CORRUPTION PRACTICES IN THE MALAYSIAN CONSTRUCTION INDUSTRY: ANALYSING CAUSES AND PREVENTIVE STRATEGIES

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A project report submitted in partial fulfilment of the requirements for the award of Bachelor of Science (Hons.) Quantity Surveying

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DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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APPROVAL FOR SUBMISSION

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ABSTRACT

The corruption practices in the construction industry undermine the construction project outcomes and the development of construction industry in Malaysia. The purpose of this paper is to provide an overview of the corrupt acts in the construction activities, allows the construction stakeholders to access and explore the causes and impacts of the corruption practices as well as the preventive strategies. A total of 18 causes, 7 impacts and 11 preventive strategies of corruption practices in construction industry were identified through comprehensive literature review. This paper adopted quantitative research method by which the data were obtained from 112 construction stakeholders through questionnaire survey within Klang Valley area with an overall response rate of 40.0%. The causes, impacts and preventive strategies of corruption practices in the construction industry were further evaluated and prioritised using mean ranking based on perception of the respondent groups. The five most significant causes of corruption practices were revealed as: (1) personal greed towards money; (2) relationship among the parties; (3) lack of ethical standard; (4) intense competitive nature; and (5) large amount of money. The findings revealed that (1) cost overrun; (2) defective works; and (3) low return as the three most agreed impacts of corruption. The top five significant preventive strategies were (1) enforcement of law, regulation and sanction; (2) high integrity and honest construction culture; (3) effective reporting channel; (4) audit mechanism; and (5) code of conduct. The analysis also manifested that the variables in the study were significant and there were significant differences in perception between the respondent groups on the causes and preventive strategies of the corruption practices in the construction projects. Spearman's correlations test revealed that there were significant relationships between the causes and preventive strategies of the corruption practices in the construction industry. Moreover, factor analysis successfully identified 4 underlying factors (unique nature of construction industry and extensive competition; bad leadership and negative thinking; legal system and social accountability; and enforcement and official bureaucracy) from 18 causes of corruption practices. This paper seeks to have an in-depth investigation to the corruption practices in Malaysian construction industry which is able to develop effective preventive strategies. It provides insights and increases awareness of the construction stakeholders as well as the society to the corruption practices in Malaysian construction industry.

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α	Cronbach's alpha value
δ	standard deviation
GDP	gross domestic product
MACC	Malaysian Anti-Corruption Commission
DOSM	Department of Statistic Malaysia
CIDB	Construction Industry Development Board
FIDIC	International Federation of Consulting Engineers
SPSS	Statistical Package for the Social Science
KMO	Kaiser-Meyer-Olkin
PCA	principal components analysis

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CHAPTER 1

INTRODUCTION

1.1 Background

According to the World Bank, Malaysia has extended its economy activities from agriculture to manufacturing and services sector and has successfully become a leading exporter of electrical appliances, electronic parts and components since gaining independence. Despite undergoing rapid economic development from early days of independence, Malaysia is yet a fully developed country. Malaysia economy has to function efficiently and effectively in order to achieve a developed country status. It requires valuable contribution from every sector to boost the economy in order to prosper Malaysia. It is disputable that the construction industry plays a key role in evolving Malaysia development.

The construction industry involves in construction, renovation, demolition and repair of buildings, infrastructure and other real properties of a country. Olanrewaju and Abdul-Aziz (2015) mentioned that the construction industry is critical for national development. The country will have difficulties in attaining meaningful development if the construction industry is ineffective. Takim and Akintoye (2002) declared that the construction industry is important to develop socio-economic of the country in term of infrastructures as the physical infrastructures are normally taken as an indicator to measure the economic growth of the country. Therefore, it is urgently important to well develop the construction industry in order to sustain the development of the country.

The construction industry is a dispensable industry as it is one of the significant keys to drive the development of Malaysia. The construction sector has been developed since the early stage of the independence as Malaysia has recognised the importance of the construction sector towards the country economy in early days (Khan, Liew and Ghazali, 2014). Construction is one of the major productive sectors in Malaysia and is necessary in order to develop the nation. The construction industry acts as an economic investment and is one of the major contributors to Malaysia's economic growth (Sambasivan and Soon, 2007). The construction industry contributes to the Malaysian gross domestic product (GDP) as it generates revenue, creates capital and produces employment as well as develop socio-economic of Malaysia.

Construction industry is different from other industries as it is unique and complex in nature. The projects of the construction industry involve large payment, large amount of parties, comprise of various complicated processes and different phase of work. Besides, they require great contribution from different parties in order to put the projects in success. Due to the complex nature of the construction industry as it involves complicated process and requires great input from numerous different parties, the construction industry is very likely involved in corruption (Stansbury, 2005; Bowen, Edwards and Cattell, 2012; Nordin, Takim and Nawawi, 2012).

According to Transparency International, corruption can be defined as misuse of entrusted power to acquire personal interest or benefit. Corruption consists of a series of dishonest, improper or unlawful behaviours in order to obtain the private gain at which it involves violation of the established rules. Furthermore, the corruption activities may be in different forms. The corruption practices in the business of any sectors often happen without any evidences and it is extremely difficult to discover such practices. One has to depend on ambiguous clues in order to search for the corruption paper trail to allow the corruption practices to be addressed effectively.

It is undeniable that there is existence of the corruption practices in Malaysia business at which it is one of key factors that give rise to Malaysia economy to be underdeveloped. The Corruption Perception Index 2017 from Transparency International stated that Malaysia's corruption rank at 62nd place out of 180 countries. Apparently, high level of transparency on business with minimal or without corruption activities are fundamental for the economic growth in Malaysia. Therefore, eliminating the corruption practices is essential to improve the economy condition of Malaysia.

Corruption in the construction industry is one of the greatest challenges to Malaysia as it imposes serious problems. The construction industry acts as a backbone to Malaysia economy at which it involves in human development and economic growth. However, the construction industry is the riskiest sector that may undertake the corruption activities (De Jong, Henry and Stansbury, 2009). Besides, the corruption activities can be happened at each stage of the construction project from planning to operation and maintenance (Sohail and Cavill, 2006). Corruption is believed to penetrate gradually to the construction industry around the world and prevention steps are necessary to contain the corruption level in the construction industry (Nordin, Takim and Nawawi, 2011).

1.2 Problem Statement

Corruption in the Malaysian construction industry is a notable fact in the industry but it is an area that most of the construction players avoid discussing on. However, the corruption practices create negative consequences and undermine the contribution of construction industry towards Malaysia development. Kenny (2009) claimed that corruption practices in construction industry is one of the key factors that cause the construction projects to be underperformed. Economic growth of the country will also be slowed down by corruption practices in construction industry.

It is undeniable that one of the major consequences of corruption practices towards the construction projects is that such practices lead to construction cost overrun. The corruption practices in construction industry result in wasted tender expenses, tendering uncertainty and increased project costs which eventually threaten the construction related companies (Stansbury, 2005). The corruption can be happened at all the time during construction especially the tendering stage, for instance, helping favoured tenderer to win tender from a long and complicated tender process and this causes high tender expenses to be a waste. Furthermore, corruption practices like approving poor quality of work through bribery will definitely increase overall project cost when extra cost is required to rectify the defects of poor quality of work.

Besides, Ahzahar et al. (2011) conducted a survey for construction players in Penang area had ranked the corruption as third major factor that contribute to building failures and defects in construction industry. In other words, corruption practices in the construction industry reduce the quality of the construction projects and eventually affects the users' safety and satisfaction as well as life span of the building. Building with large number of defects and failures generate minor problems like building crack to severe problems such as building collapse. In more serious cases, it may involve death and injuries.

In addition, in a wider scope, corruption practices in construction industry damage the economic and social development. Bowen, Edwards and Cattell (2012) mentioned that existence of corruption practices in the construction projects reflect high projects cost which subsequently impose higher rentals to users and higher living cost and lead to low spending power. This also causes government to has limited budget to spend in upgrading public policies of the country like welfare, education and health and result in economic and social of the country to be underdeveloped. However,

the research of Gupta, Davoodi and Alonso-Terme (2002) in United State had proven that the corruption practices in the country lead to income inequality and poverty.

Moreover, the corruption practices in construction industry damage the reputation of the industry. It causes the investors to lose their trust towards the construction industry of the country. The corruption practices create distrust towards the companies and the corruption practices have been generated as a culture, thus, the corruption is worsen in the construction industry (Melgar, Rossi and Smith, 2010). The corruption act as an obstacle to construction companies to execute their expansion plan to global market. On the other hand, high level of the corruption practices in a country also affect the consideration of global institutions to invest in the market of the country.

In conclusion, there are still various undiscovered effects of undertaking corruption practices in the construction industry towards the country. These consequences which are imposed by the corruption practices in the construction industry ruin the healthy development of the country and should not be overlooked. Therefore, research on corruption practices in Malaysian construction industry is necessary to examine the existence of corruption practices in the construction industry of Malaysia in order to generate effective preventive strategies to reduce corruption practice in the Malaysian construction industry.

1.3 Research Aim

The aim of the study is to access the perception of corruption in the Malaysian construction industry in order to rectify the corruption practices in the construction industry. It is to increase the awareness of construction practitioners towards the corruption practices to contain the high level of corruption practices in the Malaysian construction industry effectively.

1.4 Research Objectives

1. To examine the causes of the corruption practices in the Malaysian construction industry.
2. To access the impacts of the corruption practices in the construction industry of Malaysia.
3. To explore the preventive strategies for the corruption practices of Malaysian construction industry.

1.5 Research Scope

This research is conducted based on the construction players' perception towards the corruption practices in the construction industry of Malaysia. The sampling of this research will only include the construction players in Klang Valley area. The respondents of this study will be the relevant key stakeholders who are recently involving in the construction industry which include clients, consultants and contractors. Besides, the data will be collected based on sub-sectors in construction industry like building and infrastructure construction involved in construction industry.

1.6 Research Significance and Justification

Malaysian construction industry plays an important role in developing the country over past centuries. The major contribution of the construction industry in Malaysia is to develop the country in term of economy and physical appearance. Therefore, minimal level of corruption practices has to be attained in Malaysian construction industry in order to achieve the primary purpose of the construction industry to the country. This is due to existence of corruption practices generate adverse consequences to the construction industry and eventually affect the reputation and economy of Malaysia.

Minimum level of corruption in the construction industry is important as it improves the quality of construction works. Besides, a country with minimal corruption practices can enhance the economy development and increase the foreign investment as it increases the foreign investors' confidence towards the country's services. Thus, it is significant to study the current corruption practices of the Malaysian construction practices in order to improve the economy development in Malaysia.

This research is extremely significant to the construction players as it provides overall understanding of corruption and it discusses the types of corruption practices which exist in current construction works. However, this research discourses about the problems that are derived from the corruption practices to the construction industry. It is important to identify the problems by the construction players in order to create their awareness towards the corruption practices in the construction industry in order to contain the problems effectively. The research highlights the causes that contribute to the corruption practices and the impacts of corruption practices in the Malaysian construction industry in order to provide appropriate preventive strategies which are

necessary to reduce the high level of corruption practices in the Malaysian construction industry.

Furthermore, the research is beneficial to the construction industry as it raises the awareness of the construction players about the importance in minimising the corruption practises in the construction industry. From this research, construction practitioners can figure out the problems of corruption towards the construction industry and Malaysia economy. The perception of corruption in the construction industry is collected from the sampling of the research. It allows the construction practitioners to have a reliable platform to more understand about the corruption in the construction industry and to recognise the seriousness of the corruption in Malaysian construction industry.

1.7 Chapter Organisation

This research report comprises of 5 chapters which are to discuss on the research topic. The outline of the report is as below:

1.7.1 Chapter 1: Introduction

This chapter is the initial stage of a research report at which it discusses about the overall content of the report. This chapter includes the research background, problem statement, research aim, research objective, research scope, research significance and justification as well as chapter organisation. This chapter provides the definite understanding for overall content and purpose of the research, the problem of the research area and the evidence to justify the problem existed in Malaysia.

1.7.2 Chapter 2: Literature Review

In this chapter, literature review will be done based on previous relevant research. The fundamental concept of the research area which has been deliberated by other researchers will be included in this chapter. At first, the introduction will be prepared to discuss the overall content of this chapter. Then, definition of the corruption practices will be given in conjunction with the construction activities. It will describe the types of corruption practices exist at each stage. Next, the causes that contribute to the corruption and the impacts of corruption practices in the construction industry will be discoursed in this chapter. The importance of zero corruption and high level of transparency in the construction process will be emphasised in order to draw the

possible preventive strategies to the corruption problems. At the end of the chapter, the conclusion will be drawn to summarise the overall content of this chapter.

1.7.3 Chapter 3: Research Methodology

In this chapter, the research methods and mechanisms of the research will be defined. This chapter includes the explanation of types of research, research design, sampling design, research method, research process, data collection method and data analysis. Lastly, the conclusion will be done to summarise this chapter.

1.7.4 Chapter 4: Results and Discussions

After data collection from the respondents, the findings and results will be discussed in detail in this chapter. This chapter is mainly analysing and evaluating the data collected from the sampling to generate the new insights to the research topic. The generated results will be evaluated with the aim and objectives of the research in order to achieve the research's purpose. The overall results and findings will be concluded at the end of the chapter.

1.7.5 Chapter 5: Conclusion and Recommendations

The overall findings from the research will be concluded and summarised in this chapter. The findings will be supported by recommendation for future related research study. The purpose of this chapter is to highlight the achievement of the aim and objectives of the research. However, in order to increase the awareness towards the corruption in the construction industry of Malaysia, the importance of the research will be identified.

1.8 Conclusion

Corruption practices itself create various negative effects to the country. This situation is getting worsen when the corruption practices exist in the construction industry as the industry act as a major contributor to the economic and social development of the country. Thus, clear understanding on current corruption practices in Malaysian construction industry is significant before developing essential preventive strategies to the corruption practices. This research is carried out with purpose of providing information of corruption practices which exist in the Malaysian construction industry to the concerned parties including Malaysian construction practitioners and foreign

companies which plan to enter Malaysian construction market to increase their awareness towards corruption practices in construction industry. It is important to keep corruption practices to a minimal in the construction industry in order to bring Malaysia as a country which is able to compete with other countries.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review provides secondary data from previous research. The definition of corruption in conjunction with the construction activities will be discussed in this chapter to provide a better understanding to the readers on the corruption practices in construction industry. Through reviewing the previous similar research, this chapter will be proceeded in defining the potential causes towards the corruption practices in construction industry. The literature review will be carried out based on both the local and international corruption issues in the construction industry to provide a comprehensive overview to the research topic. The impacts of the corruption practices and potential preventive strategies to the construction industry will be assessed and discussed in order to contain the corruption practices and to keep the number of corrupt acts in the construction industry in a minimum.

2.2 Definition of Corruption

Corruption practice is a global phenomenon and commonly exercised in the business all around the world which undermines the contribution of each sector towards the development of the country. There are researches highlighted the illegal nature of corruption and define the corruption variously. In case law of United States v Liebo (1991), the court defined the term of "corruptly" as a person willingly and deliberately behaves corruptly to achieve legal or illegal outcomes through unlawful methods. It is an unlawful payment to a person in order to acquire advantage for organisation or individual (Rose-Ackerman, 1999).

Corruption is an umbrella term that covers various wrongful acts which abuse the responsibilities for private interest. In other words, when the corruption topics are brought up, the intention and benefits of the corruption participants will be discussed simultaneously. Corruption is a fraudulent behaviour normally undertake by those with unethical intention to obtain personal benefits through shortcut. Corruption is defined as a person misuses his or her power which are entrusted to him or her by involving in activities which are beyond his or her duty to gain advantage that is only offered to him or her other than the organisation (Cuervo-Cazurra, 2015). Besides, Malaysian

Anti-Corruption Commission (MACC) define corruption as a behaviour of offering and accepting gratification or award in the form of cash or any other benefit with higher value.

Corruption practices ordinarily comprise of two parties include giver and recipient at which giver requests the recipient to perform a hidden task which is within recipient's job scope in order to acquire certain benefits. Moreover, it involves underlying economic relationships such that a person offers monetary benefits to the other party to persuade the party to assist him or her to gain certain advantages instead of upholding their position (Rose-Ackerman, 2006). The corruption practices are about inducing the official to abuse his position through offering benefits like payment and promise.

Cuervo-Cazurra (2015) further declared that corruption not merely happen in government, other firms like private organisations, international organisations and non-profit organisations may also engage in corruption practices. Corruption practices is pervasive and can be in different forms which comprise of bribery, fraud, embezzlement, kickbacks, graft, extortion, nepotism and conflict of interest (Sohail and Cavill, 2006). Each of the corruption forms are further described in Table 2.1 below.

Table 2.1: Forms of Corruption Practices

Form of corruption	Description	References
Bribery	Illegal monetary or other advantages in return of private advantages and to avoid any occurrence of harmful consequences. It is also known as "speed money". The payment or benefits can be in various types like money, services, assets, bonus, position, and any other value.	Korruptsioon
Fraud	Unlawful deception intentionally to achieve certain purpose and benefits for instance by lying, hiding truth and imitate others.	Business Dictionary
Embezzlement	A crime wherein for unintended purposes, a person secretly takes or misappropriates assets like corporate funds which entrusted to him or her by an organisation.	Cambridge Dictionary

Table 2.1: Forms of Corruption Practices (Cont'd)

Form of corruption	Description	References
Kickbacks	A method of bribery at which an amount of money is paid to a recipient as rewards for providing help or favourable outcomes.	Investopedia, Investing Answer
Extortion	Blackmail which uses illegal persuasion to obtain benefits like money from someone. It can be in the form of unlawful threats to reveal the truth to public and illegal threats to cause physical harm.	Olusegun et al., 2011
Nepotism	Favouritism which involve favouring of a person by assigning the person to a role in a project based on their affiliation instead of qualification.	Korruptsioon
Conflict of interest	A situation when a person or organisation become unreliable due to clash personal interest. It happens when a person participates in various interest in a project at which it affects the decision making of the project at later stage.	Investopedia, Cambridge Dictionary
Front companies	Refer to a subsidiary company which is used to shield parent company from liability or scrutiny. It is also used to inhibit the identification of owner of another organisation to conceal unlawful activities	The Law Dictionary
Collusion	Reflect to a secret agreement made between two individuals or organisation to act together illegally to deceive other individual or organisation.	Merriam-Webster
Negligence	Refer to a person who fails to behave the level of care or intentionally acts in careless manner which result in undesired outcomes or negative consequences.	FindLaw

Based on Table 2.1 above, bribery and kickbacks are found to be similar forms of corruption exist in the business. However, these two forms of corruption are actually different in term of method of payment by giver to the recipient. Bribery is to give someone some advantages for own benefits or favours, for instance, a person gives bribe to a human resource manager in order to get an employment in an organisation. Besides, kickbacks are a type of bribe at which it offers also advantages to recipient in exchange of service or help but through different methods. For instance, a person requests an employment from a human resource manager in his organisation with condition of 5% of his income will be paid to the manager.

2.3 Corruption in Global Construction Industry

Construction industry is unique and heterogenous as compare to other industries in the country. The construction industry consists of complex and non-standard production processes in a project. This result in difficulties in achieving good quality of end products unless great efforts are paid by all the parties in the project.

However, Kenny (2009) mentioned that it is unsurprising that the construction industry is commonly claimed as one of the most corrupt industries globally. There are several forms of corruption practices exist in the construction industry include bribery, fraud, collusion, bid rigging, embezzlement, kickback, conflict of interest, dishonesty and unfairness, extortion, negligence, front companies and nepotism (Le et al., 2014b). However, the nature and extend of the corruption practices are varying across different countries due to different procurement structures, regulatory system and legislative system.

In Ghana, Ameyaw et al. (2017) conducted a survey concerning the corruption practices in the Ghanaian construction industry and ranked the extortion or kickbacks, bribery, collusion, conflict of interest, and fraud in descending form, as the top five common forms of corruption. Zou (2006) who had undertaken research on strategies to minimise corruption in China construction industry summarise the forms of corruption into two groups which are contractor related corruption and professional consultant related corruption. The study claimed that the contractors related corruption practices include paying bribe to win the tender, collusion in tender prices, false project expenditure claiming, altering invoices, disobedience of contract requirement, collusion between supervision and construction company. Besides, professional consultant related corruption practices include unlawful contract or sub-contract award, leak of confidential project information like baseline tender cost, requesting money from contractors by clients or government officials.

Bowen, Edwards and Cattell (2012) mentioned that the forms of corruption like altering the tender process and result, leak of confidential tender estimates, manipulating tender period, kickbacks and bribes exist in South African construction industry. All these tender irregularities' practices stimulate nepotism in tendering selection stage. South African construction industry also allows poor quality of work, fraud, extortion, amending of final account and false payment certificates. The corruption practices like fake or altered invoices, overclaim for business expenses, kickbacks or bribes and cash theft are commonly found in Turkey construction

industry (Gunduz and Önder, 2013). According to their survey results, about half of the construction organisation encounter internal fraud cases and half of the respondents think that their companies are undertaking corruption practices in Turkey.

Through reviewing corruption practices in other countries' construction industry, it can be argued that the construction industry in developing countries suffer also the impacts of the corruption. In developing countries, most of the corruption practices exist in the tendering stages. In other words, tendering phase is the most common stage to involve in large number of corrupt acts like kickback, nepotism, bribery and big rigging. It can be concluded that the corruption practices in construction industry are unavoidable, therefore, adequacy of investigation of such practices is essential in order to reduce the corrupt acts in the construction projects.

Due to existence of different forms of corruption practices, a list of form of corruption are summarised under Table 2.2 to describe each of the corruption forms with the construction activities.

Table 2.2: Forms of Corruption in Construction Industry

Form of corruption	Description (Construction practices)	References
Bribery	It is also known as speed money at which "payment made in order to gain advantage or to avoid disadvantage". The payment can be in the various forms like cash, affirmative appointments and special privileges.	Sohail and Cavill, 2008, pp.5; Le et al., 2014b
Fraud	A common type of corruption at which the activities include modification of documents and intentionally misguide and conceal information, theft of equipment and materials, generating fake invoice for materials which are not received at site.	De Jong, Henry and Stansbury, 2009
Collusion	Refer to collusive tendering in the construction industry at which all the tenderers collude the overall tender cost for major projects, intentionally raising or lowering the tender cost to create a situation which the high tender cost is common.	Hartley, 2009

Table 2.2: Forms of Corruption in Construction Industry (Cont'd)

Form of corruption	Description (Construction practices)	References
Bid rigging	Similar as collusive tendering at which it involves both the tenderer and tenderee. The tenderee deliberately creates a restricted situation (e.g., short time constraint and inadequate requirement) during tendering to assist the favoured tenderer to win the tender.	Bowen, Edwards and Cattell, 2012
Embezzlement	Refer to client misappropriate the construction projects fund which lead to delay payment to the contractor which result in postponement of project and project failure. It negatively affects the cost management in the construction projects.	Sohail and Cavill, 2008; Le et al., 2014b
Dishonesty and unfairness	Relate to untrustworthy and unfair conducts which commonly happened in tendering, contract negotiation phase and construction phases. For instance, contractor produce sub-standard works, overclaim project expenditures and bias in tendering.	Alutu, 2007
Kickback	Reflect in tendering phase at which the tenderer offers economic advantages to the client's consultant in return of favoured outcomes like tender award and extension of tendering period. For instance, a contractor provides part of his income to government official in return of approval of building plans of a project.	Le et al., 2014b
Conflict of interest	Refer to professional who is unable to accomplish their responsibilities impartially due to conflicting personal or professional interest in a construction project. For instance, a site supervisor supervises a site on behalf of contractor, however, the site supervisor has relationship with the client.	De Jong, Henry and Stansbury, 2009; Hartley, 2009
Extortion	Conduct in the form of pressing extraction of bribes and requesting for assistances from significant parties in construction project in order to obtain desired outcome. It normally happens between two parties in the project, for example, from main contractor to sub-contractor and from client to material suppliers. It also results in abusing project funds which involve providing illegal incomes to other individuals.	Le et al., 2014b; Sohail and Cavill, 2006; Bowen, Edwards and Cattell, 2012

Table 2.2: Forms of Corruption in Construction Industry (Cont'd)

Form of corruption	Description (Construction practices)	References
Negligence	Refer to a professional who is unable to practice the due care of the professionalism and ethical behaviour. Negligence activities include inadequate specification, sub-standard work due to poor quality of material, workmanship and supervision.	Vee and Skitmore, 2003
Front companies	Reflect the organisation entities which are created by higher position personnel in the client or government organisation to gain unlawful benefits in rewarding construction contract.	De Jong, Henry and Stansbury, 2009
Nepotism	Refer to conduct at which a tenderer is able to secure a construction tender due to the assistance of a personnel in the organisation. The tenderer and personnel might consist of special relationships like good friendship and relative relationship. This corruption conduct will definitely reduce the quality of the project if the tenderer awarded is not qualified.	Bowen, Edwards and Cattell, 2012; Hartley, 2009

2.3.1 Corruption Practices in Different Stages

The corruption practices can be carried out in every stage of a construction project from inspection to preparation of final account. All stages of a construction project like inspection, concept design to detailed design, tendering, contract awarding stages, construction stages, material procuring, variation work, evaluation at completion, handover building stages, defect liability stages and final account stages are prone to corruption (Sohail and Cavill, 2006; Zou, 2006). According to Sohail and Cavill (2006), a list of corruption practices at each stages of construction project is modified under Table 2.3 below.

Table 2.3: Corruption Practices in Construction Project Cycle

Stages	Example of corruption practices	Form of corruption
Inspection	• Bribe payment to inspectors	➢ Bribery
Design stage	• Selection of consultants corruptly	➢ Nepotism
	• Consultants intentionally overprice and over design projects	➢ Dishonesty and unfairness
	• Bribe payment in order to obtain favourable environmental impact proposal and approval.	➢ Bribery
Tendering stage	• Collusion in tendering prices among the tenderers	➢ Collusion
	• Bribe payment to tender evaluation committee to win tender	➢ Bid Rigging
	• Favouritism by creating chances to award tender to selected tenderer	➢ Nepotism
	• Disclosure of consultant's tender estimates	➢ Negligence
	• Fraud by manipulating tender result and process	➢ Fraud
Contract award	• Politician affect selection of contractors and nature of contract	➢ Kickback
	• Bribe payment to consultant to produce inequitable contract	➢ Bribery
	• Intentionally conduct dishonestly and unfairly in producing contract	➢ Dishonest and unfairness
Construction stage	• Negligence by producing poor quality works to reduce expenditure	➢ Negligence
	• Embezzlement by misusing project funds	➢ Embezzlement
	• Overclaimed with false invoices for fictitious goods and services	➢ Dishonest and unfairness
	• Bribe payment to consultant to conceal and certify sub-standard works	➢ Negligence
	• Different interest in a construction project	➢ Conflict interest
	• False certification by consultants for materials and services which are not supplied at site	➢ Negligence
	• Overclaimed invoices from material suppliers	➢ Dishonest and unfairness
Handover stage	• Purposely retain needed approval or manual to obtain bribes	➢ Fraud
	• Poor quality of operation and maintenance works	➢ Negligence

Table 2.3: Corruption Practices in Construction Project Cycle (Cont'd)

Stages	Example of corruption practices	Form of corruption
Final account stage	• Opaque billing system • Dishonest final claim by contractors • Deliberately alter amount of final account	➢ Fraud ➢ Dishonest and unfairness ➢ Negligence

2.4 Causes of Corruption Practices in Construction Industry

In order to minimise the corruption practices in the construction industry, the sources of the corruption practices should be assessed and examined in order to provide effective preventive strategies to such corruption practices. There are several different causes of corruption in construction industry which include the nature of the construction industry itself, poor government corruption regulatory system and personal's intention towards the corrupt acts as presented in Table 2.4.

2.4.1 Nature of Construction Industry

Construction industry is different with other industries exist in the country due to its uniqueness nature. Through Bribe Payers Index 2008, International Transparency revealed that the construction industry is the most corrupt industry. It is unsurprising that the construction industry is the most corrupt industry to a country (Krishnan, 2009). There are researches highlighted several nature of construction industry as major causes which lead to high tendency of the construction industry towards the corruption practices. The construction industry is known as one of the most risky industries which exposed to corruption practice due to its unique nature as in complex, involvement of various participants, large scale of financing in a single transaction, competitive nature, involvement of sub-contracting relationship (Gunduz and Önder, 2013; Bowen, Edwards and Cattell, 2012; Kenny, 2009; Zou, 2006; Sohail and Cavill, 2006; De Jong, Henry and Stansbury, 2009; Sohail and Cavill, 2008).

2.4.1.1 Fragmentation of the Construction Process

The fragmentation of the construction process leads to difficulties in monitoring the construction practitioners' behaviours and coordinating the construction projects effectively. Kenny (2009) and Tabish and Jha (2011) highlighted that the construction industry made up of fragmented and non-standard production process which eventually causes asymmetric information obtained by the parties. When there are

discrepancies between the information received by each of the party, the unscrupulous practitioners will take the chances to commit corrupt acts. In the event that such corrupt acts are discovered, the unscrupulous practitioners are able to blame the faults to others. Nordin, Takim and Nawawi (2012) mentioned that the fragmentation of the construction industry and various interaction between the construction practitioners would bring various psychological human behaviour which eventually affects the corruption rate in the construction industry.

2.4.1.2 Complexity Nature

Furthermore, the complex nature of the construction process affects the level of coordination and supervision required to the industry as in, Gunduz and Önder (2013), mentioned that construction industry has limited management supervision and control on the operations of the construction project as the project is performed at a site which are further away from the headquarters. Tanzi and Davoodi (1997) stated that the complexity of the construction project impose difficulties in project management works as in design, construction and site supervision stages. Uncertainties of the tasks in the construction projects encourage the corruptors to carry out inappropriate and illegal activities to gain shortcut money in short period of time. However, the complex construction process is also due to involvement of multitude parties in a construction project. Various different parties which contribute different psychological human behaviour to the construction project which cause the construction projects to be complex in nature and eventually affects the perspective towards the corruption practices (Nordin, Takim and Nawawi, 2012).

2.4.1.3 Large amount of money

As construction industry involves long construction period, the payment system is also one of the special characteristics which cause the construction industry to be prone to corruption practices. The construction projects often involve large amount of money leading to difficulty in coordinating project expenditure (Zou, 2006; Sohail and Cavill, 2008; Zhang et al., 2017). This subsequently catch the attention of the immoral practitioners to gain shortcut benefits through involving corruption in the construction projects. Also, as it involves fragmented processes, the payment to the contractor will be based on the contractor's work done in each stage of construction. However, in order to maintain the cash flow, the contractor is required to submit his claim to the

quantity surveyor then the architect. In other words, the contractor's expenses claims are pass through several parties and cause the responsibilities boundaries of the parties to be ambiguous. Thus, it will be a great opportunity to immoral party to betray their professional ethics to corruption practices.

2.4.1.4 Intense Competitive Nature

Furthermore, the competitive nature of the construction industry always causes the corruption rate to surge. The intense competitive nature of the construction tendering process escalates corruption rate in the construction industry (Sohail and Cavill, 2006). Construction industry is competitive in nature as it comprises of numerous contractors in tendering stage but the availability of the construction projects is limited. Therefore, in order to compete with the other contractors, some of the unethical contractors will choose to secure the construction project by paying bribe to sustain company (Nordin, Takim and Nawawi, 2012). The corruption practices in the construction industry provide the benefits to both the giver and recipient as in the giver obtains the construction contact and receive stable income while the recipient gains the reward benefits through kickback. Corruption practices always damage the competitive nature in the construction industry which lead to low value for money to the client.

2.4.1.5 Lack of Transparency

However, the construction industry involves privatised process because the decision of the construction industry is often made between the consultants and client only. Privatised process cause the construction industry to be prone to corruption practices (Kenny, 2009). For instance, privatised or opaque selection of tenderer process can lead to nepotism and bid rigging without being discovered. Lack of transparency as one of factors which leads to corruption practices in the construction industry (Sohail and Cavill, 2006; Nordin, Takim and Nawawi, 2011; Olusegun et al., 2011). The unethical construction practitioners tend to bypass certain regulations and take advantages to practice corruption in their construction projects. The corruption itself are difficult to be uncovered, thus, lack of transparency in construction industry encourages the construction practitioners to involve more in corruption.

2.4.1.6 Concealing of Works

Besides, Stansbury (2005) highlighted that the construction industry is able to conceal the quality of work especially sub-standard works and defective materials which cause the construction industry to be exposed to corruption. This often happens during underground construction like pilling and ground beam works at which the contractor is able to cover up the works when the works are completed. In the event that the architect does not instruct to open up such works for inspection, the contractor can bypass his responsibilities in the underground construction works. Thus, there are several contractors take this as an opportunity to reduce their construction expenditure to increase profit margin by constructing low quality of works, for instance, poor workmanship, defective materials and material not in accordance to specification.

2.4.1.7 Relationship among the Parties

Although lack of communication between the parties is one of the barriers to the construction projects, it does not contribute that the relationship among the construction parties are not closely tied. There is existence of good relationship between the clients, consultants and contractors which encourage the nepotism and collusion in tendering selection stage to be practiced. Overclose relationship between the contracting parties increase the amount of the corrupt act in the construction projects because overclose relationship among the parties trigger collusive tendering (Le et al., 2014a), despite that the good relationship among the construction practitioners is able to enhance the communication during the construction projects. However, close ties between the client and contractors affect the decision making in contract negotiation which leads to high tendency to corruption (Sohail and Cavill, 2006).

2.4.2 Flawed Regulation System

Flawed regulation system is the major causes to the corruption in the construction industry. This is because when there is lack of regulations and punishment, people perceive that wrongdoing will never get punished and caught. It encourages people to commit the wrong acts. Therefore, regulation system is a crucial element to govern the country to ensure fair and honest conducts.

2.4.2.1 Defective Law System

Law system is very significant to a country in controlling behaviour as it is served as norm of conduct to society. Strict law or regulation system is necessary in managing complex business entities like construction business in order to achieve the functional requirement of the business. Since construction industry made up of unique and complex nature, effective law system is very important to regulate the construction industry in order to outshine the industry and bring the country towards success. Le et al. (2014b) established that defective rules and laws system is one of the factors which contributes to corruption practices in Chinese public construction sector, in other words, it may indirectly motivate the corrupt practices among the construction practitioners.

Lack of regulation system, poor law enforcement, poor building code enforcement lead to high corruption rate in construction industry (Sohail and Cavill, 2006; Nordin, Takim and Nawawi, 2011) because the law and regulation are vital to ensure all the practices within the construction industry are ethic. Through interviewing the respondents, Zou (2006) highlighted that the laws and regulations as anti-corruption measures are inadequately detailed and, in some cases, the wrongdoers are prosecuted lightly which increase the corruption rate in construction industry.

Regulation system and building code are extremely difficult to be perfectly developed to prevent or cease corruption practices. For instance, despite the tendering laws have been implemented since 2000's in China, the law system are still involving various deficiencies which weaken the anti-corruption practices and create vulnerabilities to the corruptors (Zhang et al., 2017). Besides, corruption itself is difficult to be discovered as most of the corrupt transactions are carried out under table, this situation exacerbates if the law system towards to corruption is vague and ambiguous. Therefore, defective law system especially in regulating the construction industry will encourage the unethical construction practitioners to participate in the corruption practices.

2.4.2.2 Lack of Rigorous Supervision

The main purpose of frequent and strict supervision on the construction projects are to ensure that all the construction works are executed in accordance to the contract agreement and achieve the standards and quality which the client established in order to ensure that the project is value for money to the client. One of the most efficient

anti-corruption measures is rigorous supervision (Tanzi, 1998). It is extremely significant to ensure adequate amount of supervision has been adopted throughout the whole construction projects in order to reduce the corruption effectively in the construction industry.

The corruption practices in the construction industry are exacerbated due to lack of rigorous supervision (Li et al., 2013). Inadequate and inappropriate supervision on each of the construction stages create opportunities to the immoral construction practitioners to carry out corrupt practices in the construction projects. For instance, lack of social supervision on the tendering process stimulates occurrence of the corruption practices in the tendering phase (Zhang et al., 2017). Kenny (2009) also mentioned that poor governance in the budgeting and planning phase in the construction projects determine the corruption level in the construction industry.

However, Ko and Weng (2011) mentioned that in the Chinese context, the supervising rules are not well implemented and executed. This reflects that such supervising rules are purposeless and sometime fails to prohibit the corruptors from conducting the corrupt practices in the construction industry. Alternatively, it is extremely important to ensure that strict supervising rules are implemented at the same time imposing the rigorous supervision towards the construction projects.

2.4.2.3 Inadequate Sanction

A strict establishment of sanction is important to create harmony and impartial environment to a country. It is to ensure that the wrongdoers are punished adequately based on their crime. In other words, proper sanction allows fair conduct among the society and able to reduce the crime rates because the crime committers will be afraid of being arrested in committing the crime and charged under harsh punishment. However, the sanctions to the corruptors in the construction industry are always overlooked which aggravate the corruption level in the construction industry. Lack of punishment to the corrupt construction practitioners is one of the major causes of corruption (Sohail and Cavill, 2006; Bowen, Edwards and Cattell, 2012). This can be proven in the research paper of Zhang et al. (2017) which found the inadequate sanctions as the second major factor that cause corruption in the construction industry.

The corruption in the construction industry may be worsened if inadequate legal punishments and penalties system as well as defective law system are implemented (Bologna and Nord, 2000). There are very few corruptors have been

punished appropriately and adequately for their corrupt practices (He, 2000). Therefore, such light sanctions are not strict enough to increase fear of the corruptors to stop practising corrupt acts in the construction projects. However, in the event that the corruptors are sentenced to jail, the corruptors are able to escape such punishments easily by paying bribe to the judicial department (He, 2000).

2.4.2.4 Multifarious Licenses or Permits

The construction companies and construction professionals are required to acquire several mandatory licenses and permits before engage in the construction industry especially in public construction sector. As there is licenses and permits between the government and construction companies as well as professionals, the government official is able to have ultimate control in supervising the project execution and coordinating the construction practitioners in the construction project. This situation stimulates corruption as in some of the government officials take this opportunities to obtain bribes from the construction practitioners who are applying for licenses and permits (Tanzi, 1998).

Le et al. (2014a) described that diverse licenses and permits which are required to enter the construction industry as one of the causes of the corruption in the construction industry. In order to start up construction companies, some unethical construction practitioners may choose to pay bribe to the government officials to accelerate the application process for licenses and permits (Neelankavil, 2002). Despite various licenses or permits restrict entrance of inappropriate personnel to the construction industry which is able to ensure the quality of the construction industry, it increases the corruption rate in the construction industry as multifarious permits and licenses required long application time which trigger the intention of the construction practitioners to undergo corrupt practices.

2.4.2.5 Lack of Research

Research is also known as organised investigation and study of a specific problem or concern by implementing scientific method. The main purpose of conducting research is to establish facts and generate new conclusions to the research topic. Research in particular topic is significant to determine, assess and understand the nature and detail of the problem exist in the research area prior putting forward any preventive actions and solutions to contain and eliminate the problems in the construction industry.

Sohail and Cavill (2006) claimed that the corruption in construction industry has been overlooked by the research community. It is common that there is lack of research in corruption area in any sector because it contains sensitive topic therefore most of the researchers or research community avoid conducting research in such area. Thus, lack of research especially in corruption area is one of the causes of the corruption in the construction projects as when there is limited research available. It fails to create awareness among the construction stakeholders and society towards the corruption in the construction projects. In other words, without the research to the corruption in the construction industry, the construction stakeholders are unable to understand and evaluate the extend, nature causes and effect of the corruption. Eventually, preventive strategies and solution proposed are not effective to contain the corruption in the construction industry.

2.4.3 Negative Encouragement

Besides flawed regulation system, the construction practitioners are often indirectly encouraged by personal greed and intention. Negative encouragement creates bad intention for the construction practitioners to participate in the corruption practices.

2.4.3.1 Personal Greed towards Money

Money acts as a vital role in individual life at which it is needed to cover individual's basic expenses and beyond that, it allows individual to has more control, possessions and freedom in their life. Thus, it is unsurprising that there is existence of greed of individual towards the money because additional money possession is believed to be able to increase quality of individual's life. Excessive love for money, in other words, greed to obtain addition income is one of the driven factor that cause corruption practices in the construction industry (Olusegun et al., 2011; Sohail and Cavill, 2006; Nordin, Takim and Nawawi, 2011; Zhang et al., 2017).

The corruption acts as a strong temptation especially to the individuals with excessive greed towards the money. This is because the corruption is a shortcut method to acquire illegal additional income in a short period of time. Therefore, particularly in this competitive era, when the significance of money towards individuals' life are significantly increased, the personal greed towards money will be surging which subsequently cause the corruption in the construction industry.

2.4.3.2 Low Income Level

However, the greed towards money is often driven by the income level of the individual. The economic and financial pressure drive the society to undertake corrupt practices in order to obtain additional income. Most of the corruptors perceive that the only solution to overcome such financial pressure is through corruption which is to compensate those costs that are unable to be paid by legitimate income (Gunduz and Önder, 2013; Nordin, Takim and Nawawi, 2012, 2011). The corruption in the construction industry is exacerbated when the consultants and public officials are underpaid which eventually cause poverty among the construction practitioners (Olusegun et al., 2011; Sohail and Cavill, 2006). Low wage level of encourages the construction practitioners to undertake corrupt practices in order to obtain additional income to cover life expenses. Thus, it is under the responsibilities of the employers of construction companies to ensure that all the construction practitioners are paid accordingly and adequately.

The Salary Report from Job Street (2018) established the income level of the construction stakeholders in junior executive level is in range of RM2,800 to RM3,000 which is considered as middle range income. The Department of Statistic Malaysia (DOSM) that also shown that mean salaries and wages as in the mean salaries of paid employees at about RM3,000 in year 2017. Besides, the senior executives are having the average minimum salary in the range of RM3,700 to RM4,000 while the manager level of the construction stakeholders including construction, consulting and engineering are receiving income level at around RM6,000. Nevertheless, the senior manager level is having high range of income level which is around RM9,200 to RM15,000.

2.4.3.3 Culture of Wrong Perception

Most of the corrupt acts are started from wrong believes by the construction stakeholders to the corrupt practices in construction industry. The construction practitioners always presume that the corrupt practices are necessary in order to complete the construction projects successfully (Gunduz and Önder, 2013). The corrupt practices are difficult to be reduced as there is perception that the works must be performed corruptly in order to achieve personal objectives (Seleim and Bontis, 2009).

However, the corruption is aggravated when the construction practitioners believe that corruption in the construction projects is a culture in order to complete the projects. Profiteering and bribery has become an acknowledged norm in performing business (Zou, 2006). Sohail and Cavill (2006) also mentioned that organisational culture of corruption is one of the main causes of corruption. When the corruption acts as a norm to the construction practitioners, new entry individuals to the construction industry will be influenced and easily get involved in the corruption in the projects. This causes the corruption rate in the construction industry to be surging.

Bowen, Edwards and Cattell (2012) stated that it will motivate the corruptors to participate in corruption if there is perception that the workplace environment is favourable for committing the corrupt practices. This is due to conducive environment in conducting corrupt acts has low probability to be discovered, on the other hand, it increases courage of the individuals to participate in corruption. Furthermore, in the event that the construction practitioners perceive that it is strenuous to obtain the construction projects, the corruption in the construction industry will become more severe. Perception like difficult to win a construction project by strict conformity with the legal system creates negative encouragement to the construction practitioners to commit the corrupt acts in the tendering process (Zhang et al., 2017). As the tendering process is of competitive nature, contractors perceive that it is difficult to compete with other tenderers if they wholly comply with the law system.

2.4.3.4 Negative Leader Role

Leadership is an essential and crucial component which helps an organisation to achieve goals by motivating subordinates, building morale, providing proper guidance and shaping healthy working culture. In the event that the role models themselves possess bad morale or ethics while working, the subordinates will be influenced by such unethical morale and will also practices such bad ethics in the works. In other words, the corruption in the construction industry is resulted from negative leader role (Olusegun et al., 2011; Bowen, Edwards and Cattell, 2012). However, in the research of Le et al. (2014a), it has proven that the negative leader roles as one of the significant factors that cause the corruption practices in the Chinese public construction sector. Le et al. (2014a) also explained that the corruption happens due to engagement of the leaders in the corruption practices.

The competent leader not only will keep out of corrupt practices, the leader is also able to lead the subordinates in true direction, observe situation, discover and cease bad practices within the team effectively. The corruption in the construction industry is caused by the existence of inadequate trained leaders, engineers and builders (Sohail and Cavill, 2006) who fail to aware the existence of corrupt practices within the team.

2.4.3.5 Shortage of Skill

A diploma or degree certificate is essential to enter into the construction industry which is to ensure that all the construction stakeholders are receiving adequate level of education on the construction knowledge and also professional ethics. However, Bowen, Edwards and Cattell (2012) mentioned that shortage of skills in the construction industry leads to corruption because poor skills within the construction industry create a fertile environment towards corruption. There are construction practitioners who do not receive any education regarding the construction prior enter into the construction industry. This causes such practitioners to have poor knowledge and skills in the construction industry and eventually results in sub-standard and defective works. Also, without education, these construction practitioners are not familiar and understand their professional ethics and code of conducts in performing their tasks.

2.4.3.6 Lack of Ethical Standard

Ethical standards are a set of standards of behaviours and principles of individual and business that are professionally accepted. The ethical standards can significantly affect the professionalism as it provides the guidance from what the professionals must do to what activities must the professionals avoid. However, there is a lack of ethical standards to the construction practitioners which cause the high level of corrupt practices in the construction industry (Sohail and Cavill, 2006; Bowen, Edwards and Cattell, 2012; Le et al., 2014a; Olusegun et al., 2011; Zhang et al., 2017). In other words, the code of conduct is able to deal with the corruption by drafting, implementing and enforcing the code to the construction practitioners (Gilman, 2005).

Sohail and Cavill (2006) claimed that the corruption practices in the construction industry is driven by the lack of professional culture within the construction industry. Besides, Bowen, Edwards and Cattell (2012) received an answer

from the survey which mentioned that the ethics is commonly ignored by the professional bodies as people are only focus more in the profits. Despite there is code of conducts or professional ethics standards are established in the construction industry, the construction practitioners often overlook such code of ethics and perform the works in the way that they presume is correct. However, when the construction practitioners refuse to refer the code of ethics and at the same time perceive wrongly towards the corrupt practices, the corruption rate in the construction industry will be increased.

2.4.4 Summary of Causes of Corruption Practices

Table 2.4: Causes of Corruption Practices by Different Authors

Ref	Causes	Author																Total
		Kenny (2009)	(Tabish and Jha, 2011)	Nordin, Takim and Nawawi (2012)	Gunduz and Önder (2013)	Tanzi (1998)	Tanzi and Davoodi (1997)	Zou (2006)	Sohail and Cavill (2006)	Nordin, Takim and Nawawi (2011)	Olusegun et al. (2011)	Stansbury (2005)	Le et al. (2014a)	Le et al. (2014b)	Zhang et al. (2017)	Bowen, Edwards and Cattell (2012)	Takim, Shaari and Nordin (2013)	
A	**Nature of construction industry**																	
A1	Fragmentation of construction process	√	√	√														3
A2	Complexity nature				√		√	√										3
A3	Large amount of money							√	√						√			3
A4	Intense competitive nature			√					√									2
A5	Lack of transparency	√							√	√	√							4
A6	Concealing of works											√						1
A7	Relationship among the parties								√				√					2
B	**Flawed regulation system**																	
B1	Defective law system							√	√	√				√	√			5

Table 2.4: Causes of Corruption Practices by Different Authors (Cont'd)

Ref	Causes	Author																Total
		Kenny (2009)	(Tabish and Jha, 2011)	Nordin, Takim and Nawawi (2012)	Gunduz and Önder (2013)	Tanzi (1998)	Tanzi and Davoodi (1997)	Zou (2006)	Sohail and Cavill (2006)	Nordin, Takim and Nawawi (2011)	Olusegun et al. (2011)	Stansbury (2005)	Le et al. (2014a)	Le et al. (2014b)	Zhang et al. (2017)	Bowen, Edwards and Cattell (2012)	Takim, Shaari and Nordin (2013)	
B2	Lack of rigorous supervision	√				√							√		√			4
B3	Inadequate sanction								√						√	√		3
B4	Multifarious licenses or permits					√							√					2
B5	Lack of research								√									1
C	**Negative encouragement**																	
C1	Personal greed towards money								√	√	√				√			4
C2	Low income level			√	√				√	√	√							5
C3	Culture of wrong perception				√			√	√						√	√		5
C4	Negative leader role								√		√		√			√	√	5
C5	Shortage of skill															√		1
C6	Lack of ethical standard								√		√				√	√		4

2.5 Impacts of Corruption Practices in Construction Industry

Corruption practices are not a minor problem to the construction industry, it can bring minor to major consequences to the projects, industry and nation as illustrated in Table 2.5. However, the severity of the corruption practices towards the construction industry is often difficult to be discovered, therefore, it is a must to look into the impacts of the corruption practices towards the construction industry before implementing preventive strategies in order to contain the corruption practices to a minimum number.

2.5.1 Project Delay

Corruption practices are generally committed secretly between two or more parties in order to obtain personal benefits. However, such practices in the construction industry often dilapidate the success delivery of the construction projects. Delay in the construction projects is one of the impacts of the corruption practices to the construction industry. Delay in the construction projects are strongly discouraged in the construction industry as it has numerous negative impacts towards the project success in term of time, cost, quality and safety to both the clients and contractors, therefore, it is necessary to figure out the significant cause of delay (Faridi and El-Sayegh, 2006). There are causes factors that contribute to the construction delay, however, the financing problem which is caused by corruption is one of the factors of delay in construction projects (Mezher and Tawil, 1998; Le-Hoai, Lee and Lee, 2008; Nordin, Takim and Nawawi, 2011; Kenny, 2009; Oyewobi et al., 2011).

In some cases, the subcontractors may intentionally falsify the time requirements for a particular work programme in order to claim higher price from the contractors which eventually cause construction delays (Sohail and Cavill, 2008). Corrupt acts can lead to construction delay. For instance, the delay of project delivery can be happened when the payment made to the contractors is defaulted by the client's corrupt acts like embezzlement (Le et al., 2014a; b). Construction projects delay instigates adverse consequences like increase construction cost and lack of productivity, in worst circumstances, the projects may subject to the arbitration and litigation proceeding (Owolabi et al., 2014).

2.5.2 Cost Overrun

Corruption practices is a waste of public funds and subsequently raise the overall construction project cost due to extra expenditure in paying bribe. It is extremely

significant to maintain the construction cost within the budget, however, there are several factors which cause the construction projects to be overbudget. Kenny (2009) stated that the corruption practices in the construction industry cause the construction project to be underperformed in term of overbudgeting. Therefore, it can be concluded that corruption practices in the construction projects lead to construction cost overrun (Nawaz, Shareef and Ikram, 2013; Nordin, Takim and Nawawi, 2011; Sohail and Cavill, 2008, 2006; Olusegun et al., 2011; Le et al., 2014a; Oyewobi et al., 2011; Kenny, 2009).

Furthermore, corrupt acts like misappropriation of organisation's resources for operational and maintenance will increase the construction cost in later stage because employment of the resources in short period of time require a very high cost (Sohail and Cavill, 2006). Zou (2006) also mentioned that the process of authorising and evaluating the progress payment and final account would involve the corruption acts, for instance, the contractors submit false or modified invoices for monthly expenses claiming which subsequently cause project cost overruns.

2.5.3 Defective Works

Not merely the construction cost will be inflated due to the corruption practices, the construction projects and products will be produced in low quality and defective as well as dangerous for the end users (Sohail and Cavill, 2006; Nordin, Takim and Nawawi, 2011; Kenny, 2009). The defective works can be covered up from being inspected by the consultants and clients (Krishnan, 2009) and this subsequently leads to failure of construction end products. Therefore, this indirectly encourages the contractors to commit the corruption practices by cutting cost from materials and workmanship to produce defective works in order to gain personal benefits from such practices. Krishnan (2009) expressed that corruption practices like claiming for payment on the inferior material or non-existent material from the client can also be happened in the construction industry. Moreover, Olusegun et al. (2011) claimed that the corruption practices in the construction projects will lead to reduction of building's life span. In other words, the corrupt acts cause building failure which may eventually lead to building cracking and collapse.

However, in the event that the contractors procure defective materials, produce the defective works and cover up such works without attention from clients and consultants, the rectifying works and cost on defective buildings will be bear by the

clients in the later stage. This causes the overall construction cost to be overbudget as the clients need to spend extra money to employ other contractors to rectify and make good of such defective works after contract period.

2.5.4 Project Abandonment

The corruption practices in the construction industry also lead to project abandonment (Olusegun et al., 2011; Ameh and Odusami, 2010; Usman, Inuwa and Iro, 2012; Doraisamy, Akasah and Yunus, 2014). The project abandonment is sometime resulted from the corruption practices such as low quality or sub-standard works by the contractors (Oyewobi et al., 2011). Subsequently, the abandoned construction projects tremendously effect to the construction industry especially in terms of development, therefore, it needs all the construction practitioners and government to look into abandonment issue and take essential steps to prevent exacerbation of the corruption practices.

There are several real cases of project abandonment which are resulted from corruption practices. For instance, when the road project in Malawi's Northern region had started 4 months times, the project was abandoned due to embezzlement of the project funds to the other prioritised project in Southern region (Phiri, 2010). Furthermore, according to (Le et al., 2014b), there are also project abandonment happened in other countries due to corruption practices. As in Nigeria, there are some water and irrigation projects were abandoned and in Afghanistan, the road projects were left behind due to existence of severe corruption practices in these countries.

2.5.5 Low Return

Not merely in the building construction projects, infrastructure projects may also involve the corrupt acts by the construction practitioners despite there is involvement of government officials. The corruption activities are likely happened in the construction works by government and public entities (Zou, 2006). However, the corruption practices may be aggravated in government projects when there is involvement of public officials. Stansbury (2005) mentioned that corruption not only affect the construction and engineering companies, it affects also financing, guaranteeing and insuring institution which undertake the construction projects.

As discussed earlier, corruption practices in the construction industry leads to poor quality of construction works and end products. This may incur extra costs during

building operation time because injury and death of the users may be happened due to building failure (Kenny, 2009). Furthermore, corruption practices in the construction projects reduce the efficiency and effectiveness of the infrastructure services (Sohail and Cavill, 2006; Nordin, Takim and Nawawi, 2011). Infrastructure services is extremely important to the society in term of connectivity, economy and productivity. Infrastructure not merely provide services to the society, it generates also incomes to the government. Therefore, the poor quality, low efficiency and effectiveness of infrastructure works which are caused by the unethical performance in the construction projects will decrease the return of investment from the infrastructure services to the government and society (Kenny, 2009).

2.5.6 Lack of Productivity

Nevertheless, lack of productivity can be explained as poor service delivery by the contractors in the construction projects. Low productivity in the construction projects may be due to incompetency of the contractors in undertaking construction projects. For instance, the contractors continuously tender for projects when there are several construction projects on hand. Due to incapability to resource for more than one projects, some of the corrupt contractors choose to corrupt like paying bribes and kickbacks in order to secure the projects. This eventually results in low productivity and quality of the works. For instance, nepotism in the construction projects influences the outcomes of the construction projects which lower the productivity and efficiency of the construction projects (Le et al., 2014b).

Sohail and Cavill (2006) also claimed that poor quality of public infrastructure will result in low productivity of the society. The corruption practices not merely reduce the quality of the new or existing infrastructure works, such practices will also reduce the public investment productivity and productivity of capital spending of the country. In other words, when corruption practices are committed, it reduces the return of the public investment and lower the spending by the government which eventually influence the economic status of the country. Subsequently, corruption acts generate economic problems and hinder the economic growth of the country (Le et al., 2014b).

2.5.7 Underdevelopment of Construction Industry

Underdevelopment of the construction industry is one of the significant impacts of corruption practices. According to Damoah et al. (2018), when the corruption exist in

the construction projects especially the government projects, the construction industry fails to develop as expected because the funds are misused for personal purposes by the unscrupulous practitioners. When the projects failed to achieve the projected time, cost and quality, the nation are unable to be benefited from the projects. Furthermore, corruption practices in the construction projects act as a barrier to the investors in investing in Malaysian construction industry as the corruption breaks their confidences. Subsequently, it retards the development of construction industry.

Besides that, the construction industry is often perceived as a significant driving factor towards the national economy. Therefore, the development of construction industry is extremely important as it influences the national development. In other words, when there is corruption in the construction projects, it eventually undermines not only the construction sector itself but also the national development and will lead to socioeconomic hardships (Damoah et al., 2018).

2.5.8 Summary of Impacts of Corruption Practices

Table 2.5: Impacts of Corruption Practices by Different Authors

Ref	Impacts	Author																			Total
		Mezher and Tawil (1998)	Le-Hoai, Lee and Lee (2008)	Kenny (2009)	Oyewobi et al. (2011)	Damoah et al. (2018)	Ameh and Odusami (2010)	Usman, Inuwa and Iro (2012)	Doraisamy, Akasah and Yunus (2014)	Ahzahar et al. (2011)	Nawaz, Shareef and Ikram (2013)	Elinwa and Buba (1993)	Zou (2006)	Sohail and Cavill (2006)	Nordin, Takim and Nawawi (2011)	Olusegun et al. (2011)	Le et al. (2014a)	Le et al. (2014b)	Sohail and Cavill (2008)	Krishnan (2009)	
S1	Project delay	√	√	√	√										√		√	√	√		8
S2	Cost overrun			√	√						√	√	√	√	√	√	√		√		10
S3	Defective works			√						√				√	√	√			√	√	7
S4	Project abandonment				√		√	√	√							√		√			7
S5	Low return			√										√	√						3
S6	Lack of productivity													√				√			2
S7	Underdevelopment of construction industry					√															1

2.6 Preventive Strategies for the Corruption Practices

The corruption practices have numerous major impacts towards the construction industry and country, therefore, it is essential to define the preventive strategies and implement the preventive strategies actively and progressively in order to prevent aggravation of the corrupt practices and also reduce its consequences towards the construction industry. Preventive strategies are significant because prevention is always better than curing the problems arose. A summary of preventive strategies is presented in Table 2.6.

2.6.1 Public Disclosure

Public disclosure can be also known as transparency mechanism at which it involves disclosing of daily works to public to obtain publics' notice. It is to make the whole construction process to be opened and to allow the public to notice each and every decision made within the construction projects. Open and transparent construction process should be established especially in making decision in the construction projects include tendering and developing construction law in order to effectively reduce the corruption practices in the construction industry (De Jong, Henry and Stansbury, 2009; Gunduz and Önder, 2013; Sohail and Cavill, 2006; Le et al., 2014b; Kenny, 2009; Nordin, Takim and Nawawi, 2012; Zou, 2006; Kenny, 2007; Le et al., 2014a).

Besides, in order to prohibit corruption practices in construction, the amount of information regarding the construction projects like budgets of projects, public accounts, contractual arrangements and annual report should be disclosed more to public (Sohail and Cavill, 2008). Moreover, ordinary publication of construction contracts to public can improve the governance of construction projects and indirectly overcome the impacts of corruption in the construction industry (Kenny, 2012). Kenny (2009) also recommended that the freedom in term of accessibility of construction projects information has to be increased and the construction industry should undergo fiscal reform for transparency to monitor the construction projects publicly.

High level of public disclosure of construction information is able to allow the corrupt practices in the construction projects to be detected efficiently. Thus, the establishment of open construction processes should be adopted from procurement to completion stage in construction projects and the transparent public processes should

be adopted by all parties who involve in the construction projects in order to reduce corrupt practices in the construction projects (De Jong, Henry and Stansbury, 2009).

2.6.2 Audit Mechanism

Audit can be defined as a mechanism to examine the financial report of a company by an external independent organisation. The construction audit is to inspect various aspects of the projects in order to assure that the projects are performing accordingly and align with the agreed contract. The audit mechanism in the construction industry stands a crucial role in managing the construction projects. In order to reduce the corruption rate in the construction industry, strict audit mechanisms should be developed in the construction projects to control the processes (Gunduz and Önder, 2013; Le et al., 2014b; Zou, 2006; Le et al., 2014a; Sichombo et al., 2009).

Sichombo et al. (2009) mentioned that adoption of technical auditing should be committed in pre-contract and post-contract stage and it helps to lower the construction cost by minimising and overcoming the corrupt practices in the construction projects. Meanwhile, the post-contract audits are able to evaluate the difference between the contract requirements and the physical works. Zou (2006) also stated that the audit mechanism is necessary in the construction projects and should be carried out on the final account of the construction project to ensure that the works are done according to quality standard and the claiming are based on the work done at site.

Nevertheless, Gunduz and Önder (2013) proposed two types of technical audit mechanisms to the construction projects which include internal and external audit. However, adoption of internal audit in the Turkish construction industry is more popular method to prevent corruption compared to the external audit. The internal audit focus more on the issues regarding to the construction project practices and processes in order to manage the relevant risks. However, the external audit focus on examination of the financial accounts of the construction projects to determine if the records is reflecting the actual works.

2.6.3 High Integrity and Honest Construction Culture

A positive culture in the construction industry helps to promote and develop positive values, high level of moral and ethical standard among the construction practitioners. The construction projects are made up of different concurrent activities and involve a variety of parties, it causes difficulties in supervising every construction activity,

therefore, the development of honest and anti-corruption culture is an essential key to ensure that the corrupt practices are kept in a minimum amount in the construction industry. The establishment of ethical construction culture in the construction industry can minimise the corrupt practices effectively in the construction industry (Zou, 2006).

Not merely the construction companies, the government also plays a significant role to promote ethical and high integrity construction culture in conducting the construction projects all the time (Nordin, Takim and Nawawi, 2012; Zou, 2006). The government should prevent creating culture like the corruption will not be unearth easily. Furthermore, in order to create honest and ethical culture in the construction industry, several approaches like recruiting competent leaders, staff training, increasing awareness and developing trustworthy reporting channels can be considered.

Furthermore, the construction practitioners themselves are the vital key to develop and promote honest and clean culture within the construction industry. Controls on the employee selection must be significantly applied in the construction industry in order to filter out the unscrupulous individuals to reduce corrupt acts in the construction projects. Gunduz and Önder (2013) proposed that before the employment of the construction practitioners in the construction companies, several verification and checks should be conducted. For instance, past employment, education and certification should be examined and verified strictly to inspect whether there is past involvement of the corrupt practices of the recruiters. Besides that, the ethical behaviours of the construction practitioners should be rewarded at the right time in order to build a positive construction industry culture.

2.6.4 Code of Conduct

There are several research papers emphasise the importance of code of conduct as the code of conduct is able to enhance the professionalism, responsibility and integrity of the construction practitioners. Furthermore, Construction Industry Development Board (CIDB) has formulated and implemented the code of conduct for the construction practitioners with the primary objectives to describe the standard practices to be adopted in order to ensure that the construction practitioners are performing their task efficiently, accountably and transparently. However, the importance of such code of conduct are often being neglected among the construction practitioners and in worst circumstance, some of the practitioners have totally zero knowledge about the code of conduct when entering the construction industry.

The adequate code of conduct should be strictly established and enforced among the construction practitioners to minimise the corruption practices (Le et al., 2014a; Gunduz and Önder, 2013; Le et al., 2014b; Kenny, 2009). Nordin, Takim and Nawawi (2012) stated that there is a need to obtain an adequate monitoring system and raise the integrity among the construction practitioners by assuring that the practitioners understand their core values. Sohail and Cavill (2006) also mentioned that the code of business and professional ethical conduct are significant preventive corruption measures as the code often contains the principles of the ethical behaviours (fairness, integrity and accountability) of a business and professional in executing their tasks. For instance, the International Federation of Consulting Engineers (FIDIC) develop the code of ethics of engineers which is a significant preventive measure of corruption in the construction industry. One of the criteria of an engineer in the code of ethics include that the engineer should not offer and accept any remuneration as it influences the decision-making process in the construction projects.

The code of conduct provides the guidance of the ethical principle of the professionals to discipline the construction practitioners and to ensure that there is high integrity and accountability among the professionals. Besides, the code of conduct not merely to outline the best ethical standards, it also helps to develop anti-corruption procedures to the construction industry. Therefore, the code of conduct should not be neglected but to be enforced strictly in the construction industry to eliminate the corruption practices.

2.6.5 Employees Selection

Other than providing adequate income level to the employees, the employer of construction companies should also make appropriate choice in selecting employees. In controlling the corruption practices in the Malaysian construction industry Gunduz and Önder (2013) stated several controls which must be applied in selecting employees.

Verification on applicants' education and certificate is the most common control to ensure that the applicants are having adequate professional training and understand thoroughly the code of conduct in performing tasks. Moreover, one of the most crucial controls is that the employers should verify the past employment of all the job applicants prior accepting their job applications. This kind of verification is essential to inspect whether the applicants are participating in the corruption practices in their previous construction projects. Furthermore, the references which are provided

by the applicants in their resume must be reviewed, as in contacting the references provided to ensure that the applicants are having professional ethics in performing their previous tasks.

2.6.6 Adequate Training System

A good leadership is critical to bring the project success (Bowen, Edwards and Cattell, 2012) as the leader is often responsible in controlling overall construction process and monitoring the workers. The behaviours of the leader can affect the culture and perception towards the corruption in the construction industry. Thus, Nordin, Takim and Nawawi (2012) stated that it is important to ensure that the leader of the construction projects possess high level of integrity, good leadership and competent to guide and monitor the workers instead of showing and encouraging the unethical behaviours to the other construction practitioners. The top management of the construction projects should be well educated to assure that the leader is performing task without corrupt acts. It is also to prevent passing down of the corruption behaviours and wrong perception towards the corruption to the bottom management in the construction industry.

Other than the enforcement of code of conduct to the construction practitioners, Zou (2006), Sohail and Cavill (2008) and Le et al. (2014a) also emphasised that the ethical training programs should be strengthen and provided to the construction practitioners as it is crucial to eliminate the corruption practices. However, the construction practitioners should be trained properly and adequately through courses and talks by instilling the significance of the professionalism and integrity in the construction industry (Nordin, Takim and Nawawi, 2012). Furthermore, the construction companies including the consultants and contractors should provide internal training to the workers to ensure that the intention to participate in corruption is eliminated (Gunduz and Önder, 2013). The internal training should emphasise and raise the corruption awareness, ethical procedures, consequences of corruption and importance of self-regulatory to the workers.

2.6.7 Effective Reporting Channel

One of the most effective ways to contain the increasing number of corruption cases is through effective and protected reporting channel. The corruption acts in the construction projects cannot be uncover easily by law enforcement units especially

when the evidences of the corruption acts are unavailable at most of the time because such acts are always able to be concealed (Bowen, Edwards and Cattell, 2012). Therefore, the reporting channel is vital as it provides a platform to people to report the cases immediately to the law enforcement units when they realised the corrupt acts happen.

The whistle-blowing hotline should be provided effectively and formally in order to allow the corruption practices to be discovered (Bowen, Edwards and Cattell, 2012; Gunduz and Önder, 2013). The whistle-blowing hotline should act as a formal channel which permits the public to contact with the law enforcement units once they discover the corruption practices in the construction projects. A protected whistle-blowing hotline encourages public to report incidents of corruption (Gunduz and Önder, 2013). In most cases, the main factor which cause the whistle-blowers to give up on reporting the corrupt acts in the construction projects is that they are unable to find a correct platform to report the corrupt acts. Therefore, it is urged that the anti-corruption community to create an effective whistle-blowing hotline in Malaysian construction industry to public in order to uncover more of the corruption activities in the construction projects.

2.6.8 Protection to Whistle-Blowers

Though whistle-blowing hotline allows public to report the corruption practices in the construction projects, it puts the whistle-blowers in danger and risk. As in research of Ameyaw et al. (2017), it founded that the whistle-blowers are not appropriately protected and having risk of being exposed. However, Bowen, Edwards and Cattell (2012) in their research received respond which expressed that it is difficult in reporting the incidents of corruption as the whistle-blowers will be threaten when the identity is exposed. Not only threaten by the corruptors, the whistle-blowers are also disdained by other construction stakeholders on reporting corrupt acts although they make moral judgement.

Therefore, not only effective whistle-blowing hotline, protection towards the whistle-blowers is also very important (Gunduz and Önder, 2013; Ameyaw et al., 2017; Bowen, Edwards and Cattell, 2012). All the identity of the whistle-blowers who report the incidents of corruption is required to keep low and maintain secrecy. It is to protect the whistle-blowers from any threaten risk. The protection towards the whistle-blowers eventually helps to reduce the corruption practices in the construction projects.

2.6.9 Enforcement of Law, Regulation and Sanction

Corruption practice is a crime and normally committed under table causing difficulties in discovering such practice. In such circumstances, the enforcement of the law and regulation are crucial to combat the corruption in the construction in order to retain fair and safe nation. Law and regulation especially regarding the corruption practices should be rigorously enforced in the construction industry to reduce the corruption rate (Gunduz and Önder, 2013; Kenny, 2009; Sohail and Cavill, 2006; Zou, 2006; Nordin, Takim and Nawawi, 2012; Le et al., 2014a). However, the existing corruption-related laws and regulations should be also improved to reinforce the anti-corruption precautions strictly within the construction industry.

The laws and regulations to deal with the corruption practices should be implemented fairly and strictly to all the construction practitioners (Kenny, 2009) regardless the position or status of the practitioners in the construction industry (Nordin, Takim and Nawawi, 2012). It is critical to make sure that there is no personnel escape from the sanction of the corrupt acts through paying bribe. It is very important to ensure that the laws and regulations are established and implemented at the same time in the construction industry to eliminate the corruption practices (Zou, 2006).

Other than that, the existing sanction towards the unscrupulous construction practitioner should be review in order to increase the fear of immoral construction practitioners to participate in the corruption activities and reduce the potential in committing unethical behaviours in the construction projects. Zou (2006), Sohail and Cavill (2008), Nordin, Takim and Nawawi (2012) and Le et al. (2014a) mentioned that the corruption cases in the construction projects should be investigated strictly to discover the corruptors and such corruptors must be punished severely and accordingly to their acts. It is able to reduce the corruption practices in the construction projects as individuals tend to learn from experience and correct their wrongdoing after the punishment.

2.6.10 Rigorous Supervision

Supervision of the construction projects can effectively mitigate the corruption practices in the construction industry (Zou, 2006; Olusegun et al., 2011; Le et al., 2014a). However, Zou (2006) suggested that the supervision should be adopted internally and externally, for instance, the internal supervision should be carried out to

monitor individually on each section of the construction project process whilst the external supervision should be implemented as in supervisory organisation.

The research paper of Zou (2006) in the China construction industry is significantly emphasised on the comprehensive supervision works in the construction projects is able to deal with the corruption practices. The research paper highlighted that it is a need to establish a complete supervising procedure, system, and organisation and the supervising officials has to be proactively and impartially in supervising the works to discover corrupt practices in the construction projects. Not merely the contractors' work at site, the relevant consultants in the construction projects should be also closely monitored to explore the unethical act of the professional (Olusegun et al., 2011). Furthermore, the supervision works should be carried out randomly and regularly to increase the risk of detection of malpractices.

2.6.11 Adequacy of Income Level

At most of the time, when the corruptors realise that the benefits of corruption override the cost of carrying out such practices, they will decide to undertake such practices to obtain immediate extra income. Therefore, it is a must to reduce such benefits and increase the cost of corruption by imposing higher risk to be discover and harsh punishment. However, the wages level of the construction practitioners should be reviewed (Olusegun et al., 2011; Sohail and Cavill, 2006) in order to overcome the financial pressure and to ensure that the construction practitioners will not take it as an excuse to commit the corrupt acts in the construction projects.

Olusegun et al. (2011) highlighted that the government of Nigeria should look into, review and provide appropriate income to the construction practitioners to ensure that such income levels are adequate to the construction practitioners to live conveniently. The government can obtain adequate income level of the construction practitioners by inspecting and researching the level of salaries and incomes that the other countries approved for their construction practitioners in the construction industry. The main purpose of providing the appropriate and adequate income level to the construction practitioners is to reduce the excessive greed towards money and financial pressure that the construction practitioners commonly faced and indirectly to overcome the intention of participating in corruption in the construction industry.

2.6.12 Summary of Preventive Strategies

Table 2.6: Preventive Strategies by Different Authors

Ref	Preventive strategies	Author																
		Kenny (2007)	Kenny (2009)	Kenny (2012)	Nordin, Takim and Nawawi (2012)	Gunduz and Önder (2013)	De Jong, Henry and Stansbury (2009)	Sichombo et al. (2009)	Zou (2006)	Sohail and Cavill (2006)	Nordin, Takim and Nawawi (2011)	Olusegun et al. (2011)	Le et al. (2014a)	Le et al. (2014b)	Sohail and Cavill (2008)	Bowen, Edwards and Cattell (2012)	Ameyaw et al. (2017)	Total
P1	Public disclosure	√	√	√	√	√	√		√	√			√	√	√			11
P2	Audit mechanism					√		√	√				√	√				5
P3	High integrity and honest construction culture				√	√			√									3
P4	Code of conduct		√		√	√				√			√	√				6
P5	Employees selection					√												1
P6	Adequate training system				√	√			√				√		√	√		6
P7	Effective reporting channel					√										√		2
P8	Protection to whistle-blowers					√										√	√	3

Table 2.6: Preventive Strategies by Different Authors (Cont'd)

Ref	Preventive strategies	Author																
		Kenny (2007)	Kenny (2009)	Kenny (2012)	Nordin, Takim and Nawawi (2012)	Gunduz and Önder (2013)	De Jong, Henry and Stansbury (2009)	Sichombo et al. (2009)	Zou (2006)	Sohail and Cavill (2006)	Nordin, Takim and Nawawi (2011)	Olusegun et al. (2011)	Le et al. (2014a)	Le et al. (2014b)	Sohail and Cavill (2008)	Bowen, Edwards and Cattell (2012)	Ameyaw et al. (2017)	Total
P9	Enforcement of law, regulation and sanction		√		√	√			√	√	√		√		√			8
P10	Rigorous supervision								√			√	√					3
P11	Adequacy of income level									√		√						2

2.7 Conclusion

In conclusion, the corruption practices in the construction industry bring significant impacts to the construction industry and project which subsequently influence the economic growth of the country. After reviewing the previous similar research on the corruption practices, it is concluded that the corruption practices can be easily triggered by both the personal intention and persuasion of the third party. There are several causes that contribute to the corruption practices in the construction industry. However, not only these causes, some of the hidden factors towards the corruption practices are still undefined which will exacerbate the corruption practices in the construction industry. Furthermore, the severity of the corruption practices towards the construction industry had been studied and discussed in this chapter. It cannot deny that the corruption practices stand at a challenging position as it affects not only the construction projects and construction industry itself, in most worst circumstances, the economic growth will be dragged which eventually cause the nation to be underdeveloped. However, there are some preventive strategies are reviewed in this chapter based on previous research to reduce the existence of corruption practices.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Research can be defined as "a scientific and systematic search for pertinent information on a specific topic" (Kothari, 2004, p.1). Research is able to figure out the hidden latent facts and answers for doubts which are arose within the topic area through adopting scientific analysis and procedures on the collected data. A good planning of research also allows the researchers to achieve the established objectives. In this chapter, the adopted research methodology is discussed in terms of research process, sampling design, data collection method and data analysis method.

3.2 Research Methodology

Kothari (2004) defined the research methodology as a technique to solve the research problems methodically. The term of methodology refers to the techniques that the researchers employ in searching the answers for several research problems in a research topic (Taylor, Bogdan and Devault, 2016). In other words, research methodology establishes specific procedures or methods which are normally used to identify, collect and analyse the information and data collected for the research topic. It also allows evaluation of a study's reliability and validity. There are two main types of research approach which consist of qualitative and quantitative approach. Sometimes, both approaches are carried out simultaneously which is known as mixed methods approaches. Each type of research method provides different procedures to the researchers to collect data about their research topic.

The qualitative data can be defined as "detailed description of situations, events, people, interactions, observed behaviours, direct quotation from people about their experiences, attitudes, beliefs and thoughts" (Patton, 2002, p.22). Marczyk, DeMatteo and Festinger (2010) mentioned that the quantitative research makes use of statistical analysis and systematic measurement to the obtained data to generate findings of a particular research topic. Mixed methods research approach involves collect, combine, analyse and integrate both the quantitative and qualitative data and provide a more better and complete understanding to the research problems than either the quantitative

and qualitative approach alone (Creswell, 2014). In this research study, quantitative approach was employed to obtain the statistical data from the construction practitioners in Klang Valley area regarding the perception towards corruption practices in the Malaysian construction industry.

3.2.1 Quantitative Research

Quantitative research was adopted in this research. It is the dominant research method which comprises of empirical or statistical studies (Newman and Benz, 1998). This type of research method collects the data which is able to be analysed numerically and interpreted in the form of tables, graphs and statistics. However, this methodology is often used to deal with large amount of data which is important to achieve high reliability results. The data collected in this approach have to be valid and reliable for the purpose of data analysis to generate new insights to the research area (Yap and Chua, 2018).

The quantitative research is usually carried out by distributing closed-ended questionnaires to the respondents through hand delivery, post or email. In order to obtain the quantitative data for this research study, a list of relevant questions was carefully prepared and distributed to construction practitioners in Malaysian construction industry. After received all the statistical data from the respondents, the data was then be analysed by using Statistical Package for the Social Science (SPSS).

3.3 Research Design

The research design shall be planned properly before a research study start. According to Kothari (2004), the research design is significant to the research study as it facilitates smooth running of the research operations which generate maximal information and accurate findings in low cost, time and money. Research design is an advance planning of the techniques to collect the related data and methods to analyse and interpret the data in order to achieve the research objectives. The research process in this research study was generated as in Figure 3.1 through modification of the research design according to Creswell et al. (2003).

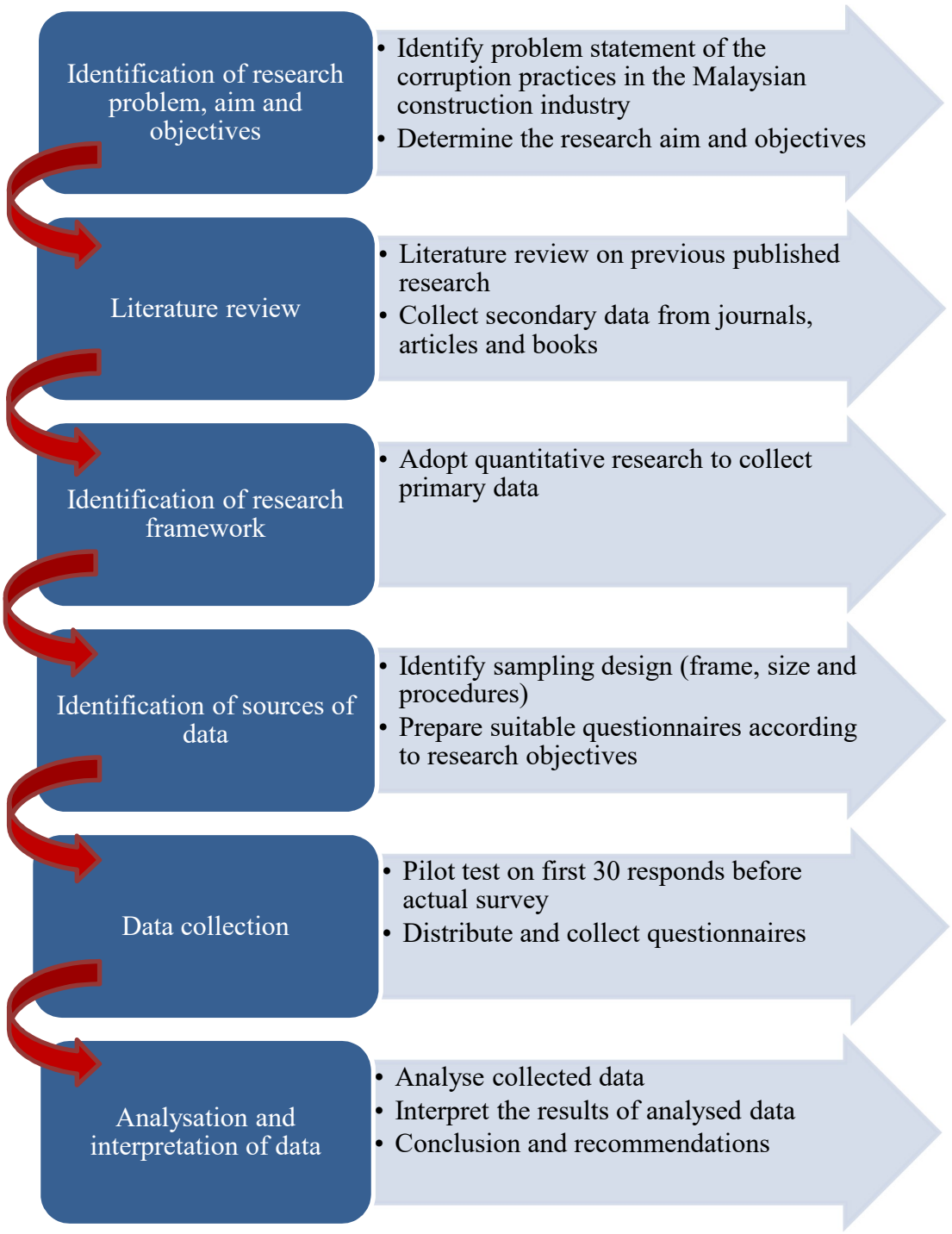

Figure 3.1: Flowchart of Research

3.4 Sampling Design

The sample design is normally decided before the data collection process. It is defined as a planning process, technique and procedure that allows the research to select the sample for the research from the a large group population (Kothari, 2004). It is essential to the research study in determining the sample size and background. Chua

(2016) mentioned that the selection of sampling is extremely important as it influences the reliability and validity of the research study. The sampling design for the research study include identifying the sample frame or target population, sampling procedures and sample size.

3.4.1 Sampling Frame

The sampling frame is one of the important areas to be considered in designing the sampling. It is to set a boundary to the sample size from large group of population. However, it is possible to has more than one sampling frame in a research study (Turner, 2003) as each of the sampling frame furnish different type of information and perspectives to the research topic.

In this research study, there were three group of sampling frames which consisted clients, contractors and consultants in the construction field within Klang Valley area. A total of three groups of sampling was adopted to obtain comprehensive information and wide range of perspectives towards the corruption practices in the Malaysian construction industry.

3.4.2 Sampling Size

The sample size must be clearly defined before commencement the data collection. As in sampling frame, the sampling size also stands a vital role in the data collection process because it affects the validity, reliability and consistency of the data which are then contributed to the findings of the research topic.

In this research study, 112 questionnaire survey were almost disseminated equally to developers, contractors and consultants in construction field which allowed balance data and findings to the research topic. The targeted respondents in this research included all position from junior to manager position regardless of the experiences, academic qualification, income level and nature of project involved.

3.4.3 Sampling Method

The sampling is very significant to bring accurate findings and achieve the research objectives of the research study. According to Chua (2013), there are two different types of sampling procedure methods which include probability sampling (simple random sampling, systematic sampling, stratified sampling and cluster sampling) and

non-probability sampling (accidental sampling, purposive sampling, quota sampling, snowball sampling, dimensional sampling, critical case sampling and maximum variation sampling). Kothari (2004) asserted that the non-probability sampling is also known as deliberate and purposive sampling at which the items of the sample are selected intentionally by the researchers. The researchers' choices on selecting the sample are supreme under non-probability sampling method procedure. Conversely, the probability sampling procedure is known as random sampling which all the items have equal opportunity of inclusion and each possible sample combination has same probability to be picked up in the sample.

In this research study, probability sampling procedure was used to select the sample which fit the research topic. The samples were selected regardless the position, experiences, academic qualification, income level and nature of project involved, as long as the sample were within the target population or research frames, the construction practitioners had an equal opportunity to be included in the sample.

3.5 Data Collection Method

The data collection is a pivotal process of a research study. Therefore, due care must be given by the researchers in order to obtain accurate data from the respondents to achieve the research aim and objective accurately. The process of data collection shall be commenced after the research problems and objectives have been identified as well as the research design has been defined (Kothari, 2004). Furthermore, according to Kothari (2004), there are two types research data which include primary and secondary data. Primary data are collected originally, directly and freshly from the respondents for the first time whereas the secondary data are data which had been collected, analysed and gone through statistical process by previous research. In other words, the secondary data refers to information and results obtained by reviewing previous relevant research as in Chapter 2 (Literature Review).

In this research study, both the primary and secondary data were collected in order to obtain broad perspective and understanding about the corruption practices in Malaysian construction industry. The primary data was collected by distributing the prepared questionnaire to relevant construction practitioners within Klang Valley area. However, the secondary data was obtained by reviewing previous research and

extracted the relevant results and findings from the past research. Both the primary and secondary could generate findings to this research topic.

3.5.1 Quantitative Research: Questionnaire

In this study, due to adoption of quantitative research method, the main source of primary data was through distribution of questionnaire. The questionnaire is made up of a list of questions which are relevant to the research objectives and the questions are arranged in order and systematically manner. However, the questionnaire is expected to be understandable and answerable and the respondents have to answer all the questions independently (Kothari, 2004). A well-designed questionnaire is extremely significant to get attention from the respondents and is able to obtain their interest to answer the questionnaire passionately and sincerely.

The research guidelines from Diem (2002) and Kothari (2004) established several questionnaire preparation rules which are important to generate a good questionnaire. The questionnaire shall be arranged systematically in the sequence like significant questions come first then followed by the general information questions. This is to avoid boredom in answering the questionnaire and it is believed that the interest in answering the questionnaire will be reduced after a period of time. However, some of the respondents may lack of sufficient time and put in answer randomly and insincerely in later part of the questionnaire. In such cases, the collected data would be inaccurate and unreliable especially when the significant questions are designed at the end part of the questionnaire.

Moreover, the wording used in questionnaire shall be short, simple, understandable and uncomplicated. Adequate amount of spaces shall be provided in the questionnaire if there are subjection questions to prevent restraining ideas from the respondents. According to Chua (2013), the questionnaire shall provide also clear instruction to guide the respondents in answering the questions. The questionnaire shall include also intention of the questionnaires and definition of unfamiliar terms in the questionnaire to avoid misunderstanding of the questions by the respondents.

The questionnaire in this research study was designed into three sections according to the research objectives. All the closed-ended questions were arranged systematically which provide multiple choices to the respondents with 5-scale Likert

scale. Likert scale provides the scale as in Figure 3.2 by Chua (2016) to the respondents to place their levels of agreement to the respective questions.

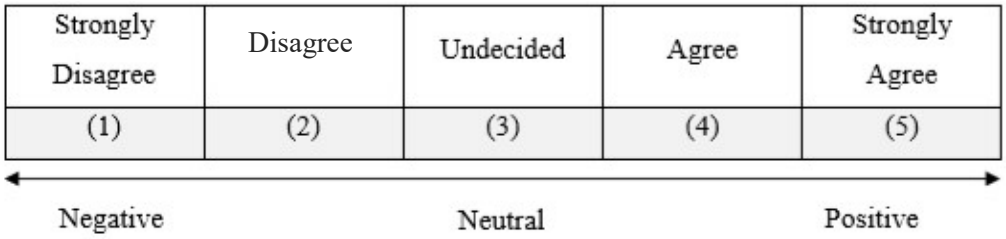

Figure 3.2: 5-Scale Likert Scale

In this research study, before the respondents entered the main part of the questionnaire, a brief introduction of the research topic and intention of the author was given. The first part of the questionnaire asked about the perception to the causes of the corruption practices while the second part prompted the respondents on their opinion on the impacts of corruption practices towards Malaysian construction industry. Then, the respondents were asked to scale on the preventive strategies which they see fit based on their experience. Towards the end of the questionnaire, the questionnaire prompted the general information of the respondents in terms of position, experiences, academic qualification, income level and nature of project involved.

3.5.2 Pilot Study

A minimum of 30 sets of questionnaires were distributed earlier and returned in order to undergo pilot test to examine the validity, reliability and appropriateness of the questions. According to Chua (2016), the pilot test is a small scale of preliminary research study to test the feasibility of the prepared questionnaire before the full-scale research study is conducted. The pilot test is critical element to a good research study design as it takes 30 sets of questionnaires as sample to make sure that the respondents understand the questionnaire and understand it in the same way. Besides, the pilot test helps to improve the research instrument before the in-depth study is carried out. The pilot test was necessary in this research study to avoid obtaining inaccurate and inconsistent data from the respondents.

3.6 Data Analysis Method

After the process of data collection, result analysation process will be carried out to analyse all the data obtained from the respondents. These results will be discussed in conjunction with the objectives of the research. The main purpose of data analysis is to ensure that the data collected from the respondents are interpreted correctly to generate accurate results to the research. During data analysis process, the collected data will be prepared, rearrange and tabulated in order to proceed to results interpretation stage. In this research study, the following data analysis methods were employed to analyse the data collected:

(i) Cronbach's alpha reliability test
(ii) Mean ranking
(iii) Kruskal-Wallis test
(iv) One-sample t-test
(v) Spearman's correlation test
(vi) Factor analysis

In order to analyse the collected data and generate reliable results and findings, SPSS was used in this research study. SPSS is a comprehensive platform which allows the researchers to perform various statistical analysis on the collected data. The SPSS is generally used to produce tabulated reports, charts and plots of distributions. It is also able to carry out complicated statistical analysis. Besides, there are several functions of the SPSS like descriptive statistics, reliability test, correlation, t-test, regression analysis and others which benefit the researchers in analysing the data for the research study.

3.6.1 Cronbach's Alpha Reliability Test

The Cronbach's alpha is significant in evaluating the assessments and questionnaires. It is an essential test for the researchers in their research study to examine the validity and accuracy of the data in order to carry out the data interpretation.

Lee Cronbach in year 1951 had developed Alpha which is generally used for internal consistency estimates to the data in the research study. The internal consistency is allowed to describe whether all the collected data are measuring the same construct or concept and to interpret the inter-relatedness of the data in the

research study. However, the reliability estimates is able to provide the amount of measurement errors in the research study (Tavakol and Dennick, 2011). The alpha value (α) is expressed in number between 0 to 1. The acceptable alpha value in the research study should be equal or more than 0.07 ($\alpha \geq 0.07$). In other words, the alpha value which is less than in 0.07 ($\alpha < 0.07$) is inadequate in the research.

According to Tavakol and Dennick (2011), if the collected data are interrelated with each other, the alpha value will be increased. The researchers should measure the alpha value each time when the collection data of the research study is conducted. The Table 3.1 below illustrated the range of Cronbach's alpha reliability coefficient by Gliem and Gliem (2003).

Table 3.1: Range of Cronbach's Alpha Reliability Coefficient

Range	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$\alpha < 0.5$	Unacceptable

3.6.2 Mean Ranking

In the research study, mean ranking will be employed to compute the mean in order to rank the variables as the respondents see important. Mean is the mathematical average and is used to measure the central tendency of the data. Measures of central tendency is to describe the position of a distribution of the data collected in the research study. Mean is generally used to investigate the relationships for different variables in the research study and whether there is existence of significance difference between the samples (Rajasekar, Pitchai and Cinnathambi, 2013). After computing the mean for each variable, the variables can be ranked according to the computed mean.

3.6.3 Kruskal-Wallis Test

Kruskal-Wallis test is a non-parametric arithmetical test (Guo, Zhang and Zhong, 2013) which is normally used in the research study to examine the hypothesis that whether there are differences between three or more groups on a continuous measure (Pallant, 2005). According to Kothari (2004), there are two types of popular rank sum tests that

are commonly used in the research which include H test and U test. H test is referred to Kruskal-Wallis test whilst U test is known as Mann-Whitney test.

In this research study, Kruskal-Wallis test was adopted to identify if there are significant differences in judgement of the variables across the respondent groups. In the event that the value is of equal or less than 0.05 (≤ 0.05), it indicates that there are significant differences in perception across the respondent groups. If there is significant difference between the respondent groups, the alternative hypothesis (H_1) shall be accepted and the null hypotheses (H_0) shall be rejected (Chua, 2013).

According to Kothari (2004), the formula of Kruskal-Wallis test is shown as below:

$$H = \left[\frac{12}{n(n+1)}\sum_{t=1}^{k}\frac{{R_i}^2}{n_i}\right] - 3(n+1) \qquad (3.1)$$

where

n = total sample size ($n_1 + n_2 + \ldots + n_k$)

k = the number of samples

n_i = the number of observations in the *i*th sample

R_i = the sum of the ranks assigned to n_i values of the *i*th sample

3.6.4 One-Sample T-test

T-tests are one of the hypothesis tests which are generally used to analyse whether the data collected in the research study are statistically significant or simply occurred by chances. There are three different types of t-tests which include one-sample t-test, independent samples t-test and paired samples t-test. One-sample t-test is to compare a sample to a known population group; independent-samples t-test compares two samples from two different population groups in regards to the same variable whilst the paired samples t-test compares two sample from the same population groups regarding the same variable.

In this research study, one-sample t-test (test value = 3) was adopted to test whether a sample mean from a population group was statistically significant or occurred by chance alone. When the significance value for a sample obtained is greater than 0.05, the specific sample of one-sample t-test is not recognised as significant by

the respondents (Yap et al., 2018). In other words, in the event that a particular factor that contribute to the research topic has a significance value less than 0.05, the particular factor is significant to the respondents.

3.6.5 Spearman's Correlation Test

According to Aksorn and Hadikusumo (2008), Spearman's correlation test is normally implemented in the research study to determine whether there is existence of correlation between two sets of ranked data. In this research, the Spearman's correlation test was adopted to examine the relationship among two sets of variables.

The correlation coefficient indicates the strength of relationship between two sets of variables which is range from -1 to 1 where correlation of 0 indicates that there is no relationship; correlation closer to 1 indicates that there is a perfect positive relationship; correlation closer to -1 indicates that there is a perfect negative relationship (Pallant, 2005). However, the negative sign of the correlation value indicates only the direction instead of the strength of the relationship. Table 3.2 summarises the correlation strength of variables which is suggested by Cohen (1988).

Table 3.2: Correlation Strength between Variables

Size of correlation	Interpretations
0.10 to 0.29 (-0.10 to -0.29)	Small correlation
0.30 to 0.49 (-0.30 to -0.49)	Medium correlation
0.50 to 1.00 (-0.50 to -1.00)	Large correlation

3.6.6 Factor Analysis

The factor analysis acts as a data reduction and summarisation technique (Yap et al., 2018). The underlying relationship between the data can be identified (Yong and Pearce, 2013). It is normally applied when the research contains a great number of variables which is unable to analysed thoroughly. The factor analysis is able to simplify and summarise a large set of variables into smaller set of factors by looking for the groups among the intercorrelations of the variables (Pallant, 2005).

There are two main approaches to factor analysis including exploratory approach and confirmatory approach. The exploratory approach is normally adopted early in the research to explore the interrelationships among the variables while the confirmatory approach is often adopted later in the research to confirm particular

hypotheses regarding the structure underlying the variables (Pallant, 2005). However, in this study, the exploratory factor analysis technique is applied.

Prior conducting the factor analysis, assessing the suitability of data in the research is important. Thus, the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity are employed (Doloi, 2008). The KMO value range from 0 to 1, the value should be greater than 0.50; if the value lesser than 0.50, the factor analysis is unlikely to produce reliable outcomes (Field, 2013). The significance value in the Bartlett's test should be lower than 0.05 to confirm that the variables have a patterned relationship (Yong and Pearce, 2013).

3.7 Conclusion

This chapter defined the employed research methodology in this research study. First, quantitative research method was employed in the research and the total 112 numbers of responds were collected through questionnaire survey. All the respondents were from construction sector within Klang Valley area and include all the construction practitioners (developers, contractors and consultants). The probability sample procedure was employed to get the random sample from the selected sampling frame for the research study. The pilot test was carried out on the prepared questionnaire to examine the validity and appropriateness prior commencement of in-depth survey. Furthermore, the Cronbach's alpha reliability test, mean ranking, Kruskal-Wallis test, one-sample t-test, Spearman's correlation test and factor analysis were adopted to analyse all the data collected in order to generate findings to the research study.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

The statistical analysis techniques discussed in previous chapter were employed to analyse the data collected from the survey. The collected data was rearranged, processed and tabulated by using the Statistical Package for the Social Sciences (SPSS) in this study. Furthermore, the results were evaluated and discussed in conjunction with tables and graphs for further interpretation to answer the aims and objectives stated in Chapter 1.

4.2 Questionnaire Design

The questionnaire was designed in sectional which was adopted from Adigüzel and Wedel (2008) to acquire the perceptions of the developers, contractors and consultants towards the corruption practices in the Malaysian construction industry. The main purpose of adopting the sectional survey design was to prevent obtaining undesired responses and early withdrawal from the survey by the respondents whom were fatigue and disinterest.

The questionnaire contained four sections. The Section A, causes of corruption practices; Section B, impacts of corruption practices and Section C, preventive strategies were designed to solicit respondents' ratings on the respective questions with Likert scale (1 = strongly disagree to 5 = strongly agree). The last section, Section D collected the general information from the respondents like type of organisation, working experience, position, academic qualification, household income level and characteristic of project involved. The ultimate purpose of designing the general information of the respondents at the last section was to avoid the respondents from feeling bored (Diem, 2002) in answering the critical section (Section A to C) of the survey.

4.3 Pilot Study

The pilot test was conducted due to its criticality to the research to make sure that the main study would be conducted smoothly (Kothari, 2004) and to assure that the

questionnaire was created practicable and without obscurity (Goh and Abdul-Rahman, 2013) as well as understandable in the same way by all the respondents. For this research, a total of 30 questionnaires purposely used for pilot test was distributed in paper through hand distribution to industry professionals in various construction discipline; all the 30 distributed questionnaires were returned, giving a response rate of 100%.

However, the advocation of 30 sample size for the pilot test in this research was referred from Memon et al., (2017). The sample size was derived from Central Limit Theorem which gave a distributional assumption of such sample size was to assure that the mean of any samples obtained from the target population was nearly equal to that of the population.

Table 4.1 summarises the alpha value for each section of the questionnaire. All the collected 30 questionnaires were pilot-tested through SPSS. From the Table 4.1, each section of the questionnaire generated the alpha value greater than 0.70 which imply that there were excellent internal consistency among the data (Gliem and Gliem, 2003). This indicated that the responses for the pilot study were reliable. Since there were no any further alterations made to the pilot study questionnaires, all these 30 responses would be included in the main study.

Table 4.1: Cronbach's Coefficient Alpha Values for Pilot Study

Category	Number of items	Cronbach's alpha
Causes of corruption practices	18	0.96
Nature of construction industry	7	0.95
Flawed regulation system	5	0.93
Negative encouragement	6	0.94
Impacts of corruption practices	7	0.93
Preventive strategies	11	0.95

4.4 Response Rate

In the main study of this research, the questionnaires were mostly disseminated through e-survey. Approximately 250 questionnaires were emailed and sent out online to the industry professionals whom were within Klang Valley area between January 2019 and February 2019. Among the 250 questionnaires, only 82 responses were returned. Since the 30 pilot study questionnaires remained unaltered, all these responses were also included in the main study sample. Therefore, a total of 112

responses were successfully collected for this research study, contributing an overall response rate up to 40%.

Table 4.2 summarises the response rate for both pilot and main study. According to Nulty (2008), most of the response rate for paper-based survey (average = 56%) would be much higher than the e-survey (average = 33%). Therefore, the response rate of the paper-based survey and e-survey obtained for this research as shown in Table 4.2 were considered optimistic. However, the paper-based survey could achieve such high response rate as in Table 4.2 because each paper questionnaire was distributed directly to the sample.

Table 4.2: Response Rate

Distribution method	Questionnaire		Response rate
	Distributed	Collected	
Pilot study			
Paper-based survey	30	30	100.0%
Main study			
E-survey	250	82	32.8%
Overall	280	112	40.0%

4.5 Profile of Respondents

Table 4.3 summarises the demographic profile of the respondents in terms of type of organisation, working experience, position in company, academic qualification, household income level and characteristic of project. In this survey, the questionnaires were almost equally distributed to 32 developers (28.6%), 41 contractors (36.6%) and 39 consultants (34.8%) in Malaysian construction industry within Klang Valley area. Around 81.2% of the respondents have at least 6 years of working experiences and 42.8% of the them are considered as experts in the construction field as they are having beyond 10 years of working experience.

Table 4.3: Demographic Profile of Respondents

Profile	Description	Respondent groups			Total	Frequency (%)
		Developer	Contractor	Consultant		
Working experience	0 – 5 years	6	3	12	21	18.8
	6 – 10 years	14	17	12	43	38.4
	11 – 15 years	4	10	11	25	22.3
	16 – 20 years	4	8	0	12	10.7
	21 years and above	4	3	4	11	9.8
Position in company	Executive	15	12	22	49	43.8
	Manager	13	18	9	40	35.7
	Senior Manager	2	7	4	13	11.6
	Director / Top Management	2	4	4	10	8.9
Academic qualification	High School	1	1	0	2	1.8
	Diploma	0	3	1	4	3.6
	Bachelor's Degree	21	30	29	80	71.4
	Master's Degree	9	7	8	24	21.4
	Doctorate	1	0	1	2	1.8
Household income level	≤ RM3,000 per month	2	1	6	9	8.0
	RM3,001 - RM6,500 per month	7	10	11	28	25.0
	RM6,501 - RM10,000 per month	11	11	9	31	27.7
	≥ RM10,001 per month	12	19	13	44	39.3
Characteristic of project	Private	23	21	34	78	69.6
	Public	9	20	5	34	30.4

Moreover, more than half of the respondents are found holding managerial positions or higher in their organisations with majority of them holding bachelor's or higher degrees. They are believed to be able to provide wider range perspective to this research study. Furthermore, only 1.8% of the respondents have only secondary education before entering the industry. This could also prove that the education level had been paid more attention and improved in Malaysian construction industry.

Besides that, more than 8% of the respondents get more than RM3,000 salary. However, in this main survey, minority of the respondents are engaging in the public sector. The respondents are asked to evaluate the corruption practices in the Malaysian construction industry based on their overall experience (mostly involved projects) or knowledge in the industry rather than the current situation in their current projects.

To conclude, the questionnaires in this survey were almost equally disseminated among the developers, contractors and consultants, majority of them have at least 6 years of working experience in the industry, more than half hold managerial positions or above, majority received tertiary education and most of respondents obtain salary of above RM3,000. As such, the data sources of this survey are trustworthy in terms of adequacy of experience and wider range of viewpoints towards the corruption practices in the Malaysian construction industry.

4.6 Reliability of Results

To test the reliability of data collected in this research, Cronbach's Alpha is adopted with SPSS. The computed coefficient value was shown in Table 4.4. The Cronbach's coefficient alpha values for data collected are all above 0.80 as in Table 4.4. The data with scale reliability value of higher than 0.80 is considered good and excellent data (Gliem and Gliem, 2003; Doloi et al., 2012). Therefore, the reliability of the data collected was considered as above acceptable level.

Table 4.4: Cronbach's Coefficient Alpha Values for Reliability Test

Category	Number of items	Cronbach's alpha
Causes of corruption practices	18	0.93
Nature of construction industry	7	0.89
Flawed regulation system	5	0.82
Negative encouragement	6	0.86
Impacts of corruption practices	7	0.87
Preventive strategies	11	0.93

4.7 Mean Ranking

The causes of corruption practices towards the Malaysian construction industry are ranked in term of mean and standard deviation based on perceptions of three respondent groups (developer, contractor and consultant).

4.7.1 Causes of Corruption Practices

The causes of corruption are prioritised in accordance of cause categories as shown in Table 4.5. In perspective of developers, the five most agreed causes of corruption practices in Malaysian construction industry are:

(1) personal greed towards money (Mean = 4.063; δ = 1.076)
(2) lack of ethical standard (Mean = 3.813; δ = 1.424)
(3) lack of rigorous supervision (Mean = 3.688; δ = 1.176)
(4) relationship among the parties (Mean = 3.688; δ = 1.281)
(5) multifarious licences and permits (Mean = 3.469; δ = 1.218)
(5) negative leader role (Mean = 3.469; δ = 1.218)

Furthermore, the top 5 causes of corruption practices as perceived by contractors are:

(1) relationship among the parties (Mean = 4.268; δ = 0.742)
(2) intense competitive nature (Mean = 4.195; δ = 0.813)
(3) lack of transparency (Mean = 4.171; δ = 0.892)
(4) personal greed towards money (Mean = 4.122; δ = 1.029)
(5) large amount of money (Mean = 4.098; δ = 0.889)

Moreover, in the viewpoint of the consultants, the five important causes of corruption practices are as follow:

(1) personal greed towards money (Mean = 4.282; δ = 0.944)
(2) lack of ethical standards (Mean = 4.051; δ = 0.999)
(3) large amount of money (Mean = 4.051; δ = 1.075)
(4) negative leader role (Mean = 3.974; δ = 0.986)
(4) relationship among the parties (Mean = 3.974; δ = 0.986)

Overall, the most five significant causes of corruption practices are:

(1) personal greed towards money (Mean = 4.161; δ = 1.009)

(2) relationship among the parties (Mean = 4.000; δ = 1.022)
(3) lack of ethical standard (Mean = 3.946; δ = 1.177)
(4) intense competitive nature (Mean = 3.893; δ = 1.085)
(5) large amount of money (Mean = 3.893; δ = 1.157)

The ranking was done based on the mean and standard deviation values. However, in circumstances like when two or more variables share the same mean value, the variable with lower standard deviation is considered as more important (Wang and Yuan, 2011). In this research, it should be highlighted that there are several pairs of causes of corruption practices sharing the same ranking. Multifarious licenses and permits and negative leader role in perspective of the developers as well as negative leader role and relationship among the parties in viewpoint of contractors are having same mean and standard deviation value. Therefore, both pairs are sharing the similar ranking.

However, according to the ranking, personal greed towards money are ranked as the most significant cause of corruption. Both the developers and consultants perceive that personal greed towards money as the most significant cause of corruption while in perception of contractors, the same cause is ranked at only fourth place.

People are often found corrupting to fulfill their greed towards money. The personal greed towards money was ranked at second significant cause out of 12 causes of corruption in the research of (Olusegun et al., 2011) regarding the causes and solutions to corruption in the construction industry of Nigeria. This further indicates that the significance of personal greed towards money as a main cause to corruption practices in construction industry. The typical economical problem over centuries is such that the resources are scarce but the desire of the people are indefinite. Therefore, one is often filled with greed and would never think there is too much of money to be owned. As there are lots of needs and wants to be satisfied, the desire to get rich is formed. The greed pressures the low integrity individuals to participate in corruption (Bowen, Edwards and Cattell, 2012) especially when poverty happen (Olusegun et al., 2011).

Moreover, it would be easier for the corruptors to participate in corruption when there are accomplices in the projects especially when the projects are in inadequate supervision. In overall, overclose relationship among the project

stakeholders is ranked as second significant cause to corruption practices. Both the developers and consultants on the other hand, has ranked the relationship among the parties as fourth significant cause while the contractors find the relationship among the parties as the most significant causes of corruption practices in Malaysian construction industry. This result is supported in research of (Le et al., 2014a) which shown that overclose relationship among the project stakeholders significantly results in corruption practices in China construction industry. However, only developers perceive that the lack of rigorous supervision as one of the top 5 causes of corruption.

Ling and Tran (2012) observed that the corruption practices are often resulted from overclose relationship among the project parties. In other words, corruption practices are more frequent when there are helping hands internally and externally of a construction project. As in, overclose relationship among the project parties trigger the corruption acts like nepotism and bid rigging during the tendering stage (Sohail and Cavill, 2006; Le et al., 2014a). However, lack of supervision in the construction projects is often due to negligence of the supervision department itself towards the significance of supervision to the construction projects (Zhang et al., 2017). This would affect the corruption level in the construction industry (Kenny, 2009). Thus, the encouragement in participating the corruption is gradually strong when strict supervision in coordinating the works is absented.

Furthermore, in overall, lack of ethical standard is perceived as third most agreed cause of corruption practices in Malaysian construction industry. Only developers and consultants think that lack of ethical standard is one of the most significant causes of corruption where both the sample groups rank it at second.

Establishment of ethical standard is to ensure that the professionals act professionally during their works. The corruption level in the construction industry is often affected by the ethical behaviours among the professionals in the construction projects (Olusegun et al., 2011). For instance, the contractors tend to divert their behaviours and actions away from the ethical standards, as they are often anxious in making profit in the construction projects (Abdul-rahman, Wang and Yap, 2010). However, each profession is bound by their own interest and code of ethics which are often divergent in nature and results in conflicting ethical standards and practice, therefore, this affects the quality performance of the professionals (Abdul-rahman,

Wang and Yap, 2010). This provides also vulnerability to the unscrupulous parties to neglect the ethical standards during their works.

Besides that, in overall, intense competitive nature of construction industry is ranked as fourth significant cause to Malaysian construction sector. The competitive nature in construction industry especially during the tendering process increase the tendency of corruption in construction industry (Gunduz and Önder, 2013). The construction activity like tender process is of greatly competitive (Sohail and Cavill, 2008) which the tenderers need to propose the most competitive price in order to get the job. Thus, in order to defeat the other tenderers, some of the contractors may choose to involve in corruption practices to obtain the tender reward (Sohail and Cavill, 2006). Therefore, among all the respondent groups, only contractors rank the intense competitive nature as second significant cause towards corruption practices. In other words, the contractors strongly believe that competitive nature in construction sector especially during the tendering stage is the root cause that lead to high level of corruption practices in Malaysian construction industry.

Furthermore, large amount of money involved in the construction industry is perceived as one of the most agreed causes of the corruption practices in construction industry which is ranked at fifth significant cause. Zou (2006) manifested that involvement of large amount of money increase the occurrence of corruption especially when the processes of money spending are not well-monitored. Only consultants and contractors think that large amount of money in construction is able to attract the unethical practitioners to construction industry which at the rank of 3 and 5 respectively.

Table 4.5: Mean and Ranking of Causes of Corruption Practices

Ref	Causes of corruption practices	Overall (N = 112)			Developer (N = 32)			Contractor (N = 41)			Consultant (N = 39)			Chi-square	Asymptotic significance
		Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank		
A	Nature of construction industry														
A7	Relationship among the parties	4.000	1.022	2	3.688	1.281	4	4.268	0.742	1	3.974	0.986	4	3.933	0.140
A4	Intense competitive nature	3.893	1.085	4	3.406	1.316	10	4.195	0.813	2	3.974	1.013	6	7.632	0.022*
A3	Large amount of money	3.893	1.157	5	3.438	1.435	7	4.098	0.889	5	4.051	1.075	3	4.685	0.096
A5	Lack of transparency	3.848	1.125	6	3.375	1.362	11	4.171	0.892	3	3.897	1.021	11	6.879	0.032*
A6	Concealing of works	3.500	0.940	13	3.125	1.008	13	3.732	0.867	10	3.564	0.882	15	5.962	0.051
A1	Fragmentation of construction process	3.411	1.119	14	3.250	1.368	12	3.512	0.925	14	3.436	1.095	18	0.391	0.823
A2	Complexity nature	3.366	1.170	16	3.063	1.243	15	3.439	1.119	16	3.539	1.144	16	2.838	0.242
B	Flawed regulation system														
B2	Lack of rigorous supervision	3.795	0.997	7	3.688	1.176	3	3.756	0.888	9	3.923	0.957	10	0.851	0.653
B3	Inadequate sanction	3.732	0.939	8	3.406	1.214	9	3.781	0.690	8	3.949	0.857	8	3.336	0.189
B4	Multifarious licenses or permits	3.670	1.102	11	3.469	1.218	5	3.561	1.205	13	3.949	0.826	7	2.750	0.253
B5	Lack of research	3.411	1.119	14	3.031	1.204	16	3.488	1.075	15	3.641	1.038	14	4.998	0.082
B1	Defective law system	3.348	1.063	17	2.844	1.139	18	3.342	0.990	18	3.769	0.902	12	12.154	0.002*
C	Negative encouragement														
C1	Personal greed towards money	4.161	1.009	1	4.063	1.076	1	4.122	1.029	4	4.282	0.944	1	0.910	0.634
C6	Lack of ethical standard	3.946	1.177	3	3.813	1.424	2	3.951	1.139	6	4.051	0.999	2	0.062	0.970
C4	Negative leader role	3.723	1.133	9	3.469	1.218	5	3.683	1.171	12	3.974	0.986	4	3.166	0.205
C2	Low income level	3.714	1.181	10	3.438	1.435	7	3.707	1.078	11	3.949	1.025	9	2.170	0.338
C3	Culture of wrong perception	3.616	1.050	12	3.125	1.212	14	3.854	0.937	7	3.769	0.902	12	7.315	0.026*
C5	Shortage of skill	3.268	1.280	18	2.875	1.314	17	3.390	1.263	17	3.462	1.232	17	3.975	0.137

Note: *. The mean difference is significant at the 0.05 level of significant.

4.7.2 Cause Categories of Corruption Practices

Figure 4.1 contains the mean ranking of the cause categories of corruption practices by three different respondent groups (developers, contractors and consultants). From the figure, both consultants and developers perceive that the negative encouragement is the main cause of corruption practices in the Malaysian construction industry. People are often found as the root causes to the corruption practices regardless how good the regulation system has been developed (Zou, 2006). Furthermore, only contractors strongly believe that the nature of construction industry itself significantly cause the corruption practices in Malaysian construction industry. In contractors' perception, among the 5 most significant causes of corruption practices, there are 4 causes of corruption practices are mainly due to nature of construction industry (e.g. relationship among the parties, intense competitive nature, lack of transparency and large amount of money). Therefore, to the contractors, the nature of construction industry act as the main contributor to the corruption practices in construction industry.

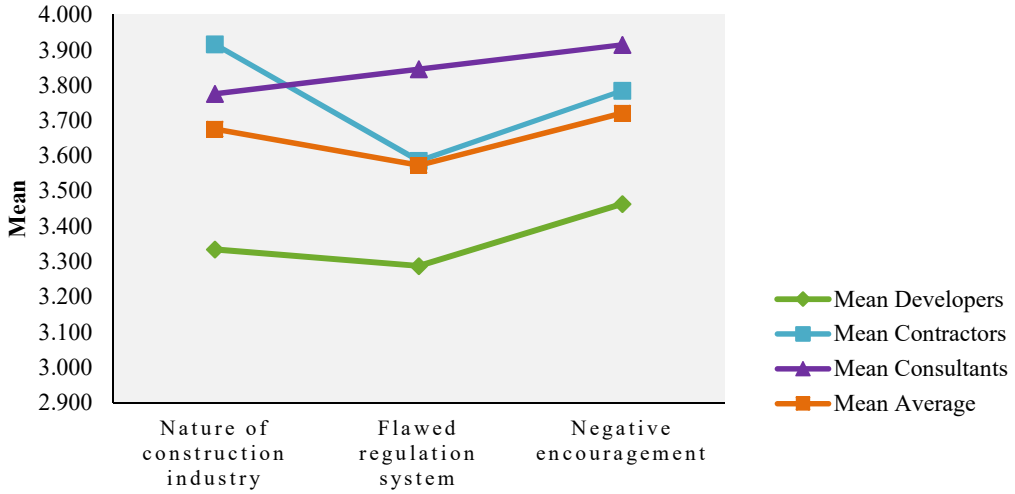

Figure 4.1: Profiles of Different Cause Categories for Mean Ranking

However, in consultants' point of view, the cause of nature of construction industry are the least significant cause as compared to the others. In other words, the consultants believe the corruption practices are mainly caused by external and personal factors like regulation system and personal integrity rather than the construction industry itself. Moreover, unlike the consultants, both the developers and contractors think that the flawed regulation system does not contribute much on the corruption

practices. They may believe that the regulation system in Malaysia towards the corruption practices is adequately rigorous to deal with corruption practices in Malaysian construction industry.

Besides that, there is disagreement in opinion between the respondent groups towards the cause of nature of construction industry to the corruption practices. From the figure, the contractors rank the nature of construction industry as the most significant cause; the developers rank it at second significant; the consultants rank it as the least significant. Therefore, each respondent groups have different opinion towards the contribution of nature of construction industry to corruption practices in Malaysian construction industry.

In overall, among the top 5 significant causes of corruption practices in the construction industry, there are two causes are caused by negative encouragement and three are caused by nature of construction industry. Figure 4.1 illustrates that the ranking of the cause categories in the Malaysian construction industry is of negative encouragement and followed by nature of construction industry and flawed regulation system, with average mean of 3.721, 3.676 and 3.573 respectively.

4.7.3 Impacts of Corruption Practices

Table 4.6 contains the ranking of impacts of corruption practices in construction industry based on its mean and standard deviation value. The cost overruns, defective works and low return are perceived as the 3 most significant impacts of corruption practices towards construction industry by developers, contractors and consultants in different sequencing.

In overall, the cost overrun is considered as the major impact of corruption practices to the construction industry. The cost overruns is a primary impact of corruption practices in construction projects (Shan et al., 2017). The corruption practices often lead to significant differences between contract cost and actual cost (Zou, 2006). Corruption practices are unethical shortcut to gain profit by the unscrupulous practitioners. Thus, increase of corruption level in a construction project raise the cost of the projects which subsequently lead to overbudget. This result is proven in the research of Elinwa and Buba (1993) in Nigeria. The respondents of the research claimed that the corruption practices like fraudulent practices and kickback in the construction projects lead to high construction costs. The developers as the

funder of the construction projects often concern more on the construction spending, thus, the developers perceive that the corruption practices significantly increase the chance of cost overruns which subsequently increase the developers' expenses and reduce the profit.

Defective works are the second significant impact of corruption practices towards the construction projects. This result is supported in the research of Ahzahar et al. (2011) regarding the significant factors to building failures and defects in Malaysia. The research found that the corruption practices was ranked as third out of nine factors that contribute to building defects and failure. In order to reduce the construction cost to increase profit, the contractors are often found in performing fraudulent conducts like obtaining sub-standard materials and workmanship which result in defective works (Sohail and Cavill, 2008) and eventually shorten building's life span (Chan and Owusu, 2017). In other words, the corrupt acts can cause building failure and may lead to building cracking and collapse. If worst comes to worst, it threatens the users' life (Ambraseys, 2010). The consultants perceive that the defective works is the most significant impact of corruption practices towards construction industry. The consultants are more particular in quality of construction projects because they are responsible in designing and coordinating the specification. Thus, when contractor corrupt, consultants think that it will crucially impacts the quality of works.

Furthermore, low return is perceived as the third crucial impact of corruption practices to construction industry. Contractors who earn profit from the construction projects perceive that the low return is the most significant impacts due to corruption practices. The management of construction projects are undeniably strenuous especially in term of cost due to involvement of large amount of money and various different transaction in the projects. Sohail and Cavill (2008) stated that the corruption practices can significantly affect the cost management of the construction projects. Vague transaction in the projects result in low return as the consultants and contractors fail to retrace the spending and cause the project spending to be out of control. When the projects are overbudget, the return of developers and contractors will also be reduced. However, extra cost is incurred to rectify defective works and compensate the injury and death of workers as well as the users which are resulted from corruption practices (Kenny, 2009).

Moreover, only the consultants perceive that underdevelopment of the construction industry is one of the 3 most significant impacts of corruption practices. The construction industry has been criticised in years of its inability to innovate and adopt to modern management methods (Zou, 2006). The corruption practices undermine the development of construction industry especially when the construction projects are delayed and abandoned as well as when the project funds are misused (Damoah et al., 2018) due to corruption practices. Corrupted construction industry weakens the confidence of investors to invest in Malaysian construction industry. Therefore, this subsequently retards the development of Malaysian construction industry.

Table 4.6: Mean and Ranking of Impacts of Corruption Practices

Ref	Impacts of corruption practices	Overall (N = 112)			Developer (N = 32)			Contractor (N = 41)			Consultant (N = 39)			Chi-square	Asymptotic significance
		Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank		
S2	Cost overrun	3.946	1.122	1	3.969	1.177	1	3.878	1.077	2	4.000	1.147	2	0.736	0.692
S3	Defective works	3.884	1.046	2	3.813	1.061	2	3.683	1.192	3	4.154	0.812	1	2.994	0.224
S5	Low return	3.759	0.998	3	3.656	1.066	3	4.000	0.866	1	3.590	1.044	5	3.684	0.158
S7	Underdevelopment of construction industry	3.607	1.118	4	3.406	1.103	7	3.610	1.070	4	3.769	1.180	3	2.189	0.335
S6	Lack of productivity	3.598	1.086	5	3.500	1.218	5	3.537	1.051	5	3.744	1.019	4	0.750	0.687
S4	Project abandonment	3.482	1.170	6	3.438	1.076	6	3.439	1.184	6	3.564	1.252	6	0.485	0.785
S1	Project delay	3.473	1.223	7	3.531	1.270	4	3.366	1.135	7	3.539	1.295	7	0.811	0.667

4.7.4 Preventive Strategies

Table 4.7 ranks the preventive strategies in accordance to its significance in preventing and reducing corruption practices in Malaysian construction industry. According to Table 4.7, the enforcement of law, regulation and sanction is the most significant preventive strategy to reduce the corruption level in Malaysian construction industry.

The research study of Zou (2006) regarding the corruption preventive measures in China received a respond from interviewee which claimed that besides strengthening the management of construction organisations, the laws and regulations as well as sanctions in the construction industry is a must to prevent vulnerability to the unscrupulous practitioners to practice corruption acts. The establishment of strict sanctions are able to increase the fear of the corruptors which eventually reduce the corruption practices (Tabish and Jha, 2012). However, the construction regulations like rules in contractor selection, dispute resolution and implementation of construction must be clearly established (Sohail and Cavill, 2006). Inadequate publication of amended regulation creates vulnerabilities to unethical practitioners as it fails to gain attention of construction stakeholders towards the amendments (Nordin, Takim and Nawawi, 2011). Not only developing corruption-related laws and regulations, the existing laws and regulations should be also reviewed strictly in combating the corruption practices in the construction industry. In other hand, Nordin, Takim and Nawawi (2012) emphasised that it is crucial to ensure that the development and maintenance of the corrupted-related laws and regulations are unambiguous and understandable.

Furthermore, high integrity and honest construction culture is ranked as second significant preventive strategy to contain the corruption level in the construction industry. In order to prevent exacerbation of corruption practices, the establishment of high integrity and honest culture in construction industry is important (Zou, 2006). The construction stakeholders like construction organisations and government should establish a perception that corruption practices are not a norm to Malaysian construction industry but a prohibit crime. In order to promote ethical and high integrity construction culture, the government plays a crucial role (Nordin, Takim and Nawawi, 2012). The government on the other hand should prevent creating the culture that the unethical behaviours will not be discovered easily in order to avoid aggravation of the corruption in the construction industry. The construction organisations should

also take responsibility in developing a healthy construction culture and brainwashing the construction workers to keep away from corruption practices.

However, effective reporting channel is also one of significant preventive strategies to the corruption practices. The effective and efficient reporting systems such as independent hotline for corruption should be adopted and implemented in order to unearth the hidden corruption practices (Owusu et al., 2019). The development of well-structured whistle-blowing mechanism act as a deterrent to corruption practices as it encourages ones to report the identified and probed corrupt cases without fear (Oladinrin, Ho and Lin, 2016) and without exposing identity. The establishment of strong whistle-blower policies which protect the whistle-blowers is also important to stimulate ones' encouragement to disclose the corruption acts (Sohail and Cavill, 2008).

Moreover, audit mechanism is ranked as fourth important preventive strategy to corruption practices. The corruption crime is not obvious due to its distinct characteristic with the other criminal cases such as lack of crime scene, left-over impression and fingerprints and the involving parties are often found unwilling to reveal the truth, therefore, it is often unable to be revealed and followed up (Owusu et al., 2019). In order to discover the hidden corruption acts in the construction activities, adequate probing measures and investigation have to be implemented (Man-wai, 2006). Rigorous technical auditing on construction project must be performed to audit the construction projects documents, work done and technical specification (Sichombo et al., 2009; Zou, 2006) as well as contractual details like contract variations (Shen and Song, 1998; Sohail and Cavill, 2006). The auditors on the other hand should familiar with adequate auditing mechanisms in order to successfully uncover corruption risk and conduct (Man-wai, 2006) because it is extremely tough to one who does not understand the construction process to discover illegal activities due to the complex nature of construction (Sichombo et al., 2009).

Code of conduct is perceived as the fifth significant preventive strategy towards corruption practices in Malaysian construction industry. Code of conduct is one of the effective tools to tackle the corruption practices in the construction industry. Hosseini et al. (2019) recommended that the construction organisations including developers, consultants and contractors to establish a framework to implement and access the code of ethics in order to prevent the corruption practices in construction

projects. Enforcement of code of conduct which used to specify the standards of conduct for business and professionals can substantially reduce the number of corruption acts (Sohail and Cavill, 2008). It is an important key to prevent corruption. Sohail and Cavill (2008) further claimed that in order to strengthen the professional institution, the professionals in the construction industry should have adequate training in codes of conducts to the construction stakeholders.

Table 4.7: Mean and Ranking of Preventive Strategies of Corruption Practices

Ref	Preventive strategies	Overall (N = 112)			Developer (N = 32)			Contractor (N = 41)			Consultant (N = 39)			Chi-square	Asymptotic significance
		Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank		
P9	Enforcement of law, regulation and sanction	4.446	0.769	1	4.531	0.842	1	4.317	0.756	1	4.513	0.721	2	3.357	0.187
P3	High integrity and honest construction culture	4.366	0.880	2	4.469	1.047	2	4.122	0.900	6	4.539	0.643	1	8.135	0.017*
P7	Effective reporting channel	4.339	0.789	3	4.344	0.827	5	4.293	0.782	2	4.385	0.782	4	0.457	0.796
P2	Audit mechanism	4.304	0.826	4	4.281	0.851	6	4.244	0.767	3	4.385	0.877	5	1.433	0.488
P4	Code of conduct	4.268	0.880	5	4.375	1.129	4	4.098	0.768	7	4.359	0.743	6	6.223	0.045*
P8	Protection to whistle-blowers	4.259	0.937	6	4.375	1.070	3	4.073	0.848	10	4.359	0.903	7	5.581	0.061
P10	Rigorous supervision	4.250	0.765	7	4.219	0.792	7	4.122	0.714	5	4.410	0.785	3	4.217	0.121
P6	Adequate training system	4.143	0.957	8	4.031	1.150	9	4.098	0.831	8	4.282	0.916	8	1.788	0.409
P11	Adequacy of income level	4.116	1.011	9	4.000	0.984	10	4.195	0.843	4	4.128	1.196	10	1.329	0.515
P5	Employees selection	4.071	0.965	10	3.906	1.088	11	4.098	0.860	9	4.180	0.970	9	1.393	0.498
P1	Public disclosure	4.000	0.986	11	4.031	0.861	8	4.024	1.012	11	3.949	1.075	11	0.082	0.960

Note: *. The mean difference is significant at the 0.05 level of significant.

4.8 Kruskal-Wallis Test

Kruskal-Wallis test was used in this research through SPSS in order to find out if there are significant differences in opinion of respondent groups. The two hypotheses generated from the Kruskal-Wallis test are as follow:

1. Null hypotheses (H_0); There is no significant difference between groups.
2. Alternative hypotheses (H_1); There is significant difference between groups.

The alpha value adopted is 0.05 with degree of freedom of 2 as there are three respondent groups to be tested. Null hypotheses is rejected when the asymptotic significance value is less or equal to 0.05 which support the alternative at 95% of confidence level (Chua, 2013).

4.8.1 Causes of Corruption Practices

The Kruskal-Wallis test was adopted to compare three respondent groups' opinions towards the causes of corruption practices. The results revealed that among the total of 18 causes of corruption practices, there are statistically significant differences in intense competitive nature, lack of transparency, defective law system and culture of wrong perception across the 3 respondent groups (developers, contractors and consultants) at 95% of confidence level.

Table 4.5 contains the results of Kruskal-Wallis test on the causes of corruption. From the table, the intense competitive nature has been revealed to be statistically significant different among the developers, contractors and consultants. The heterogeneous view between the respondent groups are probably due to the competitive nature in tendering process which indirectly pressures the contractors to participate in corruption to get the works (Nordin, Takim and Nawawi, 2012). Therefore, the contractors rank it as one of the significant causes of corruption as it influences the contractors. The developers on the other hand, do not affected much by the intense competitive nature especially during the tendering stage. Therefore, there are some developers do not see the intense competitive nature as one of the significant causes to corruption practices.

Lack of transparency is also found statistically different across the opinion of developers, contractors and consultants. According to the mean ranking, only contractors rank the lack of transparency as the third significant cause of corruption while both developers and consultants rank it at 11^{th} place. This massive difference on

the ranking further support that the opinion between the respondent groups are significantly different towards the significance of lack of transparency as a cause towards the corruption practices. It is unsurprising that the contractors perceive that lack of transparency as one of the most significant causes of corruption. This is because in perception of contractors, the nature of construction industry is the main contributor to the corruption practices in construction industry.

Furthermore, the results show that the opinion across the respondent groups are statistically significant different towards the defective law system as a cause of corruption. From the table established earlier in mean ranking, both contractors and developers rank the defective law systems at the least significant cause while only consultants rank it at 12nd place. The divergent thought is probably due to different perception towards the law system in the construction field. The consultants are the stakeholders who responsible in drafting and preparing the contracts between the project parties as well as providing some basic legal suggestions or consultations during the progress of work. Thus, the consultants may be more particular in law system than the developers and contractors and perceive that the defective law system create vulnerability to corruption in Malaysian construction industry.

Last but not least, the respondent groups are also found having statistically different thought to the culture of wrong perception. There is contrasting ranking of culture of wrong perception between the respondent groups. The developers rank the cause at 14th; the contractors rank it at 7th; and the consultants at 12nd. Each organisation is bound by its culture, thus, the individuality and actions of the workers are collectively influenced by the organisation culture (Cheung, Wong and Wu, 2011). The developers, contractors and consultants may have different insight towards the corruption culture in the organisation. There are some construction stakeholders think that the corruption is a culture while some perceive that it is a crime.

4.8.2 Impacts of Corruption Practices

The Kruskal-Wallis test is also adopted to compare the respondent groups' opinions towards the impacts of corruption practices. Table 4.6 shows the outcomes of Kruskal-Wallis test on the impacts of corruption practices in construction industry. The readings shown that there are no major differences in terms of perceptions across the developers, contractors and consultants regarding the impacts of corruption practices

in the Malaysian construction industry. As all the significance value as shown in Table 4.6 are of greater than 0.05, the null hypotheses are accepted which indicate that with 95% of confidence level, there are no significant difference in perception between the developers, contractors and consultants.

4.8.3 Preventive Strategies

The Kruskal-Wallis test is also adopted to compare 3 respondent groups' opinions towards the preventive strategies of corruption practices. The results revealed that among the total of 11 preventive strategies, the effective reporting channel and audit mechanisms are statistically significant different in term of perception by developers, contractors and consultants at 95% of confidence level.

Table 4.7 summarises the results of Kruskal-Wallis test on the preventive strategies towards the corruption practices. The high integrity and honest construction culture are found significantly different among the developers, contractors and consultants. Both the developers and consultants rank in as top 3 significant preventive strategy while the contractors rank it at only 6th. The culture in construction industry does not devise overnight, it is influenced by the individuals, professions, procedures and law system (Bröchner, Josephson and Kadefors, 2002) over a period of time. The corruption practices have been existing a long period of time, hence, the culture in construction industry is difficult to be shaped in honest and high integrity in short period of time. Therefore, there are different perception by the respondents towards the efficiency of high integrity and honest construction culture as an effective and efficient prevention strategy to the corruption practices.

Furthermore, there is significant difference in the code of conduct between the respondent groups. Table 4.7 shown that the contractors have a mean of 4.098 which is relatively low as compared with developers (mean = 4.375) and consultants (mean = 4.359). This massive differences on the mean support that there are significantly differences in perception of the respondent groups on the significance of code of conduct to prevent corruption in construction industry. There are distinct code of conduct to each profession (Abdul-rahman, Wang and Yap, 2010). Therefore, each profession may interpret their code of conduct differently in their works. Some project stakeholders may perceive that the code of conduct is significant to a profession, some may think that it is just for procedure purpose.

4.9 One-Sample T-test

The one sample t-test was employed in this research to assess the significance of variables (Yap and Skitmore, 2018). In one sample t-test, a variable with significance value lower than 0.05 is perceived as the significant variable to the research (Yap et al., 2018).

Table 4.8, 4.9 and 4.10 manifest the results of one sample t-test. The significance value for each variable is recorded at test value of 3. The significance value of causes, impacts and preventive strategies of corruption practices as shown in the tables are all lower than 0.05 at confidence level of 95%. In other words, the 18 causes of corruption practices, 7 impacts of corruption practices and 11 preventive strategies are significant to this research but however, it contains 5% of error which probably due to human-caused error.

Table 4.8: One-Sample T-test on Causes of Corruption Practices

Mean rank	Causes of corruption practices	Test value = 3	
		t-value	Significance (2-tailed)
Nature of construction industry			
2	Relationship among the parties	10.352	0.000**
4	Intense competitive nature	8.707	0.000**
5	Large amount of money	8.163	0.000**
6	Lack of transparency	7.981	0.000**
13	Concealing of works	5.632	0.000**
14	Fragmentation of construction process	3.883	0.000**
16	Complexity nature	3.311	0.001*
Flawed regulation system			
7	Lack of rigorous supervision	8.437	0.000**
8	Inadequate sanction	8.248	0.000**
11	Multifarious licenses or permits	6.431	0.000**
14	Lack of research	3.883	0.000**
17	Defective law system	3.467	0.001*
Negative encouragement			
1	Personal greed towards money	12.169	0.000**
3	Lack of ethical standard	8.512	0.000**
9	Negative leader role	6.757	0.000**
10	Low income level	6.400	0.000**
12	Culture of wrong perception	6.207	0.000**
18	Shortage of skill	2.214	0.029*

Note: **. The mean is significant at the 0.01 level of significant.
*. The mean is significant at the 0.05 level of significant.

Table 4.9: One-Sample T-test on Impacts of Corruption Practices

Mean rank	Impacts of corruption practices	Test value = 3	
		t-value	Significance (2-tailed)
1	Cost overrun	8.929	0.000**
2	Defective works	8.942	0.000**
3	Low return	8.050	0.000**
4	Underdevelopment of construction industry	5.748	0.000**
5	Lack of productivity	5.829	0.000**
6	Project abandonment	4.361	0.000**
7	Project delay	4.096	0.000**

Note: **. The mean is significant at the 0.01 level of significant.

Table 4.10: One-Sample T-test on Preventive Strategies of Corruption Practices

Mean rank	Preventive strategies	Test value = 3	
		t-value	Significance (2-tailed)
1	Enforcement of law, regulation and sanction	19.900	0.000**
2	High integrity and honest construction culture	16.425	0.000**
3	Effective reporting channel	17.963	0.000**
4	Audit mechanism	16.708	0.000**
5	Code of conduct	15.247	0.000**
6	Protection to whistle-blowers	14.216	0.000**
7	Rigorous supervision	17.287	0.000**
8	Adequate training system	12.635	0.000**
9	Adequacy of income level	11.681	0.000**
10	Employees selection	11.747	0.000**
11	Public disclosure	10.729	0.000**

Note: **. The mean is significant at the 0.01 level of significant.

4.10 Spearman's Correlation Test

Spearman's correlation test was utilised in this research to investigate the statistical relationships between the causes of corruption practices and the preventive strategies. Table 4.11 presents the results of the Spearman's correlation test. Each of the causes was found correlated with at least 5 potential preventive strategies. The complexity nature (A2), concealing of works (A6) and shortage of skill (C5) had the least relationship with the preventive strategies. These causes may need to take more attention in future studies.

The audit mechanism was found as one of the most effective preventive strategies with the greatest number of significant correlations (18). Audit mechanisms involve thorough investigation and examination of the documents of an organisation including the supplier order, order procedures and site instruction (Hartley, 2009). The

technical auditing and financial auditing are needed to be introduced and promoted in the projects in order to prevent the aggravation of corruption and engender the high ethical standard of conduct in construction industry (Sichombo et al., 2009). The audit mechanisms had successfully unearthed several corruption cases in construction industry. As in, one third of combined projects amount of few Chinese highway construction projects were found embezzled of the officials (Kenny, 2007) and the village chiefs who oversee the projects were caught orchestrating the materials theft in road construction project in Indonesia (Olken, 2007) through auditing. The significance of audit mechanisms in combating the corruption practices in construction industry was also emphasised in the research of Owusu et al. (2019) which the audit systems obtained the ranking of 4th out of 39 anti-corruption measures. Thus, the audit systems internally and externally in construction organisations were considered as one of the most effective preventive measures (Gunduz and Önder, 2013) which could reduce the corruption level in construction industry (Olken, 2007).

Besides that, the code of conduct was also found significantly correlated with the causes of corruption with significant correlation number of 18. Due to the distinct nature of construction industry, the behaviours of individual are often difficult to be monitored. Therefore, the introduction of the codes of conduct to construction industry is extremely significant in order to contain the corruption level (Bowen et al., 2007). An organisation without proper establishment and enforcement of ethical code of conduct is susceptible to corruption (Sohail and Cavill, 2008) and lack of ethic among the professionals results in exacerbation of corruption practices in construction industry (Zou, 2006). The study of Owusu et al. (2019) also revealed that most of the research regarding the corruption practices in construction industry emphasised the significance of ethical code as an anti-corruption measure in construction industry. The integration of ethical code of conduct to the construction industry is found to be successful in decreasing the unethical practices and subsequently result in high productivity for the construction industry as a whole (Hartley, 2009).

Furthermore, the public disclosure is significantly correlated with majority of the causes of corruption at number of significant correlations of 17. The privatised construction process can be prone to corruption practices, thus, increasing the transparency in construction process is important to promote high integrity, high clarity of responsibilities, disclosure of projects information and budget preparation

publicly (Kenny, 2009) which subsequently contain the corruption level in the construction industry. Public disclosure allow the construction industry to improve the accountability and level of transparency of the construction projects (Goldie-Scot, 2008). Transparency is essential in conducting construction works as it helps to cease the unethical intention of unscrupulous individual towards the corruption in construction industry. For instance, Bowen, Edwards and Cattell (2012) opined that when there were transparent procurement processes in construction projects, the impacts of corruption practices such as nepotism and unnecessary political influences would be reduced.

There are a total of 198 numbers of relationships between the causes of corruption practices and preventive strategies, 38% of the relationship were found having medium strength of relationship and 44% were having small strength of relationship in accordance to the guidance from Cohen (1988). This result also shown that the enforcement of law, regulation and sanction (P9) are significantly correlated with personal greed towards money (C1).

However, in this research, personal greed towards money was ranked at first place in overall as the root causes of corruption in perception of Malaysian construction practitioners which should be resolved to reduce the corruption level. Due to existence of strong relationship, it could be believed that the enforcement of law, regulation and sanctions could deal the cause more effectively as compared to other preventive strategies. According to Tunley (2011), low detection and prosecution risk create vulnerabilities and motivation to the unethical individuals to participate in corruption. Risk of detection and severity of the punishment can affect the decision of the corruptors. The strictly enforced law system and sanctions are able to increase the fear of the corruptors and reduce corruption practices (Tabish and Jha, 2012). Besides that, a competent regulation system in construction industry provide guidelines to the construction practitioners to which the extend they can reach or to which activities they shall avoid to prevent involving in lawsuit case. The same preventive strategy was ranked as the most significant preventive strategy towards corruption practices in construction industry.

Table 4.11: Correlation between Causes and Preventive Strategies of Corruption Practices

Causes \ Preventive strategies	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	Total number of significant correlations
A1	0.267**	0.244*	0.326**	0.315**	-	-	-	0.224*	0.316**	0.195*	0.187*	8
A2	-	0.194*	0.290**	0.325**	-	-	-	-	0.199*	0.197*	-	5
A3	0.297**	0.260**	0.308**	0.310**	-	0.203*	0.260**	0.265**	0.332**	0.324**	0.210*	10
A4	0.204*	0.216*	0.264**	0.213*	-	-	0.283**	0.192*	0.198*	0.203*	0.280**	9
A5	0.218*	0.201*	0.333**	0.208*	-	-	0.231*	0.198*	0.330**	0.251**	0.204*	9
A6	0.202*	0.254**	0.256**	0.282**	-	-	-	-	0.264**	0.291**	-	6
A7	0.378**	0.373**	0.354**	0.351**	0.216*	0.389**	0.328**	0.284**	0.356**	0.332**	0.264**	11
B1	0.302**	0.232*	0.257**	0.187*	-	0.297**	0.191*	0.232*	-	0.262**	-	8
B2	0.243**	0.287**	0.482**	0.482**	-	0.236*	0.302**	0.263**	0.314**	0.282**	-	9
B3	0.481**	0.456**	0.464**	0.465**	0.243**	0.355**	0.394**	0.381**	0.459**	0.459**	0.266**	11
B4	0.350**	0.260**	0.358**	0.329**	-	0.269**	0.271**	0.262**	0.322**	0.361**	0.204*	10
B5	0.389**	0.313**	0.294**	0.392**	0.378**	0.459**	0.281**	0.225*	0.307**	0.391**	0.323**	11
C1	0.365**	0.450**	0.407**	0.453**	0.237*	0.302**	0.456**	0.464**	0.541**	0.406**	0.228*	11
C2	0.347**	0.209*	0.287**	0.273**	-	0.250*	0.287**	0.288**	0,291**	0.225*	0.411**	10
C3	0.266**	0.241*	-	0.215*	0.214*	0.250**	0.208*	-	0.215*	-	0.218*	8
C4	0.351**	0.353**	0.356**	0.387**	0.245**	0.320**	0.348**	0.319**	0.373**	0.302**	0.327**	11
C5	0.353**	0.191*	-	0.189*	0.297**	0.302**	0.234*	-	-	-	-	6
C6	0.348**	0.359**	0.388**	0.433**	0.265**	0.313**	0.262**	0.334**	0.351**	0.352**	-	10
Total number of significant correlations	17	18	16	18	8	13	15	14	16	16	12	

Note: **. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Note to Table 4.11:

A1 - Fragmentation of construction process; A2 - Complexity nature; A3 - Large amount of money; A4 - Intense competitive nature; A5 - Lack of transparency; A6 - Concealing of works; A7 - Relationship among the parties; B1 - Defective law system; B2 - Lack of rigorous supervision; B3 - Inadequate sanction; B4 - Multifarious licenses or permits; B5 - Lack of research; C1 - Personal greed towards money; C2 - Low income level; C3 - Culture of wrong perception; C4 - Negative leader role; C5 - Shortage of skill; C6 - Lack of ethical standard.

P1 - Public disclosure; P2 - Audit mechanism; P3 - High integrity and honest construction culture; P4 - Code of conduct; P5 - Employees selection; P6 - Adequate training system; P7 - Effective reporting channel; P8 - Protection to whistle-blowers; P9 - Enforcement of law, regulation and sanction; P10 - Rigorous supervision; P11 - Adequacy of income level.

4.11 Factor Analysis

Factor analysis is mainly used for data reduction and summarisation (Pallant, 2005). The interrelationships among a large number of variables are examined and the numbers of the variables are reduced to a manageable level for better interpretation (Doloi, 2008). In this research, it was adopted to explore the principal groupings of 18 causes of corruption practices in Malaysian construction

4.11.1 Analysis Considerations

Prior the application of the factor analysis, it is important to investigate the suitability of data in this research, thus, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity are employed (Doloi et al., 2012). Table 4.12 represents the results of KMO and Bartlett's tests.

Table 4.12: Results of KMO and Bartlett's Tests

Parameter	Value
Kaiser-Meyer-Olkin measure of sampling adequacy	0.888
Bartlett's test of sphericity	
Approximate chi-square	1153.892
Degree of freedom	153
Significance	0.000

The KMO value for the 18 causes as shown in Table 4.12 is at 0.888, exceeding the recommended value of 0.50 (Field, 2013). Besides that, the Bartlett's test result is at 1153.8 with a significance value of 0.000. The Bartlett's test reached statistical significance as the obtained significance value was lower than 0.05. This supported the factorability of correlation matrix (Pallant, 2005) which indicated the variables were inter-correlated and the underlying factors were able to be identified. Hence, the parameters verified the adequacy of application of factor analysis in this research.

Both the eigenvalues and percentage of variance approach were adopted in this analysis to determine the number of underlying factors for 18 causes of corruption practices in Malaysian construction industry (Le-Hoai, Lee and Lee, 2008). The principal components analysis (PCA) shown that there are 4 components with eigenvalues greater than 1.0 as in Table 4.13 and eigenvalues smaller than 1.0 were not presented. The scree plot in Figure 4.2 manifests that the 18 causes were analysed and 4 significant factors were extracted. The four components cumulatively explained

a total of 67.5% of variance as shown in Figure 4.3. However, according to (Field, 2013), the extracted variance should be at least equal or larger than 60.0% for the analysis less than 30 factors. This justified the reliability of the outcomes of factor analysis in this research. All the 18 variables were extracted under four components with the factor loadings larger than 0.50 as in Figure 4.3 which indicated that the variables are practically significant (Hair et al., 2010).

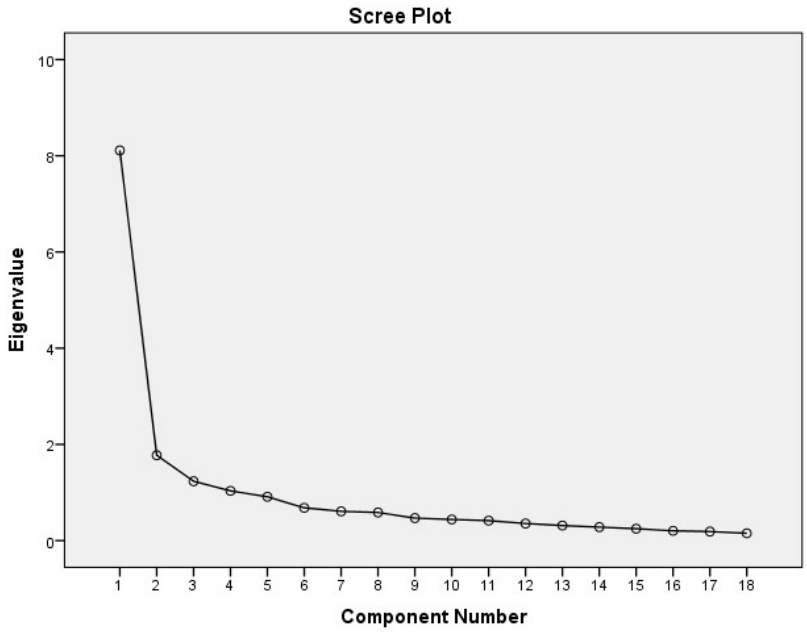

Figure 4.2: Scree Plot for 18 Items

Table 4.13: Total Variance Explained

	Initial eigenvalues		
	Total	Percentage of variance	Cumulative (%)
F1	8.111	45.062	45.062
F2	1.774	9.858	54.920
F3	1.234	6.857	61.777
F4	1.034	5.742	67.519

Figure 4.3 summarises the four underlying factors with the variance explained and factor loading for each attribute. The label of the underlying factor is assigned according to the variables with higher factor loadings or a whole set of variable (Hair et al., 2010).

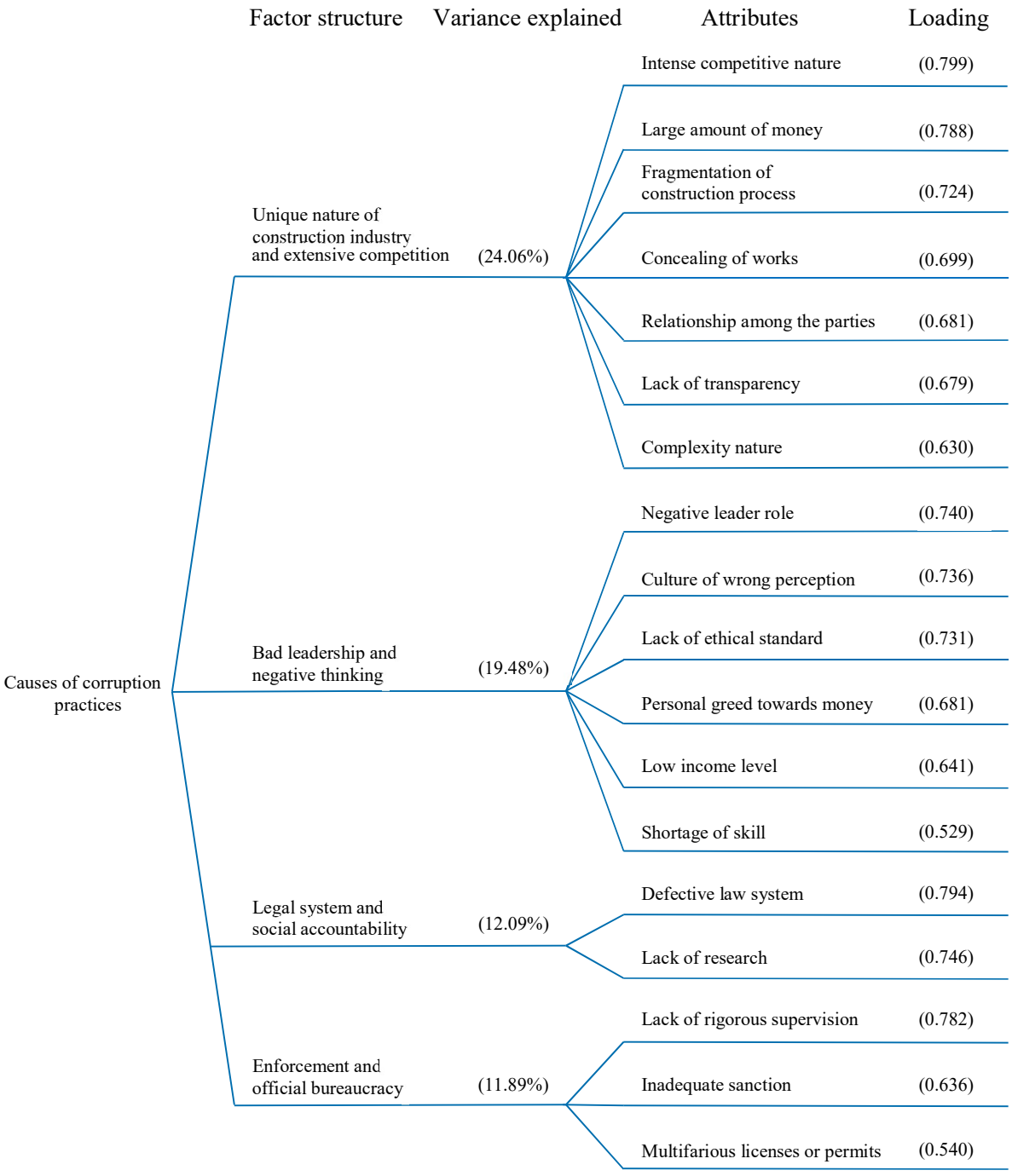

Figure 4.3: Factor Profile of Causes of Corruption Practices

4.11.2 Extraction of Underlying Factors

Factor 1: Unique Nature of Construction Industry and Extensive Competition

Factor 1 accounts for 24.06% of the total variance explained. Besides that, the nature of construction industry is distinctive with other industries. The nature itself render the construction industry to be susceptible to corruption (Bowen, Edwards and Cattell, 2012). It comprises of large amount of money, fragmentation process, concealing works, close relationship of parties, lack of transparency and complexity nature. The construction projects are prone to corruption as it involves large flow of money (Zhang et al., 2017) and fragmented process with large number of project stakeholders in complex contractual structure (Takim, Shaari and Nordin, 2013) which leads to different psychological behaviour and attitude that incline towards corruption (Stansbury, 2005; Nordin, Takim and Nawawi, 2012). Overclose relationships among the project stakeholders can trigger collusion which increase difficulties in project management task (Le et al., 2014a). The construction project is prone to corruption due to its privatised process, thus, the practices of publicising the projects are necessary to allow the process of handling projects fund to be transparent (Sohail and Cavill, 2006). Furthermore, concealable construction works allow the works to be done defectively by the contractors (Stansbury, 2005) for private gain.

Extensive competition involves in the tendering process escalate the corruption rate. Despite the competitive tendering practice improve the effectiveness of construction investment (Shen and Song, 1998), such nature results in bid rigging where the contractors decide and organise the bid among themselves (Sohail and Cavill, 2006). Studies by Bowen, Edwards and Cattell (2012) also found that the suppliers intentionally engaged in collusive tendering among the 'approved' members to confer the competitive advantage. Such competitive tendering approaches should be set up with a number of regulations in order to improve effectiveness of construction industry (Shen and Song, 1998) and safeguard the owners' benefit in obtaining competitive price in the development projects.

Factor 2: Bad Leadership and Negative Thinking

Factor 2 is accountable for 19.48% of the total variance explained. The top executive leadership is believed to has significant influences towards the rate of corruption in construction projects (Tabish and Jha, 2012). Engagement of leaders in the corruption

indirectly encourage the subordinates to participate in corruption (Le et al., 2014a). The existence of inadequate trained leaders also results in corruption practices in the construction industry (Sohail and Cavill, 2006) especially when the leaders are lack of construction knowledge which provide vulnerabilities to the unethical practitioners to provide substandard works. An incompetent leader fails to aware the occurrence of corruption among the projects stakeholders (Le et al., 2014a). Besides coordinating the subordinates, leaders in all organisations act as a role model to shape ethical culture and build morale among the subordinates. Therefore, the selection of leaders is extremely important in directing the organisation to combat against the corrupt practices (Mumford et al., 2003). A good leaders act honestly, praise the subordinate for working honestly, emphasise on anti-corruption issues and provide help to subordinates to perform honestly (Tabish and Jha, 2012).

Moreover, the way of thinking towards the corruption perception, ethical standard, income level and skills influence the behaviours of individuals to corruption. Negative thinking in term of perception increase the corruption rate in construction industry. The study of Čábelková and Hanousek (2004) found that the individuals are more probably to corrupt when the individuals perceive the corruption wrongly such as corruption is a must and common practice as well as not a crime. This culture is slowly developed into a pillar of culture to commit corruption. Lack of ethical standard among the professionals leads to immoral and indiscipline behaviour which exacerbate the corruption in construction industry (Olusegun et al., 2011) as they fail to aware the significance to uphold the integrity in their works. This situation is aggravated when there are low wage level and increase of poverty (Nordin, Takim and Nawawi, 2011) which engender greed towards money and urge the low integrity personnel to corrupt. Poor skills within the construction industry create a fertile environment towards corruption (Bowen, Edwards and Cattell, 2012) as the personnel do not obtain adequate education and training to perform the works ethically and honestly.

Factor 3: Legal System and Social Accountability

Factor 3 accounts for 12.09% of the total variance explained. Legal system acts as proper guidelines and provides orders upon the behaviours in order to retain equity, create and maintain fair and honest environment among the society. One of the sources of corruption in construction industry is found due to flawed legal systems (Le et al.,

2014a). Corruption can happen when the regulatory systems which guide the execution of activities and projects in both private and public sector is flawed (Owusu, Chan and Shan, 2017). The defective law systems as in over systems and ambiguous systems can be circumvented easily by unethical stakeholders (Nordin, Takim and Nawawi, 2011). Over regulation systems results in excessive requirements and later leads to misinterpretation of the laws (Nordin, Takim and Nawawi, 2011) and vague regulation systems allow wide discretion in interpreting the meaning of laws (Thim and Zonggui, 2004). However, the terms of punishment can be commuted easily by offering bribe to the officials in the event that the corruptors are arrested for their malpractice. Therefore, the legal system in defeating the corruption practices in construction industry should be maturely developed. The effective rules and regulation are considered as one of the most significant anti-corruption strategies (Tabish and Jha, 2012).

Furthermore, research is defined as a scientific and systematic search for relevant knowledge and information on particular topic to gain new insights (Kothari, 2004). Development of research increase social accountability towards the corruption practices in the construction sector. Strict law system incorporates with high social accountability allow the corrupt practices in construction projects to be prevented and reduced more effectively. However, the research on corruption in construction industry have been understudied and underdeveloped (Sohail and Cavill, 2006) especially in Malaysian construction industry and therefore, the social fail to aware the impact of corruption and significance to combat with corruption. Hence, new areas for research on corruption in construction industry are suggested in order to enhance social accountability towards corruption in construction industry.

Factor 4: Enforcement and Official Bureaucracy

Other than legal system in controlling the corruption in construction industry, enforcement in term of supervision and sanction is a further considerable issue. Lack of rigorous supervision had been proven as one of the most significant contributing factors to the corruption practices in the Chinese public construction sector (Le et al., 2014a). Zhang et al. (2017) explained that lack of supervision in construction projects is sometimes due to the consolidation of departments of supervision and others in organisation. Thus, the importance of supervision to combat the corruption in

construction projects is often overlooked. However, corrupted leaders often overlook the supervision in construction projects (Li et al., 2013) and such leaders will usually reject to disclose the corruption in the team. In addition, lack of punishment towards the corruptors was found as one of primary causes of corruption in construction industry (Bowen, Edwards and Cattell, 2012). Due to vague law systems, some corruptors are prosecuted lightly (Zou, 2006) and there are only limited suspects receive adequate sanctions for their misconduct (He, 2000). Thus, the enforcement of sanctions is extremely important to provide harsh punishment and penalty as well as generate fear of punishment to the corruptors (Tabish and Jha, 2012).

Besides that, the construction organisations have to deal with the official bureaucracy prior commencing the business operation. The official bureaucracy as in licences and permits for development and construction are important to maintain the positive industrial climate within the construction industry. There are several different licenses and permits must be obtained to start operations or projects. However, due to existence of multifarious permits and licences, the construction industry is prone to corruption (Le et al., 2014a). Some of the construction organisations reported themselves to be more likely to bribe in order to obtain licences and permits for business operation (Kenny, 2009). Low accessibility of information about guidance in obtaining relevant licenses and permits complicates the procedure of application (Neelankavil, 2002). Hence, the complication and slow-paced processes in obtaining the licenses and permits trigger the unethical practitioners to offer bribe to the officials in order to accelerate the procedures (Tanzi, 1998).

4.12 Conclusion

The results were generated based on the data collected from 112 construction stakeholders in Malaysian construction industry within Klang Valley area. The overall response rate in this research was at 40.0%. The data was tested through Cronbach's alpha reliability test, mean ranking, Kruskal-Wallis test, one sample t-test, Spearman's correlation test and factor analysis. The result in reliability test shown that the data collected in this research were reliable. Kruskal-Wallis analysis manifested that there were significant differences in perception between the respondent groups on the causes and preventive strategies of the corruption practices in construction projects. Moreover, factor analysis was applied and successfully identified 4 underlying factors (unique

nature of construction industry and extensive competition; bad leadership and negative thinking; legal system and social accountability; and enforcement and official bureaucracy) from 18 causes of corruption practices. Meanwhile, the 5 most significant causes of corruption practices in construction industry were (1) personal greed towards money; (2) relationship among the parties; (3) lack of ethical standard; (4) intense competitive nature; and (5) large amount of money. On the other hand, cost overrun; defective works; and low return were perceived as top 3 impacts of corruption in construction industry. Nevertheless, the top 5 potential preventive strategies were obtained including (1) enforcement of law, regulation and sanction; (2) high integrity and honest construction culture; (3) effective reporting channel; (4) audit mechanism; and (5) code of conduct. Spearman's correlations test revealed that there were significant relationships between the causes and preventive strategies of corruption practices in construction industry.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the findings of the study will be concluded and summarised based on the aim and objectives established early in the research. The research implication is highlighted in this chapter. The limitations of this study in conjunction with recommendations for further improvement in future studies are discussed at the end of the chapter to enhance the comprehensiveness of the studies towards corruption practices in the Malaysian construction industry.

5.2 Conclusion

Construction industry is crucial for national development of a country. It is a dispensable industry in Malaysia because it acts as an economic investment and contributes to economic growth. However, the Malaysian construction industry is plagued with corruption practices which create negative consequences. It undermines the contribution of construction industry towards Malaysia development. Therefore, research regarding the corruption in the construction industry is important to increase the awareness of the construction stakeholders as well as the society towards the corruption practices in the construction industry.

This study was carried out to access the perception of construction stakeholders to the corruption in the Malaysian construction industry with an aim to rectify such corrupt practices. It is also to increase the awareness of construction stakeholders towards the corruption in the Malaysian construction industry. Both the construction stakeholders and society can better understand the corruption practices in the construction industry and make efforts to contain the level of corruption. The objectives were outlined early in the research as in: (1) to examine the causes of the corruption practices, (2) to access the impacts of the corruption practices and (3) to explore the preventive strategies for the corruption practices of the Malaysian construction industry.

Literature review related to corruption practices in the construction industry had been conducted and successfully identified 18 causes of corruption practices, 7

impacts of corruption practices and 11 preventive strategies towards the Malaysian construction industry. A total of 112 responses were collected from construction stakeholders in varied backgrounds through questionnaire survey. The reliability of data collected were verified through Cronbach's alpha reliability test prior further analysis and interpretation. Besides that, the established objectives were fulfilled in this research and summarised as follows:

Objective 1:

The respondents were asked to place their level of agreement towards the causes of corruption practices in the construction industry. The five most significant causes of corruption practices in construction projects in Malaysia were revealed as: (1) personal greed towards money; (2) relationship among the parties; (3) lack of ethical standard; (4) intense competitive nature; and (5) large amount of money. The defective law system and shortage of skills in the construction industry were perceived as least significant causes of corruption by the construction stakeholders in Malaysia. However, in overall, the negative encouragement was perceived as the main contributor to the corruption in the Malaysian construction industry and was followed by nature of construction industry and flawed regulation system. Besides that, there was considerable heterogeneity of opinions among the respondent groups on causes of corruption (e.g. intense competitive nature, lack of transparency, defective law system and culture of wrong perception) which were attributed by distinct background within the construction industry.

Besides that, the 18 causes of corruption were further analysed with factor analysis and four underlying factors that explained the causes were discovered. The four underlying factors included unique nature of construction industry and extensive competition; bad leadership and negative thinking; legal system and social accountability; and enforcement and official bureaucracy. The manifested underlying factors help to expand the existing knowledge of the causes of corruption practices in the construction industry and provide deeper insights to develop effective preventive strategies to prevent exacerbation of corruption.

Objective 2:

Furthermore, the respondents were requested to select level agreement on the impacts of corruption practices in Malaysian construction industry. The findings revealed that (1) cost overrun; (2) defective works; and (3) low return as the three most agreed impacts of corruption by the construction stakeholders in the Malaysian construction industry. Project delay was ranked as the least important impacts. The corruption in the construction projects mainly influence the money matter in the projects, therefore, the project duration is unlikely to be affected by corruption. However, the analysis revealed that the respondent groups were having homogeneous perception on the impacts of corruption in the Malaysian construction industry.

Objective 3:

The preventive strategies were explored and ranked in the research. The top five significant preventive strategies as perceived by the construction stakeholders in Malaysia were (1) enforcement of law, regulation and sanction; (2) high integrity and honest construction culture; (3) effective reporting channel; (4) audit mechanism; and (5) code of conduct. However, the analysis also revealed that there were significant differences in perception of the preventive strategies (e.g. high integrity and honest construction culture; and code of conduct) by the respondent groups. Such differences were caused by divergent culture and practices by the respondent groups in the construction projects.

Moreover, Spearman's correlation test disclosed the strength of relationship between the preventive strategies and causes of corruption practices. Among all the relationship, audit mechanism; code of conduct; and public disclosure were considered as the most effective strategies to prevent corruption in construction projects because these strategies had great number of correlations with the causes of corruption as compared to other strategies. Nevertheless, the causes like complexity nature, concealing of works and shortage of skills had the least relationship with the preventive strategies. These causes may need to take more attention in future studies.

5.3 Research Implication

The study is essential as it furnishes better understanding of the corruption as well as the forms of corruption exist in the construction industry. It pinpoints the significant

causes and impacts contributing to the corruption in the construction industry. Particularly, it is extremely significant to understand the corruption as well as assess and examine the sources and effects of the corruption to the construction industry in order to provide effective and efficient preventive strategies. The findings provide useful information to the stakeholders and society on the way to prevent and combat the corruption practices in the construction industry. It is crucial to minimise high level of corruption in the construction industry (Kenny, 2009) as it influences the development of the construction industry (Damoah et al., 2018) and the project performance such as time, cost and quality.

The identification of both the causes and impacts of corruption in the construction industry can help shed light on how the organisations, industry and government can bring down the corruption level in the construction projects. The findings found that the respondents in the research perceived the personal factors as the major contributor to the corruption in the construction industry. It is followed by the industrial factors and regulatory factors. Hence, the organisation, industry and government are suggested to rectify the negative thinking of the construction stakeholders which stimulate the corruption by motivating them to keep away from committing corrupt acts through establishing high integrity and honest culture as well as enforcing code of conduct in order to prevent occurrence of corruption in the construction projects. Enforcement of law, regulations and sanctions, reporting channel and audit mechanism are also found as the most significant preventive strategies which are able to improve the low risk of detection (Sohail and Cavill, 2008) and generate fears among the construction stakeholders (Tabish and Jha, 2012). The research is beneficial because it creates the awareness of the construction stakeholders as well as the society concerning the importance in containing the corruption practices in the Malaysian construction industry to a minimum level.

5.4 Limitations of Research

The research findings were confronted with several limitations. The sampling in the research were limited in Klang Valley area. Subsequently, the outcomes of the research might not be truly represented the whole Malaysian construction industry. The comprehension by construction practitioners towards the corruption practices in construction industry may be divergent across the regions within the country. The

limitation of the research included also the insufficient sample size to represent the whole Malaysian construction industry. Due to sensitivity of the research area, there were some targeted respondents refused to answer the survey. Eventually, this led to low amount of the responds obtained within stipulated period.

Moreover, the data obtained from the samples were in unbalanced perception by different groups of personnel such as working experiences, academic qualification, income level and nature of project involved. For instance, majority of the data were obtained from private sector. Therefore, the results obtained from the research might insufficiently manifest the public sector. However, the research study had only focused on the perception of developers, contractors and consultants and the significance of the suppliers' responses is overlooked. The involvement of suppliers in the research is able to furnish different useful information to the research and examine the nature of corruption practices in the construction industry thoroughly.

Despite the study is significant in minimising the corruption in the construction industry, this research study will only focus in several area in term of causes, impacts and preventive strategies of the corruption practices in construction industry due to time and financial constraints which limit the exploration of the nature of corruption practices in detail. Besides that, the research regarding the corruption practices in Malaysian construction industry are still under-developed. This led to difficulty in sourcing the information during the research. There is limited information available within domestic construction industry concerning the corruption practices and the information obtained in the research were mostly from foreign construction industry. This may not well reflect the current situation in the Malaysian construction industry in respect of the corruption.

5.5 Recommendations

The sampling is recommended to be obtained across the regions in Malaysia to accurately represent the whole Malaysian construction industry. Furthermore, the sample size should be increased in future studies in order to conclude a valid research result. Large sample size is to ensure that the sample is well represent the construction practitioners in Malaysia and the results of the research are able to be generalised to the whole Malaysian construction industry. Conversely, small sample size will increase the difficulty in identifying the significant relationships from the data. It is

also important to ensure that the questionnaires are answered equally by all the respondent groups in order to obtain comprehensive perception towards the corruption practices in the Malaysian construction industry. The respondents of the questionnaire should also include the suppliers in order to allow wide perspective towards the corruption practices in the construction industry.

Besides that, in order to reflect the real situation of corruption practices in the Malaysian construction industry, the mixed-methods research design should be employed to incorporate the qualitative research method with the quantitative method in future studies. Due to sensitivity nature of the research area, it is helpful to undergo qualitative research to justify if the data obtained from questionnaire survey are reliable. Furthermore, in-depth case study will be beneficial to comprehend the nature of corruption practices in the construction industry and provide new insights to the research area. It can help to provide triangulation (e.g. case study, interview findings and questionnaire responses) to improve the validity and reliability of the study.

However, more researches concerning the corruption are recommended in the Malaysian construction industry. It is to ensure that the studies on the corruption practices are carried out thoroughly. It would be interesting to extend this research to investigate the frequency of occurrence of different type of corrupt practices in the Malaysian construction industry. It is also suggested that the future research to identify new vulnerabilities exist in the Malaysian construction industry which stimulate the corruption. In addition, future research about the barriers hindering the implementation of anti-corruption practices in the Malaysian construction industry are recommended.

REFERENCES

Abdul-rahman, H., Wang, C. and Yap, X.W., 2010. How professional ethics impact construction quality: Perception and evidence in a fast developing economy. *Scientific Research and Essays*, 5(23), pp.3742–3749.

Adigüzel, F. and Wedel, M., 2008. Split questionnaire design for massive surveys. *Journal of Marketing Research*, 45(5), pp.608–617.

Ahzahar, N., Karim, N.A., Hassan, S.H. and Eman, J., 2011. A study of contribution factors to building failures and defects in construction industry. *Procedia Engineering*, 20, pp.249–255.

Aksorn, T. and Hadikusumo, B.H.W., 2008. Critical success factors influencing safety program performance in Thai construction projects. *Safety Science*, 46(4), pp.709–727.

Alutu, O.E., 2007. Unethical practices in Nigerian construction industry: prospective engineers' viewpoint. *Journal of Professional Issues in Engineering Education and Practice*, 133(2), pp.84–88.

Ambraseys, N., 2010. A note on transparency and loss of life Arising from earthquakes. *Journal of Seismology and Earthquake Engineering*, 12(3), pp.83–88.

Ameh, O.J. and Odusami, K.T., 2010. Professionals ' ambivalence toward ethics in the Nigerian construction industry. *Journal of Professional issues in Engineering Education and Practice*, 136(1), pp.9–16.

Ameyaw, E.E., Pam, E., Chan, A.P.C., Owusu-Manu, D.G., Edwards, D.J. and Darko, A., 2017. Corrupt practices in the construction industry: A survey of Ghanaian experience. *Journal of Management in Engineering*, 33(6), pp.1–11.

Bologna, R. and Nord, R.D., 2000. Effects of the law reforming public works contracts on the Italian building process. *Building Research & Information*, 28(2), pp.109–118.

Bowen, P., Akintoye, A., Pearl, R. and Edwards, P.J., 2007. Ethical behaviour in the South African construction industry. *Construction Management and Economics*, 25(6), pp.631–648.

Bowen, P.A., Edwards, P.J. and Cattell, K., 2012. Corruption in the South African construction industry: A thematic analysis of verbatim comments from survey participants. *Construction Management and Economics*, 30(10), pp.885–901.

Bröchner, J., Josephson, P. and Kadefors, A., 2002. Swedish construction culture, management and collaborative quality practice. *Building Research & Information*, 30(6), pp.392–400.

Business Dictionary, n.d. Fraud. [online] Available at: <http://www.businessdictionary.com/search.php?q=fraud&cx=002109824679542468969%3Antvpz2hrzm0&cof=FORID%3A9&ie=UTF-8> [Accessed 7 Jul. 2018].

Čábelková, I. and Hanousek, J., 2004. The power of negative thinking: corruption, perception and willingness to bribe in Ukraine. *Applied Economics*, 36(4), pp.383–397.

Cambridge Dictionary, n.d. Conflict of interest. [online] Available at: <https://dictionary.cambridge.org/dictionary/english/conflict-of-interest> [Accessed 7 Jul. 2018].

Cambridge Dictionary, n.d. Embezzlememt. [online] Available at: <https://dictionary.cambridge.org/dictionary/english/> [Accessed 7 Jul. 2018].

Chan, A.P.C. and Owusu, E.K., 2017. Corruption forms in the construction industry: Literature review. *Journal of Construction Engineering and Management*, 143(8), pp.1–12.

Cheung, S.O., Wong, P.S.P. and Wu, A.W.Y., 2011. Towards an organizational culture framework in construction. *International Journal of Project Management*, 29(1), pp.33–44.

Chua, Y.P., 2013. *Mastering research methods*. Shah Alam: McGraw-Hill Education.

Chua, Y.P., 2016. *Mastering research methods*. 2nd ed. Shah Alam: McGrawHill Education.

Cohen, J.W., 1988. *Statistical power analysis for the behavioral sciences*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates.

Creswell, J.W., 2014. *Research design: Qualitative, quantitative and mixed methods approaches*. 4th ed. Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J.W., Clark, V.L.P., Gutmann, M.L. and Hanson, W.E., 2003. Advanced mixed methods research design. In: A. Tashakkori and C. Teddlie, eds., *Handbook of Mixed Methods in Social & Behavioral Research*. Thousand Oaks, CA: Sage Publication, Inc, pp.209–240.

Cuervo-Cazurra, A., 2015. Corruption in international business. *Journal of World Business*, 51(1), pp.35–49.

Damoah, I.S., Akwei, C.A., Amoako, I.O. and Botchie, D., 2018. Corruption as a source of government project failure in developing countries: Evidence from Ghana. *Project Management Journal*, 49(3), pp.17–33.

Diem, K., 2002. *A step-by-step guide to developing effective questionnaires and survey procedures for program evaluation & research*. New Brunswick, NJ: Rutgers NJAES Cooperative Extension.

Doloi, H., 2008. Analysing the novated design and construct contract from the client's, design team's and contractor's perspectives. *Construction Management and Economics*, 26(11), pp.1181–1196.

Doloi, H., Sawhney, A., Iyer, K.C. and Rentala, S., 2012. Analysing factors affecting delays in Indian construction projects. *International Journal of Project Management*, 30(4), pp.479–489.

Doraisamy, S. V., Akasah, Z. and Yunus, R., 2014. A review on abandoned construction projects: Causes and effects. *Applied Mechanics and Materials*, 773, pp.979–983.

Elinwa, A.U. and Buba, S.A., 1993. Construction cost factors in Nigeria. *Journal of Construction Engineering and Management*, 119(4), pp.698–713.

Faridi, A.S. and El-Sayegh, S.M., 2006. Significant factors causing delay in the UAE construction industry. *Construction Management and Economics*, 24(11), pp.1167–1176.

Field, A., 2013. *Discovering statistics using IBM SPSS statistics*. 4th ed. London: Sage Publications, Inc.

FindLaw, n.d. Negligence. [online] Available at: <https://injury.findlaw.com/accident-injury-law/negligence.html> [Accessed 7 Jul. 2018].

Gilman, S.C., 2005. *Ethics codes and codes of conduct as tools for promoting an ethical and professional public pervice: Comparative successes and lessons*. Washington, DC.

Gliem, J.A. and Gliem, R.R., 2003. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. *Midwest Research to Practice Conference in Adult, Continuing, and Community Education*, pp.82–88.

Goh, C.S. and Abdul-Rahman, H., 2013. The identification and management of major risks in the Malaysian construction industry. *Journal of Construction in Developing Countries*, 18(1), pp.19–32.

Goldie-Scot, H., 2008. Briefing: Corruption in construction in developing countries. In: *Proceedings of the Institution of Civil Engineers - Municipal Engineer*. pp.211–213.

Gunduz, M. and Önder, O., 2013. Corruption and internal fraud in the Turkish construction industry. *Science and Engineering Ethics*, 19(2), pp.505–528.

Guo, S., Zhang, A. and Zhong, S., 2013. Privacy-preserving Kruskal–Wallis test. *Computer Methods and Programs in Biomedicine*, 112(1), pp.135–145.

Gupta, S., Davoodi, H. and Alonso-Terme, R., 2002. Does corruption affect income inequality and poverty? *Economics of Governance*, 3(1), pp.23–45.

Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E., 2010. *Multivariate data analysis*. 7th ed. Upper Saddle River, NJ: Pearson.

Hartley, R., 2009. Fighting corruption in the Australian construction industry: The national code of practice. *Leadership and Management in Engineering*, 9(3), pp.131–135.

He, Z., 2000. Corruption and anti-corruption in reform China. *Communish and Post-Communist Studies*, 33(2), pp.243–270.

Hosseini, M.R., Martek, I., Banihashemi, S., Chan, A.P.C., Darko, A. and Tahmasebi, M., 2019. Distinguishing characteristics of corruption risks in Iranian construction projects: A weighted correlation network analysis. *Science and Engineering Ethics*, 19, pp.1–27.

International Federation of Consulting Engineers, n.d. *FIDIC Code of ethics*. [online] Available at: <http://fidic.org/sites/default/files/fidic_codeofethics_201510.pdf> [Accessed 25 Jul. 2018].

International Transparency, 2008. Bribe payers index. [online] Available at: <https://www.transparency.org/> [Accessed 11 Jul. 2018].

Investing Answer, n.d. Kickback. [online] Available at: <https://www.investinganswers.com/financial-dictionary/businesses-corporations/kickback-490> [Accessed 7 Jul. 2018].

Investopedia, n.d. Conflict of interest. [online] Available at: <https://www.investopedia.com/terms/c/conflict-of-interest.asp> [Accessed 7 Jul. 2018].

Investopedia, n.d. Kickbacks. [online] Available at: <https://www.investopedia.com/terms/c/corruption.asp> [Accessed 7 Jul. 2018].

JobStreet, 2018. *Job Street salary report*. [online] Available at: <https://www.jobstreet.com.my/en/cms/employer/wp-content/uploads/sites/4/2018/05/MY_Salary_Report_2018.pdf>.

De Jong, M., Henry, W.P. and Stansbury, N., 2009. Eliminating corruption in our engineering / construction industry. *Leadership and Management in Engineering*, 9(3), pp.105–111.

Kenny, C., 2007. Construction, corruption, and developing countries.

Kenny, C., 2009. Transport construction, corruption and developing countries. *Transport Reviews*, 29(1), pp.21–41.

Kenny, C., 2012. Publishing construction contracts to improve efficiency and governance. *Proceedings of the Institution of Civil Engineers*, 165(5), pp.18–22.

Khan, R.A., Liew, M.S. and Ghazali, Z. Bin, 2014. Malaysian construction sector and Malaysia vision 2020: Developed nation status. *Procedia - Social and Behavioral Sciences*, 109, pp.507–513.

Ko, K. and Weng, C., 2011. Critical review of conceptual definitions of chinese perspective. *Journal of Contemporary China*, 20(70), pp.359–378.

Korruptsioon, n.d. Forms of corruption. [online] Available at: <http://www.korruptsioon.ee/en/forms-corruption/> [Accessed 7 Jul. 2018].

Kothari, C.R., 2004. *Research methodology: Methods & techniques*. 2nd ed. New Delhi: New Age International (P) Ltd.

Krishnan, C., 2009. Combating corruption in the construction and engineering sector: The role of transparency international. *Leadership and Management in Engineering*, 9(3), pp.112–114.

Le-Hoai, L., Lee, Y.D. and Lee, J.Y., 2008. Delay and cost overruns in Vietnam large construction projects: A comparison with other selected countries. *KSCE Journal of Civil Engineering*, 12(6), pp.367–377.

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

Li, Y., Le, Y., Zhang, B. and Shan, M., 2013. The correlations among corruption severity, power and behavior features in construction industry: An empirical study based on 148 typical cases. *Manage. Rev.*, 8(4), pp.21–31.

Ling, F.Y.Y. and Tran, P.Q., 2012. Effects of interpersonal relations on public sector construction contracts in Vietnam. *Construction Management and Economics*, 30(12), pp.1087–1101.

Malaysian Anti-Corruption Commission, n.d. What is corruption? [online] Available at: <http://www.sprm.gov.my/index.php/en/education/what-is-corruption> [Accessed 10 Jul. 2018].

Man-wai, T.K., 2006. Formulating an effective anti-corruption strategy - The experience of Hong Kong ICAC. *Resource Material Series*, 69, pp.196–201.

Marczyk, G., DeMatteo, D. and Festinger, D., 2005. *Essentials of research design and methodology*. Canada: John Wiley & Sons, Inc.

Melgar, N., Rossi, M. and Smith, T.W., 2010. The perception of corruption. *International Journal of Public Opinion Research*, 22(1), pp.120–131.

Memon, M.A., Ting, H., Ramayah, T., Chuah, F. and Cheah, J., 2017. A review of the methodological misconceptions and guidelines related to the application of structural equation modeling: A Malaysian scnerio. *Journal of Applied Structural Equation Modeling*, 1(1), pp.1–13.

Merriam-Webster, n.d. Collusion. [online] Available at: <https://www.merriam-webster.com/dictionary/collusion> [Accessed 7 Jul. 2018].

Mezher, T.M. and Tawil, W., 1998. Causes of delays in the construction industry in Lebanon. *Engineering, Construction and Architectural Management*, 5(3), pp.252–260.

Mumford, M.D., Helton, W.B., Decker, B.P., Connelly, S. and Van Doorn, J.R., 2003. Values and beliefs related to ethical decisions. *Teaching Business Ethics*, 7(2), pp.139–170.

Nawaz, D.T., Shareef, N.A. and Ikram, A.A., 2013. Cost performance in construction industry of Pakistan. *Industrial Engineering Letters*, 3(2), pp.19–33.

Neelankavil, J.P., 2002. International business corruption: A framework of causes, effects, and prescriptions. In: *28th European Int. Business Academy Conferences*. Brussels, Belgium: European International Business Academy.

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.

Nulty, D.D., 2008. Assessment & evaluation in higher education the adequacy of response rates to online and paper surveys: What can be done? *Assessment & Evaluation in Higher Education*, 33(3), pp.301–314.

Oladinrin, O.T., Ho, C.M.F. and Lin, X., 2016. Critical analysis of whistleblowing in construction organizations: Findings from Hong Kong. *Journal of Legal Affairs and Dispute Resolution in Engi- neering and Construction*, 9(2), pp.1–8.

Olanrewaju, A.L. and Abdul-Aziz, A.R., 2015. *Building maintenance processes and practices: The case of a fast developing country*. Springer Science and Business.

Olken, B.A., 2007. Monitoring corruption: Evidence from a field experiment in Indonesia. *Journal of Political Economy*, 115(2), pp.200–249.

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.

Owolabi, J.D., Amusan, L.M., Oloke, C.O., Olusanya, O. and Tunji-Olayeni, P., 2014. Causes and effect of delay on project construcction delivery time. *International Journal of Education and Research*, 2(4), pp.197–208.

Owusu, E.K., Chan, A.P.C., Degraft, O., Ameyaw, E.E. and Robert, O., 2019. Contemporary review of anti-corruption measures in construction project management. *Project Management Journal*, 50(1), pp.40–56.

Owusu, E.K., Chan, A.P.C. and Shan, M., 2017. Causal factors of corruption in construction project management: An overview. *Science and Engineering Ethics*, 25(1), pp.1–31.

Oyewobi, L.O., Ganiyu, B.O., Oke, A.A., Ola-Awo, A.W. and Shittu, A.A., 2011. Determinants of unethical performance in Nigerian construction industry. *Journal of Sustainable Development*, 4(4), pp.175–182.

Pallant, J., 2005. *SPSS survival manual: A step by step guide to data analysis using SPSS*. 6th ed. Berkshire: Open University Press.

Patton, M.Q., 2002. *Qualitative research and evaluation methods*. 3rd ed. California: Sage Publication, Inc.

Phiri, M.A., 2010. An evaluation of the impact of corruption, economic status and political influence on the Malawian construction industry.

Rajasekar, S., Pitchai, P.N. and Cinnathambi, V., 2013. Research methodology.

Rose-Ackerman, S., 1999. *Corruption and government: Causes, consequences and reform*. Cambridge: Cambridge University Press.

Rose-Ackerman, S., 2006. *International handbook on the economics of corruption*. Celtenham: Edward Elgar Publishing Ltd.

Sambasivan, M. and Soon, Y.W., 2007. Causes and effects of delays in Malaysian construction industry. *International Journal of Project Management*, 25(5), pp.517–526.

Seleim, A. and Bontis, N., 2009. The relationship between culture and corruption: a cross-national study. *Journal of Intellectual Capital*, 10(1), pp.165–184.

Shan, M., Le, Y., Yiu, K.T.W., Chan, A.P.C. and Hu, Y., 2017. Investigating the underlying factors of corruption in the public construction sector: Evidence from China. *Science and Engineering Ethics*, 23(6), pp.1643–1666.

Shen, L. and Song, W., 1998. Competitive tendering practice in Chinese construction. *Journal of Construction Engineering and Management*, 124(2), pp.155–161.

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.

Sohail, M. and Cavill, S., 2006. Corruption in construction projects. In: *Proceedings of the CIB W107 Construction in Developing Countries Symposium 'Connstruction in Developing Economies: New Issues and Challenges'*.

Sohail, M. and Cavill, S., 2008. Accountability to prevent corruption in construction projects. *Journal of Construction Engineering and Management*, 134(9), pp.729–738.

Stansbury, N., 2005. Exposing the foundations of corruption in construction. *Global Corruption Report, 2005*, pp.36–55.

Tabish, S.Z.. and Jha, K.N., 2011. Analyses and evaluation of irregularities in public procurement in India. *Construction Management and Economics*, 29(3), pp.261–274.

Tabish, S.Z.S. and Jha, K.N., 2012. The impact of anti-corruption strategies on corruption free performance in public construction projects. *Construction Management and Economics*, 30(1), pp.21–35.

Takim, R. and Akintoye, A., 2002. Performance indicators for successful construction project performance. In: *18th Annual ARCOM Conference*. pp.545–555.

Takim, R., Shaari, S.M. and Nordin, R.M., 2013. Transparency Initiative (TI) for enhancing quality of life: Behavioural components that lead to corruption in construction. *Procedia - Social and Behavioral Sciences*, 101, pp.110–119.

Tanzi, V., 1998. Corruption around the world: Causes, consequences, scope, and cures. *Staff Papers*, 45(4), pp.559–594.

Tanzi, V. and Davoodi, H., 1997. Corruption, public investment, and growth. In: *The welfare state, public investment, and growth*. Tokyo: Springer, pp.41–60.

Tavakol, M. and Dennick, R., 2011. Making sense of Cronbach's alpha. *International journal of medical education*, 2, pp.53–55.

Taylor, S.J., Bogdan, R. and Devault, M.L., 2016. *Introduction to qualitative research methods: A guidebook and resource*. 4th ed. Hoboken, New Jersey: John Wiley & Sons, Inc.

The Law Dictionary, n.d. Front company. [online] Available at: <https://thelawdictionary.org/front-company/> [Accessed 7 Jul. 2018].

Thim, L.Y. and Zonggui, C., 2004. The development of the construction legal system in China. *Construction Management and Economics*, 22(4), pp.347–356.

Transparency International, 2017. Corruption perception index. [online] Available at: <https://www.transparency.org/news/feature/corruption_perceptions_index_2017> [Accessed 8 Jul. 2018].

Transparency International, n.d. What is corruption? [online] Available at: <https://www.transparency.org/what-is-corruption> [Accessed 5 Jul. 2018].

Tunley, M., 2011. Need , greed or opportunity ? An examination of who commits benefi t fraud and why they do it. *Security Journal*, 24(4), pp.302–319.

Turner, A.G., 2003. Sampling frames and master samples. *United Nations Secretariat Statistics Division*.

United States v Liebo 923 F.2d 1308 [1991] Available at: <https://www.justice.gov/sites/default/files/criminal-fraud/legacy/2012/06/22/1991-01-15-liebor-opinion-eighth-circuit-%2889-5621%29.pdf>.

Usman, N.D., Inuwa, I.I. and Iro, A.I., 2012. The influence of unethical professional practices on the management of construction projects in north eastern states of Nigeria. *International Journal of Economic Development Research and Investment*, 3(2), pp.124–128.

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

Wang, J. and Yuan, H., 2011. Factors affecting contractors' risk attitudes in construction projects: Case study from China. *International Journal of Project Management*, 29(2), pp.209–219.

World Bank, n.d. Malaysia overview. [online] Available at: <http://www.worldbank.org/en/country/malaysia/overview> [Accessed 5 Jun. 2018].

Yap, J.B.H., Abdul-Rahman, H., Wang, C. and Skitmore, M., 2018. Exploring the underlying factors inducing design changes during building production. *Production Planning & Control*, 29(7), pp.586–601.

Yap, J.B.H. and Chua, K.L., 2018. Application of e-booking system in enhancing Malaysian property developers' competitive advantage: A blue ocean strategy? *Property Management*, 36(1), pp.86–102.

Yap, J.B.H. and Skitmore, M., 2018. Investigating design changes in Malaysian building projects. *Architectural Engineering and Design Management*, 14(3), pp.218–238.

Yong, A.G. and Pearce, S., 2013. A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology*, 9(2), pp.79–94.

Zhang, B., Le, Y., Xia, B. and Skitmore, M., 2017. Causes of business-to-government corruption in the tendering process in China. *Journal of Management in Engineering*, 33(2), pp.1–10.

Zou, P.X.W., 2006. Strategies for minimizing corruption in the construction industry in China. *Journal of Construction in Developing Countries*, 11(2), pp.15–29.

APPENDICES

APPENDIX A: Questionnaire

CORRUPTION PRACTICES IN THE MALAYSIAN CONSTRUCTION INDUSTRY: ANALYSING CAUSES AND PREVENTIVE STRATEGIES

Dear Sir/Madam,

I am a final year student from Universiti Tunku Abdul Rahman (UTAR) and is currently working on my final year project. The objective of this present study is to examine the causes, access the impacts and explore the preventive strategies for the corruption practices in the Malaysian Construction Industry.

The questionnaire consists of (4) sections:

Section A: Causes of Corruption Practices in Construction Industry

Section B: Impacts of Corruption Practices in Construction Industry

Section C: Preventive Strategies for the Corruption Practices

Section D: General Information

This survey will take approximately 5 to 10 minutes to complete. Please be assured that there will be no attempts to disclose your identity throughout this study. All the data will be used purely for academic purpose and will be strictly anonymous. Nevertheless, you may choose to withdraw from this survey at any time if it has made you uncomfortable.

Thank you for your participation. Your response is of high importance for this study and is much appreciated. Please do not hesitate to contact me if you have questions about the study

CORRUPTION PRACTICES IN THE MALAYSIAN CONSTRUCTION INDUSTRY: ANALYSING CAUSES AND PREVENTIVE STRATEGIES

Section A: Causes of Corruption Practices in Construction Industry

Please indicate one level of agreement on causes of corruption practices in construction industry for each statement.

	Causes of corruption practices	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
A	**Nature of Construction Industry**					
A1	Fragmentation of construction process	①	②	③	④	⑤
A2	Complexity nature	①	②	③	④	⑤
A3	Large amount of money	①	②	③	④	⑤
A4	Intense competitive nature	①	②	③	④	⑤
A5	Lack of transparency	①	②	③	④	⑤
A6	Concealing of works	①	②	③	④	⑤
A7	Relationship among the parties	①	②	③	④	⑤
B	**Flawed Regulation System**					
B1	Defective law system	①	②	③	④	⑤
B2	Lack of rigorous supervision	①	②	③	④	⑤
B3	Inadequate sanction	①	②	③	④	⑤
B4	Multifarious licenses or permits	①	②	③	④	⑤
B5	Lack of research	①	②	③	④	⑤
C	**Negative Encouragement**					
C1	Personal greed towards money	①	②	③	④	⑤
C2	Low income level	①	②	③	④	⑤
C3	Culture of wrong perception	①	②	③	④	⑤
C4	Negative leader role	①	②	③	④	⑤
C5	Shortage of skill	①	②	③	④	⑤
C6	Lack of ethical standard	①	②	③	④	⑤

CORRUPTION PRACTICES IN THE MALAYSIAN CONSTRUCTION INDUSTRY: ANALYSING CAUSES AND PREVENTIVE STRATEGIES

Section B: Impacts of Corruption Practices in Construction Industry

Please indicate one level of agreement on impacts of corruption practices in construction industry for each statement.

	Impacts of corruption practices	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
S1	Project delay	①	②	③	④	⑤
S2	Cost overrun	①	②	③	④	⑤
S3	Defective works	①	②	③	④	⑤
S4	Project abandonment	①	②	③	④	⑤
S5	Low return	①	②	③	④	⑤
S6	Lack of productivity	①	②	③	④	⑤
S7	Underdevelopment of construction industry	①	②	③	④	⑤

Section C: Preventive Strategies for the Corruption Practices

Please indicate one level of agreement on preventive strategies for the corruption practices for each statement.

	Preventive strategies	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
P1	Public disclosure	①	②	③	④	⑤
P2	Audit mechanism	①	②	③	④	⑤
P3	High integrity and honest construction culture	①	②	③	④	⑤
P4	Code of conduct	①	②	③	④	⑤
P5	Employees selection	①	②	③	④	⑤
P6	Adequate training system	①	②	③	④	⑤
P7	Effective reporting channel	①	②	③	④	⑤
P8	Protection to whistle-blowers	①	②	③	④	⑤
P9	Enforcement of law, regulation and sanction	①	②	③	④	⑤
P10	Rigorous supervision	①	②	③	④	⑤
P11	Adequacy of income level	①	②	③	④	⑤

CORRUPTION PRACTICES IN THE MALAYSIAN CONSTRUCTION INDUSTRY: ANALYSING CAUSES AND PREVENTIVE STRATEGIES

Section D: General Information

1. Type of organisation *(Please select **current type**):*
    - Developer
    - Contractor
    - Consultant

2. Working experience *(Please select **one** only*):
    - 0 - 5 years
    - 6 - 10 years
    - 11 - 15 years
    - 16 - 20 years
    - 20 years above

3. Position in company *(Please select **one** only)*:
    - Executive
    - Manager
    - Senior Manager
    - Director / Top Management

4. Academic qualification *(Please select **one** only)*:
    - High School
    - Diploma
    - Bachelor's Degree
    - Master's Degree
    - Doctorate

5. Household income level *(Please select **one** only)*:
    - RM3,000 and below per month
    - Between RM3,001 to RM6,500 per month
    - Between RM6,501 to RM10,000 per month
    - RM10,001 and above per month

6. Characteristic of project *(Please select **mostly involved project** only)*:
    - Private
    - Public