RISK ASSESSMENT FOR THE DELAY FACTORS IN PROJECT MANAGEMENT OF ROAD CONSTRUCTION

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DEDICATION

Special dedicated to my supportive husband *Mohd Bakti Farial Bin Khalid,*

To my dearest mother *Waginah Bt Nuri,*

And to my beloved son *Muhammad Qayyum,*

Thank you for untiring Du'a, support, love, understanding and encouragement

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ABSTRACT

The main purpose of project management of road construction is to make sure the project completed in timely manner. Hence, the project shall be managed properly to avoid any failure / delay in the completion of the project that will cause the project be at risk throughout the construction process. One main reason for the failure and delay is when risk management and assessment are not being carried out efficiently and effectively. The objectives of this research is to identify the significant major delay factors, determine the risk ranking for the significant major delay factors and recommend the risk mitigation measures for the significant major delay factors in project management of road construction to reduce the impact of the risk. For this research, the data collected from five (5) case studies and interview sessions of selected project professionals which directly involved in the project management of road construction projects in Johor Bahru. Based on the findings, the five (5) significant delay factors identified were ineffective planning / scheduling, client work / order changes / scope or design changes, payment delays / financial issues, poor site management and supervision, and unexpected site conditions. Hence, the five (5) risks of the significant delay factors identified were ineffective planning / scheduling, client workflow / change of arrangement / scope or design change, poor management and supervision sites, payment delays / financial issues and errors and discrepancies in the design documents. In addition, five (5) measures to mitigate the impact of risk for significant delay factors are also recommended such as effective planning and site management / supervision, Customers and Contractors involved in stage design, cost control, effective Risk Reduction Plan and management of unexpected site conditions in managing road construction projects in Johor Bahru, Johor.

ABSTRAK

Matlamat utama pengurusan projek pembinaan jalan raya adalah bagi memastikan projek dapat disiapkan tepat pada masa yang telah ditetapkan. Sehubungan dengan itu, projek hendaklah diuruskan dengan sebaiknya bagi mengelakkan berlakunya kegagalan / kelewatan dalam penyiapan projek yang boleh menyebabkan projek berisiko sepanjang proses pembinaan dijalankan. Salah satu punca kepada keadaan ini adalah apabila pengurusan dan penilaian risiko projek tidak dijalankan dengan cekap dan berkesan. Objektif kajian ini adalah untuk mengenal pasti faktor kelewatan utama yang ketara, menentukan kedudukan risiko bagi faktor kelewatan utama yang ketara dan mencadangkan langkah-langkah pengurangan risiko bagi faktor kelewatan yang utama dalam pengurusan projek pembinaan jalan untuk mengurangkan kesan risiko. Untuk kajian ini, data telah dikumpulkan melalui lima (5) kajian kes dan lima (5) sesi temuramah bersama golongan profesional projek terpilih yang terlibat secara langsung dalam pengurusan projek pembinaan jalan raya di Johor Bahru. Berdasarkan dapatan kajian, lima (5) faktor kelewatan yang ketara yang telah dikenal pasti adalah perancangan / penjadualan yang tidak berkesan, variasi kerja oleh klien / perubahan tatanan / skop atau perubahan reka bentuk, kelewatan pembayaran / masalah kewangan, pengurusan tapak yang lemah dan pengawasan, dan keadaan tapak yang tidak diduga. Selain itu, lima (5) risiko daripada faktor kelewatan yang ketara telah ditentukan adalah perancangan / penjadualan yang tidak berkesan, variasi kerja oleh klien / perubahan susunan / skop atau perubahan reka bentuk, pengurusan tapak yang lemah dan penyeliaan, kelewatan pembayaran / masalah kewangan dan kesilapan dan percanggahan dalam dokumen reka bentuk. Seterusnya, lima (5) langkah-langkah bagi mengurangkan kesan-kesan risiko bagi faktor kelewatan utama yang ketara juga telah disyorkan seperti perancangan yang efektif dan pengurusan tapak / pengawasan, penglibatan Pelanggan dan Kontraktor semasa peringkat rekabentuk, kawalan kos, Pelan Pengurangan Risiko yang berkesan dan pengurusan keadaan tapak yang tidak diduga dalam pengurusan projek pembinaan jalan raya di Johor Bahru, Johor.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

The title of this research is “Risk Assessment for the Delay Factors in Project Management of Road Construction”.

Delay is one of the big challenges for the construction project parties who had involved in the construction industry (i.e. client, consultant and contractor) and it has been a very common phenomenon especially in the construction project. The construction delay could affect and risk the construction project in terms of the cost overrun, dispute, time overrun, arbitration and litigation and total abandonment (Sambasivan & Soon, 2007).

Risk management have been the key role for the project management in the construction industry nowadays. According to (Szymanski, 2017) the risk management cycle consists of four main stages and the stages are risk identification, risk analysis, risk response and risk monitoring and risk control. The most difficult and crucial part in the risk management is the risk identification process and the assessment of the identified risk. Determining what are the project’s risk and how should the identified risk being prioritized is essential to ensure that all the necessary risk is effectively handled, monitored and controlled. The effective and systematic risk assessment should be in placed to avoid or reduce the unnecessary risk before it impacted the management and the construction process.

1.2 Problem Statement

Aziz F. and Abdel-Hakam A. (2016) stated that the construction delays are normal situation in every civil engineering projects including the road construction projects. Delays is happen when project activities extended from the project schedule due to the risk impact (Al-Hazim et. al, 2017). Delay from the owner of the project perspective means profit loss due to the non-availability of production facilities and rentable space or a dependence on present facilities or in some cases, longer working period, increasing of material costs through inflation and higher labor cost are the major factors of delay (Ramanathan, C et al.,2012).

Poor risk assessment could severely impact in the project management of road construction through a delay to project benefits effecting to the revenue / profit streams and according to (U.S. Department of Transportation Federal Highway Administration, 2006), the effective Risk Management should include the risk assessment process, but unreasonably numerous undertakings still opinion that the risk assessment process is only a documentation to be filed once fully completed. Improper management of project risks can significantly influence the achievement of project objectives (Zou et. al, 2007). The capabilities of organization to develop the risk management team for the project and conducted the proper assessment to the risk could minimize the risk impact (Mohamed et. al, 2018).

(Voetsch et. al, 2004) stated that the effective risk management practices, periodically risk monitoring with sufficient risk mitigation measures was found significantly affected the project success with the management support. Other research also found out that managing the identified potential risks is essential and the organization collaboration is crucial to enhance the awareness on the project risk management (Thamhain, 2013). In order to effectively manage / minimizing the risk impact and achieve success in project delivery, there is a need to improve the understanding about the client requirements and approaches used by the project team in regard to control and response to the risks during a construction project (Jin et. al, 2017).

This study aims to determine the risk ranking for the delay factors in project management of road construction by using the method of risk identification and assessment (matrix of risk) and identify the suggestion to reduce the risk impact. Therefore, it is essential to study and analyses causes of road construction delays, risk ranking and recommendation of risk mitigation measures to minimize the risk impact.

1.3 Research Questions

The questions of this research are:

i. What are the significant major delay factors in the project management of road construction?

ii. What is the risk ranking for the delay factors in project management of road construction?

iii. What are the risk mitigation measures for the significant major delay factors in project management of road construction?

1.4 Research Objectives

The objectives of this research are:

i. To identify the significant major delay factors in project management of road construction;

ii. To determine the risk ranking for the delay factors in project management of road construction; and

iii. To recommend the risk mitigation measures for the significant major delay factors in project management of road construction to reduce the risk impact.

1.5 Scope of Research

The scope of this research shall encompass the feedback from the professionals that involved in the project management of road construction which is also experienced in risk management especially in the risk assessment process. Semi-structured interview is targeted to be conducted with the professionals from five (5) chosen case study of road construction project in Johor Bahru, Johor.

1.6 The Significant of Research

This research should give a brief review on the factors affecting time delay in project management of road construction that occur frequently during project life-time which usually leading project to the disputes and litigation proceeding. A risk identification and assessment are essential for the parties involved in the construction especially the contractor to analyse each factor and identify the significant major delay factors and determine the risk ranking for the delay factors in project management of road construction. It is hoped that the finding from this research will assist to enhance the risk management in construction industry especially in road construction, ensure the completion of the project goes smoothly thus avoid the disputes and litigation proceeding in the future.

REFERENCES

Al-Hazim, N., Abu Salem, Z., & Ahmad, H. (2017). Delay and Cost Overrun in Infrastructure Projects in Jordan. *Procedia Engineering 182*, 18-24.

Assaf, S. A., & Al-Hejji, S. (2006). Causes of delay in large construction projects. *International Journal of Project Management 24*, 349-357.

Aziz, R. F., & Abdel-Hakam, A. A. (2016). Exploring delay causes of road construction projects in Egypt. *Alexandria Engineering Journal 55*, 1515-1539.

Chan, D. W., & Kumaraswamy, M. M. (1997). A comparative study od causes of time overruns in Hong Kong construction projects. *International Journal of Project Management Vol. 15, No. 1*, 55-63.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches (3rd ed.).* Los Angeles: SAGE Publications, Limited.

Doloi, H., Sawhney, A., Iyer, K., & Rentala, S. (2012). Analysing factors effecting delays in Indian construction projects. *International Journal of Project Management*, 479-489.

Dziadosz, A., & Rejment, M. (2015). Risk Analysis in construction project - chosen methods. *Procedia Engineering 122*, 258-265.

Frimpong, Y., Oluwoye, J., & Crawford, L. (2003). Causes of delay and cost overruns in construction of groundwater projects in a developing countries; Ghana as a case study. *International Journal of Project Management 21*, 321-326.

Gardezi, S. S., Manarvi, I. A., & Gardezi, S. J. (2014). Time Extension Factors in Construction Industry of Pakistan. *Procedia Engineering 77*, 196-204.

Ghazali, F. E. (2009). Operational Risks for Highway Projects in Malaysia. *International Journal of Humanities and Social Sciences Vol:3, No:5*, 366-369.

Goh, C. S., & Abdul Rahman, H. (2013). The Identification and Management of Major Risk in the Malaysian Construction Industry. *Journal of Construction in Developing Countries 18 (1)*, 19-32.

Hamzah, N., Khoiry, M., Arshad, I., Tawil, N., & Che Ani, A. (2011). Cause of construction delay - Theoretical Framework. *Procedia Engineering 20*, 490-495.

Hwang, B. G., & Ng, H. B. (2016). Project Network Management: Risk and Contributors from the viewpoint of Contractors and Subcontractors. *Technological and Economic Development of Economy Volume 22 (4)*, 631-648.

International Organization for Standardization. (2015). *Quality management systems - Fundamentals and vocabulary*. Retrieved from International Organization for Standardization: https://www.iso.org/obp/ui/#iso:std:iso:9000:ed-4:v1:en

Jayasudha, K., & Vidivelli, B. (2016). Analysis of Major Risks in Construction Projects. *ARPN Journal of Engineering and Applied Sciences Vol.11, No. 11*, 6943-6950.

Jin, X., Zhang, G., Liu, J., Feng, Y., & Zuo, J. (2017). Major Participants in the Construction Industry and Their Approaches to Risks: a Theoretical Framework. *Procedia Engineering 182*, 314-320.

Kaliba, C., Muya, M., & Mumba, K. (2009). Cost escalation and schedule dalays in road construction projects in Zambia. *International Journal of Project Management*, 522-531.

Mahamid, I. (2011). Risk Matrix for Factors Affecting Time Delay in Road Construction Projects: Owners' Perspective. *Engineering, Construction and Architectural Management, Vol. 18 Issue: 6*, 609-617.

McNamara, C. (1999). *General Guidelines for Conducting Interviews.* Minneapolis, Minnesota: Authenticity Consulting, LLC.

Mohamed, A., Maarouf, K. I., & Annany, Y. (2018). Special studies in management of construction project risks, risk concept, plan building, risk quantitative and qualitative analysis, risk response strategies. *Alexandria Engineering Journal 57*, 3179-3187.

Niazi, G. A., & Painting, N. (2017). Significant Factors Causing Cost Overruns in the Construction Industry in Afghanistan. *Procedia Engineering 182*, 510-517.

Project Management Institute, Inc. (2013). *A Guide To The Project Management Body of Knowledge (PMBOK Guide) - Fifth Edition.* United States of America: Project Management Institute, Inc.

Radujkovic, M., & Sjekavica, M. (2017). Project Management Success Factors. *Procedia Engineering 196*, 607-615.

Remon, F., & Asmaa, A. H. (2016). Exploring delay causes of road construction projects in Egypt. *Alexandria Engineering Journal 55*, 1515-1539.

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

Szymanski, P. (2017). Risk management in construction project. *Procedia Engineering 208*, 174-182.

U.S. Department of Transportation Federal Highway Administration. (2006, October). *Guide to Risk Assessment and Allocation for Highway Construction Management.* Washington DC: U.S. Department of Transportation. Retrieved from Office of International Program: https://international.fhwa.dot.gov/pubs/pl06032/guide_to_risk_assessment_allocation_for_highway.pdf (accessed 14 August 2018)

Voetsch, R. J., Cioffi, D. F., & Anbari, F. T. (2004). Project risk management practices and their association with reported project success. *IRNOP VI Conference, Turku, Finland*.

Zavadskas, E. K., Turskis, Z., & Tamosaitiene, J. (2010). Risk Assessment of Construction Projects. *Journal of Civil Engineering and Management 16 (1)*, 33-46.

Zou, P. X., Zhang, G., & Wang, J. (2007). Understanding the key risks in construction projects in China. *International Journal of Project Management 25*, 601-614.