

**ECONOMIC CRITERIA FOR SUSTAINABLE AFFORDABLE HOUSING
MODEL**

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ECONOMIC CRITERIA FOR SUSTAINABLE AFFORDABLE HOUSING
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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 membangunkan 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. Penemuan 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 kebolegunaan 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.

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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

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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 as 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 [known 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.

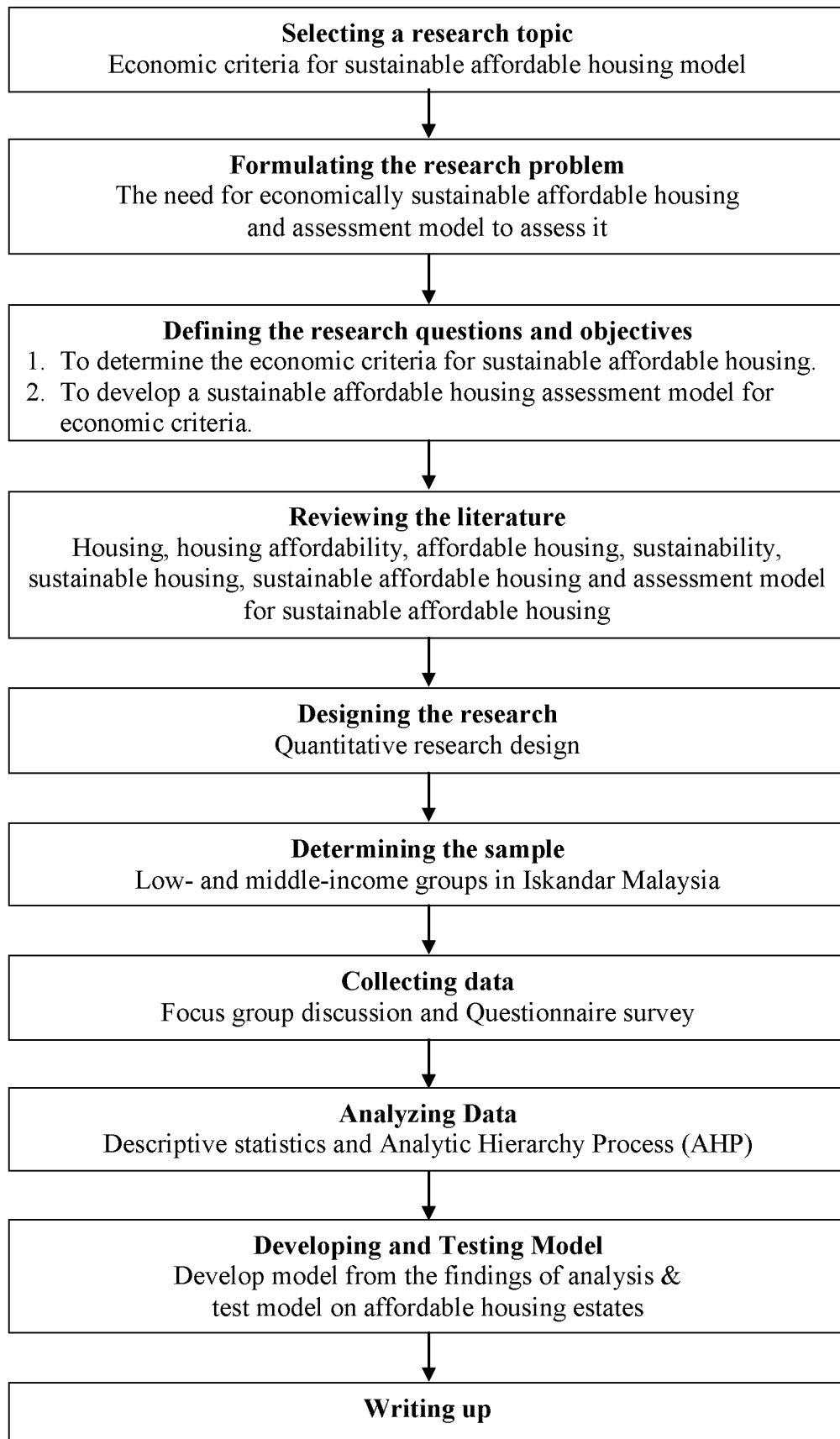


Figure 1.1: Research process

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