

RISK MANAGEMENT FRAMEWORK FOR  
THE DELIVERY OF PUBLIC-PRIVATE  
PARTNERSHIP (PPP) HOUSING  
CONSTRUCTION PROJECT:  
CASE STUDY OF MALAYSIA HOUSING  
PROGRAMME (PR1MA)

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DOCTOR OF PHILOSOPHY

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## **SUPERVISOR'S DECLARATION**

We hereby declare that, we have checked this thesis and in our opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Doctor of Philosophy.

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## **STUDENT'S DECLARATION**

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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PRIVATE PARTNERSHIP (PPP) HOUSING CONSTRUCTION PROJECT: CASE  
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Thesis submitted in fulfillment of the requirements  
for the award of the degree of  
Doctor of Philosophy

College of Engineering  
UNIVERSITI MALAYSIA PAHANG

NOVEMBER 2020

## **DEDICATION**

Dedicated to my husband and kids

## ACKNOWLEDGEMENTS

The PhD journey I embarked in February 2017 has through many phases and upside down. My ultimate appreciation to the Almighty Allah SWT for lending me time to study and strength to fight to the end.

An infinite appreciation for my main supervisor Dr. Mohamad Idris Ali, who has never failed in giving me the spirit to keep moving in my PhD journey, and also to co-supervisor Dr. Noram Irwan Ramli who often gave an opinion so that this research could be successfully achieved. I would also like to thank UMP for the sponsorship of the fellowship scheme and the Ministry of Education (MOE) for the SLAB scholarships.

Thank you for my PhD examiner; (Dr. Omar Bn Jamaludin – Internal Examiner, Prof. Dr. Nasir Shafiq – External Examiner 1 and Prof. Dr. Taksyah Majid – External Examiner 2) for all your constructive comments and advises during my PhD viva voce on 27<sup>th</sup> July 2020.

This success certainly will not happen without my beloved family support. My deepest appreciation to my husband Arif Azlee Bin Zainudin, and my kids Putri Nurqaseh Adelia and Aisy Ziqry who understand the meaning of sacrifice and patience along their mom's journey.

The next appreciation I would dedicate to my siblings, family-in-law who are together in the upside down of my PhD journey.

Next I would like to thank the friends who are both struggling in the course of this PhD, Sa'idah Annisa and Adi Setiabudi Bawono.

Last but not least, although this PhD is the result of individual work, however without the support and encouragement of the above mentioned persons, this success will not happen.

## ABSTRAK

Di kalangan negara membangun, kerjasama awam-swasta (PPP) menunjukkan peningkatan kebergantungan tidak tertakluk kepada pembangunan infrastruktur semata-mata tetapi telah berkembang kepada sektor lain termasuk perumahan sosial (rumah mampu milik). Namun demikian, kajian literatur melaporkan tentang kurangnya laporan bagi projek perumahan PPP yang berjaya, ditambah pula dengan kekurangan penilaian yang tepat untuk menilai prestasi projek PPP. Kajian ini bertujuan untuk membangunkan kerangka pengurusan risiko berdasarkan indeks risiko yang diperolehi hasil daripada analisis Proses Hierarki Analitikal (AHP), yang digunakan sebagai petunjuk skor prestasi projek. Kajian ini direka dalam tiga (3) fasa dengan menggunakan pendekatan kaedah gabungan (kualitatif dan kuantitatif). Keputusan kajian menunjukkan bahawa sejumlah 9 elemen risiko dan 33 sub-elemen yang diperolehi dari tinjauan literatur dan ditentukan semasa kajian rintis, menggunakan kaedah temubual separa berstruktur, bersama lapan (8) pakar pembinaan perumahan PPP. Kumpulan data kajian terdiri daripada tiga puluh tiga (33) pakar pembinaan yang terlibat dalam projek pembinaan perumahan PPP. Hasil kajian mendapati risiko ancaman semula jadi (risiko geologi) dan risiko ekonomi dan kewangan (inflasi dan kadar faedah) sebagai risiko luaran yang ekstrem yang mempengaruhi prestasi projek perumahan PPP lebih daripada risiko pasaran dan sosio-politik. Disebalik itu juga, nilai kewangan yang tidak tepat dan turun naik dalam kadar pertukaran mata wang bagi risiko ekonomi dan kewangan didapati mempengaruhi prestasi projek perumahan PPP secara sederhana. Begitu juga, risiko yang berkaitan dengan projek (dalaman) dalam risiko kontrak dan perolehan (ketiadaan ketelusan dan pertanggungjawaban semasa proses perolehan, dan tiada kesepakatan yang tegas dan jelas) didapati mempengaruhi kadar prestasi risiko projek secara sederhana. Turut sama dalam mempengaruhi kesan secara sederhana bagi risiko teknikal adalah (keadaan tanah yang tidak dijangka dan kekurangan kepakaran teknikal). Akhirnya, didapati bahawa risiko dalaman memonopoli risiko rendah yang diduduki dalam indeks risiko ( $0.000 < RI \leq 0.050$ ) termasuk kapasiti yang tidak mencukupi dalam perolehan dan perundingan, perubahan reka bentuk yang kerap, spesifikasi reka bentuk yang berlebihan, kualiti kerja yang teruk, ketiadaan kerangka kerja PPP yang khusus dan kemahiran dan pengetahuan PPP yang tidak mencukupi yang menyebabkan perancangan yang buruk. Bagi risiko luaran pula adalah ketidakupayaan kewangan rakan kongsi swasta, campur tangan kerajaan negeri yang lemah, dan pengambilan tanah yang berterusan. Strategi tindak balas risiko bagi risiko ekstrem kategori ( $0.100 < RI \leq 0.150$ ) adalah dengan mengelakkan risiko tersebut dan memindahkan risiko kepada sektor swasta. Sebaliknya, strategi tindak balas risiko yang disarankan untuk risiko sederhana yang dikategorikan pada ( $0.050 < RI \leq 0.100$ ), adalah untuk memindahkan risiko dan dikongsi dalam kedua-dua pihak, iaitu awam dan swasta. Sementara untuk risiko rendah terletak di antara ( $0.000 < RI \leq 0.050$ ), semua risiko perlu diterima dan dipertahankan dalam sektor awam. Secara keseluruhan, pembentukan pelan tindakbalas risiko dan pemantauan risiko dari indeks risiko memberikan sumbangan yang signifikan yang telah memperoleh pemahaman baru bahawa risiko dengan pendedahan yang teruk atau rendah dapat dikurangkan atau dielakkan dengan mempertimbangkan pendekatan tindak balas dan mitigasi yang strategik dan berkesan. Kerangka pengurusan risiko yang dibangunkan juga diharapkan dapat membantu keberhasilan pelaksanaan pengurusan risiko dan kejayaan projek perumahan PPP.

## ABSTRACT

In many developing countries, Public-Private Partnership (PPP) has shown an increased reliance not only for infrastructure development but it has expanded in other sectors that including social housing (affordable houses). However, there are evident in previous literature on the accounts of lacking success reporting on the PPP housing approach, plus inadequacy of proper evaluation for PPP performance projects. This study aims to develop a risk management framework based upon the derived risk index determined by the analysis of quantitative Analytical Hierarchy Process (AHP), used as an indicator for the project performance score. This study is designed in three (3) phases by employing a mixed-method approach (qualitative and quantitative). Results demonstrated that a total 9 risk elements and 33 sub-elements obtained from the literature review and was validated during pilot study, by employing semi-structured interview, with eight (8) PPP housing construction experts. The data set for the study comprised thirty-three (33) construction experts involved in the PPP housing construction project. Results showed that natural hazard risk (geologic hazard risk) and economic and financial risk (inflation and interest rate) risk prevails as extreme external risks that influenced PPP housing project performance more than the market and social-politics risk. On the contrary, unreliable value for money and fluctuation in the currency exchange rate of economic and financial risks discovered as moderately influenced PPP housing project performance. Similarly, project-related risk (internal) in procurement and contractual risks that including (absence of transparency and accountability during the procurement process, and absence of a robust and clear agreement) discovered will moderately affect the delivery of PPP housing project performance risks. Akin in moderating the effect in technical faulty risks are (unforeseen ground condition and shortage of technical expertise). Eventually, it was found that internal risks monopolized the low risks occupied within the risk index of ( $0.000 < RI \leq 0.050$ ) including insufficient capacity in procurement and negotiation, frequent design change, design over-specification, poor quality workmanship, absence of specific PPP framework and inadequate PPP skills and knowledge leading to poor planning. While captured from external risks are financial incapacity of private partners, weak state intervention, and persistent land acquisition. Risk response strategy for the extreme risks categorized within ( $0.100 < RI \leq 0.150$ ) is by avoiding the risk and best to assign the risks to the private sector. On the contrary, risk response approaches suggested considering the medium risks categorized at interval ( $0.050 < RI \leq 0.100$ ), is to transfer the risks and shared within both parties, i.e. public and private. While for low risks lies between ( $0.000 < RI \leq 0.050$ ), all the risks best to accept and retained within the public sectors. Taken together, the development of risk response and risk mitigation plan that emerged from the risk index offered significant contribution which has gain a new understanding that risks with severe or low exposure can be reduced or avoided taking into account its strategic and effective response and mitigation approaches. The developed risk management framework is expected to assist the successful implementation of risk management for the PPP housing project and the success of the PPP housing project.



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## LIST OF SYMBOLS

$A$	Determinant of matrix
$A_{ij}$	Element of matrix
$\lambda_{\max}$	Largest Eigenvalue
$w$	Weight Vector

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