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**FACTORS AFFECTING DESIGN & BUILD  
CONSTRUCTION PROJECT SUCCESS IN  
MANILA, PHILIPPINES**

**YIP HOCK  
SENG**

**FACTORS AFFECTING DESIGN & BUILD  
CONSTRUCTION PROJECT SUCCESS IN  
MANILA, PHILIPPINES**

**DBA 2019**

**DOCTOR OF BUSINESS ADMINISTRATION  
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**FACTORS AFFECTING DESIGN & BUILD CONSTRUCTION PROJECT  
SUCCESS IN MANILA, PHILIPPINES**

**By**

**YIP HOCK SENG**



**Thesis Submitted to  
Othman Yeop Abdullah Graduate School of Business,  
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Administration**



**OTHMAN YEOP ABDULLAH GRADUATE SCHOOL OF BUSINESS  
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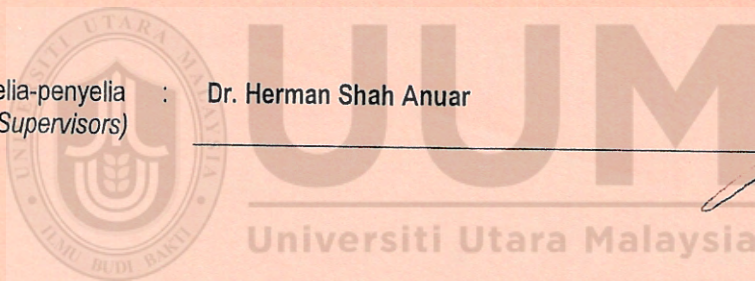
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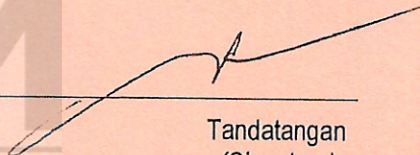
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## ABSTRACT

The growth of the construction sector saw an equal increase in the number of construction firms and is being increasingly challenged to complete projects on time in Manila, the Philippines where the prominence of the Design and Build (D&B) method of construction approach has also gained importance. The rise of new innovative systems saw the emergence of new factors in the construction industry that will become future adopted in Manila, the Philippines. This study examined factors affecting the successful completion period of the construction industry whereby it is very crucial for the country's economic and market development. There are various factors such as client, contractor, consultant, internal/external techniques, which affect the construction project completion within the resources in Manila, the Philippines. The methodology employed was the quantitative approach. A total of 967 survey questionnaires were sent out and only 396 respondents fit to be analysed. Respondents involved were contractors, consultant, and developers. Factors under study include the management of the procurement system, currency costing, logistics delivery, and causes of delay to ensure the effective success completion time related to construction projects. It was found that organizational-related factors significantly impact the project performance of the overall construction industry. It was learned that critical success factors in project management playing significant roles in driving projects to examine the determinants of success completion time of Design & Build construction projects. Findings from this study shall be used by the authority in drafting a policy guideline for future construction development. Contribution from this study would be able to provide a better understanding of construction challenges for the future undertaking.

**Keywords:** Construction, design and build, manila, factors affecting, success completion period.

## ABSTRAK

Pertumbuhan sektor pembinaan menyaksikan peningkatan yang sama dalam bilangan syarikat pembinaan dan cabaran untuk menyelesaikan projek tepat pada waktunya. Kaedah Reka dan Bina (D&B) dalam pendekatan pembinaan juga didapati semakin penting. Kebangkitan sistem inovasi baharu menyaksikan kemunculan faktor baharu dalam industri pembinaan yang bakal diterima pakai di Manila, Filipina. Kajian ini meneliti faktor yang mempengaruhi kejayaan tempoh penyelesaian projek industri pembinaan yang sangat penting kepada ekonomi negara dan pembangunan pasaran. Terdapat pelbagai faktor seperti pelanggan, kontraktor, perunding dan teknik dalaman/ luaran yang menjejaskan tempoh penyelesaian projek pembinaan dengan sumber yang ada di Manila, Filipina. Kajian ini menggunakan pendekatan kuantitatif. Sebanyak 967 borang soal selidik telah diedarkan tetapi hanya 396 borang yang boleh digunakan untuk dianalisis. Responden yang terlibat terdiri daripada kontraktor, perunding dan pemaju. Faktor yang dikaji termasuk sistem pengurusan perolehan, kos mata wang, penghantaran logistik, dan punca kelewatan dalam memastikan kejayaan tempoh penyelesaian berkaitan dengan projek pembinaan. Faktor berkaitan organisasi didapati memberi kesan yang signifikan terhadap prestasi keseluruhan industri pembinaan. Manakala faktor kejayaan yang kritikal dalam pengurusan projek didapati memainkan peranan yang signifikan dalam memacu projek bagi mengkaji penentu kejayaan tempoh penyelesaian projek pembinaan Reka & Bina. Hasil kajian ini boleh dimanfaatkan oleh pihak berkuasa dalam menyediakan garis panduan polisi untuk pembangunan pembinaan pada masa akan datang. Sumbangan kajian ini dapat memberikan pemahaman yang lebih mendalam mengenai cabaran pembinaan untuk usaha akan datang.

***Kata kunci:*** Pembinaan, reka dan bina, manila, faktor yang mempengaruhi, kejayaan tempoh penyelesaian.

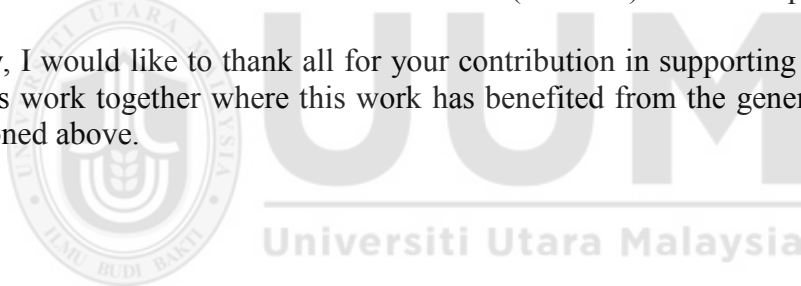
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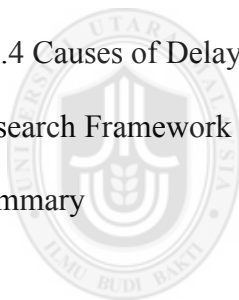
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## LIST OF ABBREVIATIONS

|            |   |   |
|------------|---|---|
| AA         | - | Grading from Philippines Construction Accreditation Board |
| AAA        | - | Grading from Philippines Construction Accreditation Board |
| AAAA       | - | Grading from Philippines Construction Accreditation Board |
| AACE       | - | American Association of Cost Engineer                     |
| A&B        | - | Grading from Philippines Construction Accreditation Board |
| BAA        | - | British Airports Authority                                |
| C, D, E    | - | Grading from Philippines Construction Accreditation Board |
| CFY        | - | Current Fiscal Year                                       |
| CICE       | - | Construction Industry Cost Effectiveness                  |
| CIF        | - | Cost, Insurance, Freight                                  |
| CIOB       | - | Chartered Institute of Buildings                          |
| CSF        | - | Critical Success Factor                                   |
| D&B        | - | Design and Build  |
| D-B-B      | - | Design-Bid-Build  |
| DV         | - | Dependent Variable  |
| E-Sourcing | - | Electronic Sourcing (Process using Web Technology)        |
| FOB        | - | Free on Board   |

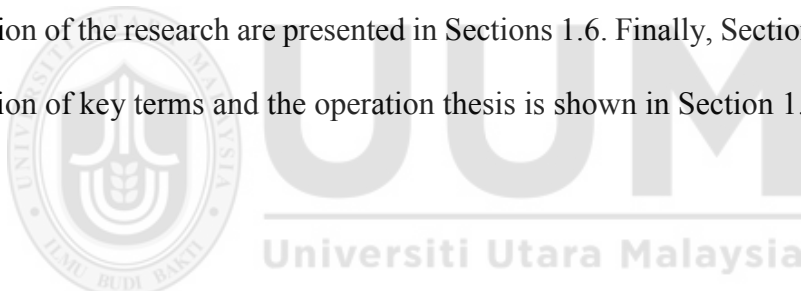
|       |   |  |
|-------|---|--|
| H     | - | Hypothesis                                   |
| IMF   | - | International Monetary Fund                  |
| IT    | - | Information Technology                       |
| IV    | - | Independent Variable                         |
| GDP   | - | Gross Domestic Product                       |
| MLR   | - | Multiple Linear Regression                   |
| OEM   | - | Original Equipment Manufacturer              |
| PCAB  | - | Philippines Construction Accreditation Board |
| PMBOK | - | Project Management Body of Knowledge         |
| PMI   | - | Project Management Institute                 |
| PTT   | - | Public Company Limited                       |
| RICS  | - | Royal Institution of Chartered Surveyors     |
| SPSS  | - | Statistical Package for Social Science       |
| UK    | - | United Kingdom                               |
| UN    | - | United Nation                                |
| USA   | - | United States of America                     |
| USD   | - | United State Dollar                          |

# Chapter 1

## Introduction

### 1.1 Introduction

This chapter presents the introduction of the research. Section 1.2 presents the background of this study by reviewing the developments in the Philippines construction industry, in general, and in Manila specifically. Section 1.3 outlines the problem statement, which is then followed by the outline of the research questions and research objectives in Section 1.4 and Section 1.5 respectively. The research scope and limitation of the research are presented in Sections 1.6. Finally, Section 1.7 defines the definition of key terms and the operation thesis is shown in Section 1.8.



### 1.2 Background of the Study

The importance of the construction sector to a country's economic performance is phenomenal. The role of this sector to a country's growth is seen from the perspective of being the pillar of the built environment, generator of job opportunities and spillover effects (Wibowo, 2010; Young & Hall, 2015; and Ofori, 2016). The vitality of the construction sector is often depicted in industrial and economic reports.

The Global Construction Market 2012 – 2017 report (Figure 1.1) shows the increased growth rate of construction projects over the five years period across the world. The growth of this sector in the Asian region seems to be the most significant, plausibly

due to high demand and supply among the consumer and the service sector. The growth of the Asian economy has driven the opportunity for the emergence of new construction projects, primarily in healthcare, education and social infrastructure, as well as retail and other consumer end-markets.

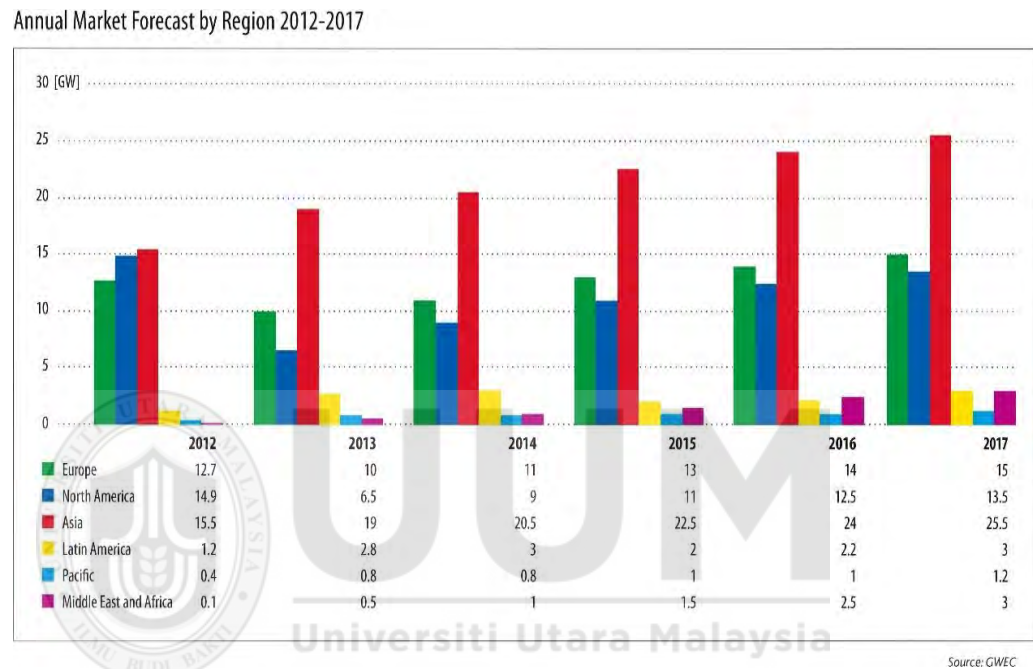


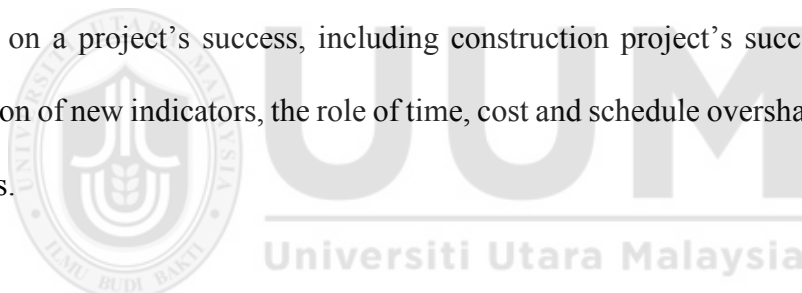
Figure 1.1  
*Annual Market Forecast by Region 2012 – 2017*  
 Source: Global Construction Growth Report 2012- 2017

In general, construction projects can be classified into residential projects such as villa, housing developments, office buildings, hotel, factory, and warehousing and non-residential projects such as large and small commercial buildings including stores, churches, schools and hospitals and engineering projects such as bridges, roads, and reservoirs (Radhia & Bouzid, 2017).

Regardless of the type of projects, construction projects are often characterised with a

large investment, project duration, and extensive resource deployment. Due to such characterisation, the success of construction projects is essential. Multiple definitions have been presented on how project success should be defined (Williams, 2016). Historically, most scholars defined a construction project's success in terms of on-time delivery, adherence to specified budget and meeting client's expectation (Pinto & Pinto, 1991; Atkinson, 1999; and Ahadzie et. al., 2008).

On a more recent note, scholars have started to define a project's success by incorporating other perspectives, such as impacts on staffs and clients, environmental impact and commercial value (e.g. Carvalho & Rabechini, 2017; and Luo, et. al., 2017). The addition of new success characteristics denoted the continued importance placed on a project's success, including construction project's success. Despite the inclusion of new indicators, the role of time, cost and schedule overshadow the success metrics.



### **1.2.1 Construction Sector in Manila, the Philippines**

Manila is a very active and growing city where the population has been increasing where the construction of the property must be in-line with the demand to prevent to inflation of the property price due to short of supply. Manila is the capital and the second largest city in the Philippines and one of the 16 cities that comprise Metro Manila. With a population of estimated 15.2 million as of 2025, Metro Manila is a highly populated (high-density level) city, with estimation of 43, 000 people per square kilometer.

Table 1.1 shows Metro Manila forecast 2025 population is at 15,200,000. These population estimates represent the urban agglomeration of Manila which typically includes Manila's population in addition to adjacent suburban areas.

Table 1.1  
*Forecast of Metro Manila Population Growth*

| Year | Population | Growth Rate (%) | Growth    |
|------|------------|-----------------|-----------|
| 2030 | 16,756,000 | 9.29            | 1,556,000 |
| 2025 | 15,200,000 | 8.28            | 1,258,000 |
| 2020 | 13,942,000 | 4.45            | 620,000   |
| 2017 | 13,322,000 | 2.83            | 376,000   |
| 2015 | 12,946,000 | 8.15            | 1,055,000 |
| 2010 | 11,891,000 | 8.47            | 1,007,000 |

Source: Philippines Statistics Authority - 2010

Located on the island of Luzon, Manila is one of the primary locations for industrial development. In terms of its people, Manila is primarily populated by its indigenous people known as the Tagalogs. Apart from the Tagalogs, Manila is also populated by Bicolanos, Visayans, Bajau, and Igorot clans. The more recent years saw the entry of Americans, Spaniards, and Koreans as part of Manila's social urban conglomerate citizens.

The population growth in Manila has paved way for emergence of various construction projects. Industrial reports stated in Figure 1.2, outlined growth in the Philippines construction industry from USD22 billion to USD54 billion in 2012 to 2021 respectively, fueled largely by increased demand for

residential properties, bridge, roads, offices, and power plants (Isip, 2018).

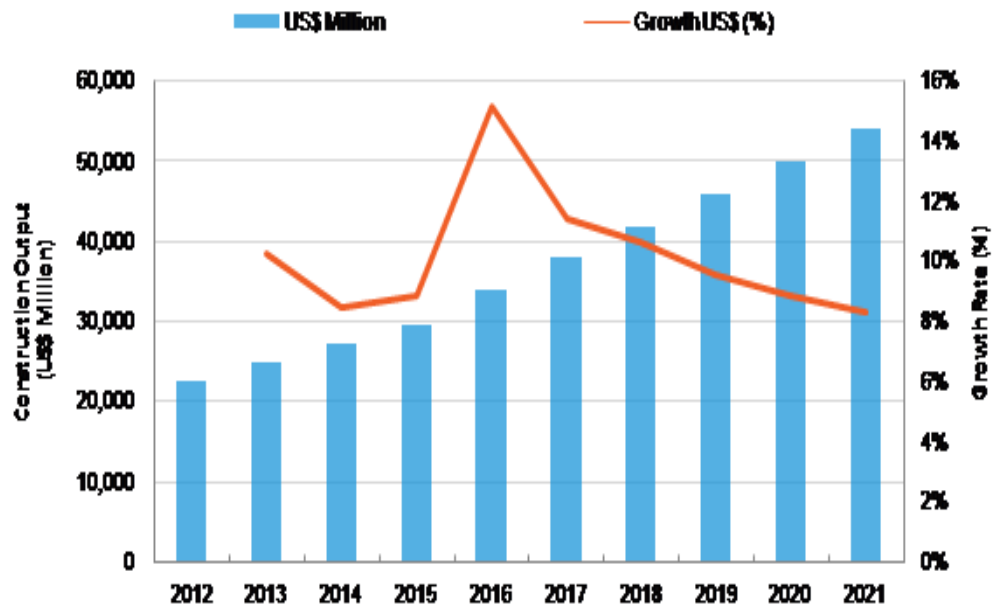


Figure 1.2  
*Philippines Construction Industry Growth, 2012 – 2017*  
 Source: Construction Intelligence Center, Philippines

The growth of the construction sector saw an equal increase in the number of construction firms in the Philippines. In 2017, Figure 1.3, the Philippines Contractors Accreditation Board (PCAB) has issued a total of 9,670 contractors' license, with 92 percent of them being existing contractors and 8 percent being new entrants. The PCAB divides the construction firms based on the size of the company and denoted in terms of large contractors (i.e. AAAA, AAA, and AA) and accounted for 5.2 percent of the total contracting population. The medium sized contractors were divided into A & B categories and comprised of 34.1 percent, while the small contractors were divided into C, D, E categories and were the largest contractor group of 60.7 percent.

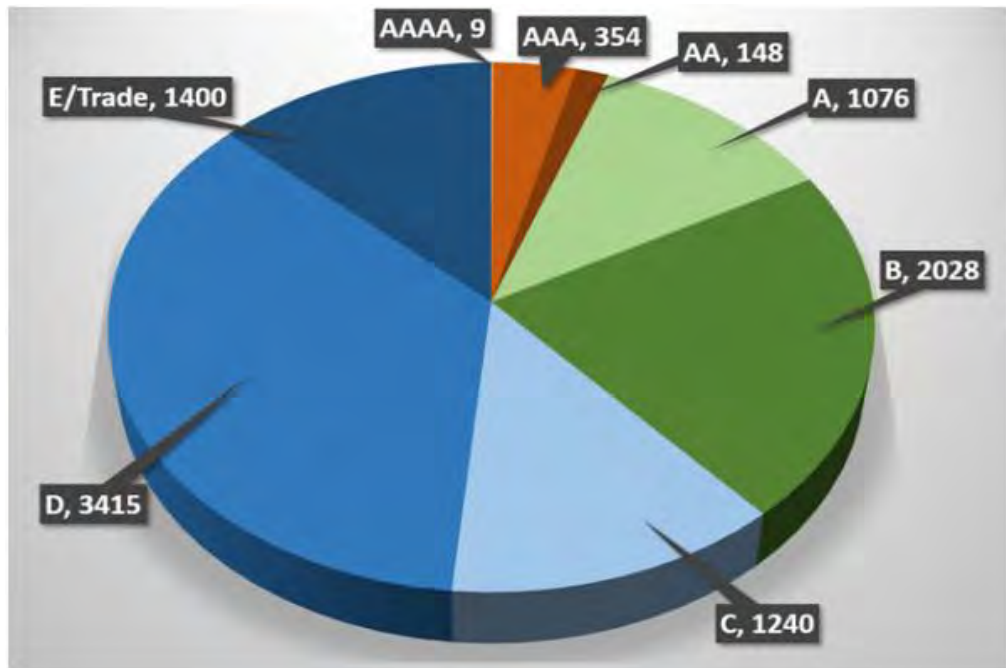


Figure 1.3  
*Distribution of PCAB Licensed Contractor 2016 – 2017*  
 Source: Department of Trade and Industry Philippines

The construction sector's contribution to the Philippines gross domestic product (GDP) over the period 2014 – 2017 is depicted in Figure 1.4.



Figure 1.4  
*Philippines Construction GDP 2014 – 2017*  
 Source: Philippines Statistical Coordination Board (2017)

It is observed that there has been a healthy increase in construction sector's GDP contribution over the period 2014 to 2017. While the July 2014's GDP contribution stood at around Php150 million, it gradually grew to Php 180,000 million in January 2015 and a further increase to Php 200 million in January 2016. In July 2016, the contribution rate grew again to Php 220 million and jumped to Php 240 million in July 2017.

### **1.3 Problem Statement**

In line with the growth and contribution of the construction sector to the Philippines economy, the prominence of the Design and Build (D&B) method of construction approach has also gained importance. The rise of new innovative systems saw the emergence of new procurement systems in the construction industry over the past decades. The prominence of the Design and Build method have become the most common project delivery systems used in many countries such as the USA, UK, Australia, and Singapore (Ling & Kerh, 2004).

The D&B method procurement system entails an agreement between a single entity to undertake both the design and construction of a project under one contract. The customer will deal with one entity responsible for design to delivery of the completed project. The D&B method procurement system has some advantages compared to other methods, including the transfer of risk to contractor, competitive design output, availability of construction expertise for design, an early commitment to maximum price and less construction information required from the client (Ling & Kerh, 2004).

As pointed much earlier, the success of typical construction projects is assessed based on the delivery time, the cost structure and the quality of the project being delivered (Skitmore & Marsden, 1998). However, the relevance of the procurement system chosen by the construction firm has been stated as a core reason for the poor performance of this industry (Masterman, 1992).

Some authors (e.g. Mohsini & Davidson, 1991; Love, et. al., 1998; Gidado, 2004; and Erikson & Westerberg, 2011) argued that the use of D&B method procurement system to project's failure, mainly due to the complexity of modern construction projects that faces numerous uncertainties and the dynamics in customers' demands.

Studies by Khalil & Ghafry, (1999), Jaweed, (2004) and Kharashi & Skitmore, (2009) highlighted the avoidance of the D&B method as the preferred option for procuring projects in the Middle East.

A review of the literature on D&B method in the Philippines has returned the very limited result. Studies by Behnam, (2016) and Abdul & Olanrewaju, (2015) are among the available scholarly works. Behnam, (2014) reviewed the effectiveness of D&B method procurement system in the context of the Philippines. In practical context, most of the D&B method in the Philippines are done for erecting new properties and/or renovation of existing structures, thus entailing projects with varying sizes. The challenges inherent within a D&B method construction are aplenty.

Researcher, Abdul & Olanrewaju, (2015) studied the causes of delays in large public

projects in Malaysia. They found that the shortage of labor, delivery, costing, management, and disagreement between clients, consultants and contractors on the use of a single system of measurement for each party's progress was among the main causes for delays. The void in academic research motivated the current research.

This research explores the reasons what factors determine the D&B method that will become future adopted in the Philippines construction industry and in Manila, in specific. Such an investigation is deemed necessary for the following reasons.

One of the core advantages of a D&B method procurement system is the integrated delivery system from the design to the delivery process. The complexity inherent in construction projects in the Philippines could make way for the integration of a D&B method by the industry. The D&B method offers shareholders efficiency, cost saving, innovation in design and rapid completion of projects when properly applied. The outcome of this research could contractors and clients to implement a more efficient way to procure and deliver construction work using the D&B method.

Second, research of this nature will highlight the impediments for uptake of a D&B method in the Philippines. Studies by Obafemi & Roy, (2013) and Sebastiano, (2014) cited that improving the collaboration and interaction practices between the obstacles related to D&B method would lead to improved resource management (including logistics, procurement and project management) and better control of the project cost and schedule.

## 1.4 Research Questions

The associative research questions following the research objectives are as per Table 1.2 below:

Table 1.2  
*Research Question*

|   |  |
|---|--|
| Research Question 1<br>Procurement System | Is there a significant relationship between the procurement system and the success completion time of construction project in Manila, the Philippines? |
| Research Question 2<br>Currency Costing   | Is there a significant relationship between the currency costing and success completion time of construction project in Manila, the Philippines?       |
| Research Question 3<br>Logistics Delivery | Is there a significant relationship between the logistics delivery and success completion time of construction project in Manila, the Philippines?     |
| Research Question 4<br>Causes of Delay    | Is there a significant relationship between the causes of delay and success completion time of construction project in Manila, the Philippines?        |

Source: Developed by researcher for research purpose

## 1.5 Research Objectives

This research aims to examine the significance of several factors to successful project management of Design & Build method by Manila's construction companies. The research will investigate the role of the targeted factors toward one of the primary elements of a project's success that is project success completion time. The research is driven by the following logic.

Since the D&B method is comprised of an integrated approach, the elements of procurement system, currency costing, logistics delivery and causes of delays forms part of the D&B method project management system. Thus, the research will examine these elements role in achieving the success completion time of construction projects in Manila, the Philippines.

In line with the points raised in the problem stated earlier, this research has the following objectives as per Table 1.3 below,

Table 1.3  
*Research Objective*

|  |  |
|--|--|
| Research Objective 1<br>Procurement System | To examine the relationship between the procurement system and success completion time of construction project in Manila, the Philippines. |
| Research Objective 2<br>Currency Costing   | To examine the relationship between the currency costing and success completion time of construction project in Manila, the Philippines.   |
| Research Objective 3<br>Logistics Delivery | To examine the relationship between the logistics delivery and success completion time of construction project in Manila, the Philippines. |
| Research Objective 4<br>Causes of Delay    | To examine the relationship between the causes for delay and success completion time of construction project in Manila, the Philippines.   |

Source: Developed by researcher for research purpose

## **1.6 Scope and Limitation of the Study**

### **1.6.1 Scope of the Study.**

The scope of this study covers the construction companies in Philippines, which registered with the PCAB under Grade AAAA (Grade AAAA contractors are the largest contractors based on the size of the company). The scope covers residential condominium and housing, hotel, factory, and office building in Philippines. The study focuses on the role and association of four elements within project management of a D&B method that is procurement system, currency costing, logistics delivery, and causes of delay towards the success of completion time. Finally, the study is characterised by the quantitative research approach.

### **1.6.2 Limitation of the Study**

The following are the limitations of this study,

- The study is limited to only Philippines construction company; hence the findings of this study may not be generalizable to the rest of the world. Therefore, the study only covers the Manila metro.
- The findings of this study must be applied with caution for other countries as the factors impacting project performance may vary between countries.

- The study is limited to only construction projects (such as residential condominium and housing, hotel, factory, office building) and the associated factors, which impact the project performance.
- The respondents of this study are the employee of the respective construction companies of the sample organization and their projects.
- The sample size used in this study is 967, out of which only 396 survey questionnaires were collected. Availability of more data for analysis could further assist the analysis to provide more accurate findings.
- The results of this study reflect the views of contractor companies. There can be chances that the results of similar research studies with the representation of the client and supplier may yield different results in the construction industry.
- The data collection of the questionnaire survey for this study is limited to one-month period only. Availability of longer duration may further enhance the analysis to obtain more details of findings.

## **1.7 Definition of Key Terms**

**Construction Industry** is a branch of the commercial enterprise concerned with all construction, general contractors and operative builders primarily engaged in the construction of residential, industrial, commercial or other buildings. For this

research, the researcher provides the operational definition for the key terms used in this research as bellows,

**Design & Build (D&B)** is a project delivery system used in the construction industry. It is a method to deliver a project in which the design and construction services are contracted by a single entity known as the design and build contractor where the contract for both the design and the construction of a structure are the responsibilities of the same contractor.

**Design–Bid–Build (D-B-B)** is a project delivery method in which the agency or owner contracts with separate entities for the design and construction of a project where the contract method is separated by the different independent party during the construction project.

**Procurement System** is the process of sourcing or buying products from varies supplier. The process includes the preparation and processing of demand as well as the end receipt and approval of payment. It often involves determination, specifications, supplier selection, planning, pricing analysis, financing, price negotiation, making the purchase, supply contract, inventory control, and other related functions. Procurement is the process of finding, agreeing with terms and acquiring goods, services or works from an external source, often via a tendering or competitive bidding process. The process of procurement is often part of a company's strategy because the ability to purchase certain materials will determine if operations will continue.

**Currency Costing** is the cost of the product changes with the exchange rate of the currency (if involved in international purchasing) which varies from day to day base

on the global rate. The amount of the profit or loss will be determined by the exchange rate when the due date occurs. Costing is an estimation of the price of a product or service which required the payment before it can be acquired.

**Logistics Delivery** is the flow of the products or services between one destination to another where the management will plan and control the procurement movement to achieve the objectives consumption requirements. This involves having the right amount of a good and the right time, to get to the appropriate destination in proper condition and delivering where provides a complex operation of coordination involving many segments like people, facilities or supplies the commercial activity of transporting. Inventory management planning and control of the procurement of material and other sources to meet a project requirement is essentially required.

A **Workforce** is people that engaged for work, either in a country or area or in a company or industry where the total number of employed and unemployed people who are seeking paid work.

**The Project Management** team is the team of an organization to manage and have the responsibility to coordinate discipline of planning, executing, controlling and closing the work to achieve specific goals to meet success criteria. The primary challenge of project management is to achieve all the project goals within the given constraints where project knowledge, skills, tools, and techniques to project activities to meet the project requirements.

**Completion Time** frame a specific period of time allocated to complete a project as planned and stated in a contract to complete or substantially complete a job or project.

**Quantitative Research** is a measurement of the data will formulate facts and discover patterns in research and data collection methods in a structured. formula Quantitative research is used to quantify the issues and the way to generate numerical data that can be transformed into statistical analysis like attitudes, opinions, behaviours and other defined variables where it generalises results from a larger sample population.

**Philippines Contractor Accreditation Board (PCAB)** license is requirements by all the contractors including main, sub or specialty contractor. All the contractors shall engage in the business of contracting provided by PCAB where requires compliance with appropriate laws to meet Technical and Financial requirements and safety training.

**Blueprint** is a research paradigm of a research design that leads the way in the completion of the research encompasses elements of research approach, time horizon, strategy, sampling, data collection, and analysis.

**Project Management Institute (PMI)** is project management where the application of knowledge, skills, tools, and techniques to a broad range of activities in order to meet the requirements of a project.

## **1.8 Organisation of the Thesis**

This dissertation is organised into five chapters, including this introductory chapter which provides an overview of the research.

Chapter 1 presents the key issues in relation to the background of the research and the problem statement derived from the literature review. The aim and objectives of the research, as well as the research scope, are outlined.

Chapter 2 reviews the volumes of the literature and the conceptual and theoretical underpinnings focusing on the construction project, design and build, project success metrics and the established research variables factors. It also summarises the key perspectives and the research framework developed to test the established research hypotheses.

Chapter 3 introduces the research methodology approach involving the research paradigm, the method employed, sampling, data collection, and the statistical techniques.

Chapter 4 presents the findings from the data analysis and describes the interpretations which can be concluded for project-related factors.

Chapter 5 presents a discussion of the research findings. The significance of the research in terms of used framework and concepts are discussed. It also outlines the theoretical and practical implications. Recommendations for further research ends the chapter.

## **Chapter 2**

### **Literature Review**

#### **2.1 Introduction**

This chapter presents the review of the work of literature that underpinned this research and its direction. The literature review was undertaken by collection and reviewing literature from academic and industrial writings such as Scopus indexed journals and Google Scholar cited articles. The literature review has been segmented into several sections, namely the review of project management in Section 2.2, which is then followed by the review of project management in the construction industry in Section 2.3. Section 2.4 outlines the critical success factors, ensured by a discussion about the success factors in project management in Section 2.5. Hypotheses development is given in Section 2.6. Finally, Sections 2.7 and 2.8 presents the research framework and the summary, respectively.

#### **2.2 Project Management**

Project management performance is focused on the triple constraints: control of time, cost, and progress of the project (Jha & Iyer, 2007). The decision of this study to focus on the most used practices and not the most useful is related to the fact that it is more difficult for practitioners to evaluate the usefulness of a project management practice than its extent of use.

According to Gomes, J. & Romao, M. (2016), the use of the best project management practices leads to added business value, greater benefit realization, and better benefit management activities.

The term project has been defined differently over the years (Kerzner, 2009). The Project Management Institute (PMI) in 2013 provided a systematic definition to the term project as a “temporary group of activities designed to produce a unique product, service or result”. This implies that a project is temporary with a beginning and a completion timeline. A project is also non-routine in nature and designed to achieve a prescribed goal.

Activities such as software development and construction of buildings are part of a project. A project entails effective management of its activities in order to ensure sound completion and delivery of the project on time and within the given budget (PMI, 2013). Hence a project and its management should be a value creation undertaking. Due to the value creation purpose, a project should be managed to for maximum optimisation by achieving efficiency as per expectation.

In this context, project management is a specialised management activity to achieve goals and objectives. As pointed by Milosevic & Srivannaboon, (2006) the management of a project should support the organisation’s goals and strategies, which are ideally about fast time to market, high quality and low-cost products.

The concept of project management was coined way back in the 1800s by Henry Gantt, (1861-1919) who also produced the Gantt chart diagram during the 1931 Hoover Dam

construction project. The establishment of the American Association of Cost Engineers (AACE) in 1956 infused the utilisation of project management tools and procedures by project management practitioners. The formation of the Project Management Institute (PMI) in 1968 formalised the use of project management approach across the globe (Huemann, 2016).

Cooke-Davies, et. al., (2009) argue that the value of project management is a function of what is implemented and how well it fits the organizational context. Project management value is created or destroyed depending on the extent of “fit” or “misfit” between the organization’s strategic drivers and the characteristics of its project management system. They particularly criticize the unconditional use of project management standards and view a misfit between specific project characteristics and the chosen management approach as a major source of project failure.

Project management bodies of knowledge are used by practitioners as “best practice” guides to what the project management discipline comprises. The project management body of knowledge is the sum of knowledge within the profession of project management, which includes proven traditional practices that are widely applied, as well as innovative practices that are emerging.

### **2.3 Project Management in Construction Industry**

The construction industry is not a homogenous industry; it is made up of many diverse and competing organizations and professional partnerships, the majority of whom is brought together for one custom-made project. The construction project passes in

different steps executed in different places and by different professionals (Gorse & Emmitt, 2007).

A cultural and behavioral shift in the mind-set of all participants in the construction process (Love & Heng, 2000; and Kanji & Wong, 1998) especially top or senior management is necessary if the construction industry is to improve its performance and competitiveness. For innovation and continuous improvement to be encouraged.

Innovation and continuous improvement to encourage has become a cultural and behavioral shift in the mindset of the team in the construction process (Love & Heng, 2000).

The importance of the construction industry for an economy has been widely cited in the literature (e.g. Ting, et. al., 2007; and Shehu, et. al., 2016). The notoriety of the construction project in terms of high cost overrun, non-adherence to project schedule and budget has affected the image of this industry all over the world. This has been exacerbated by the fact that construction projects come with high-risk factor (Koon, 2016).

In lieu of the high-risk factor, construction projects across boundaries are undertaken with a genuine view of achieving positive performance (Eynon, 2016). The early intervention by the United States government in the early 1980s saw the emergence of the Construction Industry Cost Effectiveness Project (CICE, 1983) which involved widespread research to identify issues and provide appropriate recommendations. The recommendations that followed suit paved way for other countries to undertake similar initiatives to review their construction projects' effectiveness and efficiency.

The ensuing Latham, (1994) and Egan, (1998) reports, respectively acknowledged the significance of Project Management in construction projects. This was further infused by the publication by the Chartered Institute of Buildings' (CIOB) "Code of Practice for Project Management" and the Royal Institution of Chartered Surveyors (RICS) "Guidance Notes and Conditions of Engagement for the Selection and Appointment of Project Managers". Most of these reports mirrored the call to treat construction as a manufacturing process with a high level of quality management aspects, from its inception up to the completion level (Forcada, et. al., 2007).

The introduction of the PMI's Project Management Body of Knowledge (PMBOK) Guide 2000 edition established the generally accepted principles for construction projects. The continuous revision of PMBOK's Guide (which is currently in its Sixth edition) is stressing the importance of project management toward construction projects across the world (www.pmi.org, 2015).

PMI cites case examples of successful construction projects using project management such as the creation of world's largest natural gas pipeline project in China, BAA Airport refurbishment project in Heathrow UK, the building of four soccer stadiums in Chile and the construction of the PTT Gas Separation Plant in Rayong, Thailand.

#### **2.4 Critical Success Factors (CSF)**

Critical Success Factors, or CSFs, are indicators for opportunities, activities or conditions required to achieve an objective within a project or mission. Critical

Success Factors (CSF) differ per organisation and reflect current and future objectives. Whether it concerns a bar, an insurance agency or contractor, it's essential that the course of action is coordinated with those aspects that help the organisation fulfil its mission. These key variables often have a huge impact on the degree to which a company is successful and effective in reaching strategic goals within the mission and are crucial in gaining a competitive advantage.

There are four key success factors that we can explore,

- Strategic Focus (Leadership, management, Planning)
- People (Personnel, Staff, Learning, Development)
- Operations (Processes, Work)
- Marketing (Customer Relations, Sales, Responsiveness)

Individual or relatively small aspects within organisations may also lead to new CSFs. When certain responsibilities within a management position are crucial for an organisation's performance, this must be closely monitored and measured.

The concept of critical success factor was coined by Rockart, (1979) who defined it as "the limited number of areas in which results if they are satisfactory, will ensure successful competitive performance for the organization". A few years later, Bruno & Leidecker, (1984) defined CSF as "those characteristics, conditions or variables that, when properly sustained, maintained, or managed, can have a significant impact on the success of a firm competing in a particular industry". Meanwhile Pinto & Slevin, (1987) defined CSF as "factors which, if addressed, significantly improve project implementation chances". The general consensus amongst these definitions outlines

the importance of management of certain elements used by organisations to achieve certain outcomes. Advocates of critical success factors, for example Esteves, (2004), and Zarina, et. al., (2014) conceptualised the dimensions of critical success factors (CSFs) into several aspects, namely:

#### **2.4.1 Hierarchy vs. Group of CSFs**

Rockart, (1979) and Rockart & Van Bullen, (1986) delved into the concept of hierarchy base CSF, which is closely associated with the organisation's layer of management or hierarchy, implying that CSFs can be level based. This implies that each level or hierarchy within an organisation will have its own success factors. In another context, some CSFs are categorised into groups of organisations that belong to the same industry, Esteves, (2004), inferring that organisations within the same industry work well with similar CSFs.

#### **2.4.2 Temporary vs. Ongoing CSFs**

CSFs are also classified as temporary and ongoing (Ferguson & Khandewal, 1999). Ongoing CSF exists in the example of a project champion within top management. The project champion becomes the impetus for continuity of a project until the completion stage. A temporary CSF can be regarded for a short time duration that is their relevance to success is only short term. While all CSFs may exude temporary characteristic, the degree of temporality may differ and case contingent.

### **2.4.3 Internal vs. External CSFs**

CSF can also be distinguished by the dimension of which they are internal or external to the organization in which they are applied. Internal CSF is closely associated with the organisation and available within it, and vice-versa (Arce & Flynn, 1997). Internal CSFs are easier to control by the organisation whereas external may not be so.

### **2.4.4 Building vs. Monitoring CSFs**

The concept of building and monitoring CSF imply on the level of control the management has toward the CSFs (Arce & Flynn, 1997). A monitoring CSF is responsible to monitor an existing situation within the organisation. For example, technology leaders within an organisation are monitoring CSF as they would be monitoring infrastructure developments of the organisation (Esteves, 2004). A building CSF is responsible to change the environment within the organisation or in a future context. For example, market sentiments would fall under this category, as it has the capacity to alter the direction of the organisation.

### **2.4.5 Strategic vs. Tactical CSFs**

This dimension is concerned with the type of planning that happens within an organization. This differentiates between the notion of strategic and tactical CSF. As pointed by Esteves, (2004), while strategic factors seek to identify which goals are to be achieved, the tactical factors describe possible

alternatives regarding how these goals can be met. Strategic factors are often exposed to a great amount of risk and, therefore, need long term planning to be executed by the senior management team. Tactical factors on the other hand deal with resources required to reach the goals described on the strategic level and only call for short or medium-term planning (Ward, 1990).

Rockart, (1979) also recognised that CSFs are essential in the strategic planning process. According to him, it's important that a company's characteristics are marked to gain a competitive advantage. Even though Critical Success Factors (CSF) don't provide a concrete contribution to the strategy's progress, they do provide a significant contribution to the planning procedure of the strategy. When the CSFs are combined with a complete strategic planning method, they function as elements that are vital to an organisation's success.

Temporary factors are linked to short-term situations. Although these factors can be important, they are usually not long-lasting. Temporary or one-time factors are often the result of a certain event. When an organisation expands in a new market, for instance on another continent, the CSF may concern expand and recruiting new capable management.

The external environment of an organisation largely determines the design of the Critical Success Factors (CSF). A PEST analysis can be used to analyse this external environment. These political, economic, social and technological factors create CSFs for every company. The organisation isn't always able to influence these macro-environmental factors, but these must certainly be

considered. Managers who work in production, for instance, must be able to guarantee quality and keep enough stock.

Subsequently, determine a way to measure whether the Critical Success Factors (CSF) are achieved. When the CSFs are fulfilled, chances are that the general strategy will be successful. Take the right precautions to ensure that projects are carefully measured.

## **2.5 Success Factors in Project Completion**

Success factor is a management term for an element that is necessary for an organization or project to achieve its mission where a critical factor or activity required for ensuring the success of a company or an organization. The term was initially used in the world of data analysis and business analysis.

The literature quotes a construction project's success criteria as the dependent that measure success itself (Srimathi, et. al., 2017). The coining of the concept of success factors by Ronald Daniel of McKinsey & Company in 1961 paved way for introduction of the various type of success factors over the years. Rockart, (1979) defined success factors as “the limited number of areas in which satisfactory results will ensure competitive performance for the individual, department or organisation”.

A similar definition was associated with a project's success factors by Baccarini & Collins, (2003) as important influences that contribute to the project's success. As

stated by Alias, et. al., (2014) and Iram, et. al., (2016) debated on the importance of understanding the success factors in project management leads to projects' success.

The extent of literature cites the prominent role of several success factors facilitating project management. In the 1960s, Rubin & Seeling, (1967) was amongst the first to review this issue. The authors concluded that technical knowledge of projects was the primary contributor to the success of construction projects.

Avots, (1969) debated on how inaccurate selection of project managers, unplanned project termination and unsupportive top management as the central reasons for project failures.

In the subsequent years, many other studies (e.g. Baker, et. al., 1983; Hughes, 1986; and Schultz, et. al., 1987) highlighted on the significance of strategic factors such as top management support, project scheduling, and tactical factors such as personnel selection, training and client consultation in project management success.

Post the 1990s, research like. Belassi & Tukel, (1996), Nwanekezie, (1996), and Chan, et. al., (2002) on the success factors for project management revealed the relevance of many other factors such as lack of technical know-how, institutional realities, space, cost, and political environment.

Studies on CSFs for construction projects received attention in the literature up to recent years. Ihuah, et. al., (2014) undertook a detailed review of the CSFs in project

management and concluded that various CSFs play an important role in successful project management of projects. Some studies were country-specific.

De Silva, et. al., (2008) and Gunasekera, (2009) reviewed the CSFs for the construction industry in Sri Lanka, while Tabish & Jha, (2011) and Kazaz, et. al., (2012) explored for India and Turkey, respectively. Yong & Mustaffa, (2017) examined the CSFs in Malaysia while Mitra & Tan, (2012) investigated this phenomenon in Saudi Arabia.

Garbharran, et. al., (2012) and Zidane, et. al., (2015) examined for South Africa and Norway correspondingly. The consensus in almost all these studies is that internal critical success factors remain as one of the most significant elements driving success.

One interesting fact in reviewing the CSFs is that the role of logistics, procurement, and causes of delay have not been really examined in the literature. These elements represent important representation of the PMI's PMBOK's Project Management Processes comprising of 13 dimensions, including cost management, procurement and time management. In lieu of this, the conceptualisation of the role of all these elements (including logistics) is given in the hypothesis development section.

## **2.6 Hypotheses Development**

The hypotheses established for purpose of this study are discussed in this section. Four primary hypotheses have been designed in line with the research objectives of this study. While the first three CSFs (i.e. procurement system, currency costing and causes of delay) are entangled within the PMBOK's Project Management framework, the last

CSF of logistics delivery is being addressed for the first time ever in a construction project management literature. The selected CSFs are part of internal CSFs. The conceptualisation follows next.

### **2.6.1 Procurement System**

The central debate within the procurement factor is that the selection of the best procurement method in a construction project would result in success (Molenar & Songer, 1998).

The procurement within construction projects involves the acquisition of resources to deliver the construction project. This is also called as the Design-Bid-Build (D-B-B) projects. This approach involves procuring projects through a process where clients enter into a contractual agreement with a consulting organisation and a contractor, who is commissioned to execute and design the work (Rashid, et. al., 2006).

PMI's PMBOK 6<sup>th</sup> Edition, Part 8 cites the importance of procurement management in successful project management. In an academic context, studies by Ling, et. al., (2009), Eriksson & Westerberg, (2011) and Zakaria, et. al., (2017) have demonstrated the importance of procurement system in successful construction's project management.

The influence of procurement on construction's success was found to be significant. In line with this argument, the following hypothesis is established for this purpose of this study:

*H1: There is a significant relationship between the procurement system and success completion time in Manila, the Philippines.*

### **2.6.2 Currency Costing**

The element of cost as a critical success factor in project management has been cited widely in the literature, inclusive of PMBOK's framework. The cost of undertaking a project, especially construction projects remains a very important factor of consideration, at both an academic and industrial perspective.

Cost overrun has been widely cited as the primary factor for projects to fail hence effective management of costs has been promoted as pivotal (Egan, 1998; Takim & Akintoye, 2002; Bowen, et. al., 2008; Enshassi, et. al., 2009; and Cho, et. al., 2009).

Some studies used the PMBOK's guideline and evaluated the importance of cost management in the construction project's management. Such studies can be segmented into those focussed on the cost estimation (e.g. Aibinu & Pasco, 2008; Doloi, 2011; and Yildiz, et. al., 2014), the budget determination (e.g.

Ahsan & Gunawan, 2010; and Kim, et. al., 2012) and cost control element (e.g. Jung & Woo, 2004; and Kim, et. al., 2012).

These studies concluded that concentration on enhancing the cost management activities through determining the main milestones and cost breakdown structures and developing progressive cost monitoring techniques for maximization of value whilst minimizing waste. This would, in turn, lead to effective project management.

Thus, the following hypothesis is established for costing:

*H2: There is a significant relationship between the currency costing and success completion time in Manila, the Philippines.*

### **2.6.3 Logistics Delivery**

The concept of logistics often is associated with the physical layout, plant placement, purchasing and even waste disposal (Villano, 2018). The effectiveness of logistics is measured via the extent proper management and planning has gone into precision forecasting, inventory management, transportation, loading and unloading, customs clearing, cargo insurance, storage supervision, and storage supervision.

In essence, logistics are movements of prescribed contents across locations in a proper and timely manner. In the construction environment, the role of logistics

is also pivotal as there will be an extensive level of movement of goods and materials for the project purpose.

Apart from that, the issue of inventory management and forecasting is also a central part of any construction project. This is because delays in logistical issues cause loss of revenue as well as reputation and poor customer satisfaction. These are invaluable properties, which are nearly difficult to recover once lost (Ready Fleet, 2017). It is within this ambit, that the present research is seeking to examine the significance of logistics within the project management perspective in relation to construction projects.

The following hypothesis is assumed:

*H3: There is a significant relationship between the logistics delivery and success completion time in Manila, the Philippines.*

#### **2.6.4 Causes of Delay**

A delay in the construction sector can be defined as the extra time needed to complete a project beyond the scheduled planned. Completion within the scheduled plan is the ultimate desire of all parties involved, including the project owner, consultant, and contractors. This is because delays cause financial and non-financial losses (Kumaraswamy & Chan, 1998; and Murali & Yau, 2006). There are three primary forms of delays (Ahmed & Abdul, 2003):

- Excusable and non-excusable
- Compensable and non-compensable
- Concurrent

Non-excusable delays are often caused by contractors or suppliers (Alghbari, 2005). Excusable delays, or known as “force majeure delays, are also called as acts of God. This is because the delay is not the fault of any parties.

Compensable delays are caused by the project’s owner or their agent, mainly due to wrong specifications by the contractors or the delays by the owners in responding to requests in a timely fashion, refer to Assaf, et. al., (1995).

Concurrent research arises when one factor delays the project at the same time or in overlapping periods of time.

There has been some recognition to the issue of causes of delay in the construction industry since the early 1970s. Researchers, Baldwin, et. al., (1971) were amongst the first to examine this issue. In subsequent years, studies by Kamming, et. al., (1997), Al-Momani, (2000), Nguyen, et. al., (2004), Shamas & Ogunlana, (2008), and Werku & Jha, (2016) explored the significance of causes of delays toward the construction projects.

The consensus amongst the studies is that the main causes of delays can be segmented into several types, i.e. project related factors, owner related factors, and contractor related factors, consultant related factors, design-related factors, material related, plan/equipment related, labour related and external factors.

In lieu of such findings, the present research seeks to examine the influence of causes of delay toward the construction project's management using the following hypothesis:

*H4: There is a significant relationship between the causes of delay and success completion time in Manila, the Philippines.*

## **2.7 Research Framework**

The establishment of the above research hypotheses leads to the design of the research framework. The present research framework is underpinned within three specific theoretical frameworks namely:

- (1) Theory of Project (Turner, 1993)
- (2) Theory of Project Management (PMI – PMBOK 6<sup>th</sup> Edition Guide, 2017)
- (3) Theory of Critical Success Factors (Rockart, 1979).

First, the theory of project (Turner, 1993) conceptualised the notion of what are the central elements of a project. Turner defined a project in terms of the scope of the work management to achieve a stated business purpose, by decomposing the scope of work into small manageable components. The characteristics of construction projects fit well to this theorisation.

Second, the concept of project management is advocated by the Project Management Institute (PMI). The importance of project management as a formal mechanism in the

completion of projects is quite common today that project-based management is the new general management technique in any organisation (Gareis, 2005; and Huemann, 2016).

The rise in project management adoption influenced the Project Management Institute (PMI) to develop a Guide to the Project Management Body of Knowledge (PMBOK Guide). The guide was first published by the Project Management Institute (PMI) as a white paper in 1983 and revised consistently over the years. PMI's 6<sup>th</sup> edition of the Guide, (2017) provides guidelines, rules, and characteristics for project management, including for the construction projects.

Last, the critical success factors theory as proposed by Rockart, (1979) has been explained as "the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department or organization". Rockart's concept of critical success factors is about finding the match between the environmental conditions and business characteristics.

The environmental conditions of a business present strength, weaknesses, opportunities and threats. Businesses must use these elements by aligning their operational strategies and resources to obtain the intended outcome.

Using these theoretical backgrounds and the established hypotheses, the following research framework is designed for purpose of this study. This framework acts as the guide in the completion of this research.

Independent Variables (IVs)

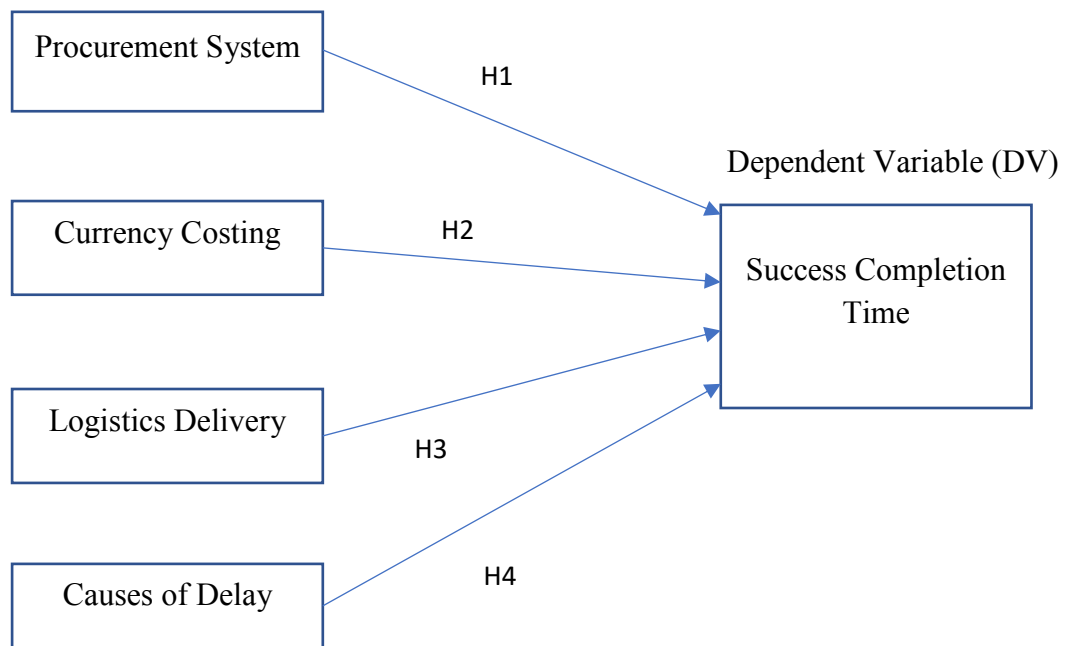


Figure 2.1  
*Research Framework*  
Source: Developed by researcher for research purpose



## 2.8 Summary

This chapter presented a review of key works of literature that helped to shape the present research. The next chapter presents the methodology employed to achieve the stated hypotheses and objectives.

## Appendix A - Summary of Journal Review

| Item | Author   | Title  | IV's                                      | DV                                     | Results   |
|------|--|--|---|--|---|
| 1    | Love, P.E.D., Earl, G & Skitmore, M.<br><br>1998 | Selecting a Suitable Method of Procurement for Building Project. Construction Mgmt and Economic, 16(2), 221-223.                         | product decisions<br>impact on the supply | strategic<br>planning                  | <ul style="list-style-type: none"> <li>- recognise formulation from strategy implementation and the focus</li> <li>- useful conceptually to distinguish between the two phases of the planning process,</li> <li>- must be integrated if organizational purpose is to be accomplished.</li> </ul> |
| 2    | Ling, F. Y.& Kerh, S.H..<br>2004                 | Comparing Performance of Design & Build and Design-Bid-Build Building Projects in Singapore<br>Architectural Science Review, 47, 163-176 | cost<br>quality<br>time                   | finish on time<br>and<br>agreed budget | <ul style="list-style-type: none"> <li>- procurement decision can make to give clients value of money</li> <li>- management abilities and to push the construction industry to achieve better performance</li> </ul>  |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 3 | Aibinu, A.A. & Pasco, T.<br>2008                  | The Accuracy of Pretender Building Cost Estimates in Australia. Construction Mgmt and Economics, 26(12), 1257-1269.                                     | undertake overseas jobs<br>commitment<br>competition<br>communication             | operations<br>stability                         | - increase contractors to export service<br>- focus on potential identified markets<br>- pooling resources can reduce risk<br>- enter new markets can diversify operation<br>and reduced demand at home |
| 4 | Ihuah, P. W., Kakulu, I. I., & Eatonn, D.<br>2014 | A Review of Critical Project Mgmt Success Factors for Sustainable Housing in Nigeria.<br>- International Journal Sustainable Built Environment 3, 62-71 | project scope<br>project proposal<br>project cost quality<br>end user requirement | method of D&B                                   | - success of the D&B projects in managing<br>- committed to the project objective achievement<br>- meeting the allotted time frame and cost   |
| 5 | Grant, C., & Osanloo, A.<br>2014                  | Understanding, Selecting and Integrating Theoretical Framework in Dissertation Research. Journal of Administration 4(2)                                 | concept of integration<br>element of integration                                  | value of mgmt<br>constructability<br>partnering | - improvement of value mgmt has impact on<br>successful performance for D&B<br>- integrated DV solution reduce problems<br>that occur in D&B projects   |

|   |   |   |   |                     |   |
|---|---|---|---|---------------------|---|
| 6 | Jaweed, R<br>2004                                       | An Implementation Model for Design & Build Project Delivery System.<br>Journal School of Environment Design, Saudi Arabia | design/build method<br>type contract<br>value contract                        | project deliver     | - D&B system has gradually accepted<br>- open tender is well accepted in Polish<br>- currently Poland believed D&B should use in small project, (below Eur1.2million)                 |
| 7 | Kerzner, H.<br>2009                                     | Project Mgmt. A Systematic Approach to Planning Scheduling and Controlling.   | purchasing supply process<br>technology solution<br>internal external factors | optimise cost value | - procurement strategic play an important role in future procurement power<br>- maturity depend on business sector, size, age<br>- internal external factors contribute to cost value |
| 8 | Zarina, A., Aris, N.M, Zawawi, E.M.A & Yusof, K<br>2014 | Determining Critical Success Factors of Project Management Practice<br>Social Behavioural Sciences, 153, 61-69            | project mgmt action<br>project procedures<br>human factors<br>external issues | project success     | - assist project mgmt to achieve specific performance level<br>- provide forecast tool enable rapidly successful project  |

|    |   |  |   |                                     |   |
|----|---|--|---|-------------------------------------|---|
|    |   |  | project related factors   |                                     | - IV's to be considered for project   |
| 9  | Ofori, G<br>2016  | Construction in Developing Countries. Current Imperatives and Potential.<br><br>Createing Built Environment of New Opportunity. 1, 39. | characters of services<br><br>knowledge mgmt<br>relevant strategic sourcing | purchase efficiently                | - procurement is a significant area of cost<br>- knowledge base service has overlooked<br><br>of applying knowledge mgmt<br>- inventory the procured knowledge can be made explicit |
| 10 | Rashid, A.R., Mat Taib, I., Wan Ahmad, W.B. Nasid, M.A & Zainordin, M..Z.<br><br>2006 | Effect of Procurement Systems on the Performance of Construction Projects, Padang. 1-13  | cost mgmt<br>IT<br>supplier relationships<br>record mgmt                    | organizational performance          | - employee were not well train<br>- IV's affects performance<br>- performance require the mgmt contribution   |
| 11 | Radhia, A. & Bouzid, A.   | Transport Infrastructure and Economic Growth. Journal of Infrastructure Development. 9(2)  | industry characteristics<br>competitive environment                         | procurement logistic<br><br>costing | - bring significant saving in procurement cost<br>- procurement system give efficient to  |

|    |   |   |   |                    |   |
|----|---|---|---|--------------------|---|
|    | 2017  |   | resources layout  |                    | procurement strategy  |
| 12 | Nguyen, D.L. Lan,<br>D.T. & Ogunlana,<br>S.<br><br>2004 | A Study of Project Success Factors in Large Construction Projects in Vietnam. Engineering Construction and Architectural Mgmt, 11(6), 404-413 | type of waste<br><br>stage of application<br>benefits of lean | lean construction  | - waiting is the most common type of waste<br><br>- lean construction is highly used in all stages<br><br>- customer satisfaction achieve                           |
| 13 | Sebastiano, L.<br>2014                                  | Client-Consultant Interaction Practices for Sources of Ingenuity, Value Creation and Strategizing. BI Norwegian Business School               | human contextual attribution trust failure                    | trust project mgmt | - benefits spread to both relational and transactional<br><br>- important of trust & benefits in project mgmt<br><br>- individual experience influence project mgmt |

## CHAPTER 3

### METHODOLOGY

#### 3.1 Introduction

This chapter presents the methodology employed in this research. The research framework is discussed in Section 3.2, It followed by the discussion of hypotheses development adopted and the discussion of the research design in Sections 3.3 and 3.4, respectively. Section 3.5 and Section 3.6 explain the operational definition and the measurement of variables. The discussion of the data collection in Section 3.7, ensured by the sampling approach used in the research is given in Section 3.8. The explanation of the data collection procedures is given in Section 3.9. The highlights of the data analysis are presented in Section 3.10 with the summary.

#### 3.2 Research Framework

Research is formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. The research framework is the structure that can hold or support a theory of a research study where introduces and describes the theory that explains why the research problem under study exists.

### Independent Variables (IVs)

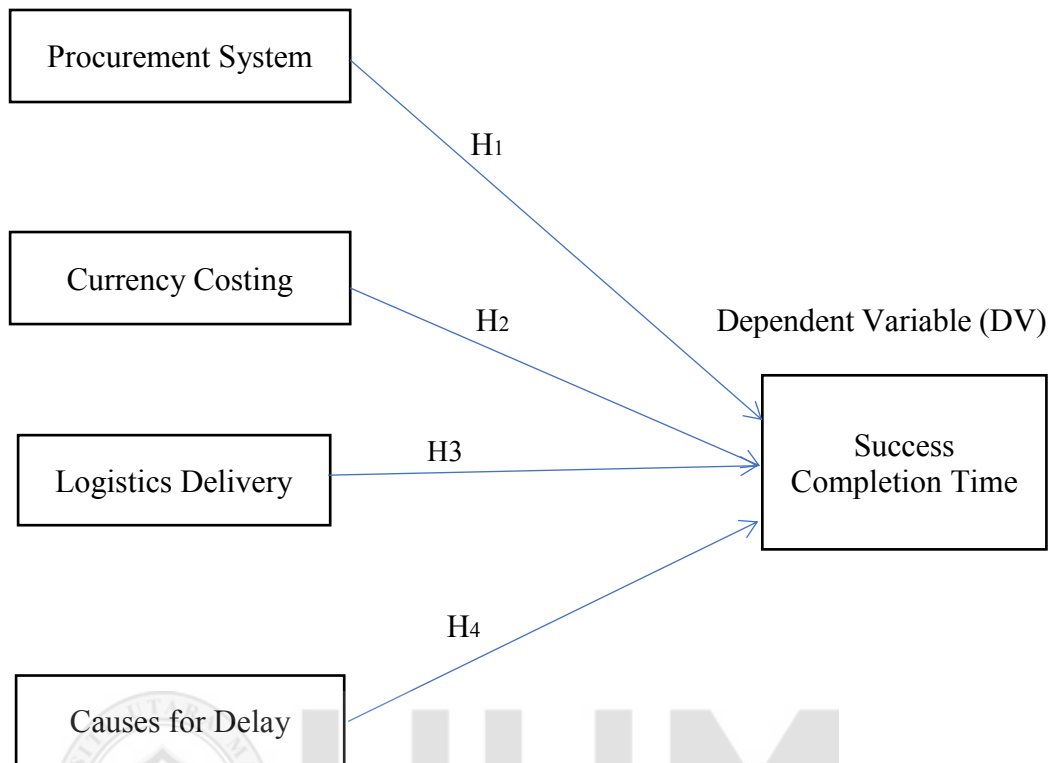
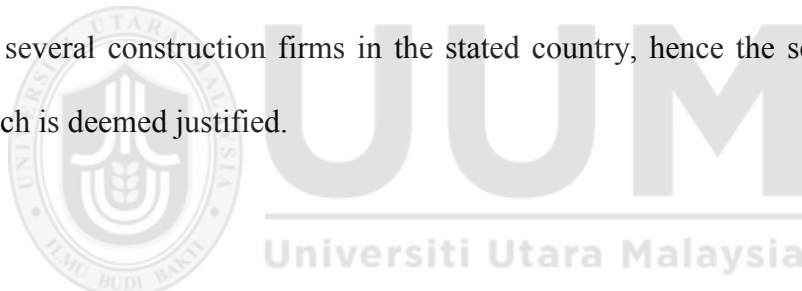


Figure 3.1  
*Research Framework*  
Source: Developed by researcher for research purpose

Methodological literature identified the existence of two main research approaches, namely quantitative and qualitative approaches (Creswell, 2003 and Cooper & Schindler, 2011). Qualitative research involves non-numeric data collection involving a smaller sample size. Qualitative research entails using direct human interaction-based data collection techniques such as interviews, focus group discussions, and observations. Qualitative research is often used when a phenomenon needs to be explored with a view of understanding a certain theoretical issue which is often new or rather unexplored. There are times qualitative research used to develop a new theoretical perspective with novel explorative nature.

Quantitative research, on the other hand, is positivism-based research approach (Becker & Jurgens, 1990). This infers that the data collection is based on investigative nature and involves number driven analysis. Data are collected and analysed statistically (Chao Han, 2018). The present research selected the quantitative approach as the chosen phenomenon of factors driving the success of project management have been investigated repeatedly in the literature, albeit across different contexts.

Thus, there is no creation of a new theoretical lens. However, this research aims to investigate the success factors of the design & build construction project management in Manila, the Philippines. This context remains unexplored and presents the need for an examination. To achieve the objective, survey-based data need to be collected across several construction firms in the stated country, hence the selected research approach is deemed justified.



### **3.3 Hypotheses/Propositions Development**

A hypothesis is a tentative statement about the relationship between two or more variables and serves as the basis for an experiment to test whether the relationship holds true. It is a specific, testable prediction about what you expect to happen in a tested research.

Hypotheses are generated in business process improvement initiatives in order to create experiments that determine the best combinations of factors for a process.

In the context of the time horizon, the present research has employed the cross-sectional surveys. This represents the gathering of data from a sample at a single point in time (Saunders, et. al., 2007 and Sekaran, 2003). In comparison to the longitudinal research, cross-sectional time horizon entails a shorter time duration with lesser effort (Aric, et. al., 2008). In this context, there was no repeated gathering of data from the same sample at the different time period. Hence the horizon remains a single timeline.

This research study the problems that considered several aspects of skill, knowledge, awareness, management, cultural, political, financial, and social. It covered a broad approach to capture and understand the entire progress view and attitude of key construction regarding this research problem.

### **3.3.1 Procurement System**

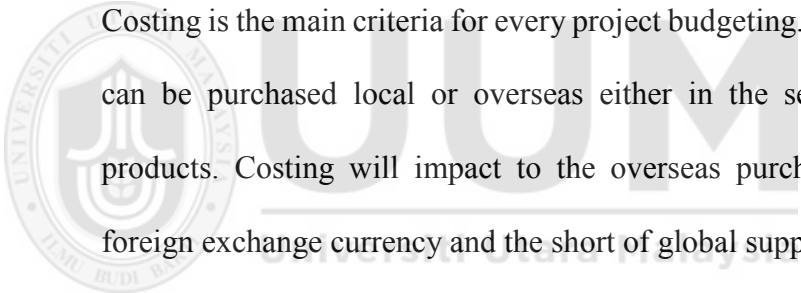
The procurement system plays a vital role in purchasing materials for respective projects at a budgeted price and delivery schedule, either locally or overseas. With the planning, materials can arrive as per schedule at the respective project site to avoid any shortage of materials which may lead to the delay of works. Procurement department must be aware of the site requirement for the respective materials require at the site at the specific time frame to prevent the obstruction of the other works schedule. Therefore, a procurement system is significant to support the project completion time.

Bowen, et. al., (2008) stated customers and contractors always have great confidence in the time performance of Design & Build

procurement systems but doubt on confidence in the conventional procurement systems. Cost projects performance has been under the low level of confidence where evidence of procurement system on all the various occasions.

Memon, et. al., (2014) found that their studies relationship between procurement and materials are related factors gave significant impact on project performance with the respect of time.

### **3.3.2 Currency Costing**



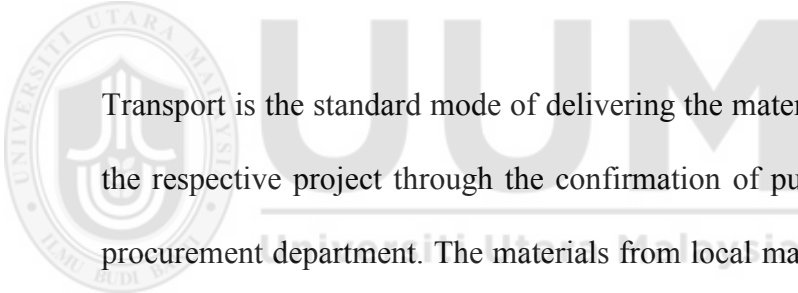
Costing is the main criteria for every project budgeting. The materials can be purchased local or overseas either in the semi or finished products. Costing will impact to the overseas purchase due to the foreign exchange currency and the short of global supply. So, the local manufacturer also facing the same scenario as they require to buy raw materials to process into semi or finished products.

Both involve a value as the commodity trade between the buyer and supplier which buyer may wait for some time for the currency to go down while supplier may prolong the delivery to gain more from the foreign exchange. Example, procurement require to place an order for the material in ahead of minimum of several months for the factory to produce and allocate a time frame for shipment to arrive destination.

Meanwhile, a lock-in price rate is required holding till the time of shipment. Should both parties cannot agree on a term of pricing at equilibrium, there will be short of materials at the site. Therefore, currency costing is significant to determine project completion time.

Shehata & El-Gohary, (2011) stated that the customers in the construction are primarily concerned with time, costing and quality while most of the construction projects are procured based on only two criteria, namely timing and costing.

### **3.3.3 Logistics Delivery**



Transport is the standard mode of delivering the materials required by the respective project through the confirmation of purchasing by the procurement department. The materials from local manufacturer to be delivered subject to schedule between the procurement and site mainly by inland transport.

Meanwhile, for those materials require to purchase from overseas, logistics must be planned as the shipment or air freight only apply to restricted schedule subject to nature delay. Without proper planning on the logistics, the materials may be a delay or late arrival to the respective site for the actual schedule to be completed. For an example, the cement or steel bar delay to reach site will obstruct the rest of the site progress as these materials require the urgency for the structure of

the construction, a good plan logistics, materials will reach the construction site on time to prevent any obstruction. Therefore, both inland and overseas logistics are significant to support the project completion time.

Sambasivan, & Soon, (2007) found in the studies that the shortage of materials at the site is one of the main causes for the delay construction project in Malaysia.

### **3.3.4 Causes of Delay**

There are many important causes of delay related to owner involvement, contractor performance and the early planning and design of the project. While in time overrun, the most important factors causing delays are design changes, resource shortages, lack of experienced construction manager, lowest bidder selection, funding shortage by owner, lack of proper management, improper planning and scheduling, lack of skilled workers, site constraints, contractors' cash flow problems during construction, escalation of resources price and contractors' excessive workload. Construction delay is a common problem worldwide, which is considered as one of the main reasons for project failure.

Abdul & Olanrewaju, (2015) studied the causes of delay in large public projects in Singapore. They found that the shortage of labor, delivery,

costing, management, and disagreement between clients, consultants and contractors on the use of a single system of measurement for each party's progress was among the main causes of delay.

### **3.3.5 Success Completion Time**

Completion period manage by management is vital for a project site where all the schedule will follow the programme. Engaging a qualify Project Manager is crucial where this person is to lead, plan, monitor, communicator and enhance the team spirit to manage and motivate the project at the site to meet the task completion at all stage of works plus solve the issues at the site. The project manager skill is to manage from the external site and internal office all the way to headquarters for the entire project duration. Therefore, the project manager is significant to achieve project completion time.

Doloi, et. al., (2011) stated that the expertise and performance by the contractors always involved in a significant role for the success of completion delivery a project. A clear understanding and the successful decision of selecting a right contractor always underlying attributes associated with contractors' context of achieving successful project references is critical.

This research employed the survey data collection strategy. The survey is a commonly

adopted research strategy within the quantitative research approach. Data collected via survey are subjected to various statistical tests to ensure the reliability and validity of the collected data. This is important of the collected data from a sample needs to be generalized to the given population.

### **3.4 Research Design**

A research design is a blueprint of a research paradigm (Grant & Osanloo, 2014). The blueprint leads the way in the completion of the research. The blueprint encompasses elements of research approach, the time horizon, the strategy adopted, sampling, data collection, and data analysis. The purpose of this research, the blueprint covers the following angles:

- Research approach – quantitative research.
- Time horizon – cross-sectional.
- The survey strategy – adopted.
- Sampling – non-probability, convenience and purposive.
- Data collection – questionnaire.
- Data analysis – statistical analysis.

### **3.5 Operational Definition**

Construction Industry is a branch of the commercial enterprise concerned with all construction, general contractors and operative builders primarily engaged in the construction of residential, industrial, commercial or other buildings. For this

purpose of this research, the researcher provides the operational definition for the key terms used in this research as bellows,

**Client Related Factors** – Odeh & Battaineh, (2002)

Factors such as finance and payment of completed work in the project, too much owner interference matters, slow decision-making on critical issues and unrealistic duration imposed for completion by the owner.

**Contractor Related Factors** – Odeh & Battaineh, (2002)

Factors related to sub-contractors such as improper site management, planning, work execution, construction methods, and inadequate experience.

**Causes of Delay** – Saleh & Addelnaser, (2009)

Causes of delay are one of the biggest problems in construction where many negative effects such as lawsuits between owners and contractors, increased costs, loss of productivity and revenue, and contract termination. insufficient coordination and ineffective communication between involved parties in construction.

**Cost Overrun** – Sambasivan & Soon, (2007)

Factors related to the contract, such as change orders that result in a cost of execution of the project exceeding the estimated cost of the project.

**Currency Costing** – Bernard & Terrance, (1996)

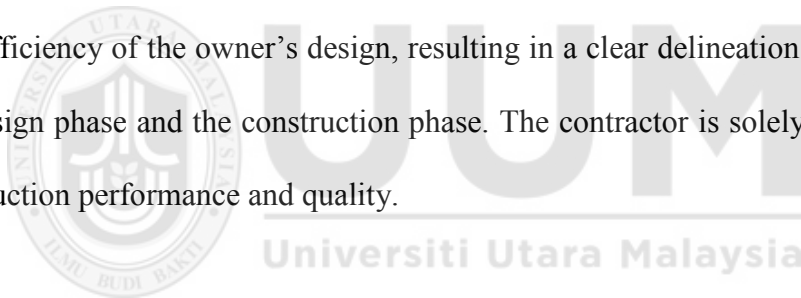
Supply chain offers many opportunities to determine the costing of the products where the potential market approach for measuring the cost of activities spanning the entire channel from one place to another where currency will be involved.

**Design & Build** – Boudjabeur, (2000)

Design and build as a method of procurement is a fundamental change in the concept of procuring buildings compared with the traditional methods. It places the responsibilities for both design and construction on to the contracting side of the industry.

**Design-Bid-Build** – Tsai & Yang, (2010)

Design-Bid-Build is the traditional delivery method where an owner contracts with the designer/engineer to develop a project design and bid package, and then the selected contractor contracts directly with the owner for the construction phase of the project. The risk of design error remains with the owner, as the contractor is entitled to rely on the sufficiency of the owner's design, resulting in a clear delineation of risk between the design phase and the construction phase. The contractor is solely responsible for construction performance and quality.



**Leadership** – Kotter, (2001)

Leadership is different from management where each has its own functions features. Leadership is about the action of leading a group of people/organization whilst management is the process of dealing with or controlling things or people.

**Logistics Delivery** – SCRC, (2011)

Logistics management is the process of strategically managing the procurement, movement, and storage of materials, parts and finished inventory through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfilment of orders.

**Material Related Factors** – Odeh & Battaineh, (2002)

Factors such as delay in delivery of materials, wrong delivery of materials, short supply of materials, quality issues of supplied materials.

**Procurement** – Robert & Stephen, (1991)

Procurement is a complex process (quality, supply chain, cost delivery) activities as the act of buying products across the organizational boundaries for the project requirement which involve several parties.

**Project** – PMBOK, (2017)

A project is a temporary endeavor undertaken to create a unique product. The project is often implemented as a means to achieve the organization's strategic plan.

**Project Management** – Maserang, (2002)

Project management is challenging with many tasks and objectives where can be defined the application of a collection of tools and techniques to plan, control and direct the use of diverse resources for the accomplishment of a task within cost, time, and quality constraints.

**Time Overrun** – Sambasivan & Soon, (2007)

Delay in completing the project within the agreed time duration of the project due to factors, such as inadequate planning, improper site management, lack of site experience, delay in payment by the client.

**Success Project** – Bannerman, (2008)

Project success is an assessment of performance is made in a post-project review based on whether the project was completed on time, within budget and to specification.

### **3.6 Measurement of Variables/Instrumentation**

Given the exploratory nature of this study comparing the methods for the data collection, analysis and reporting, the quantitative method will also present the opportunity to source, examine, interpret and analyse quantitative data. The study will include for reviewing the attitudes, opinion, and views of many concerned key industry stakeholders and analyse their perception of the impediments for the application of D&B method of contracting.

Consequently, the answers had to emerge from discussions with the selected research sample. Past studies found in the literature review which pointed to the unpopularity of D&B method of contracting in Philippines construction industry were limited to provide procurement. These variables play a part in the role to reflex the project completion schedule where each variable is interlinked.

Procurement system plays an important role in the quality, costing and shipment for the products require for respective projects specification.

Currency costing of the construction is defined as the tender cost of the project represented by the winning tender sum. Unit cost and intensity are the two cost measures used to further analyse construction costs.

Logistics delivery on the overseas shipment and local inland transport also define as the factors of the delivery of materials to the respective project's site.

Causes of delay related to owner involvement, contractor performance, and the early planning and design of the project. While in time overrun, the most important factors causing delays are design changes, lack of skill worker, inadequate planning, and resource shortages.

The project management team is the project team with qualification and experience that enhance the level of competency which derives the efficient and effective progress work for an individual project

The Likert scale established by Rensis Likert is the most repeatedly used deviation of the summarized rating scale. Summated rating scale comprises of statements that express either a satisfactory or dissatisfactory assertiveness toward the thing of interest. Likert scales are perhaps very consistent and provide a bigger volume of information that several other scales stated by Cooper, & Schindler, (2011)

### **3.7 Data Collection**

The data collection process is enveloped with the questionnaire design, measurements, and data collection approach.

### **3.7.1 Questionnaire Design**

Data for this research was collected using a questionnaire. The questionnaire was designed in a way to increase the response rate, as proposed by Dillman, (1991). The questionnaire was sent directly to the key informant in each sample firm. The questionnaire was printed on white color paper to showcase professionalism and was printed on both sides to reduce bulkiness and density. Answering the questions was made easy for the participants by asking them to make a simple tick on a number scale.

The questionnaire was designed with six sections. Section A comprised the profile of the respondents with 10 demographic questions. These questions were designed with an ordinal scale. Sections B to F comprised of Likert scale questions, with Strongly Disagree (1) through Strongly Agree (5) measures. Section B probed on the procurement system issues related to design & build construction projects, with five (5) sub-scales and comprised of a total of 22 questions.

Section C entailed the issue of currency costing of design & build construction projects, with three (3) sub-scales with a total of 19 questions. Section D probed on the logistics delivery of design & build construction projects, with a total of 20 questions in five (5) sub-scales.

Section E had 23 questions pertaining to success completion time design & build construction projects, with three (3) sub-scales and Section F probed on

the causes of delay of design & build construction projects, with 14 questions in one (1) sub-scales.

Questions in Sections B, C, D and F reflects the independent variables (IVs), while Section E informs on the dependent variable (DV).

### **3.7.2 Measurements**

The questions used in this research were designed by the researcher and validated via the pre-test and face validity approaches. The questions were designed by the researcher with the guidance of the literature (Dale, et. al., 1972; Ostriker & Kuh, 2003; and Janet, 2011) and input from the academic and industrialist experience. Prior to using the questionnaire, they were subjected to pre-testing, which was done by providing the questions to a local academic institution and three industrialists.

Both the academic and the industrialists were selected based on connection and were asked to check on the logic and relevance of the questions in accordance to the given research objectives, refer to Takim & Adnan, (2008). Some comments were received from them and the changes were undertaken by the researcher.

### 3.8 Sampling

A sample size represents a population in focus (Sekaran, 2003). Sampling is done as it would normally be challenging to gather data from an entire population to be part of the research. Two main forms of sampling exist, namely probability and non-probability sampling. A probability sampling entail selection of a sample using a systematic random approach to ensure that different units in the population stand an equal probability of being selected in the sample. A non-probability sampling involves selection of a sample using a non-systematic approach, inferring that the odds of a member of a population being selected cannot be computed. Non-probability is a subjective selection approach and requires logical and experiential driven choosing method. Some of the commonly used non-probability sampling tools are purposive, convenience and snowball.

The purpose of this research, the non-probability sampling approach was selected. This was because the population of the construction firms in Manila, the Philippines are 9,670 as of 2017 (refer to Figure 1.3, Distribution of PCAB Licensed Contractor). Obtaining the contact details of these firms remains a challenge. Thus, the researcher decided to adopt the purposive and convenience sampling techniques and selected the sample construction firms through the construction networks. Details of known construction firms were obtained from fellow construction firms in Manila, who were then approached for participation purpose.

Overall, a total of 967 participants were targeted for the purpose of this research. The details of the participants were obtained from known construction firms in Manila where knowledge of the samples helps to determine the size of this research.

### **3.9 Data Collection Procedures**

The data was collected using the following procedure. A package of the questionnaire, comprising of the questionnaire, an introductory letter and a return self-addressed envelope (addressed in Manila) was posted to the potential participants of 967 construction firm in Manila on 4<sup>th</sup> June 2018. A follow-up email was done two weeks after sending the package. Depending on the response level, a second follow up reminder email was done by end of June 2018. By the 1<sup>st</sup> week of July 2018, the researcher decided to stop collecting the questionnaire. All the questionnaires were posted to the researcher's given local address in Manila with a representative to take care of the collection.

#### **3.9.1 Pilot and Actual Studies**

This research was undertaken in two stages. First, a pilot study was carried out with 30 related respondents in Manila. The first version of the questionnaire for the pilot had a slightly different version of the questions, minus the Section F: Causes of Delay. The pilot was undertaken using a similar method and approach (as highlighted above) and the results were used to understand the questionnaire mechanism for any modification purpose. The results of the pilot

are shown in the ensuing Chapter 4. The pilot study was undertaken in May 2018.

Pursuant to the pilot study, the actual large-scale study was undertaken in June 2018. The actual study comprised of a study with 967 potential participants, as per discussion is given earlier which the actual data collected was 396 respondents.

### **3.10 Techniques of Data Analysis**

The collected data for both pilot and actual studies were analysed using descriptive analysis (i.e. frequency distribution) and multiple regression analysis. Both analyses were done using SPSS. The descriptive analysis informs on the distribution of the demographic data collected from the respondents. This indicates the background of those who participated in the research and the potential validity of the answers provided to the other psychographic questions related to independent and dependent variables. Frequency tables were projected in this analysis and reported in Chapter 4.

Following the descriptive analysis, the multiple regression test was undertaken.

Multiple linear regression is a statistical method that examines the relationships between continuous variables and the dependent variable. This test helps to identify the relationships between the established independent variables (predictors) and the single dependent variable. Prior to carrying out the multiple regression, several series of assumptive tests were executed, namely: linearity, normal distribution,

constant variance, multicollinearity, independence of errors and model adequacy (F-test).

This chapter discussed the methodology employed in this research. Details of the data collection style and approach, as well as the analytical perspective, were outlined. The next chapter presents the findings of the analysis undertaken from the gathered data.



## Chapter 4

### FINDINGS RESULT AND DISCUSSION

#### 4.1 Introduction

This chapter presents the findings obtained from the data analysis. Section 4.2 highlights the descriptive analysis interpretation in terms of the frequency distribution of the respondents' demographic properties. Section 4.3 discusses the results of the statistical components, namely the multiple regression tests. The summary of the results is given in Section 4.4.

#### 4.2 Descriptive Analysis

The descriptive analysis in this study was conducted using the frequency distribution analysis on the demographic elements of the respondents. The demographic elements are:

1. Gender.
2. Age.
3. Nationality.
4. Education level.
5. Lifetime of the company (in years).

6. Role of the employee in the company.
7. No. of experience of the employee in the company (in years).
8. No. of employees working in the company.
9. Average gross revenue of the company (in USD millions).
10. Type of projects undertaken by the company.

The frequency analysis for the individual demographic elements is as elaborated below.

#### 4.2.1 The Overall Frequency Distribution

The overall frequency analysis was conducted on the data and the result is as depicted in Figure 4.1. A total of 396 valid responses were obtained in the study with no missing elements.

Table 4.1  
Overall frequency analysis

|             | Gen<br>der | Age | Natio<br>nality | Educati<br>on Level | Compan<br>y Life<br>time<br>(years) | Role in<br>the<br>compan<br>y | Experie<br>nce<br>(years) | Number<br>of<br>Emplay<br>ees in<br>the<br>compan<br>y | Average<br>gross<br>revenue<br>/year<br>(millions<br>) | Type of<br>projects<br>undertak<br>en |
|-------------|------------|-----|-----------------|---------------------|-------------------------------------|-------------------------------|---------------------------|--|--|---------------------------------------|
| Vali<br>d   | 396        | 396 | 396             | 396                 | 396                                 | 396                           | 396                       | 396  | 396  | 396                                   |
| Missi<br>ng | 0          | 0   | 0               | 0                   | 0                                   | 0                             | 0                         | 0  | 0  | 0                                     |

Source: Data Collected by researcher for research purpose

#### 4.2.2 Gender

The gender formation of the participated respondents is shown in Figure 4.2. About 72.2 percent of the respondents were male (n = 286), while the balance of 27.8 percent (n = 110) of them were female participants. There seem to be more male construction project operators than female in Manila.

Table 4.2  
*Frequency analysis – Gender*

|            | Frequency | Percent | Valid Percent | Cumulative Percent |
|------------|-----------|---------|---------------|--------------------|
| Valid Male | 286       | 72.2    | 72.2          | 72.2               |
| Female     | 110       | 27.8    | 27.8          | 100.0              |
| Total      | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.3 Age

The analysis reveals that majority of the respondents (67.7 percent, n = 268) were from the age category of 36-50 years old as represented in Figure 4.3. Another 20.2 percent (n = 80) of them belonged to the age cohort of 20-35 years old. Only 12.1 percent of the respondents (n = 48) was 51 years and above. This indicates that the respondents were the middle 30s to early 50s adults, representing a Generation X distribution primarily.

Table 4.3  
*Frequency analysis – Age*

|                    | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------------|-----------|---------|---------------|--------------------|
| Valid 51 and above | 48        | 12.1    | 12.1          | 12.1               |
| 36-50              | 268       | 67.7    | 67.7          | 79.8               |
| 20-35              | 80        | 20.2    | 20.2          | 100.0              |
| Total              | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.4 Nationality

As shown in Figure 4.4, nearly 97.7 percent (n = 387) of the respondents were citizens of the Philippines, with a balance of 2.3 percent (n = 9) being expatriates. This reflects that the results of the analysis can be generalized to the geographic location where the study was intended to conduct.

Table 4.4  
*Frequency analysis – Nationality*

|                  | Frequency | Percent | Valid Percent | Cumulative Percent |
|------------------|-----------|---------|---------------|--------------------|
| Valid Expatriate | 9         | 2.3     | 2.3           | 2.3                |
| Citizen          | 387       | 97.7    | 97.7          | 100.0              |
| Total            | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.5 Education Level

The education background of the respondents is shown in Figure 4.5 below. As can be seen in Figure 4.5, most of the respondents (61.4 percent, n = 243) are holders of a bachelor's degree qualification, followed by diploma qualifiers (i.e. 24.0 percent, n = 95). Another 13.9 percent of them are holders of postgraduate qualification (n = 55). This suggests that the respondents' answers for the sought questions can be regarded as valuable and of decent validity due to the educational background of workers.

Table 4.5  
*Frequency analysis – Education level*

|       |             | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------|-----------|---------|---------------|--------------------|
| Valid | PhD         | 2         | .5      | .5            | .5                 |
|       | Master's    | 55        | 13.9    | 13.9          | 14.4               |
|       | Diploma     | 95        | 24.0    | 24.0          | 38.4               |
|       | Certificate | 1         | .3      | .3            | 38.6               |
|       | Bachelor's  | 243       | 61.4    | 61.4          | 100.0              |
|       | Total       | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.6 Lifetime of the Company (in years)

For the element of the sample company's lifetime, nearly 59.8 percent of the respondents indicated working in a company which has more than 10 years (n = 237) of experience in the building and construction industry (refer to Figure 4.6). This is followed by another 34.1 percent (n = 135) of the companies with 5-10 years of experience in the industry. A small percentage of the companies (6.1 percent, n = 24) indicated being in the industry for less than 5 years. This result infers selection of stable and sound sample companies for the purpose of this study, suggesting in-depth knowledge of the local construction industry.

Table 4.6  
*Frequency analysis – Company life time (in years)*

|       |              | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------------|-----------|---------|---------------|--------------------|
| Valid | more than 10 | 237       | 59.8    | 59.8          | 59.8               |
|       | less than 5  | 24        | 6.1     | 6.1           | 65.9               |
|       | 5-10         | 135       | 34.1    | 34.1          | 100.0              |
|       | Total        | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.7 Role of the Employee in the Company

The role of the responding persons was gauged. As shown in Figure 4.7, the majority (48 percent, n = 190) of the respondents are working in a managerial role. Another 31.8 percent (n = 126) of them are in executive roles. Nearly 17.7 percent (n = 70) of the employees are in senior managerial roles, with another 2.5 percent of them being in non-executive roles (n = 10). There is a sound distribution of the respondents' role and work experience in the industry, suggesting the viability of obtaining a reasonable answer to sought questions.

Table 4.7  
*Frequency analysis – Role in the company*

|                         | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------------------------|-----------|---------|---------------|--------------------|
| Valid Senior managerial | 70        | 17.7    | 17.7          | 17.7               |
| Non-executive           | 10        | 2.5     | 2.5           | 20.2               |
| Managerial              | 190       | 48.0    | 48.0          | 68.2               |
| Executive               | 126       | 31.8    | 31.8          | 100.0              |
| Total                   | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.8 No. of Experience of the Employee in the Company (in years)

The next element probed on the experience of the participant in their respective companies. The result shows (Figure 4.8) that most of the respondents indicated being in the company for more than 3 years (48.5 percent, n = 192). This is followed closely by those working between 1 – 3 years (41.9 percent, n = 166), and those working less than 1 year (9.6 percent, n = 38). Again, the expected answers from the ensuing survey were expected to be satisfactory as the respondents were young adults, with the probability of financial commitment.

Table 4.8  
*Frequency analysis – Experience in the company*

|                   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------------------|-----------|---------|---------------|--------------------|
| Valid more than 3 | 192       | 48.5    | 48.5          | 48.5               |
| less than 1       | 38        | 9.6     | 9.6           | 58.1               |
| 1-3               | 166       | 41.9    | 41.9          | 100.0              |
| Total             | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.9 No. of Employee Working in the Company

In terms of the number of employees working in the company, a large proportion of the sample companies (51.3 percent,  $n = 203$ ) suggested the existence of 51-100 employees. Nearly 37.6 percent ( $n = 149$ ) of them have staff capable of more than 100 employees.

Table 4.9  
*Frequency analysis – No. of employees in the company*

|                     | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------------|-----------|---------|---------------|--------------------|
| Valid more than 100 | 149       | 37.6    | 37.6          | 37.6               |
| less than 50        | 44        | 11.1    | 11.1          | 48.7               |
| 51-100              | 203       | 51.3    | 51.3          | 100.0              |
| Total               | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.10 Average Gross Revenue of the Company (in USD millions)

As shown in Figure 4.10, the majority of the firms (i.e. 37.4 percent, n = 148) indicated an average annual gross revenue of 8-11 million. Another 34.3 percent (n = 136) of the companies demonstrated a gross revenue of more than 11 million. Further, nearly 21.7 percent (n = 86) of the companies indicated earning a gross revenue of 5-8 million. Nearly 6.6 percent of the companies identified themselves with less than 5 million average annual gross revenue.

Table 4.10  
*Frequency analysis – Average gross revenue/year (in USD million)*

|                    | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------------|-----------|---------|---------------|--------------------|
| Valid more than 11 | 136       | 34.3    | 34.3          | 34.3               |
| less than 5        | 26        | 6.6     | 6.6           | 40.9               |
| 8-11               | 148       | 37.4    | 37.4          | 78.3               |
| 5-8                | 86        | 21.7    | 21.7          | 100.0              |
| Total              | 396       | 100.0   | 100.0         |                    |

Source: Data Collected by researcher for research purpose

#### 4.2.11 Type of Projects Undertaken by the Company

Apart from the above-discussed elements, the survey also examined the type of projects in which the participating companies are usually involved. The type of construction projects was divided into the following categories:

1. Office building
2. Factories
3. Residential condominiums
4. Residential houses
5. Hotels

The result shows that most of the companies have been undertaking mixed projects. Majority of the respondents (23 percent, n = 91) are involved in office and factory construction projects. Another 18.9 percent (n = 75) indicated doing a mix of residential condominiums, houses, and hotels. Another 15.2 percent (n = 60) firms are involved in condominiums and houses only. The third largest cohort (12.9 percent, n = 51) are into the office building, condominiums, houses, and hotel constructions. On an individual perspective, most of the respondents highlighted doing only factories (13.9 percent, n = 55).

Table 4.11  
*Frequency Analysis – Type of projects undertaken*

|  | Frequency  | Percent      | Valid Percent | Cumulative Percent |
|--|------------|--------------|---------------|--------------------|
| Residential condominiums;<br>Residential houses; Hotels                                | 75         | 18.9         | 18.9          | 18.9               |
| Residential condominiums;<br>Residential houses  | 60         | 15.2         | 15.2          | 34.1               |
| Office building; Residential<br>condominiums; Residential<br>houses; Hotels            | 51         | 12.9         | 12.9          | 47.0               |
| Office building; Residential<br>condominiums; Residential<br>houses                    | 11         | 2.8          | 2.8           | 49.7               |
| Office building; Hotels<br>Office building; Factories;                                 | 7          | 1.8          | 1.8           | 51.5               |
| Residential condominiums;<br>Residential houses; Hotels<br>Office building; Factories; | 34         | 8.6          | 8.6           | 60.1               |
| Residential condominiums;<br>Residential houses  | 2          | .5           | .5            | 60.6               |
| Office building; Factories;<br>Hotels  | 2          | .5           | .5            | 61.1               |
| Office building; Factories   | 91         | 23.0         | 23.0          | 84.1               |
| Office building  | 6          | 1.5          | 1.5           | 85.6               |
| Hotels   | 2          | .5           | .5            | 86.1               |
| Factories  | 55         | 13.9         | 13.9          | 100.0              |
| <b>Total</b>   | <b>396</b> | <b>100.0</b> | <b>100.0</b>  |                    |

Source: Data Collected by researcher for research purpose

### **4.3 Multiple Regression Analysis**

Multiple regression analysis was undertaken with a view of testing the established hypotheses in this study. Before engaging in the regression analysis, the following prior testing was undertaken.

#### **4.3.1 Pre-Processing of Data for Missing Values**

A primary data collection is always a hard process in which missing values are common. The missing values impact the data analysis thus lead to the misinterpretation of the results. The dataset obtained for this survey was found with few missing values and replaced with the most probable values of the respective attribute.

#### **4.3.2 Assumptions of Multiple Linear Regression**

Undertaking multiple regression analysis (MLR) involves testing for fulfilment of certain statistical assumptions:

##### **4.3.2.1 Linearity**

The linearity of the relationship between independent and dependent variables need to be established. This is proved by the correlation analysis undertaken using the SPSS software, as depicted in Table 4.12. The Pearson correlation coefficient of the variables is both weak and moderately positive in a linear manner. Therefore, the linearity between the independent and the dependent variables is proved, and the assumption is satisfied.

Table 4.12  
Correlation analysis

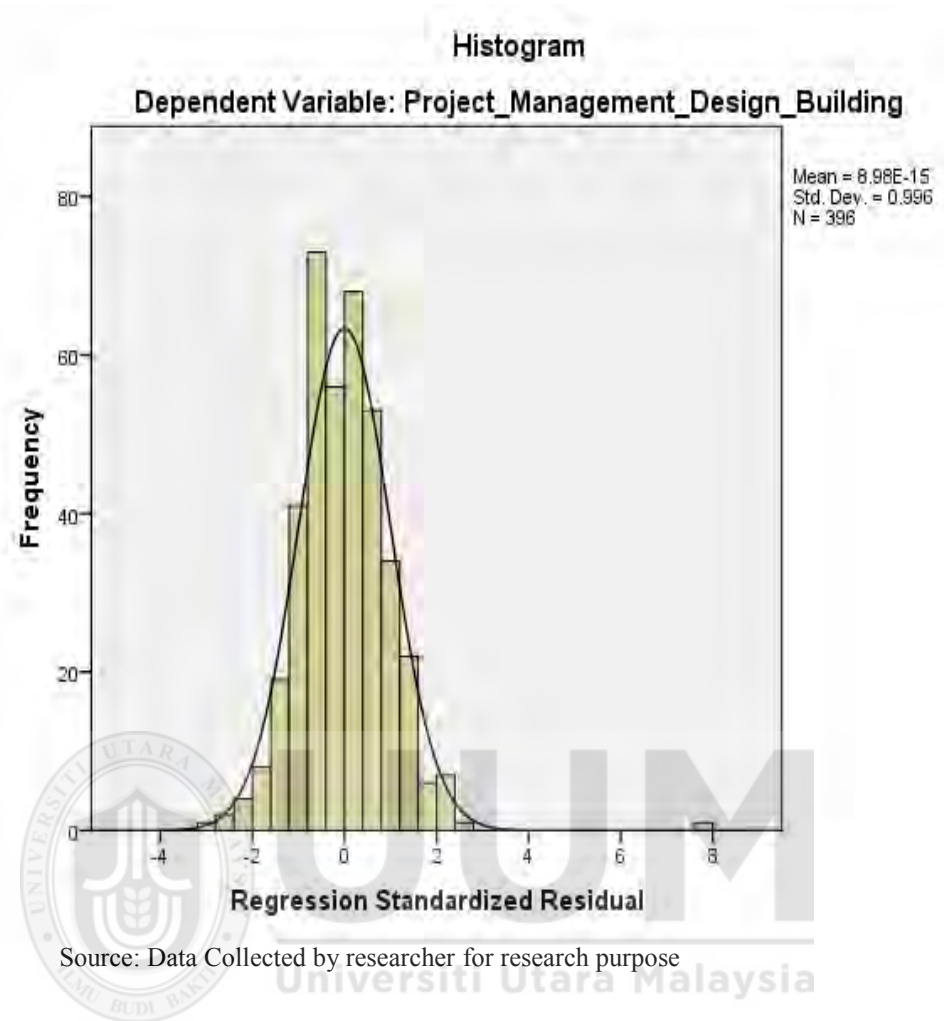
|                     |                                      | Success Completion Time_Design_Build | Procurement System_Design_Build | Currency Costing_Design_Build | Logistics_Delivery_Design_Build |
|---------------------|--------------------------------------|--------------------------------------|---------------------------------|-------------------------------|---------------------------------|
| Pearson Correlation | Success Completion Time_Design_Build | 1.000                                | .273                            | .318                          | .176                            |
|                     | Procurement_System_Design_Build      | .273                                 | 1.000                           | .368                          | .115                            |
|                     | Currency Costing_Design_Build        | .318                                 | .368                            | 1.000                         | .049                            |
|                     | Logistics_Delivery_Design_Build      | .176                                 | .115                            | .049                          | 1.000                           |
| Sig. (1-tailed)     | Success Completion Time_Design_Build |                                      | .000                            | .000                          | .000                            |
|                     | Procurement_System_Design_Build      | .000                                 |                                 | .000                          | .011                            |
|                     | Currency Costing_Design_Build        | .000                                 | .000                            |                               | .167                            |
|                     | Logistics_Delivery_Design_Build      | .000                                 | .011                            | .167                          |                                 |
| N                   | Success Completion Time_Design_Build | 396                                  | 396                             | 396                           | 396                             |
|                     | Procurement_System_Design_Build      | 396                                  | 396                             | 396                           | 396                             |
|                     | Currency Costing_Design_Build        | 396                                  | 396                             | 396                           | 396                             |
|                     | Logistics_Delivery_Design_Build      | 396                                  | 396                             | 396                           | 396                             |

Source: Data Collected by researcher for research purpose

#### 4.3.2.2 Normal Distribution

As shown in Figure 4.1, the histogram shows that the distribution of the dataset is normal and satisfies the assumption for MLR.

Figure 4.1  
Normal Distribution



Source: Data Collected by researcher for research purpose

#### 4.3.2.3 Constant Variance

As shown in Table 4.13, the standard deviation of 0.85 of the predicted value is less than the mean value of 4.28. So, it can be assumed that the variance in the error terms is constant with very few outliers, thus satisfying the assumption for MLR.

Table 4.13  
Residual Statistics

| Residuals Statistics <sup>a</sup> |         |         |      |                |     |
|-----------------------------------|---------|---------|------|----------------|-----|
|                                   | Minimum | Maximum | Mean | Std. Deviation | N   |
| Predicted Value                   | 4.04    | 4.57    | 4.28 | .085           | 396 |
| Residual                          | -.603   | 1.560   | .000 | .203           | 396 |
| Std. Predicted Value              | -2.818  | 3.510   | .000 | 1.000          | 396 |
| Std. Residual                     | -2.964  | 7.668   | .000 | .996           | 396 |

Source: Data Collected by researcher for research purpose

#### 4.3.2.4 No Multicollinearity

Tolerance and variance influence factor are the common measures for validating multicollinearity. To satisfy the assumption for MLR, the model should not have multicollinearity. The accepted value for no multicollinearity is the tolerance value should be greater than 0.01 and the variance influence factor value should be less than 10. Based on Table 4.14, the tolerance values for all the independent variables are greater than 0.01. Similarly, the variance inflation factor values for all the independent variables are less than 10. Therefore, there is low/no multicollinearity existence, thus satisfies the assumption for MLR.

Table 4.14  
Coefficients – Parameter Estimates

| Model | Unstandardized Coefficients     |            | Standardized Coefficients | t    | Sig.  | Correlations |         |      | Collinearity Statistics |      |       |
|-------|---------------------------------|------------|---------------------------|------|-------|--------------|---------|------|-------------------------|------|-------|
|       | B                               | Std. Error | Beta                      |      |       | Zero-order   | Partial | Part | Tolerance               | VIF  |       |
| 1     | (Constant)                      | 1.973      | .386                      |      | 5.112 | .000         |         |      |                         |      |       |
|       | Procurement_System Design_Build | .203       | .062                      | .165 | 3.269 | .001         | .273    | .163 | .152                    | .854 | 1.171 |
|       | Currency Costing_Design_Build   | .272       | .055                      | .249 | 4.964 | .000         | .318    | .243 | .231                    | .863 | 1.158 |
|       | Logistics_Delivery Design_Build | .109       | .036                      | .143 | 3.032 | .003         | .176    | .152 | .141                    | .982 | 1.019 |

Source: Data Collected by researcher for research purpose

### 4.3.2.5 Independence of Errors

The Durbin-Watson statistic tests for autocorrelation in the residuals from a statistical regression analysis, which supports the identification of the independence of errors. The Durbin-Watson value should fall in-between 1.5 and 2.5 to validate the independence of errors. As shown in Table 4.15, a value of 1.885 was obtained which falls in between the range and proves that the model is independence with errors thus satisfies the assumption for MLR.

Table 4.15  
Model Summary - Durbin-Watson

Model Summary<sup>b</sup>

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics |          |     |     |               | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|---------------|
|       |                   |          |                   |                            | R Square Change   | F Change | df1 | df2 | Sig. F Change |               |
| 1     | .388 <sup>a</sup> | .150     | .142              | .204                       | .150              | 17.317   | 4   | 391 | .000          | 1.885         |

Source: Data Collected by researcher for research purpose

### 4.3.2.6 Model Adequacy (F-test)

The model adequacy was tested using the following hypothesis. As shown in Table 4.16, the p-value for the model is 0.000, which is less than the significant value ( $\alpha = 0.05$ ). Therefore, the  $H_0$  can be rejected.

$$H_0: \beta_1 = \beta_2 = \beta_3 = 0$$

$$H_1: \text{At least one } \beta_j \neq 0 \text{ (j = 1, 2, 3)}$$

Table 4.16  
*ANOVA – Model adequacy*

| ANOVA <sup>a</sup> |                |     |             |        |                   |
|--------------------|----------------|-----|-------------|--------|-------------------|
| Model              | Sum of Squares | df  | Mean Square | F      | Sig.              |
| 1 Regression       | 2.855          | 3   | .952        | 22.990 | .000 <sup>b</sup> |
| Residual           | 16.226         | 392 | .041        |        |                   |
| Total              | 19.080         | 395 |             |        |                   |

Source: Data Collected by researcher for research purpose

### 4.3.3 Multiple Linear Regression

The obtained data were analysed using the most common form of linear regression analysis called the Multiple Linear Regression (MLR) analysis. This technique will be useful in explaining the relationship between the independent and dependent variables that were identified. The independent variable  $x$  is associated with the dependent variable  $y$ . As per the definition, the model equation can be defined as follows:

### General Model Equation

$$y = \alpha + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \varepsilon$$

Where,

$x$  = Independent variable

$y$  = Dependent variable

$\beta$  = Coefficient

$\alpha$  = Intercept/Constant

$\varepsilon$  = Error

#### 4.3.3.1 Independent & Dependent Variables

The following attributes were considered as the variables for the MLR analysis.

Dependent variable:

1. Success Completion Time =  $y$

Independent variables:

1. Procurement System =  $x_1$
2. Currency Costing =  $x_2$
3. Logistics Delivery =  $x_3$
4. Causes of Delay =  $x_4$

Coefficient Independent variables

1. Procurement System =  $\beta_1$
2. Currency Costing =  $\beta_2$

3. Logistics Delivery =  $\beta_3$

4. Causes of Delay =  $\beta_4$

#### 4.3.3.2 Multiple Linear Regression

The model adequacy was tested (F-test) based on the results obtained from the SPSS output as shown in Table 4.17. The results indicate that the p-value is 0.000 which is less than the significant value ( $\alpha = 0.05$ ). So, the  $H_0$  can be rejected.

$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$

$H_1: \text{At least one } \beta_j \neq 0 \text{ (} j = 1, 2, 3, 4 \text{)}$

Therefore, the MLR model is adequate & significant and can be accepted.

Table 4.17  
ANOVA – Model adequacy

| ANOVA <sup>a</sup> |            |                |     |             |        |                   |
|--------------------|------------|----------------|-----|-------------|--------|-------------------|
| Model              |            | Sum of Squares | df  | Mean Square | F      | Sig.              |
| 1                  | Regression | 2.855          | 3   | .952        | 22.990 | .000 <sup>b</sup> |
|                    | Residual   | 16.226         | 392 | .041        |        |                   |
|                    | Total      | 19.080         | 395 |             |        |                   |

Source: Data Collected by researcher for research purpose

Individual testing for the coefficient of regression (T-test) was done based on the results obtained from the SPSS output as shown in Table 4.17. Four hypotheses (procurement system, currency costing, logistics

delivery and causes of delay) are defined for this test and stated as follows:

$H_0: \beta_1 = 0$  (Procurement System)

$H_1: \beta_1 \neq 0$

$H_0: \beta_2 = 0$  (Currency Costing)

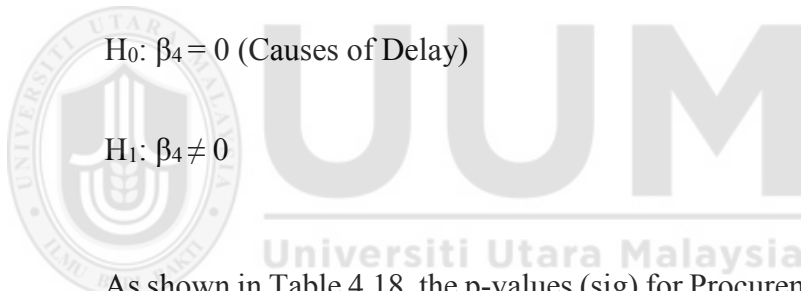
$H_1: \beta_2 \neq 0$

$H_0: \beta_3 = 0$  (Logistics Delivery)

$H_1: \beta_3 \neq 0$

$H_0: \beta_4 = 0$  (Causes of Delay)

$H_1: \beta_4 \neq 0$



As shown in Table 4.18, the p-values (sig) for Procurement System ( $\beta_1$ ) = 0.001, Currency Costing ( $\beta_2$ ) = 0.000 and Logistics Delivery ( $\beta_3$ ) = 0.003 are less than  $\alpha$  (0.05). Therefore, all the relevant  $H_0$  can be rejected, thus indicating that these independent variables are statistically significant. However, the p-value for Causes of Delay ( $\beta_4$ ) = 0.525 is greater than  $\alpha$  (0.05). Therefore, the  $H_0$  cannot be rejected and this independent variable is not significant.

Table 4.18  
Coefficients – Parameter Estimates

| Model                           | Coefficients <sup>a</sup>   |            |                           |       |      |              |         |       |                         |       |
|---------------------------------|-----------------------------|------------|---------------------------|-------|------|--------------|---------|-------|-------------------------|-------|
|                                 | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig. | Correlations |         |       | Collinearity Statistics |       |
|                                 | B                           | Std. Error | Beta                      |       |      | Zero-order   | Partial | Part  | Tolerance               | VIF   |
| 1 (Constant)                    | 1.973                       | .386       |                           | 5.112 | .000 |              |         |       |                         |       |
| Procurement System Design_Build | .203                        | .062       | .165                      | 3.269 | .001 | .273         | .163    | .152  | .854                    | 1.171 |
| Currency Costing_Design_Build   | .272                        | .055       | .249                      | 4.964 | .000 | .318         | .243    | .231  | .863                    | 1.158 |
| Logistics_Delivery_Design_Build | .109                        | .036       | .143                      | 3.032 | .003 | .176         | .152    | .141  | .982                    | 1.019 |
| Causes_of_Delay_Design_Build    | -.033                       | .051       | -.030                     | -.636 | .525 | -.046        | -.032   | -.030 | .994                    | 1.007 |

Source: Data Collected by researcher for research purpose

#### 4.3.3.3 Explanation of the Significant Coefficients

$$y = 1.973 + 0.165 x_1 + 0.249 x_2 + 0.143 x_3$$

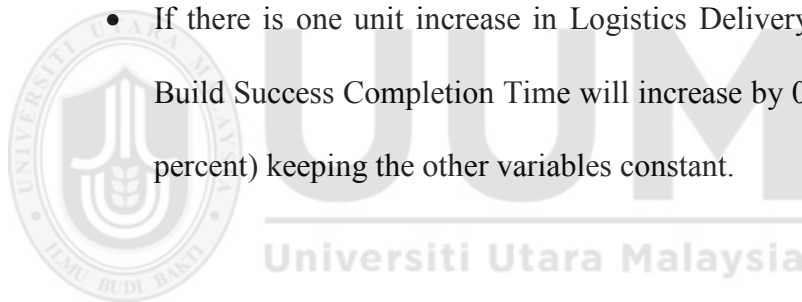
Where  $\epsilon$  is not considered in a prediction model. Therefore,

Design & Build Success Completion Time = 1.973 + 0.165 Procurement System + 0.249 Currency Costing + 0.143 Logistics Delivery.

The coefficient of the predictors/independent variables represents the mean change in the response/dependent variable. One unit of change in the predictors/independent variables would change the response / dependent variable according to the coefficient value of the predictor while holding the other predictors constant in the model. This often gives a clear interpretation of the MLR model useful for the implementation.

It is clear that except for one, all the other independent variables have a positive impact on the dependent variable. The interpretation can be given as follows from the MLR model equation.

- If there is one unit increase in Procurement System, the Design & Build Success Completion Time will increase by 0.165 units (16.5 percent) keeping the other variables constant.
- If there is one unit increases in Currency Costing, the Design & Build Success Completion Time will increase by 0.249 units (24.9 percent) keeping the other variables constant.
- If there is one unit increase in Logistics Delivery, the Design & Build Success Completion Time will increase by 0.143 units (14.3 percent) keeping the other variables constant.



From a practical standpoint, the construction companies in Manila, the Philippines should focus on these three factors, (procurement system, currency costing and logistics delivery) to ensure the effective success completion time related to construction projects. The focus should be emphasised in terms of the management of these three elements. Further elaboration of this perspective is given in Chapter 5.

## **Chapter 5**

### **Discussions and Conclusion**

#### **5.1 Introduction**

This chapter presents the discussions that follow the findings in Chapter 4. The chapter also presents the conclusion made post the discussions. In this context, Sections 5.2 Procurement System and Success Completion Time, Section 5.3 Currency Costing and Success Completion Time, Section 5.4 Logistics Delivery and Success Completion Time and Section 5.5 Causes of Delay and Success Completion Time, presents the discussions of the findings vis-à-vis the stated research objectives and hypotheses. Section 5.6 highlights the theoretical implication while Section 5.7 shows the practical implication. Section 5.8 gives the conclusion of the study.

#### **5.2 Procurement System and Success Completion Time**

The first objective of this study is to examine the relationship between the procurement system and success completion time of Design & Build construction projects in Manila, Philippines. Some form of external procurement must be undertaken for construction projects. Again, the procurements also fall within the Project Procurement Management knowledge area of PMBOK. Stakeholders involved in procurement, namely the contractors and the clients often have a strong relationship when it comes to procurements.

This is because both parties are motivated by the same goal – delivering their part of the work on time and under budget. For this purpose, both parties are required to have knowledge on procurement contracts, including the requests for proposals, invitations to tender and much more. All involved parties are subjected to knowing and implementing four processes related to procurements, namely plan procurement management, conduct procurements, control procurements and close procurements (PMBOK, 2013). The stated research hypothesis for this objective is:

***H1: There is significant relationship between the procurement system and success completion time in Manila, Philippines.***

The empirical finding shows that the procurement has a statistically significant relationship with the success completion time of construction project in Manila. For every 1 percent increase in procurement system, success completion time's efficiency increases by 16.5 percent, thus depicting the importance of this success factor in Manila's construction project's success. This implies that the established first hypothesis (H1) is accepted.

The findings show a similar conclusion with that of Ling, et. al., (2009), Eriksson & Westerberg, (2011) and Zakaria, et. al., (2017). Regardless of the country context, procurements play a pivotal role in project management. The Philippine government's concentrated focus on enhancing the construction sector's growth is also contingent upon facilitation of good procurements system, in all aspects. Poor management of this element may lead to poor or non-completion of construction projects.

### 5.3 Currency Costing and Success Completion Time

The second objective of this study is to examine the relationship between currency costing factor and success completion time of Design & Build construction projects in Manila, Philippines. The ensuing hypothesis for this objective is:

***H2: There is a significant relationship between the currency costing and success completion time in Manila, Philippines.***

The result indicated that currency costing has a statistically significant relationship with success completion time of Design & Build construction project in Manila. The relationship is implied as follows: 1 percent increase in currency costing could increase success completion time effectiveness by almost 24.9 percent in Manila. This factor has the highest t-value, inferring that the respondents has placed the greatest importance to currency costing when it comes to success completion time. The hypothesis is accepted.

This result is akin to some of the findings presented in the literature (e.g. Cho, et. al., 2009; Kim, et. al., 2012; and Yildiz, et. al., 2014). Currency costing has been found to be a significant success factor for projects, importantly in terms of cost breakdown and progressive cost monitoring. Cost management is the fourth pillar of the PMBOK's knowledge areas, with activities pertaining to (i) planning for the cost, (ii) estimating the costs, (iii) determining the budget and (iv) controlling the costs. Respondents in Manila has indicated their concentration of cost management, an issue which can lead to severe loss, if not managed accordingly.

The consistent growth of the construction sector in the Philippines has been growing at 9.3 percent year on year (Oxford Business Group, 2018). Effective cost management by the industry players could plausibly be a factor for this sector to maintain its growth rate. Overall, cost management is an important success factor for the construction project's management in Manila, the Philippines.

#### **5.4 Logistics Delivery and Success Completion Time**

The third objective of this study is to examine the relationship between logistics delivery and success completion time of Design & Build construction projects in Manila, Philippines. The empirical finding presented in the previous chapter showed that logistics delivery is indeed a crucial success factor for project management of construction projects in Manila. The statistical value was significant and showed a contribution of 14.3 percent toward success completion time. The t-statistic value (3.032) was also deterministic vis-à-vis the other variables. This led to the acceptance of the established hypothesis:

***H3: There is a significant relationship between the logistics delivery and success completion time in Manila, Philippines.***

The CSFs literature seems to have not concentrated much on the issue of logistics delivery. The concept of logistics delivery is an important component within a project perspective, especially a construction project as it is an essential component of the supply chain network. The result implied that the participating respondents in the city

of Manila believe on the value of logistics delivery in facilitating project management activities, that is a 1 percent concentration on logistics delivery helps to escalate success completion time by 14.3 percent, thus leading to on time, scope and on schedule completion of construction projects.

## 5.5 Causes of Delay and Success Completion Time

The fourth objective of this study is to examine the relationship between causes of delay and success completion time of Design & Build construction projects in Manila, Philippines. Leveraging on the following hypothesis:

*H4: There is an insignificant relationship between the causes of delay and success completion time in Manila, Philippines.*

Based on this premise, the study examined the insignificance of causes of delays toward success completion time in Manila's construction industry. The result showed that this factor as being insignificant – as the statistics showed a rejection statistical value of more than 0.05 significance level, hence H4 can be rejected. The advocates of causes of delay, such as, Nguyen, et. al., (2004) and Shamas & Ogunlana, (2008), highlighted the importance of causes of delay (which can be in various forms) as a pivotal factor. However, the current study's finding contradicts the literature.

This could possibly be because the selected respondent from Manila does not perceive this issue influencing success completion time effectiveness, potentially as the causes

of delay are at a controllable level by the respondents. Contractors, consultants and project owners in Manila may have strong control over the delay risks, thus this factor is not seen as a vital element influencing successful project management in their environment.

## **5.6 Theoretical Implications**

The findings presented in this study has several key theoretical implications.

First, this study has employed interlinked theoretical perspectives of critical success factors, project management, and projects to examine the determinants of success completion time of Design & Build construction projects in Manila. The findings strengthened the theoretical reasoning of three constructs playing significant roles in driving project management's effectiveness in Manila's construction projects.

The role and nature of the procurement system, currency costing and logistics delivery have been proven to be employed as per PMBOK's Guideline in Manila's projects. This is an important consensus as Manila's construction firms are adhering to international standards when it comes to projects and these three factors have been shown to facilitate success.

This study also has examined the role of logistics delivery, a relatively unused success factor in the literature. From a theoretical perspective, the importance of logistics delivery is conceptualised as the pinnacle of a project's supply chain as transportation,

inventory management, forecasting, planning, and other elements exist in every department, components of construction projects.

The relevance of this factor in moving each departments' functionality has been evidenced through this study. The construction industry in Manila should place greater focus on preparing and having efficient logistical arrangements to achieve success.

Theoretically, this indicate that the critical success factors for Manila's construction firms are in line with the advocacy in the critical success factors' literature. Future research could employ this theoretical perspective for other form of investigations pertaining to construction firms, perhaps in other environmental setting.

## **5.7 Practical Implications**

The findings of this research study will be helpful to the construction industry practitioners who are clients, consultants, contractors, suppliers, project management, government and professionals in the industry. The impact project performance in terms of time, cost, delivery, and delay will help them to do appropriate planning beforehand and to ensure that projects are handled well.

From the practical standpoint, the findings presented have the following specific implication for the D&B method project in Manila. Industrial practitioners in Manila should move forward and place care of logistics, costing and procurement elements in construction projects. The call for effective project management of such projects may

not work well if logistical arrangements, costing management and procurement management are not executed well. The management of these sub-domains complements project management.

Local players in Manila for D&B method construction industry may have to change or adjust their current practices and put significance in connecting the supply chain via effective logistics, procurement practices, and sound cost management. Not all construction project's project management will survive well, but the concentration of these three domains may push the success boundary further.

Specifically, the following practical suggestions are provided for the benefit of construction industry players and all other stakeholders who will have direct and indirect benefits from implementing quality project management:

#### **5.7.1 Execution of Good Procurement System Practices**

The role and nature of a good procurement system practice should be upheld by industry players in Manila. The practice of having a sound procurement method for construction projects, implementing the good practice of material sourcing, adhering to best practice relative to the criteria of the procurement process and knowing the causes for procurement can be delayed are essential.

Therefore, a qualify procurement person must have the basis of the understand the role of the procurement as below,

- Technical knowledge on the product details to be sourced that require specialty

to source and procure at the best quality and cost for the projected usage and at the respective schedule delivery.

- Knowledge and skills on the financial capacity are needed to make the fund management decisions for the procurement strategy or process.
- Understand the procurement system like open tender, limited tender, direct contract, negotiate tender, lump sum contract are very competitive for the criteria of procurement of the respective projects or products requirement.
- Procurement mechanism is among the important role that managing the specification approval, timing, delivery, cost and quality for respective projects as the requirement differs from project to project.
- Understand the agreement details of respective projects may require the sourcing from different country depends on the contract.
- Risk transfer to supplier if possible (eg. CIF - Cost, Insurance, Freight instead of FOB - Free on Board) apply to the shipment delivery and the insurance liability.
- Introduce the e-procurement system for transparent purpose and efficient to avoid any delay for submission of tender.

For instance, having wrong technical specifications, inefficient procurement team and slow approval of procurement request may lead to the extensive delay in procurement. Practitioners would be able to complete construction projects

successfully if good procurement practices are implemented and sustained.

### **5.7.2 Effective Management of Currency Costing of the Projects**

As a procurement person, you may not know much about international currency movements. But if you have any international exposure, your business will be affected by those movements and understand how to deal in a better position to understand those effects and act to manage them.

Below are some points need to be considered,

- Budget approval on the respective project on the product detail giving to the procurement team the guideline to source and negotiate.
- Product origin country of the respective country determine the actual cost (eg, OEM from a manufacturer base on the original product will reduce the costing).
- Forex exchange rate plays a criterion on the costing as the exchange rate will change every hour or daily. Therefore, understand the ‘block rate’ or ‘hedge rate’ with the bank will contribute another significant cost saving when a prominent amount involves.
- Terms of payment is a term that the procurement team can use for part of the financing package from the supplier like credit terms or letter of credit with term or bank guarantee.

The nature of currency costing is to avoid excessive expenditure and save the project from falling behind. The role of currency costing is imperative for practitioners in Manila. In this term, the issues revolving around:

- Recognizing the factors that cause a project to exceed its budgets, such as poor project design, poor site condition, and weak resources management, is paramount. Practitioners should always place significant attention to these elements.
- Scanning and understanding the issues that lead to overspending. This can be done by knowing the role of issues such as global financial standing, currency exchange rate and government regulatory changes, and its impact on the project's costing.
- Knowing the determinants of project costing that includes elements such as the location of the project, the tax structure and the timescale for the project.

### **5.7.3 Efficient the Role of Logistics Delivery**

Industry and stakeholders in Manila must comprehend the role of logistics delivery in facilitating successful completion of construction projects. The nature of construction involving various parties or stakeholders entails extensive logistical challenges. In this context, involved players must implement logistical practices that focus on:

- Having personnel with dynamic characteristics within the logistics division. For example, recruitment and sustaining knowledgeable and skilled logistics

personnel is vital.

- Recognize and practice the utilization of apt transportation for local and overseas procurements.
- Practice and maintain ideal delivery options, including on-time delivery for all types of procurements.
- Practice and maintain efficient procurement systems that uphold transparency and efficiency.
- Basic inventory management on the inventory either centralise or decentralise determine the period of delivery to the respective project site at the shortest timing.
- Understand the size per order parameter and threshold during the logistics apply in inland or shipment or air freight mode.
- A decision on in-house or outsource logistics for the volume and distance of delivery contribute the cost and time.
- Encourage to install an IT system for inventory or group procurement to standardise the system and easy to refer and detect.
- Integration of information within the inter-company for the planning and communication with all level is crucial as this can centralise the maximum delivery.
- Understand the local authority on the timing of the logistics information of the

respective areas (eg, when and which day is allowed the heavy vehicle to enter respective zone).

The above contributions are useful for planning and providing the necessary training to the construction industry professionals, identify and applying suitable project management for the construction industry to enhance project management.

## **5.8 Conclusion**

This study was conceptualised by aiming to find the core determinants of success completion time of Design & Build method of construction projects in Manila, Philippines. Using the quantitative research approach, the study sought data from more than 396 respondents and employed the multiple regression analytical procedure to identify potential linkages. The core determinants of procurement system, currency costing, logistics delivery, and causes of delay were incorporated into the research paradigm and tested accordingly. The findings corroborated with some existing literature and vice-versa.

The primary conclusion that could be drawn from this study is that construction projects in Manila are very much contingent upon the elements of procurement system, currency costing and logistics delivery. Optimal concentration toward these elements is a must to determine the success completion time of Design & Build project as projects in Manila is on its growth trajectory.

This research study achieved its research objectives by examining and investigating the various projects and organizational-related factors which significantly impact the project performance of the overall construction industry and for major construction sectors, like civil, infrastructure & building, oil & gas, multi-discipline construction sectors. This is due to the industry observation that, the old paradigms on the project management are changing rapidly due to technological development happening in the industry.

Moving forward, the construction industry in Manila need to place concentration on encouraging their industry players to have good connecting efficient procurement system, currency costing and logistics delivery management.

The researcher would like to recommend for future research studies in this area similar types of studies may be conducted in another part of the world especially in undeveloped or third world country. This will help the academicians and practitioners of the construction industry to understand the importance of different part of the world to achieve the desired project performance.

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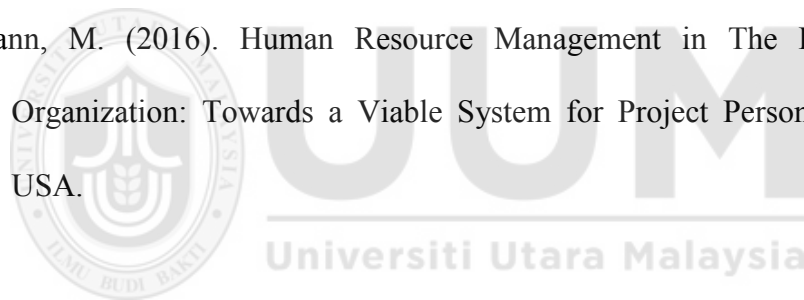
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## **Appendices**

|            |  |     |
|------------|--|-----|
| Appendix A | Summary of Literature Review World Growth Rate | 38  |
| Appendix B | Questionnaires of Survey                       | 118 |



## Appendix B



## UNIVERSITI UTARA MALAYSIA

Dear Sir / Madam,

### **Re: Questionnaire Survey**

I'm Yip Hock Seng, matric number 901164, a research student of the Doctor of Business Administration (DBA) program of Universiti Utara Malaysia (UUM) in Malaysia.

As part of the program, the study is required to conduct a survey regarding, **“Factors Affecting Design & Build Construction Project Success in Manila, Philippines”**. The objective of this study is to investigate the impact of the procurement strategy on construction project management success completion time.

Please be assured that all your responses will be kept strictly confidential and your identity will remain anonymous. All the data will be aggregated and will be strictly used for academic purpose only.

Looking forward to receiving your kind response in this regard and thank you in advance for your contributions. Should you have any queries related to this study, please feel free to contact through email at [raykayip@hotmail.com](mailto:raykayip@hotmail.com) or call at +6012 3903503.

Thank you.

Yip Hock Seng

**Appendix B**

To the respondents,

**Title: Factors Affecting Design & Build Construction  
Project Success in Manila, Philippines.**

**Please take time to participate in this survey, even if only in part. EVERY response  
will help the study to complete this research.  
Your time and input are certainly appreciated.**

**Section A: Your Profile**

- 1 Please indicate your gender  
Male  
Female

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- 2 Please indicate your gender  
20 – 35 years old  
36 – 50 years old  
51 and above

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3 Please indicate your nationality  
Citizen of the Philippines  
Expatriate

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4 What is your highest level of education?  
Certificate  
Diploma  
Bachelor's degree  
Master's degree  
Other qualifications \_\_\_\_\_ (*please describe*)

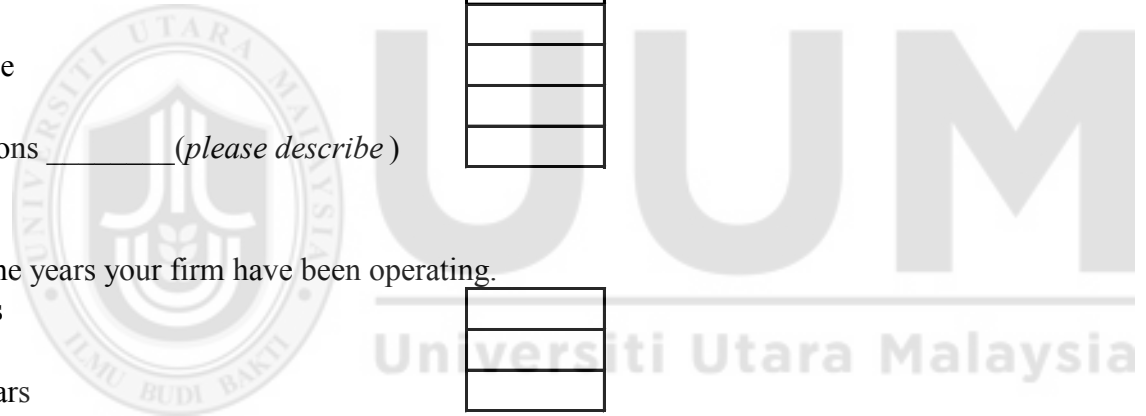
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5 Please indicate the years your firm have been operating.  
Less than 5 years  
5 – 10 years  
More than 10 years

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6 Please select your role in the company  
Senior managerial role  
Managerial role  
Executive  
Non-executive

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7 How long have you been working in this role?  
 Less than 1 year  
 1 – 3 years  
 More than 3 years

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8 Please indicate the total fulltime equivalent employees working in your company  
 Less than 50 employees  
 51 – 100 employees  
 More than 100 employees

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9 Please estimate your company’s average gross revenue per year (*in million USD*)  
 Less than 5 million  
 5 – 8 million  
 8 – 11 million  
 More than 11 million

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10 What type of projects does your company do under the Design & Build option?  
 Office building  
 Factories  
 Residential condominiums  
 Residential houses  
 Hotels  
 Others \_\_\_\_\_ (*please specify*)

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**SECTION B: PROCUREMENT STRATEGY OF DESIGN & BUILD TOWARDS SUCCESS COMPLETION TIME.**

**Thinking about the procurement methods that your company practice, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 1 We normally request quotation from the suppliers
- 2 We use tendering process in our company
- 3 We normally source from the same supplier
- 4 We often change suppliers for different projects

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
|                   |          |           |       |                |
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**Thinking about the decisions taken on procurement confirmation, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 5 Procurement confirmation is normally done by the top management
- 6 Procurement confirmation is normally done by the accounts department
- 7 Procurement confirmation is normally done by the procurement department
- 8 Procurement confirmation is normally done by the project department

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
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**Thinking about the sourcing of materials for projects, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

|  | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|--|-------------------|----------|-----------|-------|----------------|
| 9 We often source materials from local suppliers                   |                   |          |           |       |                |
| 10 We often source materials from foreign suppliers                |                   |          |           |       |                |
| 11 We often source materials from both local and foreign suppliers |                   |          |           |       |                |

**Thinking about the causes for procurement delays, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

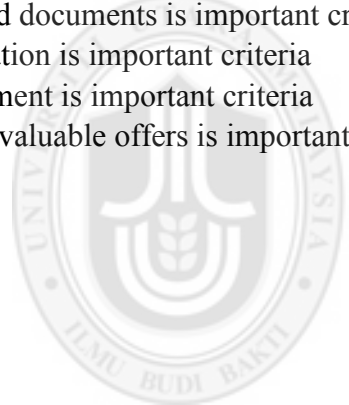
|  | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|--|-------------------|----------|-----------|-------|----------------|
| 12 Incomplete or wrong technical specifications causes delay in procurement  |                   |          |           |       |                |
| 13 Poor overall planning causes delay in procurement                         |                   |          |           |       |                |
| 14 Inefficiency of the procurement team causes delay in procurement          |                   |          |           |       |                |
| 15 Inefficient negotiation of contracts causes delay in procurement          |                   |          |           |       |                |
| 16 Slow approval of the requests for procurement causes delay in procurement |                   |          |           |       |                |
| 17 Poor pricing and payment term setting causes delay in procurement         |                   |          |           |       |                |

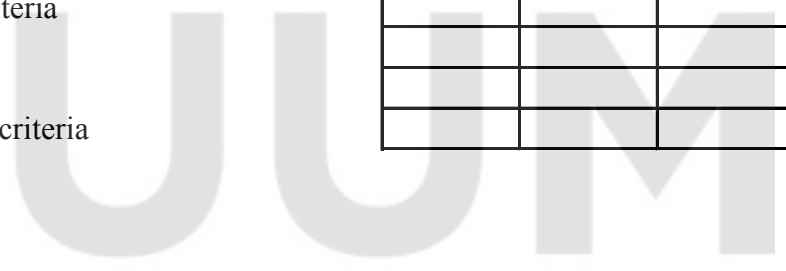
**Thinking about the important criteria adopted for procurement process, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 18 Opening of the tendering bid is important criteria
- 19 Review of related documents is important criteria
- 20 Technical evaluation is important criteria
- 21 Financial assessment is important criteria
- 22 Identification of valuable offers is important criteria

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
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**SECTION C: CURRENCY COSTING OF DESIGN & BUILD TOWARDS SUCCESS COMPLETION TIME.**

**Thinking about the reasons that could cause a project to exceed the allocated budget, please circle the numbers that best reflects your opinions on the following.**  
*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 23 Design change can lead to over budget
- 24 Poor design development can lead to over budget
- 25 Insufficient information can lead to over budget
- 26 Poor project management can lead to over budget
- 27 Poor site conditions can lead to over budget
- 28 Time limits can lead to over budget
- 29 Occurrence of accidents at site can lead to over budget
- 30 Problems with equipment and machineries can lead to over budget

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
|                   |          |           |       |                |
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**Thinking about the external issues that leads to over pricing of a project, please circle the numbers that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 31 Global financial crisis can lead to over pricing of a project
- 32 Price fluctuations can lead to over pricing of a project
- 33 Money exchange rate can lead to over pricing of a project
- 34 Government regulations can lead to over pricing of a project
- 35 Inefficient procurement team can lead to over pricing of a project
- 36 Logistics issues can lead to over pricing of a project

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
|                   |          |           |       |                |
|                   |          |           |       |                |
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**Thinking about the main determinants of a project’s costing, please circle numbers that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 37 Location influence the cost
- 38 Specifications influence the cost
- 39 Tax structure influence the cost
- 40 Timescale influence the cost
- 41 Procurement forms influence the cost
- 42 Requirements to build a new structure or simply refurbish influence the cost

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
|                   |          |           |       |                |
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**SECTION D: LOGISTICS DELIVERY OF DESIGN & BUILD TOWARDS SUCCESS COMPLETION TIME.**

**Thinking about the characteristics that personnel in the logistic that best reflects your opinions on the following department must have, please circle the number following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 43 Having a sound experience in the field is an important characteristic
- 44 Having good communication skill is an important characteristic
- 45 Sound knowledge of the logistic system is an important characteristic
- 46 Ability to work as a team member is an important characteristic
- 47 Knowledge in documentations is an important characteristic
- 48 Having a diligent work attitude is an important characteristic

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
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**Thinking about the type of transportation used mostly for overseas procurement, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 49 Shipment is the most used transportation
- 50 Air freight is the most used transportation
- 51 Courier is the most used transportation

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
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**Thinking about the type of transportation used mostly for local procurement, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 52 Inland is the most used transportation
- 53 Air freight is the most used transportation
- 54 Courier is the most used transportation
- 55 Own collection is the most used transportation

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
|                   |          |           |       |                |
|                   |          |           |       |                |
|                   |          |           |       |                |
|                   |          |           |       |                |

**Thinking about the on-time delivery of local procurement and overseas procurement, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 56 Inland transportation delivers on time
- 57 Air freight transportation delivers on time
- 58 Courier transportation delivers on time
- 59 Shipment transportation delivers on time

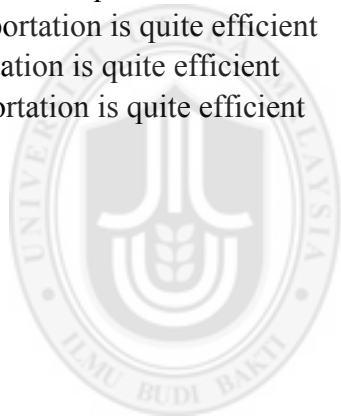
| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
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**Thinking about the efficiency of local procurement and overseas procurement, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 60 Inland transportation is quite efficient
- 61 Air freight transportation is quite efficient
- 62 Courier transportation is quite efficient
- 63 Shipment transportation is quite efficient

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
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**SECTION E: PROJECT MANAGEMENT OF DESIGN & BUILD TOWARDS SUCCESS COMPLETION TIME.**

**Thinking about the important qualification of a project manager, please circle the number that best reflects your opinions on the following.**  
*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 64 A local candidate would be more qualified
- 65 A foreigner would be more qualified
- 66 Someone with a management degree
- 67 Someone with an engineering degree would be more qualified
- 68 Someone with a finance degree would be more qualified

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
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**Thinking about the criteria of a project manager, please circle the number that best reflects your opinions on the following.**  
*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 69 Effective planning is important criteria
- 70 Effective execution is important criteria
- 71 Effective initiative is important criteria

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
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- 72 Effective implementation is important criteria
- 73 Effective management is important criteria
- 74 Effective decision making is important criteria
- 75 Effective cost control is important criteria
- 76 Good experience is important criteria
- 77 Taking responsibility is important criteria
- 78 High level of confidence is important criteria
- 79 Good communication skill is important criteria
- 80 Good negotiation skill is important criteria
- 81 Effective risk handling is important criteria

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**Thinking about the management methodology required for a project manager, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

- 82 Engagement of the right team is an important management method
- 83 Doing proper documentation is an important management method
- 84 Creating a realistic schedule is an important management method
- 85 Providing regular updates is an important management method
- 86 Ability to solve problems is an important management method
- 87 Doing brainstorming is an important management method

| Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|-------------------|----------|-----------|-------|----------------|
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**SECTION F: CAUSES OF DELAY OF DESIGN & BUILD TOWARDS SUCCESS COMPLETION TIME.**

**Thinking about the causes of the delay in completion of projects, please circle the number that best reflects your opinions on the following.**

*(Please note: 1 is “strongly disagree” through to 5, which is “strongly agree”)*

|   | <b>Strongly Disagree</b> | <b>Disagree</b> | <b>Uncertain</b> | <b>Agree</b> | <b>Strongly Agree</b> |
|---|--------------------------|-----------------|------------------|--------------|-----------------------|
| 88 Confusions are the cause of delay in completing projects                   |                          |                 |                  |              |                       |
| 89 Improper feasibility is the cause of delay in completing projects          |                          |                 |                  |              |                       |
| 90 Improper bidding is the cause of delay in completing projects              |                          |                 |                  |              |                       |
| 91 Delay in payments are the cause of delay in completing projects            |                          |                 |                  |              |                       |
| 92 Client’s financial issue is the cause of delay in completing projects      |                          |                 |                  |              |                       |
| 93 Slow response from clients are the cause of delay in completing projects   |                          |                 |                  |              |                       |
| 94 Incapable staffs are the cause of delay in completing projects             |                          |                 |                  |              |                       |
| 95 Poor leadership is the cause of delay in completing projects               |                          |                 |                  |              |                       |
| 96 Lack of timely decision is the cause of delay in completing projects       |                          |                 |                  |              |                       |
| 97 Large number of participants are the cause of delay in completing projects |                          |                 |                  |              |                       |
| 98 Poor project planning is the cause of delay in completing projects         |                          |                 |                  |              |                       |
| 99 Poor supervisions are the cause of delay in completing projects            |                          |                 |                  |              |                       |
| 100 Bad risk allocation is the cause of delay in completing projects          |                          |                 |                  |              |                       |

\*\*\*\*\* **THANK YOU** \*\*\*\*\*