THE POTENTIAL OF DESIGN AND BUILD PROCUREMENT METHOD IMPLEMENTATION IN THE DIRECTORATE OF ENVIROMENTAL SANITATION DEVELOPMENT INDONESIA

MUHAMMAD IQBAL PERKASA

A Thesis submitted in fulfillment
of the requirements for the award of the degree of
Master of Science (Construction Contract Management)

Faculty of Built Environment
Universiti Teknologi Malaysia

SEPTEMBER 2015

To my beloved wife, daughter, parents and also my brother

Thank you for your love, support and everything

ACKNOWLEDGEMENT

I would like to extend my gratitude upon the completion of this research project to those who have lended their support and encouragement to me during the research process. Thank you ALLAH for blessing my every step and prayers. My gratitude is also dedicated to my family; my Dad, Mom and Brother for your endless support. My sincere appreciation also goes to Tiara Titi Kartika and Milena Hawa Rahperkasa, my beloved Wife and Daughter, for the companionship both of you have provided me with during this study period - *I love both of you.*

I would also like to say thank you to my supervisor, Associate Professor Dr. Nur Emma Mustaffa, for such valuable guidance and advices given in ensuring that this research project is completed. It is such a precious experience for me to have the chance working with her.

I am particularly grateful to be a part of the Construction Contract Management Class of 2014/2015. Thank you to the lecturers of the programme; Associate Professor Dr. Maizon Hashim, Associate Professor Dr. Rosli Abdul Rashid, Encik Jamaludin Yaakob, Encik Norazam Othman and all of the lectures in Construction Contract Management course for the knowledge I acquired during my study. Not forgetting all the MSc(Construction Contract Management) classmates- *Thank you for the one year togetherness we had*.

Thank you to all officers in Jakarta for helping me with my field works and data collection. Lastly, I want to thank all my best friends here in Johor, Anggi, Chairul, Hermawan, Alfriady, Assad, Luckman, Ismanuel, Lutfi, Dwi, and Bayu for the great friendship given.

ABSTRACT

Sanitation infrastructure in Indonesia is conventionally procured using the traditional method. Due to sequential nature of this method, it can result in a lengthy design and construction period. Design and Build (DB) procurement method can be considered as one of the solutions since this method has been claimed as a method that offers: improved buildability, faster completion of time, and greater certainty in price. The Directorate of Environmental Sanitation Development, Ministry Of Public Work (MOPW) is the body that is responsible on sanitation infrastructure. Thus, the aim of this study is to determine the potential of Design and Build method procurement implementation in Directorate of Environmental Sanitation Development by identifying the potential barriers to implementing design and build procurement method and the critical success factors (CSFs) with strong predictive powers of its implementation particularly in sanitation infrastructure. The data collected for this study is generated from structured interviews that have been conducted among the experts who have sufficient knowledge and substantial experience of project delivery system in Indonesia. The study found that among others, the factors include “lack of experience”, “lack of regulation on contractual arrangement”, “lack of detailed regulation on tendering system”, “lack of detailed guideline on project characteristics” and “a small number of experienced and skilled of other stakeholders in DB” as potential barriers that can impede the implementation of DB system. The experts also identified “comprehensive contract form and documentation”, “well defined project scope definition, “client’s input in the project”, “contractor’s competence”, “experienced project team leader”, “and working relationship among project team members” as CSFs that need to be paid more attention on to in order to enhance the successfulness of the Design and Build project. Moreover, those factors are needed to be given more attention to enhance the potential of DB procurement method implementation in the Directorate of Environmental Sanitation Development, MOPW.

ABSTRACT

Infrastruktur sanitasi di Indonesia lazimnya diperoleh dengan menggunakan kaedah tradisional. Oleh kerana sifat urutan kaedah ini, ia boleh menyebabkan reka bentuk dan pembinaan mengambil jangka masa yang panjang. Kaedah perolehan reka dan bina boleh dianggap sebagai salah satu penyelesaian kerana kaedah ini telah dianggap sebagai kaedah yang menawarkan: kebolehbinaan yang lebih baik, lebih cepat diselesaikan mengikut masa, dan memberikan kepastian yang lebih kukuh dalam harga. Jabatan Pembangunan Kebersihan Alam Sekitar, Pekerjaan Umum adalah badan yang bertanggungjawab ke atas infrastruktur sanitasi. Oleh itu, tujuan kajian ini adalah untuk menentukan kemungkinan pelaksanaan kaedah perolehan reka dan bina dalam Jabatan Pembangunan Kebersihan Alam Sekitar dengan mengenal pasti halangan yang berpotensi untuk menghalang pelaksaan reka dan bina serta faktor-faktor kejayaan yang kritikal dengan kebolehramalan pelaksanaannya terutamanya dalam infrastruktur sanitasi. Data yang diperolehi dalam kajian ini diperolehi daripada temu bual berstruktur yang telah dijalankan di kalangan pakar-pakar yang mempunyai pengetahuan yang mencukupi dan pengalaman yang luas dalam sistem penyampaian projek di Indonesia. Kajian mendapati bahawa antara lain, faktor-faktor termasuk "kurang pengalaman", "kekurangan peraturan pada perjanjian kontrak", "kekurangan peraturan terperinci mengenai sistem tender", "kekurangan garis panduan terperinci mengenai ciri-ciri projek" dan "sebilangan kecil berpengalaman dan mahir pihak berkepentingan lain dalam reka dan bina "sebagai halangan yang berpotensi yang boleh menghalang pelaksanaan sistem reka dan bina. Pakar-pakar juga mengenalpasti "bentuk kontrak yang komprehensif dan dokumentasi", " definisi skop projek yang jelas," input pelanggan dalam projek "," kecekapan kontraktor "," Ketua projek yang berpengalaman "," dan hubungan di kalangan ahli pasukan projek bekerja "sebagai faktor kejayaan kritikal yang perlu diberikan perhatian lebih dalam usaha untuk meningkatkan kejayaan sesuatu projek reka dan bina. Selain itu, faktor-faktor tersebut perlu diberikan perhatian untuk meningkatkan kemungkinan pelaksanaan kaedah perolehan reka dan bina di Jabatan Pembangunan Kebersihan Alam Sekitar, Pekerjaan Umum.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Problems in urban sanitation are usually considered socially, managerially and technically complex. Indonesia, one of the developing countries in South East Asia (Word Bank, 2013) is struggling with these sanitation issues. The Directorate of Environmental Sanitation Development, Ministry of Public Works (MOPW) is the body that is responsible to handle this problem. In order to fulfil Millennium Development Goals (MDGs) 2015 and to achieve 100% access to sanitation in 2019, the Government of Indonesia through MOPW has increased the budget for the sanitation area almost twice in amount from 14,38 trillion rupiah in the period of 2009-2014 (*Rencana Strategis PU 2009-2014*) to 35,6 trillion rupiah in the period of 2015-2019 *(Peraturan Presiden Republik Indonesia No. 2/2015*). Although the budget has already been increased, the problems still persist.

The organizational structure that is adopted by the employer for the management of the construction and design of a construction project, according to Masterman (1992), is called the procurement method. Usually, sanitation infrastructures in Indonesia are procured by using the traditional procurement method. This approach works well when separate parties are engaged by the government for detailed engineering design (DED), supervision and construction. Traditional method runs well to achieve a lower price (which is very essential to government) and the best quality of the product. The disadvantage of using this traditional method is the time factor. Due to the sequential nature of the procurement process, sometime it takes a very long amount of time when this procurement method is adopted for a project (Rosli Abd. Rashid, 2006). Another known problem is that the construction can only start if the limited Detailed Engineering Design (DED) has already been prepared. Usually it takes around seven to eight months to prepare the DED. It means that if a project is planned in 2015, the construction will only begin in 2016. With the limitation of time to achieve the national target of 100% access sanitation in 2019, the Government must seek another alternative approach of procurement to cut the process short.

A method that is known to be able to deliver projects in a faster way is called the design and build procurement method. Because of this, this ‘fast track’ delivery system may seem to be a suitable replacement for the old traditional approach since this method can combine the construction of DED and implementation of the infrastructure simultaneously.

A method where one contracting organization, usually on a lump sum fixed-price basis, takes sole responsibility for the bespoke construction and design of a client’s project up to its practical/substantial completion is the definition of the design and build procurement. (Brian Greenhalgh and Graham Squires, 2011). Three elements which are fundamental characteristics of this system are in this definition:

a. One organization has the responsibility for design and construction
b. Generally, reimbursement is on a fixed-price lump sum;

c. In their initial employer's requirements, the project is designed and built specifically to meet the needs of the client and developed by the contractor's proposals.

In Indonesia, the design and build procurement method is commonly used in private projects, and is unlikely in public projects. The traditional method is the most common method used by the Government, especially in infrastructure projects. The procurement in The Ministry of Public Works are being guided by the Government rule *Peraturan Presiden Republik Indonesia* (Presidential Decree No 70/2012) and Ministry of Public Works Regulation (*Permen PU*) No. 14/PRT/M/2013 . This regulation covers all procurement from services to construction projects.

In a way, the Presidential Decree N0. 70/2012 and Ministry of Public Works Regulation (*Permen PU*) No. 14/PRT/M/2013 has become the main reference in almost public procurement. Provisions which are laid down in this regulation have enough detail and comprehensively assist in the procurement of goods, services and construction. However, the design and build type of procurement has not been included in this regulation.

1.2 Problem Statement

Indonesia is the world's fourth most populous country, with the population of approximately 230 million. In the absence of public investments, almost half of the population lives in urban areas and most of the households have arranged sanitation infrastructure in place themselves. It is proved that the responsibility for sanitation

investments lies with the households themselves since this has caused the public expenditure on sanitation and sewerage development to be minimal over the last decade. Based on the current rate of progress, one study (UNICEF, 2007) predicts that Indonesia would fall short of the official JMP MDG sanitation target of 73 percent by 10 percentage points, which is equivalent to 25 million of people. On the other hand, the government through the Directorate of Environmental Sanitation Development, MOPW has another goal, which is to give 100% access of sanitation nationwide in 2019. In line with this policy, the government has increased the budget for sanitation infrastructure from 14,38 Trillion Rupiah (2010-2014) to near 35,6 Trillion Rupiah for five years ahead (2015-2019) (*Peraturan Presiden Republik Indonesia No. 2/2015*).

The increasing of this sanitation budget will bring many kinds of problems. One of the major problems is the limitation of detailed engineering design (DED). As it, most public infrastructure project (in this case sanitation infrastructure) are handled by MOPW which opt for the traditional procurement method. This means that the construction of DED and the implementation of the project are sequentially done. It will take a long time to complete the infrastructure and it is clearly a barrier to achieve the government target in 2019.

The design and build method could perhaps become the best solution to settle the problem. Theoretically, design and build procurement method has advantages over the traditional procurement method in term of duration of the project completion, saving the costs and improve project performances. This procurement method will allow the progress of the DED and the project at the same time, so the project will be completed earlier. Even though the design and build procurement method is known for its advantages, it also has its own disadvantages.

Some research and surveys that has been conducted in the construction press indicate significant growth in construction procurement use the design and build

approach (Ndekugri and Curch, 1996). Singapore, one of the developed countries in South East Asia is progressively moving to the design and build method instead of using the traditional method but the practice is still considered to be in its relatively evolutionary stage in many client organizations (Palaneeswaran and Kusumaraswamy, 2001). Similar with Singapore, Hong Kong has also adopted the design and build approach in the public sector and the government agencies. In the recent years, the appliance of this method has been gradually accepted (Rizzo, 1998). In contrast with Indonesia, this method is not commonly employed by the Indonesian government. Usually only private sector in Indonesia will use this approach. Therefore, this study will investigate the potential of design and build procurement adoption in infrastructure public projects in Indonesia.

1.3 Study Aim and Objectives

The aim of this study is to identify the potential of design and build procurement method implementation in the sanitation infrastructure projects in Indonesia. In order to assist the process of achieving the aim of this study, two main objectives have been developed:-

a) To identify the potential barriers to implementing design and build procurement method;

b) To identify the Critical Success Factors (CSFs) that have strong predictive powers for the success of design and build project particularly in sanitation infrastructure.

1.4 Scope of Study

This study will focus on sanitation infrastructure projects implemented at Directorate of Environmental Sanitation Development MOPW. The sanitation projects involved are wastewater sewerage system and landfill. This study will determine the potential barriers which can impede the implementation of the design and build method procurement and the critical successful factors of the success project in design and build approach. The potential barriers were established from the literature review and were divided into four groups, namely, enforceable law, capabilities of client, capabilities of other stakeholder and client adaptability to the design and build procurement method. Lately, a list of the potential barriers will be presented on the table and the experts asked to validate the potential barriers that may affected the implementation of design and build development.

To determine the critical successful factors, this study will gather the information from many sources such as literature reviews, and make some tabular comparison about the critical success factors (CSFs) that been gathered from the result of the implementation of Design and Build from many countries which have experienced it in public projects. In terms of determining and analyzing the CSFs of the implementation of design and build projects in other countries, USA, Singapore, Hong Kong and Vietnam have been chosen because the design and build procurement method are commonly adopted in these countries in order to construct public projects. Once the CSFs have been identified, surveys will be conducted with the expertise and the professionals who have experienced in the procurement area in order to get their perspectives in terms of the potential of the design and build procurement implementation in the public sector. Most of the respondents are experts who hold top management position as well as having decision making roles in their respective organizations and have sufficient knowledge and involvement regarding the procurement system, particularly in DB procurement method. The involvement of these experts in this study will provide the opinion from the expert's perspective and will enrich the findings of this study.

1.5 Importance of This Study

The dynamics of the sanitation infrastructure development in Indonesia forces the Directorate of Environmental Sanitation Development MOPW as the body responsible to manage such project to seek another alternative method of procurement in term of cost and time. Design and build procurement method may seem as one of the best alternatives to handle the problems arising thereto. Unfortunately, the public body is still not familiar with this method. Therefore, it is vital to investigate the potential of adopting this method to ensure that it will be suitable for infrastructure projects mainly sanitation in Indonesia. It will also try to identify the potential barrier(s) that the government will face regarding the implementation of the design and build (DB) procurement method.

More importantly, the outcome of this study is to provide the information and lessons learned for the Indonesian government especially the Directorate of Environmental Sanitation Development MOPW which still practices the traditional procurement method, in order to charter a transformation from traditional method to DB method.

1.6 Research Methodology

This study will be conducted into five phases as follows:

1.6.1 Phase 1: Identify the Issue

The first phase is the identification of the issue. To determine the issue, consultation and discussion were held with the lecturers and professional expertise.

At this stage, reading and reviewing from various reliable sources such as books, international journals, seminar papers, etc has also be conducted.

1.6.2 Phase 2: Literature Review

After establishing the issue and setting the objective of the study, the literature reviewing was the phase of the research. This stage includes the process of seeking reliable documents for secondary data which are sourced from international journal, books, thesis report and others.

1.6.3 Phase 3: Data collection

The third phase was the data collection process. This is an important phase in terms of fulfilling the objective of this study. The data have been gathered in two ways; Firstly, secondary data have been gathered from reliable sources which are related to the study such as government regulations, international journals, seminar papers, statutes, etc. Secondly, after reliable secondary data have been gathered and the important elements needed to procure DB have been established, primary data have been collected through structured interview sessions with the expertise or professionals who are competent with procurement method to seek their views on the potential of the Design and Build implementation in the Indonesian infrastructure projects.

1.6.4 Phase 4: Data Analysis

At this phase, all of the data collected from the previous stages have been analyzed, interpreted and organized in terms of fulfilling the objectives that have been set up before.

1.6.5 Phase 5: Conclusion and Recommendation

This last phase will be a presentation of the conclusion of the data analysis that been discussed at the previous phase. The conclusion will determine whether the objective of this study has been fulfilled or not. This phase also presented the recommendations for the improvement.

1.7 Organization of the chapters in the Thesis

1.7.1 Chapter 1: Introduction

This chapter describes the route of the study process. It starts with the introduction of the background study, the problems identified and the objective determined which is specified with an appropriate research method to achieve them.

1.7.2 Chapter 2: Design and Build Procurement Method

This chapter will discuss on the literature review conducted on the design and build procurement method. It seeks to explain the concepts on the DB concept, right

and obligation of the stakeholders involved in DB procurement method, and getting to know what are the advantages and the disadvantages as well as the lessons learned that can be gained by implementing DB procurement method. In addition, the literature on potential barriers to implementing the DB procurement method is also surveyed.

1.7.3 Chapter 3: Success Factors Influencing Design and Build Project

This chapter will be explaining further about the various factors (that can be described as critical success factors) that affect the implementation of the design and build project. The definition of criteria and project success will firstly be introduced. Later, the critical success factors (CSFs) that had been established from previous researches will be described and presented in tabular comparison.

1.7.4 Chapter 4: The Nature and Characteristic of Project in Directorate of Environmental Sanitation Development Ministry of Public Works

This chapter will give a brief description on the nature and characteristics of the sanitation infrastructure projects in Indonesia. The project will be focused on the area that has a massive scale, complex and large project which comprises of sewerage system and landfill infrastructure. This chapter will also give an explanation about the nature and characteristic related to the procurement procedures that have been used in The Directorate of Environmental Sanitation Development, MOPW.

1.7.5 Chapter 5: Research Methodology

This chapter will present the research design in detail including the selection of the research method, the selection of the respondents, the structured interview questions, and the data analysis adopted. It starts with the summary of the literature review that leads to the establishment of the structured interview questions. The feedbacks from these questions were used as the basis to determine whether the implementation of DB is feasible in order to meet the objective of this study.

1.7.6 Chapter 6: Data Analysis

This chapter will present the analysis of the data that have been gathered in order to determine the potential of design and build procurement method to be implemented by Directorate of Environmental Sanitation Development MOPW. The views from the respondents have been gathered and analysed in detail in order to make a decision on the potential of DB implementation in sanitation projects in the Directorate of Environmental Sanitation Development MOPW. The discussion on the analysis was based on structured interview with the respondents who held top management position and decision making roles in the Directorate of Environmental Sanitation Development. The aim of this structured interview was to: (1) identify the potential barriers to design and build development; (2) identify the critical success factors for design and build procurement method; and (3) find out the additional information related to the implementation of design and build procurement method.

This chapter further explains the detailed process and result of the structured interview. This includes the profile of the experts who became a respondent to this interview. Next, the results of the structured interview questionnaire regarding the potential barriers to the design and build development and the critical success factors for design and build procurement method are presented. Discussion on the analysis will be made based on the sections in the questionnaire. Finally, the findings from this interview are summarized.

1.7.7 Chapter 7: Conclusion and Recommendation

This chapter will present the conclusions for the overall of the study which is to determine whether DB implementation is feasible in Indonesia whilst at the same time give recommendations in order to improve the use of the design and build procurement method in the public sector especially in the Directorate of Environmental Sanitation Development Ministry of Public Works.

1.8 Summary

This chapter has provided the background of this study and the justification why this study was carried out. The study approach was described. A summary of the importance of the study was given together with the organization of the thesis.

REFERENCES

Abdul Rashid, Rosli and Mat Taib, Ismail and Wan Ahmad, Wan Basiron and Nasid, Md. Asrul and Wan Ali, Wan Nordiana and Mohd Zainordin, Zainab. (2006). Effect Of Procurement Systems On The Performance Of Construction Projects. *In: International Conference on Construction Industry 2006: Toward Innovative Approach in Construction and Property Development.*

Abi-Karam, T. (2002). Risk Management in Design/Build. *First International Conference on Construction in the 21st Century: Challenges and Opportunities in Management and Technology*. Miami, Florida, USA.

Akintoye, Akintola. (1994). Design and Build: a survey of construction contractors. *Construction Management and Economics,* 12 (2), 155-163.

Anak Agung Diah Parami Dewi. (2013). *Framework for Implementing Design Build Project Delivery System in Road Infrastructure Projects in Indonesia.* Ph.D. Thesis. Queensland University of Technology.

Arti J. Jari Pankaj, and P. Bhangale. (2013). To Study Critical Factors Necessary for a Successful Construction Project. *International Journal of Innovative Technology and Exploring Engineering,* 2 (10).

Ashley and Jaselskis. (1987). Determinants of Construction Project Success. *Project Management Journal*, 18 (2), 69-79.

B.Xia, A.P.C. Chan, J.F.Y. Yeung. (2009). Identification of Key Competences of Design Builders in The Construction Market of The People's Republic of China (PRC). *Construction Management Economics*, 27 (11).

Beard, J., M. C. Loukakis and E. C. Wundram. (2001). *Design-Build: Planning through Development.* New York : McGraw Hill.

Cecil, R. (1983). Design and build. *Architectural Journal*, 177 (13), 61-62.

Chau, N. D., Long, Le-Hoai, and Young, D. L. (2012). Critical Success Factors of Large Design-Build Projects in Vietnam. *Journal of Construction Engineering and Project Management.*

Chritamara, S. and Ogunlana, S. O. (2011). Problems experienced on D/B projects in Thailand. *Journal of Construction Engineering and Management*, 125(3), 142-150.

Cockayne, J. (1996). The designer's perspective. *Design and Build*, School of Business and Industrial Management, London.

Deakin, P. (1999). Client's Local Experience on Design and Build Projects. *Seminar Proceedings on Design and Build Procurement System*, Hong Kong.

Fahmy, S and G. F. Jergeas. (2004). Design-Build Delivery System on Trial. *AACE International Transaction – 48th AACE International Annual Meeting.*

Flora, Gwen, James J. Ernzen and Cliff Schexnayder. (1998). Field-Level Management's Perspective of Design/Build. *Practice Periodical on Structural Design and Construction*, 3 (4), 180-185.

Franks, J. (1998). *Building procurement systems- A client's guide*. Horlow, England: Addison Wesley Longman Ltd. Ascot, England: Chartered Institute of Building.

Gibson, G Edward, James T O'Connor, Giovanni Migliaccio and John Walewski. (2007). *Key Implementation Issues and Lesson Learned with Design-Build Projects.*

Gidado, K. I. and Arshi, S. (2004). Suitability of different design and build configurations for procurement of buildings. Proceedings of the International Construction Conference, Royal Institute for Chartered Surveyors RICS COBRA 2004, 7-8 Sep 2004, UK.

Government of Indonesia. (2004) *Undang-Undang No. 32 Tahun 2004 Tentang Pemerintahan Daerah.*

Government of Indonesia. (2004) *Undang-Undang No. 7 Tahun 2004 Tentang Sumber Daya Air.*

Government of Indonesia. (2008). *Undang-Undang No. 11 Tahun 2008 Tentang Informasi dan Transaksi Elektronik.*

Government of Indonesia. (2008). *Undang-Undang No. 18 Tahun 2008 Tentang Pengelolaan Sampah.*

Government of Indonesia. (2009) *Undang-Undang No. 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup.*

Government of Indonesia. (2012). *Peraturan Pemerintah Republik Indonesia No. 81 Tahun 2012 Tentang Pengelolaan Sampah Rumah Tangga dan Sampah Sejenis Sampah Rumah Tangga.*

Government of Indonesia. (2012). *Peraturan Presiden Republik Indonesia No. 72 Tahun 2012 Tentang Perubahan Kedua atas Peraturan Presiden Republik Indonesia No. 54 Tahun 2010 Tentang Pengadaan Barang/Jasa Pemerintah.*

Government of Indonesia. (2015). *Peraturan Presiden Republik Indonesia No. 2 Tahun 2015 Tentang Rencana Pembangunan Jangka Menengah Nasional 2015-2019*

Greenhalgh, Brian and Squires, Graham. (2011). *Introduction to building procurement*. New York: Spon Press.

Griffith, A. (2003). *Best Practice Tendering for Design and Build Projects*. London: Thomas Telford.

Hanna, Awad S, PI, John C. Lynch and Mounir El Asmar. (2008). *Effective Implementation of The Design Build on Transportation Projects.*

Hemlin, D. (1999). Contractor's Local Experienceon Design/Build Projects. *Seminar Proceedings on Design and Build Procurement System,* Hong Kong.

Ho, D C K, K W Chau and H F Leung. (1996). Are Contractors Prepared to Take on Design Build Contr. *Proceedings of CIB W92 Procurement Systems Nort Meets South Africa, Developing Ideas,* South Africa.

Hubbard, D. G. (1990). Successful utility project management from lessons learned. *Project Management Journal*, 21 (3), 19-22.

Iqbal, Hasan. 2006. *Analisis Data Penelitian dengan Statistik.* Jakarta: PT. Bumi Aksara.

Jasri, Siti Aishah Aqilah (2011) *Disputes in design and build construction contract.* Masters thesis, Universiti Teknologi Malaysia, Faculty of Built Environment.

Kassim, G. and Shamsaddin, A. (2004). Stability of Different Design and Build Configurations for Procurement of Buildings. *Proceedings of the International construction research conference of the Royal Institute of Chartered Surveyors,* 7-8 September, 2004, Leeds Metropolitan University.

Kennedy, Holly Powell. (2004). Enhancing Delphi Research: Methods and Results. *Journal of Advanced Nursing,* 45 (5).

Kok, S. H. (1995). Design and Build- The local experience (with public client). Design and Build Projects – International Experiences, *International Congress on Construction,* 5-6 October 1995, Singapore, 223-231.

La Grange, A and Prestorius, F. (1996). Privatization of public housing in Hong Kong: An assessment of the private sector participation scheme. *Proceedings of CIB W92- Procurement Systems North meets South: Developing Ideas,* South Africa, 14-17 January 1996, 261-274.

Lam, E. W. M., Chan, A. P. C and Chan, D. W. M. (2004). Benchmarking design-build procurement system in construction. *Benchmarking: An International Journal,* 11 (3), 287-302

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

Leung, KS. (1999). Characteristics of Design and Build Projects. *Seminar Proceedings on Design Build Procurement System,* January, 1999, Hong Kong.

Li, Y., Nie, X. and Chen, S. (2007). Fuzzy Approach to Prequalifying Construction Contractors. *Journal of Construction Engineering and Management,* 133: 1 (40).

Lim, C.S and Mohamed, M.Z. (1999). Criteria of project success: an exploratory re-examination. *International Journal of Project Management,* 17 (4), 243-248.

Ling, F. Y. Y., and Liu, M. (2004) Using neural network to predict performance of design-build projects in Singapore, *Building and Environment,* 39 (10), 1263-1274.

Ling, Florence Yean Yng and Benjamin Huat Meng Poh. (2008). Problems encountered by owners of design-build projects in Singapore. *International Journal of Project Management,* 26 (2).

Ling, Florence Yean Yng and Canny Lee Kian Chong. (2005). Design and Build contractor's service quality in public projects in Singapore. *Building and Environment.*

Ling, Y.Y. (1997). Procuring design services for design/build projects. *CIB W9 Symposium Procurement-a key to innovation*. University de Montreal, 20-23 May 1997, 405-412.

Ling, Y.Y. and Lau, B.S.Y. (2002). A Case Study on the Management of the Development of a Large Scale Power Project in East Asia based on Design-Build Arrangement. *International Journal of Project Management*, 20, 413-423

Masterman, J. W. E. (2002). *An Introduction to Building Procurement System*. New York.: Spoon Press University of Reading (1996)

Masterman, J.W.E. (1992). *An introduction to building procurement systems*.

McManus, J. 2004. *Managing Stakeholders in Software Development Projects: Burlington Elsevier Butterwoth-Heinemann.*

Mead, Donna and Laurence Moseley. (2001). The Use of Delphi as Research Approach. *Nurse Researcher,* 8 (4).

Merna, A and Smith, N.J. (1990). Bid Evaluation for UK Public Sector Construction Contractors. *Journal of Construction Engineering and Management*, 133: 1 (40).

Migliaccio, Giovanni Ciro. (2007). *Planning for Strategy Change in The Project Delivery Strategy.* Doctor of Philosophy, The University of Texas.

Ming, Lam Wai. 2005. *Conceptual Model of Success for Design Build Project in The Public Sector of Hong Kong*. Ph.D. Thesis. Department of Building on Real Estate, The Hong Kong Polytechnic University.

Ministri of Public Works. (2008). *Peraturan Menteri Pekerjaan Umum No. 23 Tahun 2010 Tentang Perubahan Peraturan Menteri No. 02 Tahun 2010 Tentang Rencana Strategis Kementerian PU 2010-2014.*

Ministry of Environment. (2003). *Keputusan Menteri Negara Lingungan Hidup No. 112 Tahun 2003 Tentang Baku Mutu Air Limbah Domestik*

Ministry of Public Works. (2013). *Diseminasi Keteknikan Bidang Air Limbah. Jakarta: Indonesia*

Ministry of Public Works. (2013). *Diseminasi Keteknikan Bidang Air Limbah. Jakarta: Indonesia (Word Bank, 2013).*

Ministry of Public Works. (2013). *Peraturan Menteri Pekerjaan Umum No. 14 Tahun 2013 Tentang Standard dan Pedoman Pengadaan Pengadaan Konstruksi dan Jasa Konsultansi* .

Mo, J.K.W. and Ng, L.Y. (1997). Design and build procurement method in Hong Kong-An overview. *CIB W92 Symposium Procurement-a key to innovation.* University de Montreal, 20-23 May 1997, 453-462.

Molenaar, K.R. and Songer, A.D. (1998). Model for Public Sector Design-Build Project Selection. *Journal of Construction Engineering and Management*.

Molenaar, Keith R. and Douglas D. Gransberg. (2001). Design-Builder Selection for Small Highway Projects. *Journal of Management in Engineering*, 17 (4), 214-223

Molenaar, Keith R., Anthony D. Songer and Mouji Barash. (1999). Public-Sector Design/Build Evolution and Performance. *Journal of Management in Engineering,* 15 (2), 54-62.

Ndekugri, I. and Church, R. (1996). Construction procurement by the design and build approach: A survey of problems. *Proceedings of CIB W92 Procurement Systems North meets South: Developing Ideas,* South Africa.

Newcombe, R. 2003. *Funding Urban Services – Option for Physical Infrastructure*: Allen & Unwin Publisher, NSW, Australia.

Nguyen, N.D, Ogunlana, S.O, Lan, D.T.X. (2004). A Study on Project Success Factors in Large Construction Project in Vietnam. Engineering, *Construction and Architectural Management,* 11 (6).

Nkado, R.N. (1995). A model for predicting and planning construction times at early design stages for D/B projects. *Design and Build Projects-International Experiences, International Congress on Construction*, 5-6 October, 1995, Singapore, 166-172.

Palaneeswaran, E. and Kusumaraswamy, M.M. (2001). Reinforcing Design-Build Contractor Selection: A Hong Kong Perspective. *Journal of Construction Engineering and Management,* 8 (1).

Pearson, M and D Skues. (1999). Control of Projects Implemented through Design and Build Contracts. *In Seminar proceeding on Design Build Procurement System,* January 1999, Hong Kong.

Pietroforte, Roberto and John B. Miller. (2002). Procurement methods for US infrastructure: historical perspectives and recent trends. *Building Research & Information.* 30 (6), 425-434.

Pinto, J. K. and Slevin, D. P. (1989). Critical success factors in R&D projects. *Research Technology Management*, 32 (1), 31-35.

Punch, K.F. (1998). *Introduction to Social Research – Quantitative and Qualitative Approaches.* London: Sage Publications.

Rahadian, Hedy. (2009). *Langkah Awal Menuju Performanced Based Contract Melalui Extended Warranty Period.*

Ramus, J.W. (1996). *Contract Practice for Surveyors*. Third Edition. Oxford: Laxton's.

Rizzo, J. (1998). Design/Build Alternative: A Contracting Method. *Journal of Management in Engineering*, 14 (6).

Rowlinson, S M. and Walker, A. (1995). *The construction industry in Hong Kong*. Hong Kong: Longman

Schaufelberger, J. E. (2004). Success factors for design-build contracting. *Journal of Construction Engineering and Management, ASCE Conference Procurement.*

Singh, D. and Tiong, R.I.K. (2005). A Fuzzy Decision Framework for Contractor Selection. *Journal of Construction Engineering and Management*, 62-70.

Soemardi, Biemo and Khrisna S. Pribadi. (2010). The Role of Central Local Agencies in Indonesia's Road Project Delivery System. *Paper presented at the 5th Civil Engineering Conference in the Asian Region and Australian Structural Engineering Conference.*

Songer, A. D. and Molenaar, K. R. (1996). Selecting Design-Build: Private and Public Sector Owner Attitude, *Journal of Engineering Management*, 12 (6), 47-53.

Songer, Anthony D. and Keith R. Molenaar. (1997). Project Characteristics for Successful Public-Sector Design-Build. *Journal of Construction Engineering and Management,* 123 (1), 34-40.

Tchobanoglous, G., Theisen, H., and Vigil, S.A. (1993). *Integrated solid waste management: engineering principles and management issues.* McGraw-Hill, the University of Michigan.

Thurgood, Maggie. (1999). *Solid Waste Landfills: Decision-Makers' Guide Summary. Joint publication of the World Bank, Swiss Agency for Development and Cooperation (SDC), World Health Organization Regional Office for Europe, and the Swiss Centre for Development Cooperation in Technology and Management (SKAT).* Washington, D.C. and Copenhagen, Denmark. Pp. 3.

Tiong, R. L. K., Yeo, R. T. and McCarthy, S. C. (1992). Critical success factors in winning BOT contracts. *Journal of Construction Engineering and Management,* 118 (2), 217-228.

Toni, Alam. (2011). *Identifikasi Faktor - Faktor Risiko Proyek Rancang Bangun (Design and Build) pada PT. X Y Z yang Berpengaruh pada Kinerja Waktu.* Thesis Master. Universitas Indonesia.

Water and Sanitation Program East Asia and The Pacific World Bank. (2007). *Economics Impact of Sanitation in Indonesia.* Jakarta: Indonesia UNICEF (2007).

Yuwono, Bambang E. (2003). *Faktor Penentu Kesuksesan Proyek Rancang Bangun. Jurnal Sipil.* University of Trisakti.