ECONOMIC CRITERIA FOR SUSTAINABLE AFFORDABLE HOUSING MODEL

BEH HOOI SEAN

UNIVERSITI TEKNOLOGI MALAYSIA

ECONOMIC CRITERIA FOR SUSTAINABLE AFFORDABLE HOUSING MODEL

BEH HOOI SEAN

A report submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Science (Real Estate)

Faculty of Built Environment and Surveying
Universiti Teknologi Malaysia

NOVEMBER 2018

To my beloved father, mother, sister and brothers
For their love, sacrifices and supports

To all my fellow friends
For their support in terms of spiritual and encouragement

To people who guided and helped me
Prof Madya Dr. Ibrahim @ Atan bin Sipan
&
Prof Madya Dr. Maimunah Sapri

ACKNOWLEDGEMENT

Foremost, my deep appreciation and gratitude dedicate to my main supervisor, Prof. Madya Dr. Ibrahim @ Atan bin Sipan for his patient and excellent guidance with constructive comments on the direction during this study. I am also thankful for my panels Prof. Madya Dr. Maimunah Sapri for her opinions and suggestions for improving my study. Their valuable information has been of great value to me.

I am grateful and feel indebted to my friends for their willingness to share their suggestions and ideas with me throughout this study as well as their accompanies during the data collection process. Besides, I am grateful to my lovely family members for their never-ending support and encouragement to me until this study is completed.

In addition, I would like to convey my sincerest thanks to all the people who help me in filling up my questionnaire that has been distributed. Last but not least, I would like to deserve my sincere appreciation to the staffs of Faculty of Built Environment and Surveying (FABU) who had delivered their help to me throughout this study.

ABSTRACT

Affordable housing and sustainable development are major challenges across the world, including Malaysia. To address the housing affordability issue, the government has provided affordable housing to the citizens. However, the economic sustainability of affordable housing remains questionable. Housing affordability is often defined by house price and household income without considering other criteria that affect long-term affordability. In fact, there are three ways to measure housing affordability, namely purchase, repayment and income. Therefore, there is a need to assess housing affordability by linking it with sustainability issues in order to provide affordable housing that is economically sustainable. The objectives of this research are to determine the economic criteria for sustainable affordable housing and to develop a model known as Economically Sustainable Affordable Housing Assessment Model (ESAHAM). From literature review and focus group discussion, it was found that there are 25 economic criteria for sustainable affordable housing grouped into the three categories of affordability. These criteria were then assigned its relative importance from the perspective of low- and middle-income residents in Iskandar Malaysia, Johor, who were selected by using probability sampling technique. 573 from 1,200 questionnaires were usable for descriptive statistical analysis and Analytic Hierarchy Process. The findings showed that all the economic criteria were important as each had a mean score of more than 3.0. These criteria were then assigned its weights to reflect its contribution to the overall criteria in the development of ESAHAM. Three affordable housing estates in Iskandar Malaysia were selected to test the applicability of the model and it revealed that these estates are economically sustainable. The assessment results showed that ESAHAM is able to measure the economic sustainability of affordable housing. As a conclusion, the findings of this research contribute to the government, policymakers, developers, home buyers and those who are involved in the housing industry by providing a guideline for economically sustainable affordable housing provision and determination.

ABSTRAK

Perumahan mampu milik dan pembangunan lestari merupakan cabaran utama diseluruh dunia, termasuk Malaysia. Untuk menangani isu kemampuan memiliki rumah, kerajaan telah menyediakan rumah mampu milik kepada warganegara. Walau bagaimanapun, kelestarian ekonomi bagi rumah mampu milik masih dipersoalkan. Kemampuan memiliki rumah sering dikaitkan dengan harga rumah dan pendapatan isi rumah tanpa mengambil kira kriteria lain yang juga memberi kesan kepada kemampuan memiliki rumah dalam jangka panjang. Malah, terdapat tiga cara untuk mengukur kemampuan memiliki rumah iaitu membeli, membayar balik dan pendapatan. Oleh itu, kemampuan memiliki rumah perlu diukur dengan menghubungkannya bersama isu-isu kelestarian bagi menyediakan perumahan mampu milik lestari ekonomi. Objektif kajian ini adalah untuk menentukan kriteria-kriteria ekonomi bagi perumahan mampu milik yang lestari dan untuk mambangunkan model yang dikenali sebagai Model Penilaian Perumahan Mampu Milik Lestari Ekonomi (ESAHAM). Dari kajian literatur dan perbincangan kumpulan fokus, terdapat 25 kriteria ekonomi bagi perumahan mampu milik lestari yang dikumpulkan dalam tiga kategori kemampuan. Kriteria ini kemudiannya diberikan kepentingan relatif dari perspektif penduduk berpendapatan rendah dan sederhana di Iskandar Malaysia, Johor, yang dipilih dengan menggunakan teknik pensampelan kebarangkalian. 573 daripada 1,200 soal selidik telah digunakan untuk analisis statistik deskriptif dan Proses Hierarki Analitik. Penemuaan kajian menunjukkan bahawa semua kriteria ekonomi adalah penting kerana masing-masing mempunyai skor min lebih daripada 3.0. Kriteria-kriteria ini kemudiannya diberikan pemberat untuk mencerminkan sumbangannya terhadap keseluruhan kriteria dalam pembangunan ESAHAM. Tiga taman perumahan yang mengandungi rumah mampu milik di Iskandar Malaysia telah dipilih untuk menguji kebolehgunaan model tersebut dan ia mendapati taman-taman ini adalah lestari ekonomi. Hasil ujian menunjukkan bahawa ESAHAM mampu untuk mengukur kelestarian ekonomi perumahan mampu milik. Sebagai kesimpulan, hasil penyelidikan ini menyumbang kepada kerajaan, pembuat dasar, pemaju, pembeli rumah dan mereka yang terlibat dalam industri perumahan dengan menyediakan garis panduan bagi peruntukkan dan penentuan perumahan mampu milik lestari ekonomi.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xiii
	LIST OF FIGURES	xv
	LIST OF ABBREVIATIONS	xvi
	LIST OF APPENDICES	xviii
1	**INTRODUCTION**	
	1.1 Introduction	1
	1.2 Research Background	1
	1.3 Problem Statement	5
	1.4 Research Questions	8
	1.5 Research Objectives	8
	1.6 Research Scopes	9
	1.7 Significance of the Research	11
	1.8 Research Methodology	12
	1.9 Organisation of Chapters	14
2	**SUSTAINABLE AFFORDABLE HOUSING**	17
	2.1 Introduction	17

	2.2	Housing	18
	2.3	Housing Affordability	19
		2.3.1 Definitions of Housing Affordability	20
		2.3.1.1 Policy Perspectives	22
		2.3.1.2 Academic Perspectives	24
		2.3.2 Concepts of Housing Affordability	26
	2.4	Affordable Housing	27
		2.4.1 Affordable Housing in Malaysia	28
	2.5	Sustainability	33
	2.6	Sustainable Housing	35
	2.7	Sustainable Affordable Housing	38
	2.8	Assessment Model for Sustainable Affordable Housing	41
	2.9	Summary of Chapter	42
3	**ECONOMIC CRITERIA FOR SUSTAINABLE AFFORDABLE HOUSING**		43
	3.1	Introduction	43
	3.2	Definitions of Economic Criteria	44
	3.3	House Price	46
	3.4	Down Payment	48
	3.5	Monthly Mortgage Payment	50
	3.6	Housing Costs	50
	3.7	Property Size	53
	3.8	Property Tenure	53
	3.9	Restriction in Interest	54
	3.10	Reputation of Developer	55
	3.11	Government Housing Policies	55
	3.12	Housing Position	56
	3.13	Housing Quality	56
	3.14	Housing Type/Design/Accommodation	57

	3.15	Public Facilities	58
	3.16	Safety	58
	3.17	Energy Efficiency	59
	3.18	Water Efficiency	59
	3.19	Availability of Waste Management Facilities	60
	3.20	Near to Workplace	60
	3.21	Near to Education	61
	3.22	Near to Childcare	61
	3.23	Near to Shopping Facilities	62
	3.24	Near to Public Transport Station	62
	3.25	Near to Healthcare	62
	3.26	Near to Public Amenities	63
	3.27	Summary of Chapter	63
4	**RESEARCH METHODOLOGY**		64
	4.1	Introduction	64
	4.2	Research Design	65
		4.2.1 Research Philosophy	66
		4.2.2 Research Approach	67
		4.2.3 Research Strategy	67
		4.2.4 Research Choice	69
		4.2.5 Time Horizon	70
		4.2.6 Techniques and Procedures	70
	4.3	Research Methodology Stages	73
	4.4	Research Setting	74
	4.5	Data Collection and Analysis	76
		4.5.1 Stage 1	76
		4.5.1.1 Literature Review	76
		4.5.1.2 Focus Group Discussion	77
		4.5.2 Stage 2	80

	4.5.2.1	Sample Selection	80
	4.5.2.2	Questionnaire Design	86
	4.5.2.3	Questionnaire Administration	90
	4.5.2.4	Questionnaire Data Coding and Entry	93
	4.5.2.5	Questionnaire Data Analysis	93
4.5.3	Stage 3		102
4.6	Summary of Chapter		107
5	**DATA ANALYSIS AND FINDINGS**		108
5.1	Introduction		108
5.2	Analysis of Background of the Respondents (Part A)		109
5.2.1	Gender		109
5.2.2	Age		110
5.2.3	Ethnic group		110
5.2.4	Marital Status		111
5.2.5	Number of Households		112
5.2.6	Education Level		112
5.2.7	Employment Sector		113
5.2.8	Monthly Household Income		114
5.2.9	Housing Status		115
5.2.10	Affordable Housing Price		115
5.2.11	Affordable Housing Down Payment		116
5.2.12	Affordable Housing Monthly Instalment		117
5.3	Analysis of Economic Criteria for Sustainable Affordable Housing (Part B)		118
5.3.1	Determine the Mean Score for Economic Criteria		118
5.3.2	Determine the Relative Weights for Economic Criteria		122

	5.4	Analysis of Affordability Criteria for Sustainable Affordable Housing (Part C)	123
		5.4.1 Aggregation of Individual Judgment	124
		5.4.2 Make a Pairwise Comparison Matrix	126
		5.4.3 Derive Weights for Affordability Criteria	127
		5.4.4 Check the Consistency of the Judgments	129
	5.5	Summary of Chapter	130
6	**SUSTAINABLE AFFORDABLE HOUSING ASSESSMENT MODEL FOR ECONOMIC CRITERIA**		131
	6.1	Introduction	131
	6.2	Purposes of the Model	131
	6.3	Model Development	132
	6.4	Model Testing	135
		6.4.1 Step 1: Define Measurement Tools for Economic Criteria	136
		6.4.2 Step 2: Develop a Rating Benchmark Table	137
		6.4.3` Step 3: Select Affordable Housing Estates for Assessment	137
		6.4.3.1 Taman Seri Setanggi	138
		6.4.3.2 Taman Nusantara	139
		6.4.3.3 Taman Seroja	141
		6.4.4 Step 4: Conduct the Economic Sustainability Assessment on Site	142
		6.4.5 Step 5: Calculate the Overall Score for Each Affordable Housing Estate	143
	6.5	Economic Sustainability Assessment Results	145
	6.6	Summary of Chapter	145

7	**CONCLUSIONS AND RECOMMENDATIONS**		146
	7.1	Introduction	146
	7.2	Research Findings	146
		7.2.1 Objective 1: Economic Criteria for Sustainable Affordable Housing	147
		7.2.2 Objective 2: Sustainable Affordable Housing Assessment Model (ESAHAM)	147
	7.3	Research Contribution	148
	7.4	Research Limitations	150
	7.5	Recommendations for Future Research	150

REFERENCES 152

Appendix A-C 172-179

LIST OF TABLES

TABLE NO.	TITLE	PAGE
2.1	House price structure and target groups (after revision in June 1998)	33
3.1	Selected economic criteria for sustainable affordable housing	45
3.2	Housing affordability across states in Malaysia, 2014	48
4.1	Economic criteria derived considered relevant from local experts' opinion	78
4.2	Economic criteria grouping	79
4.3	The number of population in Iskandar Malaysia	84
4.4	Sample size for each local authority area	85
4.5	Five-point Likert scale adopted in the survey	88
4.6	Cronbach's alpha reliability test for economic criteria	89
4.7	Main survey response rate	92
4.8	The fundamental scale for pairwise comparison	99
4.9	Random Consistency Index (RI)	102
4.10	Rating benchmark tables for green building assessment tools	105
5.1	Gender of respondents	109
5.2	Age group of respondents	110
5.3	Ethnic group of respondents	111
5.4	Marital status of respondents	111
5.5	Number of households of respondents	112
5.6	Education level of respondents	113
5.7	Employment sector of respondents	113

5.8	Monthly household income of respondents	114
5.9	Housing status of the respondents	115
5.10	Affordable housing price for the respondents	115
5.11	Affordable housing down payment for the respondents	116
5.12	Affordable housing monthly instalment for the respondents	117
5.13	Mean scores for economic criteria under purchase affordability category	119
5.14	Mean scores for economic criteria under repayment affordability category	120
5.15	Mean scores for economic criteria under income affordability category	121
5.16	The relative weights for economic criteria	122
5.17	Nine-point scale entered into an Excel spreadsheet	124
5.18	Geometric mean judgment values for affordability criteria	125
5.19	Pairwise comparison matrix	126
5.20	The sum for each column in a pairwise comparison matrix	127
5.21	The normalised relative weights for each criterion	128
5.22	The weights for affordability criteria	128
6.1	Final weights for affordability criteria and economic criteria	134
6.2	ESAHAM rating benchmark table	137
6.3	Overall score for three affordable housing estates	144

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
1.1	Research Process	16
2.1	House price and income trends in Malaysia, 2002-2014	29
2.2	Three dimensions of sustainability	35
3.1	Malaysia's house price index, 2000-2016	47
4.1	The research onion	66
4.2	Research methodology stages	74
4.3	Municipal jurisdiction within the Iskandar Malaysia	75
4.4	AHP model for the research	98
6.1	Framework of Sustainable Affordable Housing Assessment Model for Economic Criteria (ESAHAM)	133
6.2	Sustainable Affordable Housing Assessment Model for Economic Criteria (ESAHAM)	135
6.3	The location of selected affordable housing estates	138
6.4	General view of Taman Seri Setanggi phase A	139
6.5	General view of Taman Seri Setaggi phase B	139
6.6	General view of Taman Nusantara phase 11C (2)	141
6.7	General view of Taman Seroja	142

LIST OF ABBREVIATIONS

AHNRC	-	Affordable Housing National Research Consortium
AHP	-	Analytic Hierarchy Process
CI	-	Consistency Index
HNZC	-	Housing New Zealand Corporation
HUD	-	Department of Housing and Development
KRI	-	Khazanah Research Institute
MBJB	-	Majlis Bandaraya Johor Bahru
MCDM	-	Multi-Criteria Decision Making Method
MDP	-	Majlis Daerah Pontian
MFT	-	Ministry of Federal Territories
MHLG	-	Ministry of Urban Wellbeing, Housing and Local Government
MPJBT	-	Majlis Perbandaran Johor Bahru Tengah
MPKu	-	Majlis Perbandaran Kulai
MPPG	-	Majlis Perbandaran Pasir Gudang
MRRD	-	Ministry of Rural and Regional Development
NBA	-	National House Buyers Association
NHS	-	National Housing Strategy
OECD	-	Organisation for Economic Co-operation and Development
PBR	-	Program Bantuan Rakyat
PPA1M	-	Perumahan Rakyat Penjawat Awam 1Malaysia
PPR	-	Program Perumahan Rakyat
PR1MA	-	Perumahan Rakyat 1Malaysia
RAR	-	Rumah Aspirasi Rakyat

RI	-	Random Consistency Index
RIR	-	Rumah Idaman Rakyat
RMR1M	-	Rumah Mesra Rakyat 1Malaysia
RUMAWIP	-	Rumah Wilayah Persekutuan
SPNB	-	Syarikat perumahan Negara Berhad

LIST OF APPENDICES

APPENDIX NO.	TITLE	PAGE
A	Eligibility criteria for housing loan and affordable housing programmes application in Malaysia	172
B	Main survey questionnaire	174
C	Economic sustainability assessment form	179

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides an overall picture of the study. It begins with the background of this research and the research problem, followed by the research questions, research objectives, research scope, research significance and research methodology. An overview of the structure of this thesis is also provided at the end of this chapter.

1.2 Research Background

Housing is a key agenda of every country in the world. The Malaysian government has recognized housing as a basic human need and one of the important components of the urban economy (Suhaida et al., 2011). However, in recent decades, most people have found it difficult in achieving this basic need. The increase in urbanization has resulted in high demand for housing in urban areas

which consequently led to a sharp rise in house prices and thus making housing affordability an issue in Malaysia (MHLG, 2013). Khazanah Research Institute (KRI) in its report "Making housing affordable" revealed that the Malaysian's housing market was "seriously unaffordable" in 2014 with a median multiple of 4.4. However, the urban areas fared even worse, with Kuala Lumpur having 5.4, followed by Penang 5.2; both fell under the category of "severely unaffordable" (S. Ismail et al., 2015). As a result, having a roof over one's head remains a major problem for Malaysians, particularly the lower and middle-income groups. To solve this problem, the government aspires to accommodate the nation at all income levels in quality and affordable housing, as stipulated in the National Housing Policy 2011.

In the Tenth Malaysia Plan (2010-2015), the government has targeted 78,000 units of affordable housing to be built, consisting of 38,950 units under the Program Perumahan Rakyat (PPR) programme and 39,050 units under programmes related to the Ministry of Rural and Regional Development (MRRD) to meet the needs of low-income groups and squatters (EPU, 2010). Further to that, the government has continued to implement those affordable housing programmes with a much higher new target of 653,000 units, as stated in the recent Eleventh Malaysia Plan (2016-2020) (EPU, 2016). In addition to this, the private sector is encouraged to provide medium-cost housing for the middle-income households besides their obligation of providing 30 per cent of their total housing development for low-cost housing. Overall, there are many affordable housing that has been provided by both the public and private sectors over the decades; however, are these affordable housing economically sustainable (affordable in the long-term)?

Mohamed et al. (2014a) claimed that low-cost housing, which is also known as affordable housing, is always associated with the poor quality of the outdoor environment. Arman et al. (2009a) supported that housing that is affordable for most Australians is poorly located on cheap land (which built to minimise construction costs), and hence resulting in lower environmental performances and questionable social acceptability. Besides, MacKillop (2012) also argued that housing that falls into the trap of "cheap that looks cheap", conflating "affordable" with "cheap", is not

necessarily energy saving or well-connected by public transport. This is mainly due to the following scenario: when the government is in a rush to build more houses to meet the demand of people, they are essentially concerned mainly with housing masses of people cheaply in terms of the immediate cost of the house and land package, and not seriously consider the long-term perspective of affordability (MacKillop, 2012). In this context, affordable housing is seen as how to make it economically viable while other important issues (e.g., housing location, quality of life and sustainability) are largely ignored (Karuppannan and Sivam, 2009; Mulliner and Maliene, 2011, 2012, 2015; Mulliner et al., 2013).

In this regard, Mackillop (2012) indicated that cheap is not necessarily affordable and there is a need for a different way to view affordability as more than just the price of a house and land; but also to include the cost of getting to and from work, to social and family activities, which can infinitely outweigh the perceived "savings" achieved by buying a house at the urban fringes. Mulliner and Maliene (2011) also stated that providing affordable housing is not simply about cheap and decent homes; they must consider a lot of other factors such as the sustainability of housing and its environment. They added that not only housing costs and household income will affect housing affordability, but also the other criteria that influence the quality of life of a household. Therefore, housing affordability should be mutually discussed with sustainability issues since they are affecting one another.

MacKillop (2012) asserted that housing affordability and sustainability are both sides of the same coin. Sustainability can be a basis of affordability, as a sustainable house can greatly impact the affordability by minimizing or reducing the overall use of energy and water consumption as well as less money spent on filling up petrol (MacKillop, 2012). In a study conducted by Karuppannan and Sivam (2009), they found that many objectives of affordable housing are closely aligned with the objectives of sustainability. They further concluded that it is possible to make affordable housing sustainable by involving the community in the design process and by providing government subsidies to achieve eco-efficient houses. For housing to be sustainable, Mulliner et al. (2013) suggested that affordable housing

should be located within sustainable communities or sustainable communities must provide affordable housing.

This is also in line with what Stone (2006) has defined as affordable housing, in which an affordable housing could only have meaning if three essential questions are answered: (i) affordable to whom, (ii) on what standard of affordability, and (iii) for how long? To answer the third question, to make housing affordable in the long-term, it may require sustainability consideration in housing and its environment; and this could give benefits to the costs a household may face over their lifetime living in the house. For example, an energy efficient housing is well located close to employment, public transport, education, key services and facilities could give a positive effect on household income with a decrease in the indirect costs the household may face (Mulliner and Maleine, 2011). This will then improve the household's situation in terms of everyday affordability. Therefore, in order to provide affordable housing that is economically sustainable, the sustainability of housing and its environment must be taken into consideration, not only the house price.

In Malaysia, the concept of sustainability is a relatively new concept (Goh et al., 2013). Zainul Abidin (2010) believed that Malaysian property developers are now beginning to implement this concept as part of their marketing campaign and strategic product differentiation as compared to their competitors. Recognising the need to balance up the relationship between economic development, social integration and environmental protection, the government has commenced on initiatives for sustainable development in the housing sector. Setting the future direction to ensure the sustainability of the housing sector has been one of the objectives of the National Housing Policy (NHD, 2011). The policy does emphasis on essentials such as quality construction and provision of basic amenities as well as facilities; however, there is fear that in trying to meet such target affordable housing numbers, the sustainability aspect can be somewhat compromised, which could lead to the provision of affordable housing that is not economically sustainable. Therefore, there is a need to assess the sustainability of affordable housing,

particularly from the economic aspect since housing affordability needs to be looked at a long-term perspective, not just at the point of sale.

1.3 Problem Statement

Housing affordability is a multi-dimensional issue; it cannot be viewed as a purely monetary concern. In general, housing affordability is commonly defined by using house price to income ratio (Whitehead, 1991; Hulchanski, 1995; Kutty, 2005). However, this might be a relatively simple and unsustainable way to view housing affordability since the traditional method of measuring housing affordability may show that such areas are affordable simply because they are low-cost and it fails to indicate anything regarding the quality of the housing and its environment (Mulliner et al., 2013). In this regard, Fisher et al. (2009) said that continuing to focus on house price alone may give inaccurate conclusions regarding the affordability of different areas. Thus, housing affordability should be defined and assessed in a different way rather than focus only on financial terms.

According to Gabriel et al. (2005), OECD countries are increasingly recognising the need for a broader and more encompassing understanding of housing affordability with the measures that could replace the simple ratio measures which cannot deal with issues such as housing adequacy, location quality and access to services. Since then, a number of researchers have begun to seek beyond the traditional concept of financial impacts on households. For example, researches in the United States have suggested that transportation cost, proximity to employment opportunities, public safety and location must be considered when defining housing affordability (Mulliner and Maliene, 2012). They added that research in Australia attempts to link the notion of affordability with environmental sustainability and argues that 'true' housing affordability must take into account, not only rent or mortgage price but a wide range of costs, such as energy and transport related costs.

Besides, a study conducted by Seelig and Phibbs (2006) in Australia revealed that low-income people did not choose to live in the cheapest housing available if it presented poor options in terms of amenity and location. To them, although the cost was an essential consideration in the housing selection decision, addressing the needs or preferences for dwelling features, location or proximity to services and facilities was a priority, even though such choice or trade-offs resulted in very tight household budgets. On the other hand, research in the United Kingdom seeks to link between affordability and sustainability issues in order to create more successful and sustainable communities. A sustainable housing affordability criteria system has been developed as to assess the affordability of different housing locations in a sustainable manner, taking into consideration a range of economic criteria (e.g., house prices in relation to income, interest rates and mortgage availability), environmental criteria (e.g., energy efficiency of housing) and social criteria (e.g., access to employment, housing quality, safety) that influence both the affordability and sustainability of housing (Mulliner and Maliene, 2011, 2012,2015; Mulliner et al., 2013).

In view of this, it can be said that housing affordability can be assessed in a wider context by integrating affordability and sustainability issues in order to derive a more sustainable outcome. A housing area is said to be affordable not only because of the low price of housing but also the sustainability aspects of the housing and its environment. In Malaysia, most studies have prominently looked separately at the two different aspects of affordability and sustainability. There are only a few studies (Baqutayan et al., 2015; Hashim et al., 2012; Md. Sani and Che Munaaim, 2012; Mohamed et al., 2014a, 2014b; Mohamed Zaid, 2015a, 2015b; Abdul Mohit et al., 2010; Sabri et al., 2013; Salleh, 2008; Salleh et al., 2013; Sulaiman and Yahaya; 1987; Zaid and Graham, 2011) have been undertaken to test the compatibility between affordable housing and sustainability. Among these studies, the majority (nine out of eleven) of them focused on social or environmental aspect. Only two studies were conducted on the economic aspect.

Mohamed Zaid (2015a and 2015b) has carried out a local study on two PPR low-cost housing projects in Kuala Lumpur to show that how low-cost housing (also known affordable housing) can contribute to sustainable development from the economic aspect. They assessed the economic sustainability of housing in terms of long-term operational affordability, looking at the operational costs of housing such as rent or housing loan repayment, electricity and other utility bills (e.g., water, telephone, internet and/or satellite television). They revealed that the PPR housing is economically sustainable since the households spend less than 30% and 10% of their income for rent or housing loan repayment and the combined operational costs, respectively. Another local study conducted by Sabri et al. (2013) has considered household transportation costs (that incurred by the location and characteristics of the neighbourhood) in determining the affordability of a neighbourhood. They employed an index, called Affordability Index, in assessing three neighbourhoods' affordability in Kuala Lumpur and found that a neighbourhood with good public transportation services (high accessibility to different modes of transport) has a higher affordability index and vice versa.

However, these two studies were too limited since the affordability of housing was assessed based only on a few criteria (e.g, house price, household income, housing loan repayment, expenditure on electricity, utility, transportation costs and etc) regardless of the other important criteria (relating to housing sustainability, quality, safety and others) which could affect the economic sustainability of affordable housing. Furthermore, there is no comprehensive assessment model developed from these two studies. Thus, there is a gap in knowledge in the Malaysian context in determining the affordability of affordable housing by linking it with comprehensive economic sustainability issues and further enhances with an assessment model.

This research is intended to fill in the gap by identifying the comprehensive economic criteria that an affordable housing must have in order to become not only affordable but also economically sustainable. Furthermore, an assessment model for economically sustainable affordable housing is then developed to examine the extent

to which the available affordable housing estates in the market have generated economic sustainability outcomes.

1.4 Research Questions

Based on the statement of the problem, this research attempts to address the following questions throughout the whole research process:

i. What are the economic criteria for sustainable affordable housing?
ii. How to develop a sustainable affordable housing assessment model for economic criteria?

1.5 Research Objectives

The objectives of this research are:

i. To determine the economic criteria for sustainable affordable housing.
ii. To develop a sustainable affordable housing assessment model for economic criteria.

1.6 Research Scopes

In general, this research focuses on the determination of criteria that affect the sustainability of affordable housing from the economic aspect and the development of a model [know as ESAHAM (Economically Sustainable Affordable Housing Assessment Model)] which can be used to assess the economic sustainability of affordable housing, looking into three different kinds of affordability concepts, based on the perceived relative importance of economic criteria that influence such affordability, from the perspective of low- and middle-income groups who reside in Iskandar Malaysia with a monthly household income of less than RM10,000.

This research only concentrates on the economic criteria for sustainable affordable housing assessment model, not on environment nor social criteria, because the economic criteria in an assessment model developed by foreign researchers (Pullen et al., 2010a, 2010b; Arman et al., 2009a; Mohamed Zaid, 2010a, 2015b; Sabri et al., 2013) only cover six items such as house price or rent, location, size, quality, financial procurement and desirability. They did not include the other items such as operational costs, transportation costs, safety and so on. Thus, a comprehensive list of economic criteria are needed to be identified for sustainable affordable housing assessment model.

Besides, there are a few studies (Gan and Hill, 2009; Bujang et al., 2010; Suhaida et al., 2011; Azmi et al., 2015 and A. Ismail et al., 2015b) revealed that housing affordability can be measured in three different ways, namely purchase affordability, repayment affordability and income affordability. However, many literatures only covering the latter, which is income affordability that mainly uses house price to income ratio as the measure (Suhaida et al., 2011). Thus, economic sustainability in this research was assessed based on these three affordability concepts. It implies that a house is said economically sustainable if it is affordable not only at the time of purchase, but also affordable after purchase (in paying housing loan on a continuing basis).

Moreover, the current housing problem in Malaysia revolves more around the issue of inadequate provision of affordable housing not only for low-income households but also the middle-income households (Wan Abd Aziz et al., 2011). Thus, the low- and middle-income residents with a household income of no more than RM10,000 were involved in this research and it is important to know their perceptions of the relative importance of each economic criterion that will contribute to the sustainability of affordable housing. As stated in National Housing Policy 2011, low- and middle-income groups are those who earn a monthly household income of less than RM2,500 and between RM2,500 to RM3,999 respectively (NHD, 2011). But, with economic growth, rapid urbanisation and increased living costs, the benchmark used to categorise the middle-income group is no longer applicable (Mustafa Kamal et al., 2015). In this regard, the definition of the middle-income group given by Perbadanan PR1MA Malaysia (a government-owned organisation who provide affordable housing to the middle-income people in the whole Malaysia) was used, which referred to those who earn a monthly income of between RM2,500 to RM10,000 (PR1MA, 2015).

Furthermore, Iskandar Malaysia is chosen as the study area since it is Malaysia's proposed model of socio-economically and environmentally sustainable development zone with excellent connectivity, infrastructure services, and environmental sensitivity (Tan, 2014). Besides, Johor was ranked top in the list of housing accommodation business in our country which is mainly contributed by Iskandar Malaysia where many of its main towns are located (Zainudin et al., 2012). Also, the overall house prices in this area have improved in several areas since the demand increase due to its strategic location, as stated in the Property Market Report (A. Ismail et al., 2015b). As a result, it is interested to know how economically sustainable the affordable housing was in the region of Iskandar Malaysia by using the assessment model proposed in this research.

1.7 Significance of the Research

This research hopefully will give an idea and guideline to a number of interested parties who involve in the housing industry in Malaysia. To be named, people will get the benefit are:

i. Housing supplier

This covers various people, including the developer, financial institutions, government, and any other party who will take the role in housing industrial development. This research provides a picture of what are the economic criteria that an affordable housing should have in order to become sustainable. This research also suggests the most important criteria that can be taken into account by the housing supplier in order to provide affordable housing that is not only affordable but also sustainable for the citizens.

ii. Home buyer

Home buyer is a key person who will decide the demand for housing in the particular area. The assessment model developed in this research will help them in making housing purchase decision by determining which affordable housing estates are economically sustainable in terms of purchase affordability, repayment affordability and income affordability.

iii. Policymaker

This party is actually playing an important role to provide affordable housing schemes for the people. By right, the existing policy only gives a view for household income, especially in the lower-income group, but it doesn't reflect with three concepts of affordability in accessing the affordability of potential buyers for the affordable housing. This research will give some viewpoints and recommendations to solve the problems. It will also give them a picture of their responsibilities in implementing the housing planning and policy which considered the other economic criteria as well, rather than house price and household income. With this, the target of " every person can own their house" can be achieved.

1.8 Research Methodology

This research was conducted in a number of stages and utilized a variety of research methods in order to ensure the effectiveness and accuracy of data. Briefly, this research involved 5 stages, namely the initial stage, literature review stage, data collection stage, data analysis stage, model development and testing stage, and finally, the conclusion and recommendation stage. An overall process as described below. Figure 1.1 illustrates the overall process of this research.

i. Stage 1 – Initial stage

This initial stage covered the decision process of the research in a sense of preliminary phase. It looked into the issues regarding the topics, determined the consequences of the problem, and propose some possible strategies. Then, the objective, scope, significance and the methodology of this research were elaborated.

ii. Stage 2 – Literature review

The second stage of the research involved a detailed review of the empirical and theoretical literature concerning about housing, housing affordability, affordable housing, sustainability, sustainable housing, sustainable affordable housing, as well as the assessment model for sustainable affordable housing.

iii. Stage 3 – Data collection

Data collection is a process of collecting data from different resources. Data are valuable pieces of information collected in a study. There are two types of data, namely primary and secondary data, and both types of data were collected in order to answer the research questions.

a) Primary data

Primary data are information gathered from primary sources. They are original data collected by the researcher for the research problem at hand. The primary data was collected from a large group of people through a

questionnaire survey to solicit the opinions of the respondents about the importance of economic criteria for sustainable affordable housing.

b) Secondary data

Secondary data are information gathered from secondary sources. Nearly every research project begins with a search of secondary data, in order to get a better picture of what is going to be investigated and support the topic of the research. The previous information related to the issues of housing affordability, sustainable housing affordability and sustainable affordable housing were collected from the sources such as books, journal articles, conference papers, theses, government publications, statistics, newspapers, websites and other relevant published and unpublished material.

iv. Stage 4 – Data analysis

Data analysis is the process of systematically applying statistical and logical techniques to describe, illustrate, and evaluate the data. For this research, the analyses were conducted based on the data collected from the questionnaire instrument with the respondents. Descriptive statistics analysis (i.e., frequency tabulation and central tendency test) and Analytic Hierarchy Process (AHP) were conducted to ensure the accurate data in the research.

v. Stage 5 – Model development and testing

The fifth stage of the research involves the development of ESAHAM from the findings of the data analysed in Stage 4. To ensure the model is applicable, the model was then tested on the available affordable housing schemes in the market.

vi. Stage 6 - Conclusion and recommendations

Findings in the data analysis will be evaluated and be discussed in detail during this stage. It had also answered all the issues which have been determined in the problem statement as well as achieving the objectives of this research.

1.9 Organisation of Chapters

This research is conducted by dividing into seven chapters entirely. Chapter one is about the *Introduction* of this research where the research background, problem statement, questions, objectives, scopes, significance and methodology are stated briefly and will be described in detail.

Chapter two is about the *Sustainable Affordable Housing* where the definitions, theories and concepts of housing, housing affordability, affordable housing, sustainability, sustainable housing, sustainable affordable housing and the assessment model for sustainable affordable housing are described in detail based on the literature review of the various reading materials.

Chapter three is about *Economic Criteria for Sustainable Affordable Housing* where the economic criteria that were retrieved from the literature review are listed out and described in detail.

Chapter four is about the *Research Methodology* which includes the methodologies employed in this research in order to achieve the research's objectives. This chapter talks about research design, research setting as well as the methods used for data collection and analysis.

Chapter five is about the *Analysis and Findings* which includes the analysis and findings on the data collected from a questionnaire survey. Descriptive statistic analysis and Analytic Hierarchy Process (AHP) are applied to conduct the analysis.

Chapter six is about the *Sustainable Affordable Housing Assessment Model for Economic Criteria* which includes the ways to develop the framework from the

results of analysis and the way to test this framework on the available affordable housing estates in the market.

Chapter seven is about the *Conclusions and Recommendations* which includes the conclusions from the findings of the analysis, contribution and limitation of the research as well as some recommendations for future research.

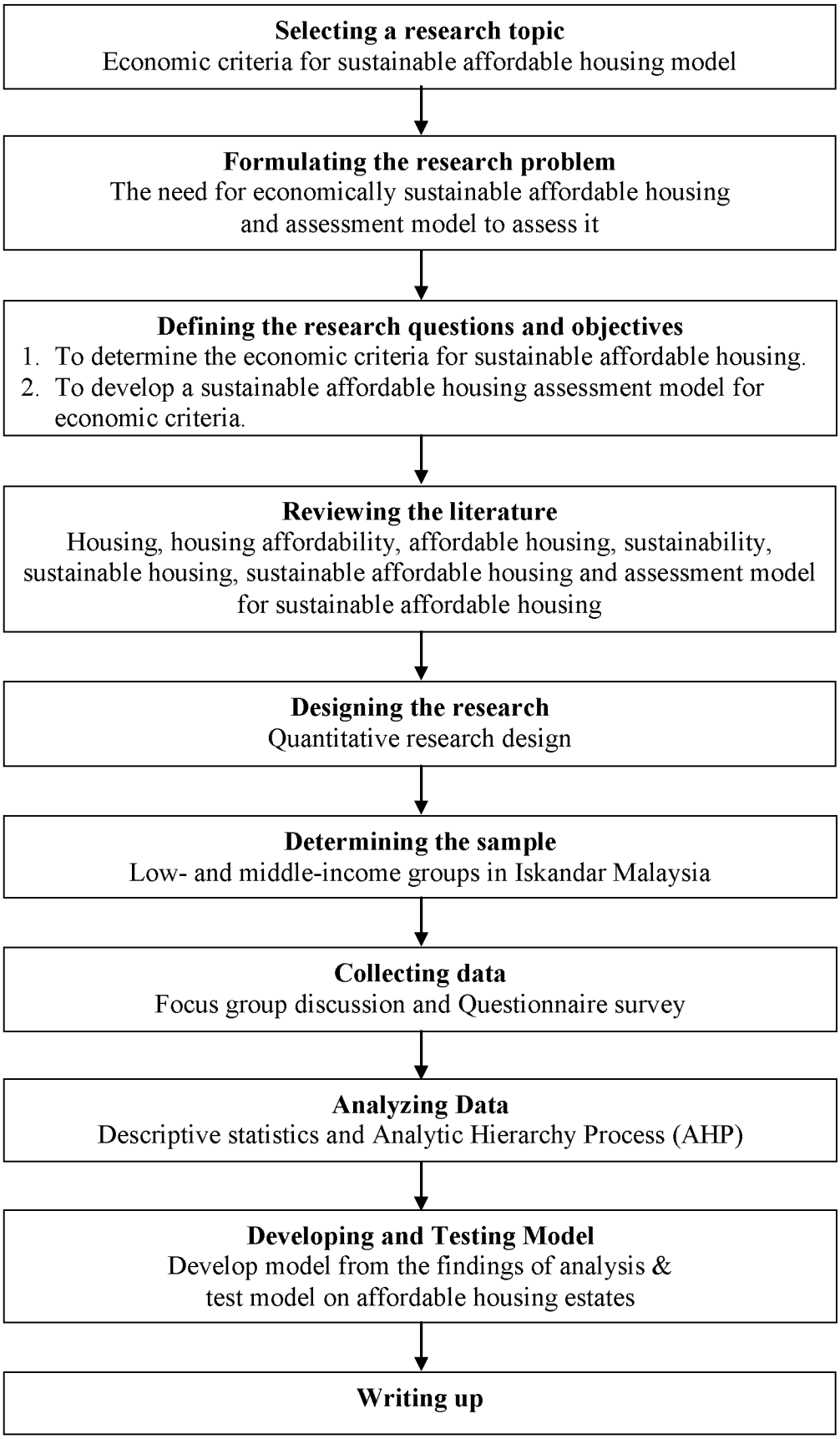

Figure 1.1: Research process

REFERENCES

Abu Bakar, A. H., Khor, S. C. and Rahmawaty. (2011). Sustainable housing practices in Malaysian Housing Development: Towards establishing sustainability index. *International Journal of Technology*. 1, 84-93.

Abdul Mohit, M., Ibrahim, M., & Rashid, Y. R. (2010). Assessment of residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia. *Habitat International, 34*(1), 18-27.

Aczel, J. and Saaty, T. L. (1983). Procedures for synthesizing ratio judgments. *Journal of Math. Psychology*. 27, 93-102.

Affordable homes – Part2 (2014, August 15). *The Sun Daily*. Retrieved from http://www.thesundaily.my/node/267667

AHNRC (Affordable Housing National Research Consortium) (2001). *Affordable housing in Australia: Pressing need, effective solution*. Working paper. Retrieved from http://www.consortium.asn.au/library/affordable_hous_sum_ web.pdf

A. Ismail, Bujang, A. A., Anthony Jiram, W. R., Abu Zarin, H. and Jaafar, M. N. (2015a). Housing financing facility and affordability level of Bumiputera within Iskandar Malaysia. *Journal of Economics, Business and Management*. 3(9), 870-874.

A. Ismail, Bujang, A. A. Anthony Jiram, W. R., Abu Zarin, H. and Jaafar, M. N. (2015b). Factors affecting the housing financing of Bumiputera in Iskandar Malaysia. *Journal of Economics, Business and Management*. 3(11), 1031-1036.

Aragon, T. J., Dalnoki-Veress, F. and Shiu, K. (2012). *Deriving criteria weights for health decision making: A brief tutorial*. Berkeley, CA: Center for Infectious Diseases and Emergency Readiness. Retrieved from https://escholarship.org/content/qt52755837/qt52755837.pdf

Arman, M., Wilson, L., Zuo, J., Zillante, G., and Pullen, S. (2009a). Conceptualising affordable and sustainable housing: Towards a working model to guide planning and construction. *Proceedings of 34th Australasian Universities Building Educators Conference*. Barossa Valley, South Australia.

Arman, M., Zuo, J., Wilson, L., Zillante, G., Pullen, S. (2009b). Challenges of responding to sustainability with implications for affordable housing. *Ecological Economics*. 68, 3034-3041.

Assaf, S. A., Bubshait, A. A. and Al-Muwasheer, F. (2010). Factors affecting affordable housing cost in Saudi Arabia. *International Journal of Housing Markets and Analysis*. 3(4), 290-307.

Azmi, N., Bujang, A. A., Jiram, W. R. A. and Zarin, H. A. (2015). Mismatch between housing affordability and affordable house in Malaysia property market: A review. *Proceedings of the 2015 International Congress of Economics, Social sciences and information management (ICESSIM).* 28-29 March. Bali, Indonesia, 125-132.

Baker, S. (2006). Sustainable development. London: Routledge.

Bank Negara Malaysia (2003). *Housing loans* [Booklet]. Retrieved from https://www.bankinginfo.com.my/pdf/housing_loans.pdf

Baqutayan, S. M. S., Ariffin, A. S. and Raji, F. (2015). Describing the need for affordable livable sustainable housing based on Maslow's theory of need. *Mediterranean Journal of Social Science.* 6(3), 353-357.

Beins, B. and McCarthy, M. A. (2012). *Research methods and statistics.* Boston: Pearson.

Berry, M. and Hall, J. (2001). *Policy options for stimulating private sector investment in affordable housing across Australia. Stage 1 report: Outlining the need for action.* Australia: Australian Housing and Urban Research Institute. Retrieved from https://www.ahuri.edu.au/research/other-reports/policy-options-for-stimulating-private-sector-investment-in-affordable-housing-across-australia

Bieri, D. S. (2012). Housing affordability. Paper submitted to *Encyclopedia of Quality of Life Research.* Retrieved from http://www.david-bieri.com/docs/QOLHousingAffordability_Bieri_Springer.pdf

Bramley, G. (1994). An affordability crisis in British housing: Dimensions, causes and policy impact. *Housing Studies.* 9(1), 103–124.

Bryman, B. and Bell, E. (2007). *Business research methods* (2nd ed.). Oxford: Oxford University Press.

Building and Construction Authority (2016). *BCA Green Mark Certification Standard for Existing Buildings (GM Version 3.0).* Singapore: Building and Construction Authority. Retrieved from https://www.bca.gov.sg/greenmark/others/GM_Existing_Building_Certification_Standard.pdf

Bujang, A. A. (2006). *Pemilikan harta tanah kediaman: Satu kajian penilaian ke atas peraturan kuota lot bumiputera di daerah Johor Bahru.* Doctoral thesis. Universiti Malaya, Kuala Lumpur.

Bujang, A. A., Abu Zarin, H. and Jumadi, N. (2010). The relationship between demographic factors and housing affordability. *Malaysian Journal of Real Estate*, 5(1), 49- 58.

Bujang, A. A., Anthony Jiram, W. R., Abu Zarin, H. and Md. Anuar, F. H. (2015). Measuring the Gen Y housing affordability problem. *International Journal of Trade, Economics and Finance.* 6(1), 22-26.

BREEAM (2016). *Scoring and Rating.* Retrieved from http://www.breeam.com/domrefurbmanual/content/03scoring/01scoring_and_rating.htm

Canadian Mortgage and Housing Corporation (2016). *12.7% of urban households were in core housing need in 2014.* Retrieved from https://www.cmhcschl.gc.ca/en/hoficlincl/observer/observer_110.cfm

Chang, K. L. (2013). *The housing affordability question.* In Cagamas Holdings Berhad. *Housing the nation: Policies, issues and prospects* (pp. 95-106). Malaysia: Cagamas Holdings Berhad.

Chen, J., Hao, Q. and Stephens, M. (2010). Assessing housing affordability in Post-reform China: A case study of Shanghai. *Housing Studies.* 25(6), 877-901.

Cheng, E. W. L. and Li, H. (2001). Analytic hierarchy process: An approach to determine measures for business performance. *Measuring Business Excellence.* 5(3), 30-36.

Chiu, R. L. H. (2004). Socio-cultural sustainability of housing: A conceptual exploration. *Housing, Theory and Society.* 21, 65-76.

Choguill, C. L. (2007). The search for policies to support sustainable housing. *Habitat International.* 31, 143-149.

Chohan, A. H., Che-Ani, A. I., Shar, B. K., Awad, J., Jawaid, A. and Mohd Tawil, N. (2015). A model of housing quality determinants (HQD) for affordable housing. *Journal of Construction in Developing Countries.* 20(1), 117–136.

Chua, Y. P. (2011). *Kaedah dan statistik penyelidikan (Buku 1): Kaedah penyelidikan* (2nd ed.). Kuala Lumpur: McGraw-Hill.

CLG (Communities and Local Government) (2007). *Strategic Housing Market Assessments: Practice Guidance Version 2.* London: Communities and Local Government.

CLG (Communities and Local Government) (2011). *Planning Policy Statement 3 (PPS3): Housing.* London: The Stationary Office.

CSIR (2005). *Guidelines for human settlement planning and design (Volume 1).* Pretoria: CSIR Building and Construction Technology. Retrieved from https://www.csir.co.za/sites/default/files/Documents/Red_bookvol1.pdf

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

Dacquisto, D. J. and Rodda, D. (2006). *Housing impact analysis.* United State: U.S. Departmet of Housing and Urban Development. Retrieved from https://www.huduser.gov/publications/pdf/hsgimp act.pdf

Daud, M. N., Mohd Adnan, Y. Mohd, I. and Abd Aziz, A. (2011). Developing a model for Malaysia's office classification. *Building Research &Information.* 39(3), 301-313.

de Vaus, D. A. (2001). *Research design in social research.* London: SAGE Publications.

DOSM (Department of Statistics Malaysia) (2011). *Population distribution by local authority areas and mukims 2010.* Putrajaya, Malaysia: Department of Statistics Malaysia.

Down payment (n.d.). *Lightbulb Press Dictionary of Financial Terms.* Retrieved from http://financial-dictionary.thefreedictionary.com/Down+Payment

DTZ New Zealand (2004). *Housing costs and affordability in New Zealand.* Research report. New Zealand: Centre for Housing Research.

Emsley, S., Phibbs, P. and Crabtree, L. (2008). *Models of sustainable and affordable housing for local government.* Australia: Urban Research Centre. Retrieved from http://www.uws.edu.au/__data/assets/pdf_file/0019/164620/models_of_sustainable_and_affordable_housing_for_local_govt.pdf

EPU (Economic Planning Unit) (2010). *Tenth Malaysia Plan 2011-2015.* Putrajaya: Economic Planning Unit, The Prime Minister's Office.

EPU (Economic Planning Unit) (2016). *Eleventh Malaysia Plan 2016-2020.* Putrajaya: Economic Planning Unit, The Prime Minister's Office.

Esruq-Labin, A. M. J., Che-Ani, A. I., Tawil, N. M.. Nawi, m. N. M. and Othman Mydin, M. A. (2014). Criteria for affordable housing performance measurement: A review. *E3S Web of Conferences*. 3(01003), p.1-p.7.

Eze, U. C. and Lim, Y. Y. (2013). Indicators in the purchase of housing properties. *Journal of Southeast Asian Research.* 1-10.

Fauzi, M. A. and Abdul Malek, N. (2013). Green building assessment tools: evaluating different tools for green roof system. *International of Journal of Education and Research.* 1(11), 1-14.

Federal Department of Town and Country Planning (2010). *National Physical Plan 2*. Kuala Lumpur, Malaysia: Ministry of Housing and Local Government. Retrieved from https://www.townplan.gov.my/download/National%20Physical%20Plan%28kecik%29.pdf

Field, C. G. (1997). Building consensus for affordable housing. *Housing Policy Debate*. 8(4), 801-832.

Fisher, L. M., Pollakowski, H. O., and Zabel, J. (2009). Amenity-based housing affordability indexes. *Real Estate Economics*. 37(4), 705-746.

Foo, D. E. L. (2015). *Categories of homes in Malaysia.* Retrieved from https://www.proposal.my/topic/226/categories-of-homes-in-malaysia-posted-by-propsocialeditor

Forman and Peniwati (1998). Aggregating individual judgments and priorities with the Analytic Hierarchy Process. *European Journal of Operational Research.* 108, 165-169.

Forster-Kraus, S., Reed, R. and Wilkinson, S. (2009), Affordable housing in the context of social sustainability. *Proceedings of the ISA International Housing Conference*. 1-4 September. Glasgow, 1-21.

Gabriel, M., Jacobs, K., Arthurson, K., Burke, T., and Yates, J. (2005). *Conceptualising and measuring the housing affordability problem* (AHURI Research Paper No. NRV3-1). Melbourne: Australian Housing and Urban Research Institute Limited. Retrieved from https://www.ahuri.edu.au/research/nrv-research-papers/nrv3-1

Gan, Q. and Hill, R. J. (2009). Measuring housing affordability: Looking beyond the median. *Journal of Housing Economics*. 18, 115-125.

Gans, J. and King, S. (2004). The housing lifeline: A housing affordability policy. *Agenda.* 11(2), 143-155.

Gay, L.R., Mills, G. E. and Airasian, P. (2006). *Educational research: Competencies for analysis and applications* (8th ed.). Upper Saddle River, NJ: Merill Prentice Hall.

GBI (2016). *GBI Classification.* Retrieved from http://new.greenbuildi ngindex.org/how/classification

Ghauri, P. and Gronhaug, K. (2005). *Research methods in business studies: A practical guide* (3rd ed.). London, Prentice Hall.

Goh, K. C., Seow, T. W., and Goh, H. H. (2013). Challenges of implementing sustainability in Malaysian housing industry. *Paper presented at the International Conference on Sustainable Built Environment for Now and Future (SBE2013).* 26-27 March 2013. Hanoi.

Gopalakrishnan Nair, D. (2006). Sustainable-affordable housing for the poor in Kerala. Doctoral thesis. Birla Institute of Technology and Science, India. Retrieved from https://www.researchgate.net/publication/27347118_Sustainable_Affordable_Housing_for_the_Poor_in_Kerala

Gopalan, K. and Venkataraman, M. (2015). Affordable housing: Policy and practice in India. *IIMB Management Review.* 27, 129-140.

Government of Malaysia (1965). National Land Code 1965 (Act 56). Kuala Lumpur: Government of Malaysia.

Gravetter, F. J. and Wallnau, L. B. (2008). *Essentials of statistics for the behavioural sciences.* Belmont, CA: Thomson Wadsworth.

Grove, S. K., Gray, J. R. and Burns, N. (2015). *Understanding nursing research: Building an evidence-based practice* (6th ed.). St. Louis, Missouri: Elsevier Saunders.

Hancock, K. E. (1993). 'Can pay? Won't pay?' or economic principles of 'affordability'. *Urban Studies.* 30(1), 127-145.

Hashim, A.E., Samikon, S.A., Nasir, N.M., and Ismail, N. (2012). Assessing factors influencing performance of Malaysian low-cost public housing in sustainable environment. *Procedia-Social and Behavioral Sciences, 50,* 920-927.

Hashim, A. E., Samikon, S. A., Ismail, F. and Ismail, Z. (2015). Managing facilities on Malaysian low-cost public residential for sustainable adaptation. *Procedia – Social and Behavioral Sciences.* 168, 52-60.

Hashim, Z. A. (2010). House price and affordability in housing in Malaysia. *Akademika*. 78, 37-46.

Ho, C. S. and Chau, L. W. and Teh, B. T. and Matsuoka, Y. and Gomi, K. (2015). *'Science to action' of the sustainable low carbon city-region: lessons learnt from Iskandar Malaysia.* In: Enabling Asia to Stabilise the Climate. Springer Singapore, 119-150.

Ho, F. (2014). *6 hidden homeowner costs you can't avoid*. Retrieved from https://www.imoney.my/articles/6-hidden-homeowner-cots-you-cant-avoid

Ho, W. (2008). Integrated analytic hierarchy process and its applications – A literature review. *European Journal of Operational Research*. 189, 211-228.

Housing New Zealand Corporation (2004). *Building the future: Towards a New Zealand housing strategy*. A discussion document. Retrieved from http://www.urbancentre.utoronto.ca/pdfs/elibrary/NZHS_New-Zealand-Housing-St.pdf

Hulchanski, J. D. (1995). The concept of housing affordability: Six contemporary uses of the housing expenditure-to-income ratio. *Housing Studies*. 10(4), 471-491.

Hulchanski, J. D. (2005). *Rethinking Canada's housing affordability challenge*. A discussion paper. Centre for Urban and Community Studies, University of Toronto. Retrieved from https://scarp.ubc.ca/sites/scarp.ubc.ca/files/Rethinking%20Canada%27s%20Housing%20Affordability%20Challenge.pdf [2 February 2016]

Ibem, E. O. and Aduwo, E. B. (2015). A framework for understanding sustainable housing for policy development and practical actions. *Paper presented at Architects Registration Council of Nigeria (ARCON) ARCHITECTS COLLOQUIUM*. 1-18.

Ibrahim, F. S. and Mustaffa, N. E. (2012). Sustainable housing development: The way forward for hillside areas. *Proceedings of the 3rd international Conference on Business and Economic Research (ICBER)*. 12-13 March. Bandung, Indonesia, 272-298.

iMoney (2014). *6 things you should know before buying your first home: The ultimate first-time homebuyer guide*. Retrieved from https://www.imoney.my/articles/home-buying-guide/buying-first-home

iMoney Editorial (2016). *Freehold vs. leasehold: Which is a better buy?* Retrieved from http://www.imoney.my/articles/freehold_vs_leasehold-which-is-a-better-buy

Ishak, N. H., Mohd Ariffin, A. R. and Mohd Zailani, M. N. (2016). Rethinking space design standards towards quality affordable housing in Malaysia. *MATEC Web of Conferences*. 66 (00112), p.

ISIS (Institute of Strategic and International Studies Malaysia) (2013). *ISIS roundtable providing public and affordable housing for Malaysia* (A report). Kuala Lumpur, Malaysia: ISIS. Retrieved from http://www.isis.org.my/files/IF_2013/IF3_2013.pdf

Ismail, A. (2015). *Kemampuan pembiayaan perumahan untuk golongan Bumiputera*. Master's thesis. Universiti Teknologi Malaysia, Johor.

Jackson, W. (1995). *Methods: Doing social research.* Scarborough, ON: Prentice Hall Canada.

Jumadi, N. (2009). *The most significant characteristics in demographic factors and its relationship in determining affordable house: Johor Bahru case study.* Master's thesis. Universiti Teknologi Malaysia, Johor.

Karuppannan, S. and Sivam, A. (2009). Sustainable development and housing affordability. *Paper presented at the European Network for Housing Research Conference*. 28 June – 1 July. Prague, Czech Republic, 1-9.

Keeney, R. L. and Raiffa, H. (1976). *Decisions with multiple objectives: Preferences and value trade-offs.* New York: Cambridge University Press.

King, L.A. (2008). *Sustainable community development code: Housing affordability.* Arlington, Virginia: Housing Food System. *Retrieved* from http://www.law.du.edu/images/uploads/rmlui/rmlui-sustainable-housingAffordability.pdf

Kok, Y. F. (2007). *Law & Reality: Difference between freehold, leasehold properties.* Retrieved from http://www.malaysianbar.org.my/conveyancing_practice/law_really_difference_between_freehold_leasehold_properties.html

Kothari, C. R. (2004). *Research methodology: Methods and techniques* (2nd ed.). New Delhi: New Age International Limited.

Krishnaswami. O. R. & Ranganathan, M. (2009). *Methodology of research in social sciences*. New Delhi: Himalaya Publishing House.

Kumar, R. (2011). *Research methodology: A step-by-step guide for beginners* (3rd ed.). New Delhi: SAGE Publications.

Kuruoglu, E., Guldal, D., Mevsim, V. and Gunvar, T. (2015). Which family physician should I choose? The analytic hierarchy process approach for ranking of criteria in the selection of a family physician. *BMC Medical Informatics and Decision Making.* 15(63), 1-8.

Kutty, N. K. (2005). A new measure of housing affordability: Estimates and analytical results. *Housing Policy Debate.* 16(1), 113-142.

Lea, M. J., and Wallace, J. E.. (1996). *Current practices for financing affordable housing in the united states.* A paper prepared for the Fannie Mae Foundation Office of Housing Research and the 1996 Tri-Country Conference on Housing and Urban Issues.

Lee, G. K. L. (2008). *Sustainable urban renewal model for a high density city – Hong Kong.* Doctoral thesis. http://ira.lib.polyu.edu.hk/bitstream/10397/2791/2/b22755524_ir.pdf

Lee, G. K. L. and Chan, E. H. W. (2008). The Analytic Hierarchy Process (AHP) for assessment of urban renewal proposals. *Social Indicators Research.* 89, 155-168.

Lee, I. (2014). *6 property factors that may result in your home loan being rejected.* Retrieved from https://www.imoney.my/articles/6-property-factors-that-may-result-in-your-home-loan-being-rejected

Linneman, P.D. and Megbolugbe, I.F. (1992). Housing affordability: myth or reality? *Urban. Studies.* 29(3/4), 369–392.

Litman, T. (2010). *Affordable-accessible housing in a dynamic city: Why and how to increase affordable housing development in accessible locations.* Victoria, BC: Victoria Transport Policy Institute. Retrieved from http://www.vtpi.org/aff_acc_hou.pdf

Loanstreet (2013). *Property attributes in Malaysia – Key things to look for.* Retrieved from https://loanstreet.com.my/learning-centre/property-attributes-in-malaysia-key-things-to-look-for

Loanstreet (2014). *4 bumi attributes you should know about Malaysian properties.* Retrieved from https://loanstreet.com.my/learning-centre/bumi-land-jargons-explained

Ma, A. and Chow, N. W. S. (2002*). The residential mobility and housing preferences of Hong Kong retiree movers to the Pearl River Delta*. In Yeh, A. G., Sit, V. F., Chen, G. and Zhou, Y. (Eds.) *Developing a competitive Pearl River Delta in south China under one country-two systems* (pp. 229-254). Hong Kong: Hong Kong University Press.

MacKillop, F. (2012). Balancing the need for affordable housing with the challenges of sustainable development in South East Queensland and beyond. *Proceedings of the 18th Annual Pacific-Rim Real Estate Society Conference*. 15-18 January. Adelaide, Australia, 1-10.

Malek, N. M. and Husin, A. (2012). Pemilikan rumah dalam kalangan masyarakat bandar berpendapatan sederhana dan rendah di malaysia. *SOSIOHUMANIKA*. 5(2), 269–284.

Martin, D. J. and Loomis, K. S. (2014). *Building teachers: A constructivist approach to introducing education* (2nd ed.). Belmont, CA: Wadsworth.

Mayer, C. J. and Engelhardt, G. V. (1996). Gifts, down payments and housing affordability. *Journal of Housing Research.* 7(1), 59-77.

McCord, M., McGreal, S. Berry, J., Haran, M. and Davis, P. (2011). The implications of mortgage finance on housing market affordability. *International Journal of Housing Markets and Analysis.* 4(4), 394-417.

McLafferty, S. (2010). *Conducting questionnaire surveys.* In Clifford, N. and Valentine, G. (Eds.) *Key methods in Geography* (2nd ed.) (pp. 77-88). London: Sage Publications.

Md. Sani, N. (2015a). Relationship between housing affordability and house ownership in Penang. *Jurnal Teknologi.* 75(9), 65-70.

Md. Sani, N. (2015b). Price to income ratio approach in housing affordability. *Journal of Economics, Business and Management.* 3(12), 1190-1193.

Md. Sani, N. and Che Munaaim, M. A. (2012). Sustainable house principle in affordable house. *Paper presented at the International Conference on Innovation, Trade and Economics*. 2-3 June. Hong Kong, China, 1–4.

MHLG (Ministry of Urban Wellbeing, Housing and Local Government) (2013). *The National Housing Policy*. In Cagamas Holdings Berhad. *Housing the nation: Policies, issues and prospects* (pp. 107-116). Malaysia: Cagamas Holdings Berhad.

MHLG (Ministry of Urban Wellbeing, Housing and Local Government) (2015). *Program Perumahan Rakyat (PPR).* Retrieved from http://ehome.kpkt.gov.my/index.php/pages/view/133

Milligan, V. R. (2003). How different? Comparing housing policies and housing affordability consequences for low income households in Australia and Netherlands. *Netherlands Geographical Studies.* 19-246. Retrieved from https://dspace.library.uu.nl/bitstream/handle/1874/576/full.pdf?sequence=2&isAllowed=y

Milligan, V., Phibbs, P., Fagan, K. and Gurran, N. (2004). *A practical framework for expanding affordable housing services in Australia: Learning from experience* (AHURI Final Report No. 65). Melbourne: Australian Housing and Urban Research Institute Limited. Retrieved from https://www.ahuri.edu.au/research/ final-reports/65

Millock, K. and Nauges, C. (2010). Household adoption of water-efficient equipment: The role of socio-economic factors, environmental attitudes and policy. *Environmental and Resource Economics*. 46(4), 539-565.

Mitchell, L. M. (2010). *Green Star and NEBERS: Learning from the Australian Experience with Green Building Rating Tools.* In Bose, R. K. Energy Efficiency Cities: Assessment Tools and Benchmarking Practices (pp. 93-130). Washington, DC: The International Bank of Reconstruction and Development/The World Bank.

Mohamed, M. F., Raman, S. N., Iman Pratama, T. M. and Mohammad Yusoff, W. F. (2014a). Outdoor environment of low-cost housing: A case study of Flat Taman Desa Sentosa. *E3S Web of Conferences.* 3 (01005), p.1-p.7.

Mohamed, M. F., Mohammad Yusoff, W. F., Iman Pratama, T. M. and Raman, S. N. (2014b). Satisfaction perception of indoor environment of low-cost housing: A case study of Flat Taman Desa Sentosa. *E3S Web of Conferences.* 3 (01001), p.1-p.7.

Mohamed Zaid, S. (2015a). Measuring operational affordability of public low-cost housing in Kuala Lumpur. Case study of People's Housing Programme public low-cost housing in Kuala Lumpur. *International Journal of Social Sciences* 4 (4), 54-74.

Mohamed Zaid, S. (2015b). Is public low-cost housing in Malaysia really affordable? Measuring operational affordability of public low-cost housing in Kuala

Lumpur. *Proceedings of the 18th International Academic Conference.* 25 August. London, 799-814.

Mohd Safian, E. E. and Nawawi, A. H. (2011). The evolution of Analytic Hierarchy Process (AHP) as a decision making tool in property sectors. *International Conferences on Management and Artificial Intelligence.* 1-2 April. Bali, 28-31.

Monette, D. R., Sulliivan, T. J.,DeJong, C. R., Hilton, T. (2014). *Applied social research: a tool for the human services* (9th ed.). Belton, CA: Brooks/Cole.

Morgan, D. L. (1997). *Focus groups as qualitative research.* California: SAGE Publications.

Mousavi, S. M., Khan, T. H. and Javidi, B. (2013). Environmentally sustainable affordable design elements in housing in the context of Malaysia: Focus on middle income group. *Life Science Journal.* 10(3), 1138-1148.

MRRD (Ministry of Rural and Regional Development) (2015). *Housing Assistance Programme (PBR).* Retrieved from http://www.rurallink.gov.my/en/citizen/peoples-welfare/housing-assistance-programme-pbr/

Mulliner E. K. (2012). *A model for the complex assessment of sustainable housing affordability.* Doctoral thesis. Liverpool John Moores University. Retrieved from http://researchonline.ljmu.ac.uk/6183/1/589785.pdf

Mulliner, E. and Maliene, V. (2011). Criteria for sustainable housing affordability. *Journal of Environmental Engineering*, 3, 966-973.

Mulliner, E. and Maliene, V. (2012). What attributes determine housing affordability? World Academy of Science, Engineering and Technology. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering.* 6(7), 1833-1838.

Mulliner, E. and Maliene, V. (2015). An analysis of professional perceptions of criteria contributing to sustainable housing affordability. *Sustainability.* 7, 248-270.

Mulliner, E., Smallbone, K. and Maliene, V. (2013). An assessment of sustainable housing affordability using a multiple criteria decision making method. *Omega. 41*, 270–279.

Mustafa Kamal, E. and Hassan, H. and Osmadi, A. (2016). Factors influencing the housing price: Developers' perspective. *International Journal of Social,*

Behavioral, Educational, economic, Business and Industrial Engineering. 10(5), 1637-1643.

Muttagi, P. K. (1998). *Sustainable development – A third world perspective.* In Hamm, B. and Muttagi, P. K. (Eds.). *Sustainable development and the future of cities* (pp. 43-56). New Dehli/Calcutta: Oxford & IBH Publishing.

Nair, D. G., Enserink, B., Gopikuttan, G., Vergragt, P., Fraaij, A. and Dalmeijer, R. (2005). A conceptual framework for sustainable-affordable housing for the rural poor in less developed economies. *Paper presented at the 2005 World Sustainable Building Conference*, 27-29 September. Tokyo, Japan, 4429-4436.

NAPIC (National Property Information Centre) (2014). *Property Market Report 2014*. Malaysia: Valuation and Property Service Department, Ministry of Finance.

NAPIC (National Property Information Centre) (2016). *The Malaysian House Price Index 1988-2016*. Putrajaya, NAPIC.

Ndubueze, O. (2007). Measuring housing affordability: A composite approach. *ENHR 2007 International Conference 'Sustainable Urban Areas'*. Rotterdam, Netherlands.

NHD (National Housing Department) (2011). *National Housing Policy*. Kuala Lumpur: The Ministry of Housing and Local Government.

Neuman, W. L. (2014). *Social research methods: Qualitative and quantitative approaches* (7th ed.). Harlow, Essex: Pearson Education Limited.

Newman, P. (2002). Sustainability and housing: More than a roof over head. *Paper presented at the 2002 Barnett Oration*. 31 October. Melbourne, 1-29.

Nwuba, C. C. (2015). *Development of a model foe measurement of urban incremental housing affordability in Kaduna state, Nigeria.* Doctoral thesis. University of Nigeria, Nigeria. Retrieved from https://www.researchgate.net/profile/Chukwuma_Nwuba/publication/320320409_DEVELOPMENT_OF_A_MODEL_FOR_MEASUREMENT_OF_URBAN_INCREMENTAL_HOUSING_AFFORDABILITY_IN_KADUNA_STATE_NIGERIA/links/59dd7e03458515f6efefd674/DEVELOPMENT-OF-A-MODEL-FOR-MEASUREMENT-OF-URBAN-INCREMENTAL-HOUSING-AFFORDABILITY-IN-KADUNA-STATE-NIGERIA.pdf

Omar, I. (2002). Rules affecting the land development process in Malaysia – A review on regulation of Environmental Impact Assessment (EIA). *Paper presented at the 8th Pacific Rim Real Estate Society Conference*. 21-23 January. New Zealand, 1-21.

Osmadi, A., Mustafa Kamal, E., Hassan, H. and Abdul Fattah, H. (2015). Exploring the elements of housing price in Malaysia. *Asian Social Science*. 11(24), 26-38.

Pakoz, M. Z. and Yuzer, M. A. (2014). Access to healthcare: A field survey in Istanbul. *A|Z ITU Journal of the Faculty of the Architecture*. 11(2), 271-290.

Pandey, P. and Pandey, M. M. (2015). *Research methodology: Tools and techniques*. New York, USA: Bridge Center Publication.

Partovi, F. (1994). Determining what to benchmark: An analytic hierarchy process approach. *International Journal of Operations and Production Management*. 14(6), 25-39.

PPA1M (Perumahan Penjawat Awam 1Malaysia) (2015). *Garis panduan Perumahan Penjawat Awam 1Malaysia (PPA1M)*. Malaysia: Jabatan Perdana Menteri. Retrieved from https://www.ppa1m.gov.my/assets/manual/garis_panduan.pdf

Phellas, C. N., Bloch, A. and Seale, C. (2011). *Structured methods: Interviews, questionnaires and observation*. In Seale, C. (Ed.) *Researching society and culture* (3rd ed.) (pp. 181-205). London: SAGE Publications.

Pittini, A. (2012). *Housing affordability in the EU current situation and recent trends*. CECODHAS European Social Housing Observatory Research Briefing (Year 5/No. 1). Retrieved from http://www.housingeurope.eu/file/41/download

Pullen, S., Zillante, G., Arman, M., Wilson, L., Zuo, J., and Chileshe, N. (2010a). A case study analysis of sustainable and affordable housing, *Proceedings of the 35th Australasian Universities Building Education Association (AUBEA) annual conference*. 14-16 July. Melbourne, Australia, A037-1–A037-18.

Pullen, S., Arman, M., Zillante, G., Zuo, J., Chileshe, N., and Wilson, L. (2010b). Developing an assessment framework for affordable and sustainable housing. *The Australasian Journal of Construction Economics and Building*. 10 (1/2), 48-64.

Polit, D. F. and Beck, C. T. (2010). *Essentials of nursing research: Appraising evidence for nursing practice* (7th ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.

Priemus, H. (2005). How to make housing sustainable? The Dutch experience. *Environment and Planning B: Planning and Design*. 32, 5-19.

PR1MA (Perbadanan PR1MA Malaysia) (2015). About PR1MA. Retrieved from: http://www.pr1ma.my/about.php?lang=en

Privitera, G. J. (2014). *Research methods for the behavioural sciences.* Los Angeles, SAGE Publications.

Ramanathan (2001). A note on the analytic hierarchy process for environmental impact assessment. *Journal of Environmental Management.* 63, 27-35.

REHDA (Real Estate and Housing Developers' Association Malaysia) (2014). *Report of summary of Budget 2015 in relation to property industry.* Bulletin 11-12, November-December. Retrieved from: http://rehda.com/?news=november-december-2014-issue-summary-of-budget-2015-in-relation-to-the-property-industry

Remenyi, D., Williams, B., Money, A. and Swartz, E. (1998). *Doing research in business and management: An introduction to process and method.* London, England: SAGE Publications.

Robinson, M., Scobie, G.M., Hallinan, B. (2006). *Affordability of housing: concepts, measurement and evidence.* Working Paper No. 06/03, New Zealand Treasury.

Rogers, P. P., Jalal, K. F. and Boyd, J. A. (2008). *An introduction to sustainable development.* London: Earthscan.

Rowley, S. and Ong, R. (2012). *Housing affordability, housing stress and household wellbeing in Australia* (AHURI Final Report No. 192). Melbourne: Australian Housing and Urban Research Institute.

Rozali, N. J. (2015). *Pembiayaan perumahan mampu milik - Kes kajian: Johor Bahru*. Master's thesis. Universiti Teknologi Malaysia, Johor.

RUMAWIP (Rumah Wilayah Persekutuan) (2015). *Soalan Lazim*. Retrieved from: https://rumawip.kwp.gov.my/faq

Saaty, T. L. (1990). How to make a decision: The analytic hierarchy process. *European Journal of Operational Research.* 18, 9-26.

Saaty, T. L. (1994). How to make a decision: The analytic hierarchy process. *Interfaces.* 24(6), 19-43.

Saaty, T. L. (2003). Why the magic number seven plus or minus two. *Mathematical and Computer Modelling*. 38, 233-244.

Sabri, S., M. Ludin, A. N. and Johar, F. (2013). Assessment of neighbourhood affordability based on housing and transportation costs in Kuala Lumpur, Malaysia. *Geospatial Analysis in Urban Planning*. 2, 75-100.

Said, I., Osman, O., Mohd Shafiei, M. W., Abd Razak, A. and Tee, K. K. (2009). Sustainability in the housing development among construction industry players in Malaysia. *The Journal of Global Business Management*. 5(15), 1-9.

Said, N. S. and Martin @ D. J., D (2013). The housing environment preference among housing consumers in Johor Bahru. *2nd International Conference on Technology Management, Business and Entrepreneurship*. 5 December. Melaka, Malaysia, 55-70.

Salleh, A. G. (2008). Neighbourhood factors in private low-cost housing in Malaysia *Habitat International*. 32(4), 485-493.

Salleh, A. G., Badarulzaman, N., Ali, K. and Abdul Fattah, H. (2013). Residents' assessment of neighbourhood quality in Penang, Malaysia. *OIDA International Journal of Sustainable Development*. 6(12), 65-72.

Saunders, M., Lewis, P. and Thornhill, A. (2009). *Research methods for business students* (5th ed.). Harlow: Financial Times Prentice Hall.

Saunders, M. and Tosey, P. (2013). The layers of research design. *Rapport Winter (2012/2013)*. 30, 58-59.

Seelig, T. and Phibbs, P. (2006). Beyond the normative: Low income private renters' perspectives of housing affordability and need for housing assistance. *Urban Policy and Research*. 24 (1), 53-66.

Sekaran, U. (2003). *Research methods for business: A skill-building approach*. 4th Edition, John Wiley & Sons, New York.

Sendi, R. (2014). Housing accessibility versus housing affordability: Searching for an alternative approach to housing provision. *Sociologija i prostor*. 200 (3), 239-260.

Shuid, S. (2004). Low medium cost housing in Malaysia: Issues and challenges. *Proceedings of Asia Pacific Network for Housing Research Conference (APNHR)*. 5-6 February 2004. Hong Kong, 1-13.

S. Ismail, Jalil, I. N. and Megat Muzafar, P. M. (2015). *Making housing affordable.* Malaysia: Khazanah Research Institute.

Sliogeris, E., Crabtree, L., Phibbs, P. and Johnston, K. (2008). *Housing affordability literature review and affordable housing program audit.* Penrith, N. S. W.:

University of Western Sydney. Retrieved from http://www.uws.edu.au/__data /assets/pdf_file/0004/164623/landcom_report_2008-07-21.pdf

Stone, M. E. (2006). What is housing affordability? The case for the residual income approach. *Housing Policy Debate.* 17(1), 151-184.

Stone, M., Burke, T. and Ralston, L. (2011). *The residual income approach to housing affordability: The theory and the practice (*AHURI Positioning Paper No. 139). Melbourne: Australian Housing and Urban Research Institute Limited. Retrieved from https://www.ahuri.edu.au/research/positionpapers/139

Suhaida, M. S., Tawil, N. M., Hamzah, N., Che-Ani, A.I., Basri, H. and Yuzainee, M.Y. (2011). Housing affordability: A conceptual overview for house price index. *Procedia Engineering 20*, 346–353.

Sulaiman, H. and Yahaya, N. (1987). Housing provision and satisfaction of low-income households in Kuala Lumpur. *Habitat International.* 11(4), 27-38.

Sulaiman, N. Baldry, D. and Ruddock, L. (2005). Can low cost housing in Malaysia be considered as affordable housing? *Proceedings of the European Real Estate Society (ERES) Conference 2005*. 14-18 June. University College Dublin, Ireland.

Tan, T. H. (2012). Meeting first-time buyers' housing needs and preferences in greater Kuala Lumpur. *Cities*. 29, 389-396.

Tan, T. H. (2014). Assessing green home performance: A case study of Iskandar Malaysia. *International Journal of Property Sciences*. 4(1), 1-12.

Tips on choosing a property developer (2014, January 28) *[Blog post]*. Retrieved from http://blog.megaworldatthefort.com/tips-on-choosing-a-property-developer/

Tosics, I. (2004). European urban development: Sustainability and the role of housing, *Journal of Housing and the Built Environment.* 19, 67–90.

Tshuma, R. and Mafa, O. (2013). *Research designs*. In Tichapondwa, S. M. (Ed.) *Preparing your dissertation at a distance: A research guide* (pp. 114-137). Vancouver: Virtual University for Small States of the Collonwealth.

Tuohy, P. G. (2004). *Sustainable housing*. Master Degree. University of Strathclyde, Scotland. Retrieved from http://www.esru.strath.ac.uk/Documents/MSc_2004/tuohy.pdf

Ubale, M. Y., Martin, D. and Seow, T. W. (2015). Investigating housing affordability pursuant to sustainable development mechanisms and the new Malaysian housing policy. *Journal of Economics and Sustainable Development*. 6(3), 49-66.

UN-HABITAT (United Nations Human Settlements Programme) (2008). The Role of government in the housing market: The experiences from Asia. Nairobi: UN-HABITAT. Retrieved from https://www.researchgate.net/profile/Hoang_Phe/publication/275210268_The_Role_of_Government_in_the_Housing_Market_The_Experiences_from_Asia/links/5760e6aa08aeeada5bc30b8a/The-Role-of-Government-in-the-Housing-Market-The-Experiences-from-Asia.pdf

UN-HABITAT (United Nations Human Settlements Programme) (2012). *Sustainable housing for sustainable cities: A policy framework for developing countries*. Nairobi: UN-HABITAT.

United Nations (1948). *Universal Declaration of Human Rights*. New York: Department of Public Information. Retrieved from: https://www.ohchr.org/EN/UDHR/Documents/UDHR_Translations/eng.pdf

U.S. Department of Housing and Urban Development (n.d.). *Affordable housing*. Retrieved from https://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing/

Vaidya, O. S. and Kumar, S. (2006). Analytic hierarchy process: An overview of applications. *European Journal of Operational Research*. 169, 1-29.

van Teijlingen, E. R. and Hundley, V. (2001). *The importance of pilot studies*. Social Research Update. Issue 35. University of Surrey. Retrieved from http://sru.soc.surrey.ac.uk/SRU35.html

Wahab, I. (1991). Housing strategies in Malaysia: A review. *Architecture and Planning*. 3, 19-36.

Wan Abd Aziz, W. N. A., Hanif, N. R. and Singaravello, K. (2011). A study on affordable housing within the middle income households in the major cities and towns in Malaysia. *Paper presented at the 4th NAPREC Conference*, 29 September, Malaysia, 1-20.

Wan Abd Aziz, W. N. A., Singaravelloo, K., Doling, J. and Hanif, N. R. (2014). *Towards a housing policy in Malaysia*. In: Doling, J. and Ronald, R. (Eds.) *Housing East Asia: Socioeconomic and Demographic Challenges*. London: Palgrave Macmillan.

WCED (World Commission for Environment and Development) (1987). *Our Common Future*. Oxford: Oxford University Press. Retrieved from http://www.un-ocuments.net/our-common-future.pdf

Whitehead, C. M. E. (1991). From need to affordability: an analysis of UK housing objectives. *Urban Studies*. 28(6), 871-887.

Wiesel I., Davison, G., Milligan, V., Phibbs, P., Judd, B. and Zanardo, M. (2012). *Developing sustainable affordable housing: A project level analysis* (AHURI Final Report No.183). Melbourne: Australian Housing and Urban Research Institute. Retrieved from http://www.ahuri.edu.au/publications/projects/p70617

Wilkinson, S. (2008). *Focus groups.* In Smith, J. A. (Ed.). *Qualitative psychology: A practical guide to research methods* (2nd ed.). London: SAGE Publications.

Woetzel, J., Ram, S., Mischke, J., Garemo, N. and Sankhe, S. (2014). *A blueprint for addressing the global affordable housing challenge.* Shanghai: McKinsey Global Institute. Retrieved from https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Urbanization/Tackling%20the%20worlds%20affordable%20housing%20challenge/MGI_Affordable_housing_Executive%20summary_October%202014.ashx

Wyatt, A. (2015). *Using GEOMEAN with a large list.* Retrieved from: https://excel.tips.net/T002580_Using_GEOMEAN_with_a_Large_List.html

Yam, S. Y. L., Ismail, M. and Tan, S. Y. (2015). Corporate social responsibility in Malaysia housing development – The developer's perspective. *Pacific Rim Property Research Journal*. 14(2), 177-198.

Yamane, T. (1973). *Statistics: An introductory analysis* (3rd ed.). New York: Harper & Row.

Yates, J. (2008). Australia's housing affordability crisis. T*he Australian Economic Review*. 41, 200-214.

Yip, N. M. (1995). *Housing affordability in England.* Doctoral thesis, University of York. The Hong Kong Polytechnic University, Hong Kong. Retrieved from

Zaid, N. S. M. and Graham, P. (2011). Low-cost housing in Malaysia: A contribution to sustainable development. *eddBE Proceedings*. 82-87.

Zainudin, A. Z., Abd Latiff, M., Md Yunus, N., Yusof, N. A., Megat Abdul Rahman, M. M. G. and Hussin, K. (2012). Housing developers' initiative in supporting

sustainable housing development in Iskandar Malaysia. *International Journal of Real Estate Studies*. 7(1), 24-29.

Zainul Abidin, N. (2010). Investigating the awareness and application of sustainable construction concept by Malaysian developers. *Habitat International*. 34(4), 421-426.

Zillante, G., Pullen, S., Lou, W., Davidson, K., chileshe, N., Zuo, J. and Arman, M. (2013). *Integrating affordable housing and sustainable housing: Bridging two merit goods in Australia*. In Wallis, I., Bilan, L., Smith, M. and Kazi, A. S. (Eds.) *Industrialised, Integrated, Intelligent sustainable construction I3CON Handbook 2* (pp. 43-60). UK: I3CON.