However, most public projects in Malaysia experience poor performance. Though the contractors for public projects are usually able to complete and deliver the projects back to the client, the finished product is generally received in a less than satisfactory manner.

1.5 Research Methodology

Research methodology is a way to find out the results of a research problem. Researchers use different criteria for solving or searching research problems. Different sources use different types of methods for solving problems. According to the Industrial Research Institute (2010), the word “methodology” is defined as the way of searching for or solving a research problem. Redmen and Mory (2009) defined research as a systematised effort to gain new knowledge. Therefore, this study

employed several methods of data collection for the purpose of objective achievement. The research methodology for this study consists of eight phases as summarised in Figure 1.1.

The first step conducted in this research is determining the problem statement, aim, and objective of this research. Public construction projects in Malaysia are often associated with poor performance issues; thus, there is a need to identify the causes of such poor performance. The Audit General's Report has revealed the occurrence of the same problems over the studied years (2003 to 2014). The abovementioned issues serve as the problem formulation in this research. The identification of issues or problems are carried out by browsing references from the local authorities, local newspapers, reports from Construction Industry Development Board (CIDB), the Public Works Department (PWD) website, and review on the General Audit Reports.

The second step is the literature study where a performance review of current and past construction projects is conducted to identify the issues leading to poor performance in the construction industry worldwide as reported by other researchers. This is done together with analyses on the Auditor General's Report to identify the performance level of public projects in Malaysia. Problems that contribute to the poor performance of public construction projects are identified by reviewing and analysing the reports spanning 12 years (2003 to 2014). These materials are used for background reading to obtain full understanding and the information needed to develop the questionnaire and consequently, the analysis and discussion of this research. This profound review provides a significant foundation for data collection, which is crucial in validating the research objectives at a later stage.

A survey questionnaire is the most cost-effective and effective method to be used to obtain a large number of respondents' perception in order to achieve good results in a particular study (McQueen and Knussen, 2002; Andi and Minato, 2003). Therefore, in this study, the structured questionnaire method is applied to the three main target groups involved in Malaysian construction projects. The three targeted groups are

government agencies (client), consultants (architects, engineers, quantity surveyors), and contractors.

Data analysis refers to the process of evaluating data using analytical and logical tools to examine the components of the data provided. In this research, the quantitative data collected using the questionnaires are analysed using the Statistical Package for Social Sciences (SPSS). In order to capture the respondents' opinions, a 5-point Likert Scale is used as response. Data are analysed using frequency and descriptive analyses. Furthermore, Relative Importance Index (RII) is used to rank the performance factors, and factors with the highest ranking which are considered as significant and seriously affect the performance of public construction projects in Malaysia are thus presented.

Results from the analysis are used to form the Public Project Performance Management framework. The poor performance factors are derived from the respondents' perceptions on the problems faced in public construction projects. Factors with high RII are chosen as the poor performance factors of public projects in Malaysia. Data validation is conducted through semi-structured interviews on practitioners and project management experts. Their comments are adapted to improve the Public Project Performance Management framework. Limitations in terms of findings are included along with further recommendations for future research in the area. Figure 1.1 summarises this research methodology process.

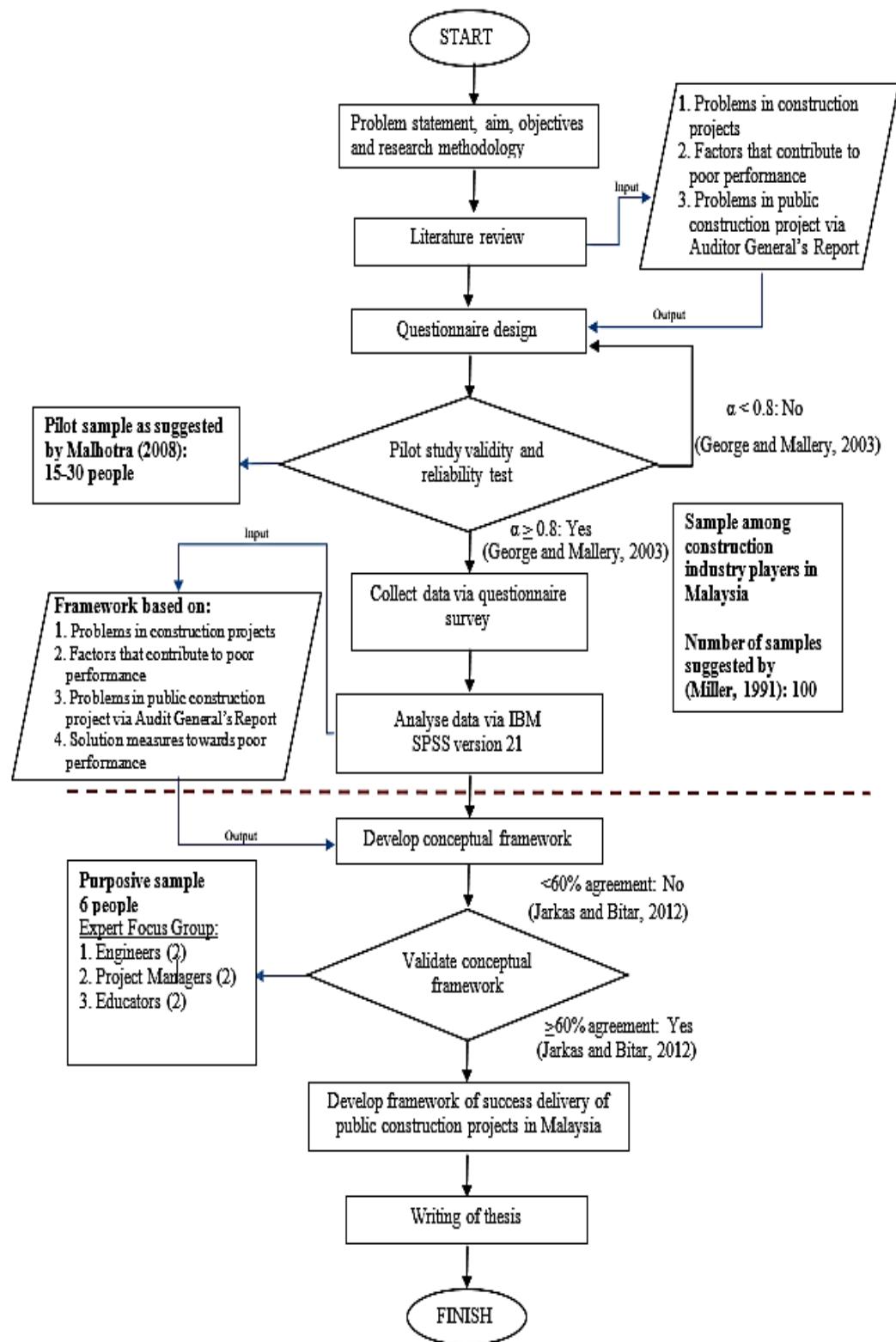


Figure 1.1: Research Flowchart

1.6 Significance of the Research

Each research is unique and has its own way to solve societal problems. The research issue is unique in the sense that it is executed within a period in a country. This research is therefore significant in identifying the problems faced in public construction projects as well as the factors that contribute to the poor performance of public construction projects in Malaysia.

The research aims to review and address the poor performance factors which exist in the delivery process of public construction projects. A new classification of poor performance factors is essential to provide a new platform for discussion in order to determine the performance of public construction projects' delivery process. This research is significant in determining the issues evident in the construction of public projects that lead to poor performance.

1.7 Structure of Thesis

This thesis is structured into six (6) chapters. Chapter 1 deals with an introduction to the thesis. It presents the background and problem statement. The chapter sets the direction of the research and illustrates the methodology employed in this research. Chapter 2 reviews the construction projects conducted in Malaysia. This aims at providing a general understanding of what had happened and is happening in Malaysia. The types of projects and stakeholders in the construction industry are also discussed.

Chapter 3 analyses the poor performance of Malaysian public construction projects. The chapter reviews the meaning of performance in general, in addition to

the definition of poor performance, issues of poor performance in construction, and factors of poor performance in construction. Finally, the chapter deals with the factors of poor performance in public construction projects in Malaysia.

Chapter 4 describes the methods used to collect and analyse data. It aims at elaborating the methodological process carried out in the research. Chapter 5 presents the analysis of the data. The analysis comprises of the computation mean and the Relative Importance Index (RII) which are used to explore and prioritise. The index allows the identification of factors' contribution to the poor performance in public construction projects. Chapter 6 concludes the research and proposes the framework of performance management for public construction projects in Malaysia.

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