SUCCESS FACTORS FOR BUMIPUTRA CONTRACTORS IN MALAYSIA: JOHOR STATE

NOOR IDIRAH BINTI RAHMAT

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This thesis is dedicated to my parents,

Rahmat Bin Ambon and Idiana Binti Ibrahim,

for their love, endless support and encouragement.

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ABSTRACT

Several parties which include client, consultant, contractor, supplier and local authorities are involved in ensuring the success of a construction project. Among these parties, contractor plays the most important role in making the project success within stipulated time, cost and quality. In reality, studies reported that construction projects often encountered delays or late deliveries, sub-standard workmanship and materials, poor safety management on sites and cost over-run of construction due to problems encountered by contractors in executing the project. Since many of these studies uncovered the contractors' problems, thus this study was intended to determine success factors for contractors focusing on Bumiputra contractors. This is a quantitative study where data was collected using questionnaire survey and analysed using descriptive and multivariate approach. Pilot study was carried out to assess contents validity of the questionnaire on the 33 identified success factors by 10 experienced Bumiputra contractors. After the pilot study, actual survey managed to secure responses of 100 Bumiputra contractors for the state of Johor. Descriptive analysis on the collected data has resulted to five most significant success factors for Bumiputra contractors which are prepare competitive tender pricing for tendering process, maintain good reputation for better chance of getting new project, filling correct terms and condition in tender document, manage risk of not having good and sustainable team of construction workers and manage workers to carry out the given tasks in systematic manner. PLS-SEM path modelling approach was used to develop a model showing the graphical relationships of the success factors. Based on the developed model, it was found that factors in resources group are giving the highest impact load of 0.299 to the success of Bumiputra contractors. Hopefully, the findings from this study will be a constructive guide to Bumiputra contractors to improve their potentials to be successful in the competitive construction business.

ABSTRAK

Beberapa pihak seperti pemaju, perunding, kontraktor, pembekal dan pihak berkuasa tempatan adalah merupakan pihak-pihak yang terlibat untuk memastikan kejayaan projek pembinaan. Di antara pihak-pihak yang terlibat, kontraktor merupakan pihak yang sangat penting untuk menjayakan projek itu mengikut tempoh masa, kos dan kualiti yang ditetapkan. Hakikatnya, banyak kajian melaporkan kontraktor yang terlibat dalam projek pembinaan sering menghadapi masalah seperti kelewatan atau penghantaran lewat, mutu kerja dan bahan yang kurang berkualiti, kelemahan pengurusan keselamatan di tapak dan lebihan kos pembinaan. Oleh kerana banyak kajian telah mengenalpasti masalah-masalah yang dihadapi kontraktor maka, kajian ini bertujuan untuk mengenalpasti faktor-faktor kejayaan bagi kontraktor terutama kepada kontraktor Bumiputra. Kajian ini merupakan kajian kuantitatif dimana data dikumpul menggunakan borang kaji selidik dan dianalisis menggunakan pendekatan deskriptif dan multivariat. Kajian rintis telah dijalankan untuk menilai kandungan pengesahan kaji selidik daripada 33 faktor-faktor kejayaan yang telah dikenalpasti melalui 10 kontraktor bumiputera yang berpengalaman. Selepas kajian rintis, kajian sebenar berjaya mendapatkan maklum balas daripada 100 kontraktor Bumiputra bagi negeri Johor. Analisis deskriptif mengenai data yang dikumpul telah menunjukkan lima faktor kejayaan yang paling penting untuk kontraktor Bumiputra di mana faktor kejayaan itu adalah dalam menyediakan harga tender yang kompetitif dalam proses pembidaan, mengekalkan reputasi yang baik untuk berpeluang mendapatkan projek baru, mengisi terma dan keadaan dengan betul dalam dokumen tender, menguruskan risiko bahan yang sukar didapati dan pasukan pekerja pembinaan yang mampan dan menguruskan pekerja untuk menjalankan tugas-tugas yang diberikan dengan cara yang sistematik.

Analisis ini menggunakan pendekatan pemodelan PLS-SEM untuk membangunkan model dalam mod perwakilan grafik yang menunjukkan hubungan struktur faktor. Berdasarkan kepada model yang terbina, menunjukkan bahawa faktor-faktor dalam kumpulan sumber-sumber telah memberi kesan beban tertinggi 0.299 kepada kejayaan kontraktor Bumiputra. Diharapkan, penemuan daripada kajian ini dapat menjadi panduan yang membina kepada kontraktor Bumiputera untuk meningkatkan potensi mereka untuk berjaya dalam perniagaan pembinaan yang kompetitif.

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LIST OF SYMBOLS AND ABBREVIATIONS

$\bar{r}$	-	Average inter-correlation items
α	-	Cronbach's alpha coefficient
AI	-	Average Index
AVE	-	Average Variance Extracted
CB-SEM	-	Covariance-based SEM
CIDB	-	Construction Industry Development Board
CR	-	Composite Reliability
CSC	-	Contractor Services Center
CV Com	-	cross validated communality
CV Red	-	cross validated redundancy
CV	-	Convergent validity
DOSH	-	Department of Occupational Safety and Health
DV	-	Dependent Variable
f^2	-	Effect Size
FIN	-	Finance
IIR	-	Individual item reliability
IV	-	Independent Variable
MAN	-	Management
MARA	-	Majlis Amanah Rakyat
MM	-	Measurement Model
NEP	-	New Economy Policy
PKK	-	Pusat Khidmat Kontraktor
PLS-SEM	-	Partial Least Square-Structural Equation Modelling
PROC	-	Procurement

Q^2	-	Predictive Relevance
q^2	-	Relative impact of predictive relevance
R^2	-	Explanatory Power
RES	-	Resources
RISK	-	Risk
SEM	-	Structural Equation Modelling
SM	-	Structural Model
SPM	-	Sijil Pelajaran Malaysia
SPSS	-	Statistical Package for the Social Sciences
USA	-	United States of America

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Construction industry involves several parties such as client, consultant, contractor, supplier and local authorities in ensuring the success of the construction projects. Nevertheless, the construction project is greatly dependent on the contractor's involvement which plays the most important parts in realising the success of the project (Hanif, 2011). In reality, construction project often encounter delays or late deliveries, sub-standard workmanship and materials, poor safety management on sites and cost over-run of construction projects that have been seriously discussed by the public (Koon, 2015). According to Ayub & Eman (2006), quality of contractors in implementing the projects have often been subjected to questions, criticisms and underrating.

Contracting business is considered as a very difficult business which needs to overcome all the inherent difficulties to become competitive and efficient. The business is fragmented and resources driven in nature which needs proper management to ensure the success of the project interm of time, budget and also quality (Koon, 2005).

A good teamwork amongst the client, consultant and contractor to complete construction projects successfully are being experienced and enjoyed in Malaysia construction industry to transform Malaysia into developed world by 2020 (Abdullah *et. al.*, 2004).

According to Construction Industry Development Board (CIDB) statistic, Malaysia is having amongst the highest ratio of contractor in the world with 1 contractor to 614 person and these has caused more failures and bankruptcies in contracting than in any other business (CIDB, 2015b). Majority of these failures are related to Bumiputra contractors which has been discussed in local newspaper. Failure amongst Bumiputra contractors in delivering the project according specifications has become an issue to the government in elevating the economy of Bumiputra through New Economy Policy that was introduced since 1969 (Hanif, 2011).

According to Ayub & Eman (2006), there are a lot problems faced by Bumiputra contractors in delivering the construction project that was awarded to them which needs to be uncovered and highlighted especially when considering the fact that certain government projects are restricted for the bumiputera contractors. Thus, it is very important to address the problems faced by Bumiputra contractors for achieving the success of construction projects.

Success is defined by Ashley & Jaselskis (1987) as results much better than expected or normally observed in terms of cost, schedule, quality, safety and participant satisfaction. The investigation of the success factors of construction projects has attracted the interest of many reseachers and many studies have been conducted with the aim of providing contract parties with valuable insight into how to consistently achieve superior results for their projects. Although, construction projects are by their repetitive activities, each one has its own characteristics and circumstances.

According to Hwang & Lim (2013), success factors are used to support and measure the success of a strategic and tactical approach to project execution with the intent of ensuring the success of the project delivery system and to support the appropriate allocation of limited resources. Thus, this study builds based on the past studies by identified the problems faced by Bumiputra contractors and rephrased into success factors.

1.2 Problem Statement

Issues faced by Bumiputra contractors such as leakages of government's construction projects awarded to Bumiputra contractors, lack of entrepreneurship knowledge amongst Bumiputra contractors, difficulty of getting building materials at affordable prices, inability to fully understand the construction process and requirements for achieving success are often highlighted in newspapers and also in academic articles (Rosli, 2004; Lim, 2004; Koon, 2005; Ayub & Eman, 2006; Kadir, 2006; Musu, 2008; Rahman, 2009; Zaini *et. al.*, 2010; Othman, 2010; Hanif, 2011; Adam, 2011). Studies on Bumiputra contractors issues has only managed to identify problems encountered by Bumiputra contractors however study on the success factors for Bumiputra contractors was not found. Thus, this study will uncover the factors which will contribute to the success of Bumiputra contractors either in securing project and also in completing the awarded projects. With these success factors, Bumiputra contractors can strategies their company to perform well on the on-going project and also to bid for new construction project.

1.3 Objective of Study

The aim of this study is to uncover success factors for Bumiputra contractors. To achieve this aim, the following objectives are carried out as below:

i. Identifying the Bumiputra contractors' success factors.
ii. Determining the significant level of Bumiputra contractors success factors.
iii. Developing the Partial Least Squares Structural Equation Modelling (PLS-SEM) model of Bumiputra contractors success factors.

1.4 Scope and Limitation of Study

This study involves quantitative approach using structured questionnaire survey in identifying the factors for Bumiputra contractors success in construction industry. However, the scope of this research is limited to the construction companies located in state of Johor. Targeted respondents for data collection are Bumiputra contractors who are registered with Construction Industry Board Development Malaysia (CIDB) and Bahagian Pembangunan Kontraktor dan Usahawan (BPKU).

1.5 Significant of Study

Since the issues of Bumiputra contractor to survive in competitive construction industry has become national agenda, this study partially address the issues or problems and provides somekinds of means to assess Bumiputra contractor competitiveness. By identifying these success factors, Bumiputra contractors will able to navigate their company successfully in the competitive construction industry.

1.6 Thesis Layout

The thesis layout of this study consists of six chapters as follows:

- Chapter 1: describes the introduction and needs of this study. It includes background of study, problem statement, objectives and scope of this study.
- Chapter 2: focuses on review of published research works related to issues and problem faced by Bumiputra contractors.
- Chapter 3: describes the methodology of study adopted for executing this research. It also contains the explanation about the methods used for data collection and analysis.

- Chapter 4: discusses a process to determine the rank of identified factors based on their average index score of significance in contributing to Bumiputra contractors success.
- Chapter 5: explains the development of PLS-SEM path model and the assessments that are carried out on it to ensure the model is fit for representation.
- Chapter 6: presents the conclusion for the overall study which summarised the important findings related to the objectives of study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to provide an overview of issues and problems faced by Bumiputra contractors in construction industry. This chapter begins with the general view of construction industry about the issues faced by the construction industry. Then will be followed by reviewing the issues and problems faced by Bumiputra contractors.

2.2 Issues in Construction Industry

Construction industry is considered as a locomotive of physical development which bring substantial and significant impacts to the country's economy (Kumaraswamy, 2006). However, it also contributes to negative implications especially to the environment and social aspect of a country.

In addition, the industry is always facing chronic problems such as time overrun, cost overrun, poor safety and poor quality (Nahmens & Ikuma, 2009).

Achievement in completing construction project on time is a basic requirement but it seldom completed on time. This has become a worldwide problem including Malaysia where the construction industry is facing the critical problem of time overrun (Alaghbari *et. al.,* 2007; Ibrahim *et. al.,* 2010; Sambasivan & Soon, 2007). Abdullah (2010) reported that more than 90% of large Majlis Amanah Rakyat (MARA) construction projects experienced delay since 1984. Endut *et. al.,* (2009) studied on time performance of 359 projects (301 new constructions while 58 refurbishment projects) in Malaysia. 359 of these projects, 301 were public projects and 51 private projects. The study found that only 18.2% of the public sector projects and 29.45% of private sector projects had 0% time deviation (no delays) while the average percentage of time overrun for other projects was 49.71%. Time delay can be due to one or more reasons including problems of financing and payment for completed works.

Cost is one of the major considerations throughout the lifecycle of a project. Unfortunately, most of the projects failed to achieve project completion with the estimated cost. Besides time overrun, cost overrun is also a serious problem in the constructions industry. This is a major problem both in developed and developing countries. The trend is more several in developing countries where this overrun sometimes exceeds 100% of the anticipated cost of the project (Azhar *et. al.,* 2008). Malaysia construction industry is also facing a lot of challenges in completing the construction projects within the estimated cost (Ibrahim *et. al.,* 2010; Toh *et. al.,* 2011) and more than 50% of projects face cost overrun (Endut *et. al.,* 2009).

Another problem faced by construction industry is poor quality. It is very common and serious problem as the expected quality is not complied in the construction projects (Kometa & Olomolaiye, 1997). Failure in achieving required quality has also significant impact of project cost. Koskela (1992) stated that quality cost (non-conformance) in construction industry in the United States of America (USA) contributed to 12% of total project cost. Marosszeky *et. al.,* (2002) showed that quality failures had resulted in rework which incurred extra cost approximately 2% - 12% of project cost and stated that quality rectification problem contributed to approximately 3.4% - 6.2% of project cost.

Finally, the construction industry is notoriously known for its poor safety record as compared with other industries (Mohamed, 2002). Poor safety resulted to accidents and fatality which effect significantly on efficiency and cost of the projects. Accident data prepared by Department of Occupational Safety and Health (DOSH), Malaysia shows that accident related to fatality rates in the construction industry much worse than all other industry for many years, the accident related to fatality rate are 42 cases till September 2015 higher than other industries. According to Sharif (2015), the causes of accident at construction site are too many, one of it is caused by contractors' attitude, workers and the environment of construction site. Thus, it can be concluded that construction industry is the most challenging industry where besides generating the country's economy, it also being engulfed with chronic issues that are difficult to resolve.

2.3 Contractors

Contractor is someone who enters into a binding agreement to perform a certain service or provide a certain product in exchange for valuable consideration, monetary, goods, services, even barter arrangements. In the building trades, a contractor is one who is engaged in the construction or building related services for a client. The construction site is overseen by a "Prime", General, or Specialty contractor, who may perform the work with employees, subcontractors or any combination (Othman, 2010). According to Act 520, Part 1 (1994), the definition of contractor is someone who undertakes to carry out and complete any construction work (CIDB, 2015a).

Zaini *et. al.*, (2010), defines contractors as the most powerful and carry ultimate responsibility, in both internal and external aspects, for the firm and its investment capital. In this sense, the contractor is a body consisting of company director general and commercial manager of private companies.

According to Ayub & Eman (2006), contractors are independent business organizations and are awarded the projects to produce the required end product as stipulated in the contract documents. In the case of the owner and the contractor may disagree on certain things, the achievement of the end product must always be the top

REFERENCES

Abdullah, M. R. (2010). Significant causes and effects of construction delay. University Tun Hussein Onn Malaysia: Master Thesis.

Abdullah, M. R., Razaki, M., Rahman, I. A., & Azis, A. A. A. (2010). Causes of delay in MARA management procurement construction projects. *Journal of Surveying, Construction and Property*, *1*(1): 123–138.

Abdullah, M. R., Razaki, M., Rahman, I. A., Asmi, A., &bAzis, A. A. A. (2009). Delay in large mara construction projects based on project. In *Proceedings of MUCEET2009 Malaysian Technical Universities Conference on Engineering and Technology* June 20-22, 2009, MS Garden, Kuantan, Pahang, Malaysia (pp. 9–13).

Abdulllah, F., Chai, V. C., Anuar, K., & Tan, T. S. (2004). An Overview On The Growth and Development Of The Malaysian Construction Industry. *Workshop on Construction Contract Management 2004*, Universiti Teknologi Malaysia, 2004.

Act 520, Pembinaan Malaysia Act (1994), Construction Industry Development Board, 1-16

Adam, I. M. (2011). *Tahap kebergantungan kontraktor kelas F di Kelantan kepada kontrak kerajaan.* Universiti Teknologi Malaysia: Degree's Thesis

Aibinu, A., & Al-lawati, A. (2010). Using PLS-SEM Technique to Model Construction Organizations Willingness to Participate in E-bidding. *Automation in Construction*, 19 (6), 714-724. Doi: 10.1016/j.autcon.2010.02.016.

Akhir, N. S. M. (2014). Assessing the risk level of factors causing construction waste generation throughout construction project life cycle. Universiti Tun Hussein Onn Malaysia: Master's Thesis.

Akter, S., Ambra, J. D., & Ray, P. (2011). An evaluation of PLS based complex models: the roles of power analysis, predictive relevance and GoF index. *Proceedings of the 17th Americas Conference on Information Systems*. Detroit, Michigan. Pp. 1-7.

Alaghbari, W., Kadir, M. R. A., Salim, A., & Ernawati. (2007). The significant factors causing delay of building consruction projects in Malaysia. *Engineering, Construction and Architectural Management*, 14(2): 192-206.

Ashley & Jaselkis (1987). Determinants of construction project success. *Project Management Journal*, 18 (2): 69-79.

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

Azhar, N., Farooqui, R. U., & Ahmed, S. M. (2008). Cost Overrun Factors In Construction Industry of Pakistan. Paper presented at the *First International Conference on Construction In Developing Countries (ICCIDC-I)* "Advancing And Integrating Construction Education, Research & Practice".

Banerjee, A., Chitnis, U. B., Jadhav, S. L., Bhawalkar, J. S., & Chaudhury, S. (2009). Hypothesis Testing, Type I and Type II Errors. *Industrial Psychiatry Journal*, 18(2): 127-131. doi: 10.4103/0972-6748.62274.

Bernama (2012). Persatuan Kontraktor: Beri Bumiputra lebih ruang sertai projek Johor. *Sinar Harian*. Accessed at http://www.sinarharian.com.my/persatuan-kontraktor-beri-Bumiputra-lebih-ruang-sertai-project-johor-1.84407.

Bernama (2013a). 10 hingga 15 peratus projek pembinaan gagal disiapkan ikut jadual. *Berita Harian*. Accessed at http://www2.bharian.com.my/articles/10hingga15peratusprojekpembinaangagaldisiapkanikutjadual/Article

Bernama (2013b). Kontraktor Melayu Johor kecewa kurang peluang dalam projek mega. *Utusan Borneo*. Accessed at http://www.theborneopost.com/2013.07/10/kontraktor-melayu-johor-kecewa-kurang-peluang-dalam-projek-mega/

Breiman, L. & Friedman, J. H. (1985). Estimating optimal transformations for multiple regression and correlation. *Journal of the American Statistical Association*, 80: 580-598.

Brown, J. D. (2001). *Using Surveys in Language Programs*. Cambridge: Cambridge University Press.

Carter, M. P & Williamson, D (1996). *Questionnaire Design*. Staffordshire University Business School, Leek Road, Stokeon-Trent ST4 2DF, United Kingdom. http://www.staffs.ac.uk/ buss/bscal/mandev/m_qm/t_que/que.htm

Chin, W. W. (1998). The Partial Least Squares Approach to Structural Equation Modelling. *Modern Methods for Business Research*, 295(2): 295-336.

Chin, W. W. (2010). How to Write Up and Report PLS Analyses. In V. Esposito Vinzi et al. (eds.) (Ed.), *Handbook of Partial Least Squares*, Berlin: Springer. Doi: 10.1007/978-3-540-32827-8 29.

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

CIDB (2015b). Construction Statistics Quarterly Bulletin (Sept 2015). Construction Industry Development Board Malaysia. Retrieved from http://www.cidb.gov.my/cidbv4/images/pdf/2015/bisnes/bahagian%201%20q3%202015.pdf.

CIOB. (2010). A report Exploring Procurement in the Construction Industry, *The Chartered Institute of Building*. Berkshire, United Kingdom. Pp 1-28

Cohen. (1988). *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. New Jersey: Lawrence Erlbaum Associates Publishers.

Constitution of Malaysia (1957a). Constitutional definition of Malay: Article 160

Constitution of Malaysia (1957b). Special Position of Bumiputras and Legitimate Interests of Other Communities: Article 153

Construction Industry Development Board (2007). Construction Industry Master Plan Malaysia 2006-2015, Kuala Lumpur.

Datuk Nur Jazlan Mohamed (2011). Kontraktor Bumiputera perlu berubah ke arah Wawasan 2020. Retrieved on 13 February 2015 at 10.15 a.m from www.themalaysianinsider.com.

Endut, I. R., Akintoye, A., & Kelly, J. (2009). Cost and time overruns of projects in Malaysia. Retrieved on 21 August, 2015, from *http://www.irbnet.de/daten/iconda/CIB10633.pdf*, 243-252.

Fellows, R., & Liu, A. (2008). *Research Methods for Construction*. 3rd ed. Wiley-Blackwell: Utopia Press.

Field, A. (2010). *Discovering Statistics using SPSS for Window*. London Thousand Oaks, New Delhi: SAGE Publications.

Geisser, S. (1974). A predictive approach to the random effects model. *Biometrika*, 61: 101-107.

Hair, J. F., Hilt, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modelling (PLS-SEM)*. United State of America: SAGE Publications.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. (2011). An Assessment of the Use of Partial Least Squares Structural Equation Modelling in Marketing Research. *Journal of the Academy of Marketing Science*, 40(3): 414-433.

Hanif, M. I. F (2011). Problems and Dilemmas of Class F contractors' participation in large projects. Universiti Teknologi Malaysia: Master's Thesis

Henseler, J. (2009). On the Convergence of the Partial Least Squares Path Modelling Algorithm. *Conputational Statistics*, 25(1): 107-120.

Hulland. (1999). Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies. *Strategic Management Journal*, 20(2): 195-204.

Hwang, B., & Lim, E. (2013). Critical Success Factors for Key Project Players and Objectives: Case Study of Singapore. *Journal of Construction Engineering and Management*, 139(2): 204-215.

Ibrahim, A. R., Roy, M. H., Ahmed, Z., & Imtiaz., G. (2010). An investigation of the status of the Malaysian construction industry. Benchmarking: *An International Journal*, 17(2): 294-308.

Islam, M. D. M., & Faniran, O. O. (2005). Structural Equation Model of Project Planning Effectiveness. *Journal of Construction Management and Economics*, 23(2): 215-223.

Ismail, I. (2014). Assessing the risk of factors on time and cost overrun throughout lifecycle of Construction Project. Universiti Tun Hussein Onn Malaysia: Master's Thesis.

Jin, X. H., Doloi, H., & Gao, S. Y. (2007). Relationship-Based Determinants of Building Project Performance in China. *Journal of Construction Management and Economics*, 25: 297-304.

Kadir, A. A. (2006). *Risiko dan pengurusannya dalam pembinaan: Perspektif kontraktor*. Universiti Teknologi Malaysia: Degree's Thesis.

Kometa, T. S., & Olomolaiye, P. O. (1997). Factors influencing construction client's decisions to build. *Journal of Management in Engineering*, 13(2): 77-86.

Koon, Y. Y. (2005). Why are there so few successful bumiputera contractors?. Aliran Monthly Vol 25 (2005): Issue 5

Koon, Y. Y. (2015). Bumiputera contractors: Producing competitive Bumiputra contractors**.** Retrieved on 13 February 2015 at 9.30 a.m from http://www.malaysiakini.com/letters/223247.

Koon, Y. Y. (2013). Bumiputera contractors: A wasteful national mission**.** Retrieved on 13 February 2015 at 9.15 a.m from http://klse.i3investor.com.

Koskela, L. (1992). Application of the New Production Philosophy to Construction. *Center for Integrated Facility Engineering*, Stanford University.

Kumaraswamy, M. M. (2006). Accelerating construction industry development. *Journal of Construction in Developing Countries*, 11(1): 73-96.

Leung, M. Y., Ng, S. T., Skitmore, M., & Cheung S. O. (2005). Critical Stressors Influencing Construction Estimators in Hong Kong. *Construction Management and Economics*, 23 (1): 33-43.

Li, X., & Wang, R. (2007). Survey Research on Relationship among Service Failure: Service Recovery and Customer Satisfaction. *Proceedings of the International coference on Management Science and Engineering*, Harbin, China. Pp. 1121-1123.

Lim, L. C (*2004*). Study on the performance and development of class F contractors in Samarahan division. Universiti Teknologi Malaysia: Degree's Thesis.

Malaysia (1995). *Dasar dan Keutamaan kepada syarikat Bumiputera dalam Perolehan Kerajaan*: SPP Bil. 4/95.

Malaysia (2012). *Gred Pendaftaran Kontraktor Kerja*: SPP Bil. 6/2012.

Mahamid, I. (2011). Causes of Contractors' Failure: Contractors' View. *2nd International Conference on Construction and Project Management IPEDR vol.15 (2011)* © (2011) IACSIT Press, Singapore.

Marosszeky, M., Thomas, R., Karim, K., Davis, S., & McGeorge, D. (2002). Quality management tools for lean production-moving from enforcement to empowerment. *Paper presented at the Proceedings IGLC-10*, Gramado, Brazil.

Masturianeh, M. (2008). *Analisis permasalahan kontraktor Bumiputra di dalam perkembangan industry pembinaan di Malaysia*. Universiti Teknologi Malaysia: Degree's Thesis.

Meepol, S., & Ogunlana, S. O. (2006). Factors affecting cost and time performance on highway construction projects: evidence from Thailand. *Journal of Financial Management of Property and Construction* 2006; 11(1): 3:20.

Memon, A. H. (2013). Structural Modelling of Factors Causing Cost Overrun in Construction Industry. Universiti Tun Hussein Onn Malaysia: Ph.D Thesis.

Memon, A. H., Rahman, I. A., Abdullah, M. R., & Azis, A. A. A. (2010). Factors affecting construction cost in Mara large construction project : Perspective of project management Consultant. *Journal of Construction Engineering and Management*, 1(2): 41–54.

Mohamed, N. J. (2011). Kontraktor Bumiputra perlu jadi trend setter. *Harian Metro* Newspaper. p. 20.

Mohamed, S. (2002). Safety climate in construction site environments. *Journal of Construction Engineering and Management*, 128(5), 375-384.

Molenaar, Washington, & Diekmann. (2000). Structural Equation Model of Construction Contract Dispute Potential. *Journal of Construction Engineering and Management*, 126(4): 268-277.

Muhammad, N. (2011). Kontraktor Bumiputra lemah dalam praktikal. The *Borneo Post*. Accessed at http://www.theborneopost.com/2011/12/12/kontraktor-Bumiputra-lemah-dalam-praktikal/

Murray, M., & Seif, M. (2013). Causes of project delays in Nigerian construction industry. *European Journal of Civil Engineering and Architecture*, 10(1): 1–7.

Musu, M. (2008). *Analisis permasalahan kontraktor Bumiputra di dalam perkembangan industry pembinaan di Malaysia*. Universiti Teknologi Malaysia: Degree's Thesis.

Nagapan, S. (2014). Structural modelling of cause and effect factors of construction waste generation in Malaysia construction industry. Universiti Tun Hussein Onn Malaysia: Ph.D Thesis.

Nahmens, I., & Ikuma, L. H. (2009). An Empirical Examination of the Relationship between Lean Construction and Safety in the Industrialized Housing Industry. *Lean Construction Journal*, 1, pp.1-12.

Odeh, A. M., & Battaineh, H. T. (2002). Causes of construction delay : traditional contracts. *International Journal of Project Management*, 20(1): 67–73.

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

Rahman, I. A., & Nagapan, S. (2015). Causative factors of Construction waste generation in Malaysia. Universiti Tun Hussein Onn: Penerbit UTHM.

Rahman, I. A., Memon, A. H., Abdullah, N. H., & Azis, A. A. A. (2013). Application of PLS-SEM to Assess the Influence of Construction Resoueces on Cost Overrun. *Applied Mechanics and Materials*, 284: 3649-3656.

Rahman, I.A., Memon A.H., Karim, A., Tarmizi, A (2013). Significant factors causing cost overruns in large construction projects in Malaysia. *Journal of Applied Science* 13(2): 286-293

Rahman, N. H. (2009). A survey on problem faced by contractors using design & build contract. Universiti Malaysia Pahang: Degree's Thesis.

Ramayah, T., Lee, J. W. C., & Chyaw, J. B. C. (2011). Network Collaboration and Performance in the Tourism Sector. *Service Business*, 5(4): 411-428.

Rosli, R. S. A (2004). *Masalah kontraktor Bumiputra di Sabah*. Universiti Teknologi Malaysia: Degree's Thesis.

Rummel, R. J. (1970). *Applied factor analysis*. Evanston, IL: Northwestern University Press.

Salian, S. (2015). Hasil kerja berkualiti Tarik keyakinan. *Berita Harian* Newspaper. p. 4.

Samad, M. (2013). Bumi initiatives must provide solutions to problems. New Straits Times. Accessed at http://www2.nst.com.my/top-news/bumi-initiatives-must-provide-solution-to-problems.

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

Sekaran, U., & Bougie, R. (2010). *Research Methods for Business*: A Skill Building Approach. London: Wiley.

Seuring, S., & Muller, M. (2008). From a Literature Review to a Conceptual Framework for Sustainable Supply Chain Management. *Journal of Cleaner Production journal*, 16: 1699-1710.

Sharif, M. S. (2015). *Kajian tahap kesedaran pekerja terhadap aspek keselamatan dan kesihatan pekerjaan di tapak pembinaan*. Universiti Utara Malaysia: Master's Thesis.

Srivastava, S. K. (2007). Green Supply-Chain Management: A State of the Art Literature Review. *International Journal of Management Reviews*, 9 (1): 53-80.

Stone, M. (1974). Cross validatory choice and assessment of statistical predictions. *Journal of the Royal Statistical Society*, 36: 111-147.

Suangsuwan, J., Wiratchai, N., & Wongwanich, S. A. (2005). Development of Indicators and the Cause and Effect Model of Collaboration of Primary School Teacher in Ayuttaya province, Thailand. *Proceeding of the Australian Association for Research in Education Annual Conference*, Thailand.

Tenenhaus, M., Esposito Vinzi, V., Chatelin, Y. M., & Lauro, C. (2005). PLS path modelling. *Computational Statistics & Data Analysis*, 48 (1): 159-205.

Thompson, B. (2004). Exploratory and Confirmatory factor analysis: understanding concepts and applications. *Washington, DC: American Psychological Association*, 84(9): 784-799.

Toh, T. C., Ali, K. N., & Aliagha, G. U. (2011). Modeling Construction Cost on Business. *Engineering and Industrial Applications (ISBEIA).*

Urbach, N., & Ahlemann, F. (2010). Structural Equation Modelling in Information Systems Research Using Partial Least Squares. *Journal of Information Technology Theory and Application*, 11(2): 5-40.

Wan, S. K. M., Kumaraswamy, M. M., & Liu, D. T. C. (2009). Contributors to Construction Debris from Electrical and Mechanical Work in Hong Kong Infrasructure Projects. *Journal of Construction Engineering and Management*, 135(7): 637-646.

Williams, B., Brown, T., & Onsman, A. (2010). Exploratory factor analysis: A five-step guide for novices. *Journal of Emergency Primary Health Care (JEPHC)*, 8(3), Article 990399.

Wong, P. S. P., & Cheung, S. O. (2005). Structural Equation Model of Trust and Partnering Success. *Journal of Management in Engineering*, 21(2): 70-80.

Xia, B., & Chan, A. P. C. (2010). Key competences of design-build clients in China. *Journal of Facilities Management*, *8*(2), 114–129.

Yang, J. B., & Peng, S. C. (2008). Development of a Customer Satisfaction Evaluation Model for Construction Project Management. *Building and Environment*, 43(4): 458-468.

Yee, C. Y., & Mustaffa, N. E. (2012). Analysis of factors critical to construction project success in Malaysia. *Engineering, Construction and Architectural Management*, 19 (5): 543-556

Yong, A. G., & Pearce, S. (2013). A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. *Tutorials in Quantitative Methods for Psychology*, 9(2): 79-94.

Yeung, J. F. Y., Chan, A. P. C., & Chan, D. W. M. (2009). Developing a Performance Index for Relationship-Based Construction Projects in Australia. *Journal of Management in Engineering*, *25*(2), 59–68.

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

Zainun, N. Y., Roslan, N., & Memon, A. H. (2014). Assessing Low-Cost Housing Demand in Melaka: PLS-SEM Approach. *Advanced Materials Research*, 838: 3156-3162.

Zulkifli, A. (1997). *Masalah kontraktor di Negeri Johor*. Universiti Teknologi Malaysia: Degree's Thesis.