RISK OF CONSTRUCTION CORRUPTION FACTORS IN CONSTRUCTION PROJECT LIFE CYCLE FROM CONTRACTORS' PERSPECTIVES

NUR AMYLIA IZRIN BINTI MOHD SAIM

A thesis submitted in
fulfilment of the requirement for the award of the
Degree of Master of Civil Engineering

Faculty of Civil Engineering and Built Environmental
Universiti Tun Hussein Onn Malaysia

MARCH 2021

DEDICATION

For my parents, lover and son.

ACKNOWLEDGEMENT

First and foremost, Alhamdulillah and praise the Lord Almighty for giving me the opportunity and wellness for me to carry out this study. Despite some hitch along the way it is a good learning curve to hone my skills. Many love to my parents for whom without their support and tender care made me who I am today. Special Thanks to my husband, Mohd Firdaus and my little son, Kaiser Althaf for your love, support and understanding my passion. For my amiable and hardworking supervisor I have all the gratitude for teaching and guiding this thesis to be what it is I present here.

ABSTRACT

Oftentimes, construction industry is well known to be one the most easily corruptible industry in this world. This is due to the nature of the complexities of the industry itself, as there exists many loopholes that makes it easy for dishonest people looking to take advantage to gain for themselves. The practice of corruption in Malaysia have been severe as seen in the Corruption Perception Index (CPI) which ranked the country, 58th out of 180 countries in 2019. This makes it important to study the corrupt practices construction industry moreover it contributed to more than RM60 billion towards the Malaysian GDP. Corrupt practices not only affect the economic side of the nation but it also affects the government's image as well as the nation's reputation. Hence this study intended to identify the factors contributing to corruption throughout the construction project life cycle phases as it reveals the riskiest phases which are prone to corrupt practices. From literature review, it was found that there were around 200 corruption factors relating to the corruption in construction industry. After similarity checking, it was found that only 31 corruption factors were relevant which would then be placed under the construction project life cycle (CPLC) phases to categorize it. The pilot study involved 13 construction experts and the study found that all the construction corruption factor (CCF) to be relevant and the questionnaire reliable which is all Cronbach Alpha value above 0.600. The actual questionnaire survey was conducted among contractors from Grade 1 to 7 of the southern region of peninsular Malaysia. From 150 questionnaires distributed, the study managed to get back 135 sets which means 90% response rate. Data was then established from these 135 valid sets of questionnaires and was analysed using statistical tools and risk matrix chart. It was found that the collected data were reliable as the Cronbach alpha values shows it to be reliable. The data was further used to analyse the ranking of occurrence and severity for each factor in construction project life cycle (CPLC) phases. Based on the occurrence and severity values, the risk level of each factor was identified and plotted using risk matrix chart to show the riskiest factor in the CPLC. Finally, for the high risk factors, this study has proposed mitigation plan that will help to counter the corrupt practices. The findings from this study will assist the construction community in Malaysia to take appropriate actions in resolving the corruption issues with the suggested mitigation strategies for their organisations. For the relevant authorities, these findings can help to formulate rules and regulations to prevent corrupt practices and ensuring the construction activities can be carried out with a clean, high quality and in sustainable manner.

ABSTRAK

Kebelakangan ini, industri pembinaan terkenal sebagai salah satu industri di dunia yang paling mudah berlakunya kegiatan rasuah. Ini disebabkan oleh, sifat kompleks industri itu sendiri kerana terdapat banyak celah yang memudahkan orang yang tidak jujur mencari peluang untuk mendapat keuntungan untuk diri sendiri. Kegiatan rasuah di Malaysia semakin parah , seperti dapat dilihat daripada Indeks Persepsi Rasuah (CPI) di mana negara berada ditangga ke 58 daripada 108 negara pada tahun 2019. Hal ini menjadikan betapa pentingnya untuk mengkaji kegiatan rasuah didalam industri pembinaan dan menyumbang lebih RM60 billion kepada KDNK negara. Kegiatan rasuah bukan sahaja memberi impak negatif kepada ekonomi negara, malah memberi impak negatif kepada imej negara dan reputasi negara. Oleh itu, kajian ini bertujuan untuk mengenal pasti dan menilai faktor-faktor menyumbang kepada rasuah sepanjang fasa kitaran pembinaan projek (CPLC) dan mengenal pasti fasa paling berisiko yang terdedah kepada kegiatan rasuah . Daripada kajian literatur, didapati terdapat sekitar 200 faktor rasuah yang berkaitan dengan rasuah di dalam industri pembinaan. Selepas semakan kesamaan, didapati hanya 31 faktor rasuah yang relevan dan diketegorikan dibawah fasa kitaran projek pembinaan (CPLC). Setelah itu, faktor-faktor tersebut digunakan di dalam borang soal selidik semasa kajian lapangan dimana untuk melihat sama ada faktor-faktor tersebut relevan dengan industri pembinaan Malaysia. Kajian lapangan melibatkan 13 orang pakar pembinaan dan kajian mendapati bahwa kesemua factor rasuah pembinaan (CCF) adalah relevan dan borang soal selidik adalah boleh dipercayai di mana semua nilai Cronbach Alpha atas 0.600. Tinjauan soal selidik sebenar telah dijalankan dan melibatkan kontraktor Gred 1 hingga Gred 7 daripada Wilayah Selatan Semenanjung Malaysia. Daripada 150 set borang soal selidik diedarkan, kajian berjaya mendapatkan kembali 135 set borang soal selidik, ini bermakna, 90% kadar tindakbalas. Selepas itu, data terkumpul daripada 135 set borang soal selidik yang lengkap akan dianalisis menggunakan alat statistik dan carta matrik risiko. Didapati bahawa, data yang terkumpul boleh dipercayai sebagaimana nilai Cronbach alfa menunjukkan ia boleh dipercayai. Selanjutnya, data digunakan untuk menganalisis tahap keberangkalian kejadian dan keparahan untuk setiap faktor dalam fasa kitaran hidup projek pembinaan (CPLC). Berdasarkan nilai kejadian dan keparahan, tahap risiko setiap faktor dapat dikenal pasti dan diplot menggunakan carta matrik risiko untuk menunjukkan fasa paling berisiko di dalam fasa kitaran hidup projek pembinaan (CPLC). Akhir sekali, faktor yang telah dikenal pasti paling berisiko, kajian telah mengemukakan pelan mitigasi untuk membantu mengatasi kegiatan rasuah. Dengan hasil kajian ini, komuniti pembinaan di Malaysia dapat mengambil tindakan yang sewajarnya dalam menyelesaikan masalah-masalah ini dan memperbaiki strategi pencegahan rasuah di syarikat mereka. Bagi pihak berkuasa eksekutif, pengenalpastian fasa paling berisiko yang mungkin berlaku daripada amalan rasuah adalah penting kerana ia membantu menggubal peraturan dan undang-undang untuk mencegah amalan rasuah dan memastikan aktiviti pembinaan dapat dijalankan dengan pendekatan yang bebas dari rasuah, berkualiti tinggi dan pendekatan lestari.

TABLE OF CONTENTS

TITLE		**i**
DECLARATION		**ii**
DEDICATION		**iii**
ACKNOWLEDGEMENT		**iv**
ABSTRACT		**v**
ABSTRAK		**vi**
TABLE OF CONTENT		**vii**
LIST OF TABLES		**xi**
LIST OF FIGURES		**xiii**
LIST OF APPENDICES		**xiv**
LIST OF SYMBOLS AND ABBREVIATIONS		**xv**
CHAPTER 1 INTRODUCTION		**1**
1.1	Background	1
1.2	Problem of Statement	2
1.3	Research Question	4
1.4	Research Objectives	4
1.5	Scope of the Study	4
1.6	Significance of the Study	5
1.7	Thesis Structure	5
1.8	Summary	7
CHAPTER 2 LITERATURE REVIEW		**8**
2.1	Introduction	8
2.2	Construction Industry	8
2.3	Malaysian Construction Industry	9
2.4	Construction Project Life Cycle Phases (CPLC)	12

i

2.5 Corruption 16

2.5.1 International Anti-Corruption Agencies 18

2.5.2 Malaysia Anti-Corruption Agencies 23

2.5.3 Form of Corruption 25

2.6 Corruption in Construction Industry 28

2.6.1 Corruption by Construction Project Life Cycle (CPLC) 30

2.6.2 Parties Prone to Corruption 31

2.6.3 Involvement of Contractor in Corruption 33

2.6.4 The Impact of Corruption 34

2.7 Construction Corruption Factors (CCF) 37

2.7.1 Construction Corruption Factors (CCF) by CPLC 37

2.7.2 Construction Corruption Factors (CCF) in Relation to Form of Corruption Practices 41

2.8 Risk of Corruption in the Construction 44

2.8.1 Categorization of Risk 46

2.8.2 Managing Risk 46

2.8.3 Risk Matrix 48

2.8.4 Mitigation Measures of Construction Corruption Practices 54

2.9 Summary 59

CHAPTER 3 METHODOLOGY 60

3.1 Introduction 60

3.2 Research Design 60

3.3 Research Framework 61

3.4 Research Flow Chart 63

3.5 Questionnaire Development 65

3.6 Selecting Respondents 66

3.7 Pilot study 67

3.8 Actual survey 67

3.9	Analysis Method		68
	3.9.1	Reliability Test	68
	3.9.2	Descriptive Analysis	69
	3.9.3	Risk Matrix	70
3.10	Summary		72
CHAPTER 4	**ANALYSIS AND DISCUSSION**		**73**
4.1	Introduction		73
4.2	Pilot Study Analysis		73
	4.2.1	Experts' Demography	73
	4.2.2	Reliability Test	75
	4.2.3	Content Validity and Relevancy of CCF	76
4.3	Analysis of the Collected Data		78
	4.3.1	Demographics of Respondents	78
	4.3.2	Reliability Analysis	83
	4.3.3	CCF severity rank	84
	4.3.4	CCF Risk Level	90
	4.3.5	CPLC Phases Risk Rank	96
4.4	Proposing Mitigation Measure for Corrupt Practices		96
4.5	Summary		98
CHAPTER 5	**CONCLUSION AND RECOMMENDATION**		**99**
5.1	Introduction		99
5.2	Conclusion of Findings		99
	5.2.1	Findings for Objective 1	99
	5.2.2	Findings for Objective 2	100
	5.2.3	Findings for Objective 3	101
	5.2.4	Findings for Objective 4	101
	5.2.5	Findings for Objective 5	101
5.3	Contribution of the Study		101
	5.3.1	Construction Industry	102
	5.3.2	Academic Knowledge	102

5.4	Limitation of the Study	102
5.5	Recommendations	103
	5.5.1 Recommendations for Construction Leaders	103
	5.5.2 Recommendations for Future Works	103

REFERENCES **105**

APPENDIX **117**

LIST OF TABLES

2.1	GDP by Sector	10
2.2	Limit of building/civil/mechanical work	11
2.3	Registered contractors according to grade in 2018	11
2.4	List of CPLC models	14
2.5	Definitions of corruption given by organizations	17
2.6	Definition of corruption by construction researchers	17
2.7	The forms of corruption by researchers	26
2.8	Parties in construction corruption practices	32
2.9	Mapping of the impact of corruption in the construction industry	35
2.10	Corruption factors from previous researchers	38
2.11	CCF relation to form of corruption practices	42
2.12	Definitions of risk by organizations and standards	44
2.13	Definition of risk by construction researchers	45
2.14	Type of risks	46
2.15	List of working models for CRM	47
2.16	Definition of terms from the heat map	52
2.17	Mitigation strategies from previous studies	55
2.18	Mitigation strategies descriptions	57
3.1	The research framework.	62
3.2	Likert scale of relevancy	65
3.3	Likert scale of occurrence and severity	66
3.4	Probability of occurence	70
4.1	Demography of respondents	74
4.2	Reliability test results	76
4.3	CCF average index in each CPLC phase	77
4.4	Reliability of CCF occurrence	84

4.5	Reliability of CCF severity	84
4.6	Ranking of Construction Corruption Factors (CCF) in Design and Tendering Phase	85
4.7	Ranking of Construction Corruption Factors (CCF) in Construction Phase	86
4.8	Ranking of Construction Corruption Factors (CCF) in Completion Phase	87
4.9	Ranking of Construction Corruption Factors (CCF) in Maintenance Phase	89
4.10	Risk of CCF in Design and Tendering phase	91
4.11	Risk of CCF in the construction phase	92
4.12	Risk of CCF in Completion phase	93
4.13	Risk of CCF in the Maintenance phase	94
4.14	Ranking of CPLC phase risk	96
4.15	Proposed mitigation	97
5.1	Summary of CCF	100

LIST OF FIGURES

2.1	Construction Project Life Cycle (CPLC)	15
2.2	IACA Logo	18
2.3	IAACA Logo	19
2.4	ICAC Logo	20
2.5	Trace Anti-Bribery Compliance Solutions Logo	21
2.6	United Nation Global Compact	22
2.7	OECD Logo	22
2.8	Establishment of the Anti-Corruption Agency	24
2.9	Risk Matrix	49
2.10	Simple Heat Map Background	50
2.11	Heat Map	51
2.12	Risk Heat Map	52
2.13	Risk Matrix	53
2.14	Risk Matrix	54
3.1	Research Flow Chart	64
3.2	Risk Matrix	70
4.1	Age of respondents	79
4.2	Respondents' level of education	79
4.3	Respondents' experiences in the construction industry	80
4.4	Company's grade registered with CIDB	81
4.5	Highest amount of project handled	81
4.6	Position in Company	82
4.7	Experience in facing corruption practices	83
4.8	CCF in Design and Tendering phase	91
4.9	CCF in the Construction phase	93
4.10	CCF in the completion phase	94
4.11	CCF in the Maintenance phase	95

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Actual Questionnaire Survey	117
B	Questionnaire Survey for Pilot Study	121
C	Tendering process	125

LIST OF SYMBOLS AND ABBREVIATIONS

CIDB	-	Construction Industry Development Board
USAID	-	United State Agency for International Development
CPLC	-	Construction Project Life Cycle
GDP	-	Global Development Plan
GNI	-	Gross National Income
GFCF	-	Gross Fixed Capital Formation
MACC	-	Malaysia Anti-Corruption Commission
OECD	-	Organisation for Economic Co-operation and Development
TI	-	Transparency International
EU	-	European Union
IMF	-	International Monetary Fund
ACA	-	Anti-Corruption Agency
PCB	-	Public Complaints Bureau
MAMPU	-	Malaysian Administration Modernization and Management Planning Unit
GIACC	-	Governance, Integrity and Anti-Corruption Centre
CPI	-	Corruption Perception Index
KPMG	-	Klynveld Peat Marwick Goerdeler
IEM	-	Institute of Engineer Malaysia
BEM	-	Board of Engineer Malaysia
CCF	-	Construction Corruption Factors
IRM	-	Institute of Risk Management
HM	-	Her Majesty
PMBOK	-	Project Management Book of Knowledge
ISO	-	International Standard Organization
CRM	-	Corruption Risk Management

i

UN	-	United National
MCI	-	Malaysian Construction Industry
AI	-	Average Index
G	-	Grade
NS	-	Not Significant
SS	-	Slightly Significant
MS	-	Moderately Significant
VS	-	Very Significant
ES	-	Extremely Significant
JKR	-	Public Work Department

CHAPTER 1

INTRODUCTION

1.1 Background

In the world, the construction industry plays a major role in developing the national economy and socio-economic development which ultimately supports other industries (Abd Nifa, 2013; Ofori, 2015; Ali Khan, Liew and Ghazali, 2014). The construction industry also contributes to job-creation, re-distribution of wealth and income generation (Durdvey and Ismail, 2012; Kasimu and Kolaweli, 2015). While, according to Ibrahim, Roy, Ahmed and Imtiaz (2013) the industry plays a role in improving the quality of life and a lifeline for the sustainability of a country. In Malaysia, the construction industry also contributed to the development of Malaysia in all aspects including tourism, technology and other industries in which it supports other by providing infrastructures to hold the pieces together (Ali Khan *et al*., 2014).

However, this industry faces high risk due to the complexities of construction business such as high employee turnover ratios in the sector, low frequency of construction projects, insufficient regulations and understaffing due to cost reduction strategies also corruption issues (Gunduz and Onder, 2012). Recently, Malaysian's construction industry faces many challenges that can affect project success, such as the lack of local manpower, cost overrun, delays in payments, financial issues and most concerning are the corruption issues (Rahim, 2010; Adnan, Hashim, Yusuwan and Ahmad, 2011; Asohan, 2014; Lee, 2019). According to Asohan (2014), corruption in the construction industry is critical and affects the Government's image as well as the nation's reputation. Corruption occurs due to many causes such as characteristics of construction project, tendering system, inspection system and greediness of some parties (Stansbury, 2005; Mohd Nordin, Takim and Nawawi, 2011; Shan, Yun, Chan and Yi, 2014).

Corruption has been critical issues in the construction industry worldwide and it is ranked first in the risk of corruption amongst other industries (Transparency International, 2018). Corruption is a misuse of power was granted for public officials and its stakeholders. This misuse of power is for self-benefit that is undisclosed and lacking transparency (World Bank, 1997; Transparency International, 2017 (a)). According to the Malaysian Anti-Corruption Commission (MACC, 2017 (a)), the parties that are likely to be involved with corruption are government officials, project owners, financiers, consultants, contractors, sub-contractors, suppliers, partners and agents. However, from the previous studies, the party that usually deals illegitimately with corruption are usually contractors as they are required to cooperate with other parties and as one of the main roles in the construction industry (Zou, 2006; Mohd Nordin, Takim and Nawawi, 2013).

Hence, there is a need to understand the risk of corruption as a way to overcome corrupt practices in the construction industry (United Nations Global Compact, 2013). Thus, this study considers contractors who are registered in CIDB as the targeted respondents. This study intends to uncover issues regarding corrupt practices in Malaysian construction industry and also to determine the level of risk for corruption propensity in Malaysian construction industry.

1.2 Problem of Statement

Tun Dr. Mahathir Mohamad had introduced Vision 2020 in 1990 which inspires Malaysia to be a fully industrialized country by the year 2020 (Ali Khan *et al*., 2014). Since the inception of the vision, Malaysia has experienced rapid development and seeing an increased demand for the construction industry which have recorded significant growth and about RM 250 billion, worth of construction contracts is expected to be awarded with the announcement of 2020 Budget (Tan, 2019). However, there are many challenges to achieve a transparent construction industry such as shortage of labour, safety and corruption issues. Based on Transparency International (2020), Malaysia is one of the Asia Pacific countries that is in the bottom half which was ranked as 51 over 180 countries for the Corruption Perceptions Index (CPI) in 2019. Several newspapers also reported that the construction industry is highly prone to corruption and these are serious issues that ruins the Government's image and the country's reputation (Abdullah, 2017; Lee, 2017).

There are several studies on corrupt practices in the construction industry and amongst them is by Sohail and Cavill (2006 (a)) on the effect of corruption in the

construction industry and the methods to combat corruption. Then in 2008, Sohail and Cavill conducted two studies specifically on the effect of corruption in the United Kingdom's construction industry throughout the project life cycle and also on developing the accountability initiative to combat corruption. Research by Clarke (2010) is regarding the effect of corruption in competing for a government contract in Afghanistan. While in India, Tabish and Jha (2012) conducted a study on the impact of corruption in public construction projects and developing an anti-corruption strategy model. There are also studies on corruption in the China construction industry by Ming Shan *et al*., (2014) which relates to the forms of corruption, the impact of corruption and anti-corruption strategies applied to avoid corrupt practices for the future. Ming Shan, Chan, Yun and Bo, (2015) further explained by developing a systematic model to measure the corruption level in a public construction project. The latest studies by Locatelli, Giacomo, Tristano and Marco, (2017) in Italy is regarding project characteristics can favour corruption and the effect of corruption on project performance.

There are several research works related to corrupt practices in the Malaysian construction industry. Namely, a study by Mohamad and Abdul Aziz, (2005) which discussed the ethical practices in the construction industry and found that many unethical practices were happening during the whole construction project life cycle which leads to corruption. Later Salim (2009) developed a strategy to combat corruption in the construction industry by using corruption factors from previous studies in each phase of Project Life Cycle. Mohd Nordin *et al*., (2011) published a reviewed work on critical corruption factors which partly extracted from Rahim (2010). Furthermore, Mohd Nordin *et al*., (2013) conducted a study on the behavioural factors that lead to corruption and developed the corruption combating action model for Malaysian construction. In the same year, Gevansri (2013) studied corruption in the Malaysian construction industry which identifies the causes of corruption in the construction industry, consequences and also methods to minimize corruption in the construction industry. The next year, Zakaria, Lee, Nilashi, Abd Majid, Ibrahim and Mohamad Zin (2014) studied the behavioural factors contributing to corruption issues and suggested the need to identify the corruption factors in the Malaysian construction industry. The latest study in 2019 by Lee investigated the corrupt practices in the Malaysian construction industry and developed preventive strategies.

These studies indicate that there are gaps to pursue more studies and one of them is to uncover the risk level of construction corruption factors throughout the construction project life cycle (CPLC) for the Malaysian construction industry. There are many

opportunities to explore the corruption practices in Malaysia construction industry like the forms of corruption, the occurrence and severity of the practices, the risk of the corruption and others. Hence this study takes the advantage to explore and asses the construction corruption factors throughout the construction project life cycle (CPLC) for Malaysia construction industry which is still not being investigated and will contribute to new body of knowledge. Beside that the findings from this study will benefits the relevant stakeholders of the construction community.

1.3 Research Question

Based on the problem statement of the study, the research questions here are designed to assist the researcher to achieve the main goal. This research focuses on the following research questions:

i. What are the corruption factors related to the Malaysian construction industry?
ii. What is the degree of occurrence and severity of the construction corruption factors in Malaysia?
iii. What is the level of risk each of the construction corruption factor in Malaysia?
iv. What is the riskiest phase for corruption in construction phases?
v. What is the mitigation measures for high risk of corruption factors?

1.4 Research Objectives

This study aims to assess the risk of corruption factors in the Malaysian construction industry by Construction Project Life Cycle (CPLC). Referring to the statement of the problem, the objectives are as follows:

i. Identify the construction corruption factors in construction industry
ii. Determine the degree of occurrence and severity for corruption factors
iii. Assess the risk level of corruption factors by CPLC phases
iv. Propose mitigation measure for high risk the corruption factors

1.5 Scope of the Study

The study was conducted based on conventional construction management method as this approach is typically adopted in Malaysia. It is conducted through a quantitative approach to achieve the objectives. The pilot study conducted using a structured questionnaire

survey with 13 experts in the construction industry. While the data collection conducted using the same questionnaire survey after it has been verified from the pilot study. The targeted respondents of data collection are building/civil contractors G1 until G7 from Southern Part of Malaysia (Johor, Malacca and Negeri Sembilan). There were 150 questionnaires distributed amongst the respondents through face-to-face surveys, by e-mails and by Google form. These respondents are chosen for this study because they are highly susceptible to corrupt practices and the type of sampling carried out for this study is nonprobability sampling approach. The average index score and risk matrix are tools for analyzing the data collection to determine the degree of occurrence and severity of each corruption factor and risk level of each construction corruption factor.

1.6 Significance of the Study

This research has significant benefits for construction practitioners; government bodies and academia alike which its significance is outlined as follows:

- This study has identified the impact of corruption on the construction industry.
- This study also investigates the construction corruption factors that can contribute to the academic world by providing the risk of construction corruption factors and mitigation towards corruption practices.
- This finding contributes to the community to have a good quality construction at a reasonable price due to contractor used low quality of materials to cover the cost of corruption.
- This finding contributes to construction industry practices and Malaysia Anti-Corruption Commission (MACC) in handling corruption practices in construction industry.

1.7 Thesis Structure

Chapter 1: This chapter is the introduction of the entire research. It discusses briefly the background of the study and the need for this study. It also contains the problem statement, objective, scope of study and significance of the study. The thesis structure also provided as an introduction to every chapter in this study. Finally, a summary of the first chapter is highlighted.

Chapter 2: The second chapter is about the literature review related to this study and was carried out to provide a comprehensive understanding of the

background of the construction industry and corruption issues in the construction industry. It discusses the phases in the construction industry which is the construction project life cycle (CPLC). This chapter also explained the corruption definition, forms of corruption, the impact of corruption and discusses corruption in the construction industry in Malaysia. Corruption risk management was discussed including the definition of risk for deeper understanding. Then, the factor contributing to corruption from previous studies is extracted. Finally, the mitigation strategies were extracted and simplified from previous studies and the description was explained.

Chapter 3: This chapter is explained the research approach and methods adopted for this study. Firstly, it discusses the research design which is a quantitative research method used for this research using the survey. Then, the research framework is designed to provide guidelines for the researcher to conduct the study. This chapter also describes the quantitative research method including questionnaire development for a pilot study and actual survey. Then method selection of respondents was discussed. The purpose and method of the pilot study and the actual survey were explained in detail. Then, discussion regarding the reliability test analysis by using Cronbach Alpha. The data analysis using SPSS 19.0 software. Finally, it discusses the analysis method adopted for this study.

Chapter 4: Chapter Four presents the pilot study and data collection which is conducted in the Southern Part of Malaysia (Johor, Malacca and Negeri Sembilan). The pilot study conducted to determine the relevancy for each construction corruption factor with Malaysia's situation and involved 13 construction experts. This chapter also discusses the actual survey of data collection which is carried out amongst the Southern Part of Malaysia's Grade 1-Grade 7 contractors. It presents the demographics profile of construction workers including position, the grades of the company based on CIDB and experience. Besides that, the degree of severity and occurrence by using the average index score. Then, the risk level of each construction corruption factor is identified by using risk matrix which multiplies of occurrence and severity. After the data analysis, the result discussed deeply. Then the mitigation strategies were proposed based on previous studies and only for

riskiest construction corruption factors. Finally, the summary of the chapter is outlined.

Chapter 5: This chapter is discussing the conclusion of the overall findings of the entire research. It also provides a summary of its main findings and its achievements by providing answers to the aim, objectives and questions of the research. Besides that, the limitations of the research are outlined and recommendations for practitioners and further research is given out.

1.8 Summary

This chapter intends to describe the introduction of this study. It consists of the background of the research, problem statement, research questions, aim and objectives and scope of this study. It also explains briefly the significance of this study and discusses the thesis structure.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review carried out by this study. The purpose of this literature review is to provide the researcher with a general overview of corruption in the construction industry and also in helping to build the foundation for the theoretical framework of this study. The first part of this chapter gives a brief description of the construction industry and an in-depth description of the Malaysian construction industry. Afterwards, this chapter also discussed the phases/stages of the construction industry, which is the Construction Project Life Cycle (CPLC). Additionally, the corruption issues in the construction industry will be discussed in-depth in this chapter. From the discussion, several corruption factors in the construction industry have been identified and extracted from previous studies. Next, corruption risk in the construction industry discourse was presented to assess the risk of each factor. Finally, this chapter will end with the summary

2.2 Construction Industry

Construction industry includes all immobile structures such as buildings, tunnels, pipelines, dams, canals, airports, power plants, railroads and factories. The construction industry is one of the economic sectors that are responsible for planning, designing, constructing, maintenance and demolition of buildings and works. The industry plays roles in the success of major national policies, strategies, economic development and productivity rather than the size of the industry (Halim, Jusoh, Osman and Amlus, 2014). According to Olanrewaju and Abd Aziz, (2015), the roles of the construction industry should be as following;

a. *A strategic tool to achieve sustainable development outputs which are growth-initiating and growth-dependent*
b. *Contribution to the economy as part of; Global Development Plan (GDP), Gross National Income (GNI), Gross Fixed Capital Formation (GFCF)*
c. *Provide utilities and infrastructure for other industries*
d. *Contributing significantly to another informal sector*
e. *As income for wealth generation and wealth re-distribution*
f. *Providing vacancies for job creation*

Construction is a dynamic and responsive industry which relates and reflects to the economic investment and development of a country (Mohd Nordin *et al*., 2011; Durdyev and Ismail, 2012). The industry is unique and one of a kind which means that each and every of projects has a different nature of work, location, different personalities to employ, parties and type of production such as dam, stadium and road (Abd Sani, 2011). It also involves huge and complex of activities where the quality is hard to assess and this industry can be categorized as a high-risk business (Kenny, 2007 (a); Zakaria *et al*., 2014). Since the industry involves a complex process that sometimes non-standardized modes that can raise the asymmetric information between clients and suppliers which connect to the government (Kenny, 2007 (b)). The construction industry comprises projects from government and private sectors that involve numerous parties, different phases of work, complex working process and input either from public or private sectors (Takim and Akintoye, 2002; Stansbury, 2005).

2.3 Malaysian Construction Industry

Malaysia is categorized as a developing country and set the way forward for national development plan for 2021 until 2025. The Twelfth Malaysia Plan (12MP) aligned with the shared prosperity initiative encompassing three dimensions which are economic empowerment, environmental sustainability and social re-engineering for next 2021 until 2025. The plan to transform Malaysia economic is include Industrial Revolution 4.0 (Economic Planning Unit, 2020). Malaysia depends on the construction industry as an economic investment for opening opportunities for other industrial development. The construction industry has been significantly contributing towards the revenue generation, capital formation and employment creation which ultimately support the growth of gross

REFERENCES

Ab. Rani N.I.; Ismail Syuhaida I.; Mohamed Z.; Hussain A. H.& Kambiz G. (2018) Local Contractors' Awareness on Competitiveness towards Liberalisation and Globalisation in the Malaysian Construction Industry. *Journal of Construction in Developing Countries.* 23(1). 21-42.

Abd Nifa F.A. (2013). *Development of a Framework for Partnering through Aligning Organizational Cultures in the Malaysian Construction Industry*. The University of Salford: P.h.D. Thesis.

Abdul Rahman, H., Saimon, M. A., & Ali, A. S. (2009). Professional Ethics in The Construction Industry Of An Islamic Country: Clients's Perspective. *Construction in the Muslim World Conference*, October 21-23, 2009, Kuala Lumpur, Malaysia.

Abd Sani Z.S. (2011) *Safety Culture on Construction Sites*. University Technology Malaysia: Master.

Abdul Hamid, Abdul Rahim & Badroldin, Mohd & Raman, Syazwani & Zakaria, Rozana & Mohandes, Saeed Reza. (2016). Late Payment Practices in The Malaysian Construction Industry. *Malaysian Journal of Civil Engineering (Mjce)*. 28. 149-162.

Abdul Rahman H., Chen W. & Sheik Mohamad F. (2015) Implementation of Risk Management in Malaysian Construction Industry: Case Studies. *Journal of Construction Engineering.*

Abdullah Z. (25 February 2017) A source of embarrassment. *New Straits Times*

Adnan H., Hashim N., Mohd Yusuwan N. & Ahmad N. (2011). Ethical Issues in the Construction Industry: Contractor's Perspective. *Procedia- Social and Behavioural Sciences*. 35:719-727.

Ahmad Noruddin N. A. & Norziaton I. K. (2017) The Development of Auditing Arena and Corporate Governance Landscape in Malaysia: An Initiative to Combat Fraud and Corruptions. 36. 1-11

Ali Khan R., Liew M.S. & Ghazali Z. (2014). Malaysian Construction Sector and Malaysia Vision 2020: Developed Nation Status. *Procedia- Social and Behavioural Sciences*. 109: 507-513.

Alvi M. (2016). A Manual for Selecting Sampling Techniques in Research. 1-56.

Ameyaw E. E., Parn E., Chan A. P. C., Owusu-Manu D. G., David J. E. & Amos D. Corrupt Practices in the Construction Industry: Survey of Ghanaian Experience. *Journal Management Engineering.* 33 (6): 05017006. 1-11.

Ampratwum E. (2008). The fight against corruption and its implications and transitions economies. *Journal of Money Laundering Control.* 11(1): 76-87.

Asohan A (25 April 2014). State director says corruption in construction industry at serious level. *The Star.*

Augustin S. (23 January 2020) 'Malaysia Jumps 10 Spots in Corruption Perception Index'. *Free Malaysia*.

Awang Z. (2012) Research Methodology and Data Analysis. 2nd ed. UiTM Press: Malaysia. 1-321.

Ayub, A. R. & Eman, J. (2006). Identification of Challenges faced by Bumiputra Contractors & Roles of Local Government in ensuring a successful completion of a project. *International Conference of Local Governments 2006.*

Balboa J. & Erlinda M. (2006) Anti-Corruption and Governance: The Philippine Experience. 1-28.

Baruch Y. & Holtom B. (2008) Survey Response Rate Levels and Trends in Organizational Research. *Human Relations.* 61(8). 1139-1160.

Bernama (29 January 2019) Procurement Sector Records Highest Corruption Complaints. *The Star.*

Bertoli J. (2016) Preventing Corruption in Public Procurement. OECD Biennial Publication. Paris. 1-30.

Bowen P, Edwards P. &Cattell K. (2012). Corruption in the South African construction industry: A mixed methods study. *Association of Researchers in Construction Management,* 521-531.

Bowen P.; Pearl R.; Akintoye A. & Edwards P.J. (2007) Ethical Behaviour in the South African Construction Industry. *Construction Management and Economics*. 25 (6). 631-648.

Bowen P., Edwards P.J. and Cattell K. (2015). Corruption in the South African construction industry: experiences of clients and construction professionals. *International Journal of Project Organisation and Management, 7(1), 72–.*

Brookes N. J.& Locatelli G. (2015). Power plants as megaprojects: using empirics to shape policy, planning, and construction management. Util. Policy. 36: 57–66.

Chandrashekhar K. (2009) Combating Corruption in the Construction and Engineering Sector: the Role of Transparency International. *Leadership Management Engineering.*9(3). 112-114.

Chang E.C.C. (2013). A Comparative Analysis of How Corruption Erodes Institutional Trust. *Taiwan Journal of Democracy*. 9(1), 73–92.

Cheng S. G. & Abdul Rahman H. (2013) The Identification and Management of Major Risks in the Malaysian Construction Industry. *Journal of Construction in Developing Countries.* 18 (1): 19-32.

CIDB (2015). "Buku keperluan dan prosedur pendaftran kontraktor". Mac 2015 ed. Malaysia: Construction Industry Development Board Malaysia, CIDB.92.

CIDB (2016) Legislation Act 520. Retrieved on August 30, 2016 http://www.cidb.gov.my/index.php/en/legislation/act-520 .

CIDB (2017) Registered Contractor by Registration Grade and State. Retrieved on 28 September, 2018 http://www.cidb.gov.my/index.php/en/component/content/article/72-kos-pembinaan/performance-appraisal-forecasting-market-watch-perform/buletin-statistik-pembinaan-suku-tahunan-tahun/714-construction-statistics-quarterly-bulletin-2017?Itemid=140 .

CIDB (2018 (a)) Registered Contractor by Registration Grade and State. Retrieved on 28 September, 2019 http://www.data.gov.my/data/ms_MY/dataset/d1999872-8421-476f-99ca-c300659b0fcb/resource/0eb9e692-59b4-4b2d-8990-f51aaf51d761/download/bilangan-kontraktor-kejuruteraan-awam-mengikut-negeri-dan-gred-pada-tahun-2018.xlsx.

CIDB (2018 (b)) Construction Contractor in 2018. Retrieved on 28 January 2019 from http://www.data.gov.my/data/ms_MY/dataset/bilangan-kontraktor-pembinaan-mengikut-negeri-dan-gred-pada-tahun-2018.

CIDB (2019) SPB CIDB (Integrated Management System) Anti-Corruption Manual. CIDB-MAR01. Date 1 August 2019. Retrieved on 2 February 2020 from http://www.cidb.gov.my/images/content/pdf/peraturan/Manual-Anti-Rasuah-updated.pdf.

CIDB (2020) Contractor Registration. Retrieved on 26 February 2020 from http://www.cidb.gov.my/index.php/en/list-of-contractors.

Clarke G. (2010). The Effect of Corruption on Competition for Government Contracts.

Davidson Frame J. (2003) Managing Risk in Organizations: A Guide for Managers. John Wiley & Sons: San Francisco. 288.

Davis, J. (2004). Corruption in public service delivery: experience from South Asia's water and sanitation sector. *World Development*. 32(1), pp. 53–71.

De Jong M., P. Henry W., Stansbury N. (2009) Eliminating Corruption in Our Engineering/ Construction Industry. Leadership and Management in Engineering. 105-111.

Department of Statistics Malaysia (2020). Quarterly construction statistics. Retrieved on 20 January 2020 from https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=100&bul_id=R09wdGZSektvNmw5T1VCeVphNXRqdz09&menu_id=TE5CRUZCblh4ZTZMODZIbmk2aWRRQT09 .

Durdyev S. & Ismail S. (2012) Role of the construction industry in economic development of Turkmenistan. *Energy Education Science and Technology Part A: Energy Science and Research 2012.* 29(2): 883-890.

Erasmus J. & Pillay K. (2013) Understanding Tender Corruption. *Corruption Watch*. Johannesburg, South Africa: 1-17.

Fei X. & Khan T. (2015) Identifying Attributes for Expert Construction Project Managers in the Context of China. *International Journal of Asian Social Science.* 5 (7). 407-418.

Fukuyama, F. (2005). "Global corruption report 2005." Transparency International, Berlin.

Gevansri B. K. (2013) *Corruption Construction Industry*. University Technology Malaysia: Master Thesis.

Glavinja, A. Cerića , M-M. Nahod (2017) Corruption In The Construction Industry: Comparison Of Survey Results In Croatia And The United Kingdom.

Gunduz M. & Onder O. (2012). Fraud and Corruption Risk Assessment in Construction Industry.

Gunduz M. & Onder O. (2013) Corruption and Internal Fraud in the Turkish Construction Industry. *Sci Eng Ethics.* 19(2): 505-528.

Hadiwattege C., De Silva L. & Pathirage C. (2010). Corruption Sri Lankan Construction Industry. 141-152.

Halim Ab. M.S., Jusoh M.S., Osman N.H. and Amlus H., (2014). Performance Factors among Entrepreneurs in Malaysian Construction Industry. *Australian Journal of Basic and Applied Sciences.* 8(12): 18-24.

Hardoon D., and Heinrich F. (2011). "Bribe payers index 2011." Transparency International, Berlin.

Hartley R. (2009). Fighting Corruption in the Australian Construction Industry: The National Code of Practice. *Leadership & Management in Engineering*. 9(3): 131–135.

Hassan M. N. (2016) The Determinants of Public Procurement Corruption in Malaysia. *World Applied Sciences Journal*. 34 (12): 1865-1868.

Heuvel, G. V. D. (2005). "The parliamentary enquiry on fraud in the Dutch construction industry collusion as concept between corruption and state-corporate crime." Crime Law Social Change, 44(2), 133–151.

Hidayat F. & Mulyanto S. (2016) Analysis characteristic of corruption in construction project in Indonesia.

Hillson, D. (2004). Efective opportunity management for projects – exploiting positive risk. New York, EE. UU: Marcel Dekker.

Hillson, D. (2011). Dealing with business uncertainty. Unloaded from: http://www.risk-doctor.com/briefings.

HM Treasury (2005) Managing risks to the public: appraisal guidance: London. 1-58

Humaidi N. & Said N. A. (2011) The Influence of Project Life Cycle and Key Performance Indicators in Project Management Performance: Comparison between IT and Construction Project.

IACA (2021) Who We Are. Retrieved on January 28. 2021 from https://www.iaca.int/who-we-are/about-us/history.html .

IAACA (2021) Who We Are. Retrieved on January 30. 2021 from https://www.iaca.int/ .

ICAC (2021) Overview. Retrieved on January 20. 2021 from https://www.icac.nsw.gov.au/about-the-nsw-icac/overview .

Ibrahim A.R., Roy M.H., Ahmed Z.U. & Imtiaz, G. (2013). Analyzing the Dynamics of the Global Construction Industry: Past, Present and Future. *Benchmarking: An International Journal*. 17(2): 232-252.

Ibrahim A. N.; Erdogan B. and Nielsen Y. (2019). Corruption in the Egyptian Construction Industry.

Institute of Risk Management, IRM (2002) A Risk Management Standard. 1-14.

International Federation of Accountants, 1999. Enhancing Shareholder Wealth by Better Managing Business Risk (International Management Accounting Study No. 9).

International Monetary Fund (2005). *International Monetary Fund Annual Report 2005: Making the Global Economy Work for All*. 234.

Iqbal A., Choudhry R. M., Holschemacher K., Ali H. & Tamosaitiene J. (2015) Risk Management in Construction Projects. *Technological and Economic Development of Economy.* 21(1): 65-78.

ISO 31000:2009. Risk Management- Principles and Guidelines. November 2009.

Jaafar M. (28 April 2008) 'Ubah suai system Tender'. *Utusan Malaysia.*

Jannadi O.A. & Almishari S. (2003) Risk assessment in construction. *Journal Construction Engineering Management*. 129(5): 492–500.

Kana G. (30 Jun 2018) The Burden to the Country. *The Star*.

Kang B.G., Fazlie M.A., Boon H.G., Myung K.S. and Cheng Z. (2015). Current Practice of Risk Management in the Malaysia Construction Industry- The Process and Tools/Techniques. 4(4): 371-377.

Kapeli N.S. & Mohamed N. (2015). Insight of Anti-Corruption Initiatives in Malaysia. *Procedia Economics and Finance*. 31. 525-534.

Kartam N. A. (1996). Making effective use of construction lessons learned in project life cycle. *Journal of Construction Engineering and Management.* 122 (5913). 14-21.

Kasimu M. & Kolawole A. (2015). Appraisal of the Impact of Corruption on Sustainable Development in Nigerian Construction Industry. *Journal of Multidisciplinary Engineering Science and Technology*. 2(10): 2834-2842.

Kaufman, D. & Gray, C. W., (1998). Corruption and Development. Finance Development 35(1), 7–10.

Kenny C. (2006). Measuring and Reducing the Impact of Corruption in Infrastructure. 1-42.

Kenny C. (2009). Measuring Corruption in Infrastructure: Evidence from Transition and Developing Countries. *Journal of Development Studies.* 45(3): 314-332.

Kenny C. (2011) Publishing Construction Contract as a Tool for Efficiency and Good Governance. 1-10.

Kenny C. (2007 (a)). Construction, Corruption, and Developing Countries. 4271: 0-31.

Kenny C. (2007 (b)). Infrastructure Governance and Corruption: Where Next? 4331: 1-32.

Koon Y. Y. (2014). Follow the World Bank procurement guidelines to prevent corruption and abuse.

KPMG (2013). KPMG Malaysia Fraud, Bribery and Corruption Survey 2013. KPMG forensic. 1-72.

Krantikurmar M., Konnur B. A.& Landage A. B. (2016) Risk Management in Construction Industry. *International Journal of Engineering Research.* 5 (1): 153-155

Kumar & Harison (2016). Risk Management during Project Life Cycle. Malaysian Construction Industry. *Journal of Civil Engineering.* (6):55-69.

Le, Y., Shan, M., Chan, A.P.C. & Hu, Y., (2014 (a)). Investigating the causal relationships between causes of and vulnerabilities to corruption in the Chinese public construction sector. *Journal of Construction Engineering and Management*, 140(9), pp.1–12.

Le, Y., Shan, M., Chan, A.P.C. and Hu, Y., (2014 (b)). Overview of corruption research in construction. *Journal of Management in Engineering*, 30(4), pp.1–7.

Lee K. (2019) *Corruption Practices in the Malaysian Construction Industry: Analysing Causes and Preventive Strategies*. University Tunku Abdul Rahman: Master Thesis.

Lee K.; Yap J. ; Rose T. & Skitmore M. (2020) Corruption in he Malaysian Construction Industry: Investigating Effects, Causes, and Preventive Measures. *International Journal of Construction Management.* 1-12.

Lee L.T. (18 May 2017) Fight corruption at all levels. *The Star.*

Lester, A., (2007). Project management, planning and control, 5th edition. Oxford: Elsevier Ltd.

Ling, F. Y. Y., and Hoang, V. T. P. (2010). Political, economic, and legal risks faced in international projects: Case study of Vietnam. *Journal Professional Issues Engineering Education Practices*. 156–164.

Liu X. (2016). A literature review on the definition of risk of corruption and factors affecting the risk of corruption. 4(6) 1-8.

Locatelli G.; Giacomo M.; Tristano S. and Marco G. (2017). Corruption in public projects and megaprojects: There is an elephant in the room! *Journal of Project Management.* 35(3): 252-268.

Loosemore, M., Raftery, J., Reilly, C., & Higgon, D. (2006). Risk Management in Projects. 2nd . London: Taylor & Francis.

MACC (2018) Corruption Risk Management. Retrieved on January 28 2018 from https://www.sprm.gov.my/index.php/en/maca/korporat/142-knowledge/769-anti-corruption-framework-guidelines-and-corruption-risk-management-crm

MACC (2017 (a)) Construction Industry And Background. Retrieved on July 1, 2017, from http://www.sprm.gov.my/index.php/en/corporate-info/message-from-the-chief-commissioner/199-pembinaan/1042-industri-latar-belakang

MACC (2017 (b)) *THE WHO'S WHO IN CONSTRUCTION INDUSTRY*. Retrieved on July 1, 2017, from http://www.sprm.gov.my/index.php/en/corporate-info/message-from-the-chief-commissioner/199-pembinaan/1042-industri-latar-belakang

MACC (2017 (c)) *MACC Organization.* Retrieved on July 1, 2017, from https://www.sprm.gov.my/index.php/en/corporate-info/mengenai-sprm/organisation-info/organisation

Mazigo D. (2014) *Causes of corruption in construction public procurement in Tanzania: A case of Manyara Region*. Mzumbe University: Master Thesis. 1-88.

Md Akhir N. S. (2015) *Risk Level of Factors Causing Construction Waste Generation throughout Construction Project Life Cycle*. University Tun Hussein Onn Malaysia: Master Thesis.

Memon, A. H., Rahman, I. A., Abdullah, M. R., & Azis, A. A. A. (2011). Time Overrun in Construction Projects from the Perspective of Project Management Consultant (PMC). Journal of Surveying, Construction and Property, 2(1), 54-66.

Mohamad N. & Abd Aziz R. (2005). Towards Improving Ethical Practices in the Construction Industry. 492-502.

Mohamed O., Abd Karim S. B., Roslan N. H., Mohd Daruni M. S. & Zakaria N. (2014) Risk Management: Looming the Modus Operandi among Construction Contractors in Malaysia. *International Journal of Construction Management.* 1-12.

Mohd Noor M. H. (25 February 2017) Time to get Tough. *New Straits Times.*

Mohd Nordin R., Takim R. & Nawawi A. H. (2011). Critical Factors Contributing to Corruption in Construction Industry. *IEEE Symposium on Business, Engineering and Industrial Applications.* 330-333.

Mohd Nordin R., Takim R. & Nawawi A.H. (2013). Behavioural Factors of Corruption in the Construction Industry. *Procedia- Social and Behavioural Sciences.* 105: 64-74.

Mustafa Kamal E., Haron S.H., Md Ulang N. and Baharun F. (2012). The Critical Review on the Malaysian Construction Industry. *Journal of Economics and Sustainable Development.* 3(13):81-87.

Nordin, R.M., Takim, R. and Nawawi, A.H., 2011. Critical factors contributing to corruption in construction industry. In: 2011 IEEE Symposium on Business, Engineering and Industrial Applications (ISBEIA). pp.330–333.

Nordin, R.M., Takim, R. and Nawawi, A.H., 2012. Transparency Initiatives (TI) in construction: The social psychology of human behaviours. Procedia - Social and Behavioral Sciences, 50, pp.350–360.

OECD (2016) Preventing Corruption in Public Procurement. 1-30.

OECD (2021) About Us. Retrieved on January 22.2021 from https://www.oecd.org/corruption-integrity/ .

Ofori G. (2015). Nature of the Construction Industry, Its Needs and Its Development: A Review of Four Decades of Research. *Journal of Construction in Development Countries*. 20(2): 115-135.

Olanrewaju, A. L., and Abdul-Aziz, A. R. (2015). Building Maintenance Processes, Principles, Procedures, Practices and Strategies.*Building Maintenance Processes and Practices*. Malaysia: Springer. 79-129.

Olken B. A. & Pande R. (2012). Corruption in Developing Countries. *Annual Review of Economics, Annual Reviews*. 4(1): 479-509.

Olusegun, A.E., Benson, A., Esther, I. and Michael, A.O., 2011. Corruption in the construction industry of Nigeria: Causes and solutions. Journal of Emerging Trends in Economics and Management Science, 2(3), pp.156–159.

Othman, M. H. (2010). *A Study on Problems of Bumiputera Contractor in Construction Industry*. Universiti Malaysia Pahang: Degree Thesis.

Oxford Dictionary (2017) Definition of Corruption. Retrieved on February 27, 2017 from https://en.oxforddictionaries.com/definition/corruption

Peace C. (2017) The Risk Matric : Uncertain Results?. *Policy and Practice in Health and Safety*. 15.1-14.

PMBOK (2008). *A Guide to the Project Management Body of Knowledge*. 4th ed. Project Management Institute Inc: Pennslyvania. 1-445.

PMBOK (2012). *A Guide To The Project Management Body Of Knowledge*. 5th ed. Project Management Institute : Newtown Square, PA.

Public Work Department Malaysia, JKR (2017). 'Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan'. 1-166.

Rahim N. (2010). Corruption and Its Effect to Country's Construction Sector. Trans. M. "Rasuah dan Implikasinya dalan Sektor Pembinaan Negara". 4: 1985-7632.

RIBA Plan of Work 2013: Consultant document. (2013). (pp. 1-6).

Ristic D. (2013) A Tool for Risk Assessment. 3(3). 121-127.

Rodrigo D. (2012) An Exploratory Study of Corrupt Practices within the Procurement Process of the Indian Construction Industry. 1-18.

Saieed Z. (26 May 2018). TIM: Corruption has cost the country 4% of GDP value annually. The Star.

Salim R. (2009). Corruption in Construction Industry.

Shabbir A. (2014) *Corruption in Infrastructure Procurement - A Study Based on Procurement of Infrastructure Projects in Pakistan*. University of Manchester: Doctor of Philosophy Thesis.

Shan M.; Yun L.; Chan Albert P. C.; and Yi H. (2014). Overview of Corruption Research in Construction. *Journal of Management in Engineering.* 140 (9): 1-7.

Shan M.; Chan Albert P. C.; Yun L.; Bo X. (2015). Measuring Corruption in Public Construction Projects in China. *Journal of professional issues in engineering education and practice.* 1-11.

Sharma G. (2017) Pros and Cons of Different Sampling Techniques. *International Journal of Applied Research.*3(7). 749-752.

Sichombo, B., Muya, M., Shakantu, W. and Kaliba, C., 2009. The need for technical auditing in the Zambian construction industry. *International Journal of Project Management,* 27(8), pp.821–832.

Siddiquee, N.A. (2011). Approaches to Fighting Corruption and Managing Integrity in Malaysia: A Critical Perspective. Journal of Administrative Science, 8(1), 47-74.

Sieber N. (2012) *Fighting Corruption in the Road Transport Sector*. 2012. Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH 1-68.

Skrbec J. (2016) Corruption Risk Management: Addendum to the Risk Management Guidelines.

Sohail M. & Cavill S. (2006 (a)) Corruption in construction projects. *Proceedings of the CIB W107 Construction in Developing Countries Symposium "Construction in developing economies: New Issues and Challenges"*.

Sohail M. & Cavill S. (2008 (a)). Does Corruption Affect Construction? *Construction in Developing Countries International Symposium "Construction in Developing Countries: Procurement, Ethics and Technology"*.

Sohail M. & Cavill S. (2008 (b)). Accountability to prevent corruption in construction projects. *Journal of Construction Engineering and Management.* 139 (4): 729-738

Sohail M. and Cavill S. (2006 (a)). Combating corruption in the delivery of infrastructure services. *Conference on Institutions and Development, Reading*.

Stansbury N. (2005) Exposing the Foundations of Corruption in Construction. Transparency International Global Corruption Report 2005. *Global Corruption Report (2005) Special Focus Corruption in Construction and Post-Conflict Reconstruction.* England: Transparency International. 36.

Stansbury, C. (2009). The global infrastructure anti-corruption centre. *Leadership and Management in Engineering*, 9(3), 119-122.

Surach G. (1 June 2018) Abu Kassim to head newly established centre for governance. *New Straits Times.*

Tabish S. & Jha K. (2012). The impact of anti-corruption strategies on corruption free performance in public construction projects. *Construction Management and Economics.* 30(1): 37-41.

Takim, R., and Akintoye, A. (2002). Performance indicators for successful construction project performance. *Proc., 18th Annual ARCOM Conf., D. Greenwood*, 2: 545–555.

Tamim N., Scott S., Zhu W., Koirala Y. and Mannan M.S. (2017) Roles of Contractors in Process Safety. *Journal of Loss Prevention in the Process Industries.* 48:358-366.

Tan J. (5 Mei 2019) Construction sector 'ultimate beneficiary' of 11th Malaysia Plan - Hong Leong Retrieved on 2 January 2020. https://www.theedgemarkets.com/article/construction-sector-ultimate-beneficiary-11th-malaysia-plan-hong-leong

Tanzi, V., and Davoodi, H. (1998). Corruption, public investment, and growth, Springer, Tokyo.

Tharanya A. & Koris S. N. N. (a) (5 February 2017) Bribery an 'unwritten rule' to secure projects. *New Straits Times.*

Tharanya A. & Koris S. N. N. (b) (5 February 2017) Govt's exit policy should cover graft, fraud and negligence. *New Straits Times.* 2-9.

The Star (29 January 2019) Procurement Sectors Records Highest Corruption Complaints. *The Star.*

The Star (31 January 2011) Engineer Charged over Terengganu Stadium Collapse. *The Star.*

The World Bank (2000). Anticorruption in Transition: A Contribution to the Policy Debate.Washington, DC:World Bank.

Tow, D., and Loosemore, M. (2009). Corporate ethics in the construction and engineering industry. *J. Leg. Aff. Dispute Resolut. Eng. Constr*. 122–129.

TRACE (2021) About Us. Retrieved on January 25. 2021. From https://www.traceinternational.org/

Transparency International (2009). Corruption perceptions index 2009.

Transparency International (2021) About Us. Retrieved on January 23. 2021 from https://www.transparency.org/en/about#

Transparency International (2017) What *is corruption?* Retrieved on June 30, 2017, from https://www.transparency.org/what-is-corruption?

gclid=CjwKCAjwspHaBRBFEiwA0eM3kcs88tWrryB5XvlJOxHJ1Nc3fN1DWtvsJX7JmVgbQGtuBeLqQdhoCLGIQAvD_BwE#define

Transparency International, (2018). *Malaysia CPI*. Retrieved on January 28 2018. https://www.transparency.org/country/MYS

Transparency International, (2020). *Malaysia CPI*. Retrieved on January 28 2020. https://www.transparency.org/country/MYS

United Nations Global Compact (2013) A Guide for Risk Assessment. United Nation Global Compact Office, NewYork,USA. 1-72.

UN Global Compact (2021) About. Retrieved on January 19. 2021 from https://www.unglobalcompact.org/about/governance

USAID (2005) Tools for Assessing Corruption & Integrity in Institutions: a Handbook. USA: IRIS Center.1-155.

Usman N, Inuwa I, Iro A. 2012. *The influence of unethical professional practices on the management of construction projects in North Eastern states of Nigeria*. Int J Econ Develop Res Invest. 3(2):124–129.

Vee C. and Skitmore M. (2003). Professional ethics in the construction industry. *Engineering, Construction and Architectural Management*. 10 (2): 117-127.

Wells J. (2015). *Corruption in the construction of public infrastructure: Critical issues in project preparation*. Norway: U4. 8.1-23.

Williams, R. (1987) Political Corruption in Africa. Hampshire: Aldershot England.

Winsek W. & De Vet J (2013). Identifying and Reducing Corruption in Public Procurement in the EU. 1-371.

World Bank. (1997). *Helping countries combat corruption: The role of the World Bank.* Retrieved on January 25 2017 http://www1.worldbank.org/publicsector/anticorrupt/corruptn/cor02.htm

Zaini, A. A., Adnan, H., & Haron, R. C. (2010). *Contractors' Approaches to Risk Management at the Construction Phase in Malaysia*. Universiti Teknologi MARA: Master Thesis.

Zakaria R., Lee Z.K., Nilashi M., Abd. Majid M.Z., Ibrahim O. and Mohamad Zin R., (2014) Ethical Behaviors in E-Tendering Process for Construction Project in Malaysia. *Journal of Theoretical and Applied Information Technology*, 70 (1). pp. 210-225.

Zou P. X.W. (2006). Strategies for Minimizing Corruption in the Construction Industry in China. *Journal of Construction in Developing Countries.* 11(2): 15-29.

Zou P.; Zhang G. & Wang J. (2007) Understanding the Key Risks in Construction Projects in China. *International Journal of Project Management.* 6(25). 601-614.