EFFECTS OF TANGIBLE AND INTANGIBLE GREEN ELEMENTS OF STRATIFIED RESIDENTIAL PROPERTY ON LOCAL AUTHORITY PROPERTY TAX ASSESSMENT REVENUE IN JOHOR BAHRU

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DEDICATION

For my parents,
Zulkifli Long and Halizah Abd Kadir for their endless love, support, and guidance,
and thank you to Zikri Arif for all his love, patience, and faith.

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ABSTRACT

Property tax assessment revenue is the main income of local authority and is used to provide services and maintenance to the community. Past research has found the link between property value and property tax whereby any differences affecting property value reflect the property tax assessment value. Over decades, numerous studies have been conducted to investigate the relationship between green elements and property value. Past research has identified tangible elements of green building: green envelope components that affect property value. However, to date, no research has been conducted to determine the effect of both tangible and intangible green elements on property value. Henceforth, this research intends to identify and measure the effect of intangible green elements on local authority property tax revenue. Three objectives have been outlined in this research which are, 1) To identify tangible and intangible green elements on the property, 2) To measure the effect of tangible and intangible green elements on property value, and 3) To validate the effect of tangible and intangible green elements on local authority property tax assessment revenue. A comprehensive review of literature and guidelines by green rating tools was conducted and analysed through systematic analysis. The findings are used to construct questionnaires and distributed among property valuers to identify the effects of tangible and intangible green elements on property value. Furthermore, hedonic models through multiple regression analysis were developed to measure the percentage of value increment and decrement for each green element. The results are then used to validate the effect of tangible and intangible green elements on local authorities' property tax assessments revenue. The findings show local authorities' property tax assessment revenue is estimated to increase by 36.4% if the property under their administrative area implements green elements that have a positive effect on the value and decrease by 7.0% if the property under their administrative area implements green elements that have a negative effect on value. This research is significant for the local authority to support sustainable agenda by promoting green building development at the local level.

ABSTRAK

Hasil taksiran cukai harta tanah merupakan pendapatan utama PBT dan digunakan untuk menyediakan perkhidmatan dan penyelenggaraan kepada masyarakat. Penyelidikan lepas telah menemui kaitan antara nilai hartanah dan cukai taksiran di mana sebarang perbezaan yang mempengaruhi nilai hartanah mencerminkan nilai taksiran cukai harta. Kajian lepas telah mengenal pasti elemen bangunan hijau iaitu komponen hijau yang mempunyai kesan ke atas nilai hartanah. Walau bagaimanapun, sehingga kini, tiada kajian telah dijalankan untuk menentukan kesan unsur hijau ketara dan tidak ketara terhadap nilai hartanah. Oleh itu, penyelidikan ini dijalankan untuk mengenal pasti dan mengukur kesan unsur hijau tidak ketara terhadap hasil cukai harta tanah pihak berkuasa tempatan. Terdapat tiga objektif yang digariskan dalam penyelidikan ini iaitu; 1) Untuk mengenal pasti elemen hijau ketara dan tidak ketara pada harta; 2) Untuk mengukur kesan unsur hijau ketara dan tidak ketara terhadap nilai hartanah; dan 3) Untuk mengesahkan kesan elemen hijau ketara dan tidak ketara ke atas hasil taksiran cukai harta pihak berkuasa tempatan. Kajian menyeluruh terhadap literatur dan garis panduan oleh alat penarafan hijau telah dijalankan. Dapatan ini digunakan untuk membina soal selidik dan diedarkan di kalangan penilai hartanah untuk mengenal pasti kesan unsur hijau ketara dan tidak ketara terhadap nilai hartanah. Tambahan pula, model hedonik melalui analisis regresi berganda telah dibangunkan untuk mengukur peratusan kenaikan dan penurunan nilai bagi setiap elemen hijau. Hasilnya kemudiannya digunakan untuk mengesahkan kesan unsur hijau ketara dan tidak ketara ke atas hasil taksiran cukai harta pihak berkuasa tempatan. Penemuan menunjukkan hasil taksiran cukai harta PBT dianggarkan meningkat sebanyak 36.4% sekiranya hartanah di bawah kawasan pentadbiran mereka melaksanakan elemen hijau yang memberi kesan positif kepada nilai dan menurun sebanyak 7.0% jika hartanah di bawah kawasan pentadbiran mereka melaksanakan elemen hijau yang mempunyai kesan negatif terhadap nilai. Penyelidikan ini penting bagi pihak berkuasa tempatan untuk menyokong agenda mampan dengan mempromosikan pembangunan bangunan hijau di peringkat tempatan.

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CHAPTER 1

INTRODUCTION

1.1 Problem Background

Property tax revenue is the main source of income for local authorities, which are used to pay for services and maintenance in the local authority administrative areas (Pawi et al., 2011). The enforcement of property tax assessment in Malaysia is based on the authority of sections 127, 129, and 163 by the Local Government Act 1976. According to Part XV, Section 127 of the Local Government Act 1976 (Act 171), local authorities are authorized to levy a property tax to perform their roles as organizations that have autonomy over the public. Property tax assessment is derived based on the market value of the property based on the tone of the list (Ibrahim, 2009).

There are two bases of property tax assessment, namely annual value, and improved value. Annual value is derived by multiplies rent value of a property ($) and rate (%), while improved value is derived by multiplies market value of a property ($) and rate (%) (Ariffian and Hasmah, 2014). Past research has found the link between property value and property tax whereby any differences affecting property value reflect the property tax assessment value (Franzsen, & McCluskey, 2005; Oliviero & Scognamiglio; 2019). Past research has proved that property value positively affects property tax assessment revenue (Duncan et al., 2020; Awasti et al., 2020).

Improved value is determined based on the property market value, which depends on the date of the tone of the list adopted by the local authority (Ariffian and Hasmah, 2014). According to The International Valuation Standards (IVS) and Malaysia Valuation Standard (MVS), market value refers to the estimated amount for which property should be exchanged on the date of valuation between the willingness of buyers and the willingness of the sellers. This occurs at the conclusion of an arms-

length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently, and without any compulsion (IVS, 2011).

Therefore, to determine the market value of the property, IVS (2011) has described that the market-based valuation usually employs one or more valuation approaches applying the principles of substitution that use the market data. The principle of the market-based valuation method is that a person would not pay more for a product than the cost of getting an alike satisfactory substitute product (IVS, 2011). International Valuation Standards Council (IVS, 2011) and Malaysia Valuation Standards (MVS) have listed three types of traditional market-based valuation methods specifically: sale comparison method, income method, and cost method.

Valuation of property must consider several factors that affect the property value. To date, several factors need to be considered in determining the market value of the property, including basic factors such as age, location, floor level, and more. Besides, any additional factors related to the property need to be considered to determine the market value. Past research has proven that green building is categorized as an additional factor affecting property value as it gives a premium price to the property value (Lorenz & Lutzkendorf, 2008). Green building, described by Muldavin (2010), serves as an outcome of building performance that is determined by green features, strategies, and green certification. Findings from literature studies prove that green components conveyed benefits in terms of energy-saving in aspects of cooling, lighting, and heating, with annual energy-saving nominated as the most prominent benefit conveyed by green components (Cole, 2003).

Green buildings offer several economic or financial benefits relevant to a range of different people or groups of people (GBI, 2013). These include cost savings on utility bills for tenants or households (through energy and water efficiency), lower construction costs and higher property value for building developers; increased occupancy rates or operating costs for building owners; and job creation (Elias et al., 2015).

The green building comprises several green elements that can reduce energy demand and improve occupants' health and well-being (Lin et al., 2021; Rodriguez-Ubinas et al., 2014). Green elements can be further categorized as tangible and intangible green elements based on their characteristics and their features. Green building components such as green roof, green wall, solar photovoltaics, roof skylight, external window shading, and light shelves are not only structural or architectural tangible elements but are also designed to maintain a safe and comfortable indoor environment (Ralegaonkar et al., 2014; Shazmin et al., 2017; He et al., 2017; Alaidroos & Krarti, 2015). For example, façade greening of building envelope components can adapt to warm temperature, thus reducing the indoor operative temperature by 0.34 °C (Lin et al., 2021; He et al., 2017). Besides, professional building experts such as architects and engineers considered that energy efficiency and renewable energy is among the high priority of green building components (Vatalis et al., 2013).

Green building also consists of nonphysical and intangible green elements such as location, accessibility, and neighborhood impact green building certification (Chen & Nguyen, 2017; Porumb et al., 2020; Houghton & Castillo-Salgado, 2020). In addition, intangible green elements of green building are often associated with the sustainable effects of site location and transportation to the ecosystem and human life (Chen & Nguyen, 2017). Besides, green features of green buildings, such as indoor environmental quality, are also among nonphysical green features that can increase the health and productivity of occupants (Muldavin, 2009; Ismail & Majid, 2014).

1.2 Problem Statement

According to Meins et al. (2010), green components are expected to contribute to property value. Lorenz and Lutzkendorf (2008), in their research related to sustainability in property valuation, also agreed that green features have a positive impact on building worth and market value. Royal Institution Chartered Surveyor (RICS) introduced the green value concept, which evaluates the monetary benefits of sustainable development. Past research has proven that green value gives the additional value of a certified green building compared to a non-certified building. The existence

of the relationship between green and market value has been proven through case studies, empirical data, and property market information. The market value of green buildings is higher than conventional buildings by 2% to 16% (Kamar & Hamid, 2012; Aroul, 2009). Ismail and Majid (2014) agreed that green features approved by Green Building Index should be considered in the valuation procedure due to the features' influence on the added value from green building to the market value.

Green elements of green building are divided into two categories: tangible green elements and intangible green elements (Nalewaik & Venters, 2010; Liu et al., 2014). Building component is a tangible element that contributes to building value, including building material, finishes material, and more (Saghafi & Teshnizi, 2011). Meanwhile, the intangible element represents land value, including location, neighborhood area, and accessibility, which positively and negatively impact property value (Surianto et al., 2019; Swamidurai, 2014). Based on past research, tangible green elements such as green roofs and green walls positively impact building value by 3% to 20% (Tomalty et al., 2010; Chen et al., 2014). A hedonic price regression has investigated the effects of tangible green components on stratified green residential buildings in Johor Bahru. The finding shows that green roofs and green walls provide value increments at 13% and 43%, respectively (Zulkifli et al., 2019). Besides, solar photovoltaics is also one of the tangible green elements that positively affect property value, where it increases property value by 3% to 5% (Dastrup et al., 2012).

However, the effect of intangible green elements on property value remains unknown. To date, no research has been done regarding the determination of the intangible green element of a property and its effects on value. In valuing a property for property tax assessment purposes, a property should consider both tangible and intangible green elements of a property. The derivation of tangible and intangible green elements is important as it will affect the property value and it will directly reflect total property tax revenue gained by local authorities. Green elements that positively affect property value convey a positive effect on local authorities' property tax revenue and vice versa. Determination of local authority property tax revenue is substantial due to the function of tax revenue in providing services and maintenance

to the community and as the main source of income for local authority (Pawi et al., 2011).

Shazmin's (2017) research has identified the tangible green elements of a property that affect property value and local authorities' property tax assessment. However, the research does not include any consideration of intangible green elements of a property. Therefore, considering the importance of property tax assessment revenue to the local authority and community, it is important to ensure that a property is being valued comprehensively by including all tangible and intangible factors and green elements that affect property value. Henceforth, this research motivates to identify and measure the effect of intangible green elements on local authority property tax revenue.

1.3 Research Questions

Hence, research questions arise as below;

(a) What type of tangible and intangible green elements on residential property value?

(b) How do these tangible and intangible green elements affect the residential property value?

(c) What are the contributions of the tangible and intangible green elements on local authority property tax revenue?

1.4 Research Aim

This study aims to measure the effect of implementing tangible and intangible green elements on local authority tax revenue.

1.5 Research Objectives

The objectives of the research are:

(a) To identify tangible and intangible green elements on residential property.

(b) To measure the effect of tangible and intangible green elements on residential property value.

(c) To validate the effect of tangible and intangible green elements on local authority property tax assessment revenue.

1.6 Research Scope

The scope of this research consists of the research area, property type, and type of green elements.

1.6.1 Research Area

This study was conducted in Johor Bahru, Johor. This study has selected 3 stratified green residential buildings and 2 conventional residential buildings in Johor Bahru. The selected green residential buildings are Molek Pine 3, Molek Pine 4, and Ponderosa Lakeside Apartment, while the selected conventional residential building are Molek Pine and Molek Regency. Locations of the selected case studied are as shown in Figure 11.

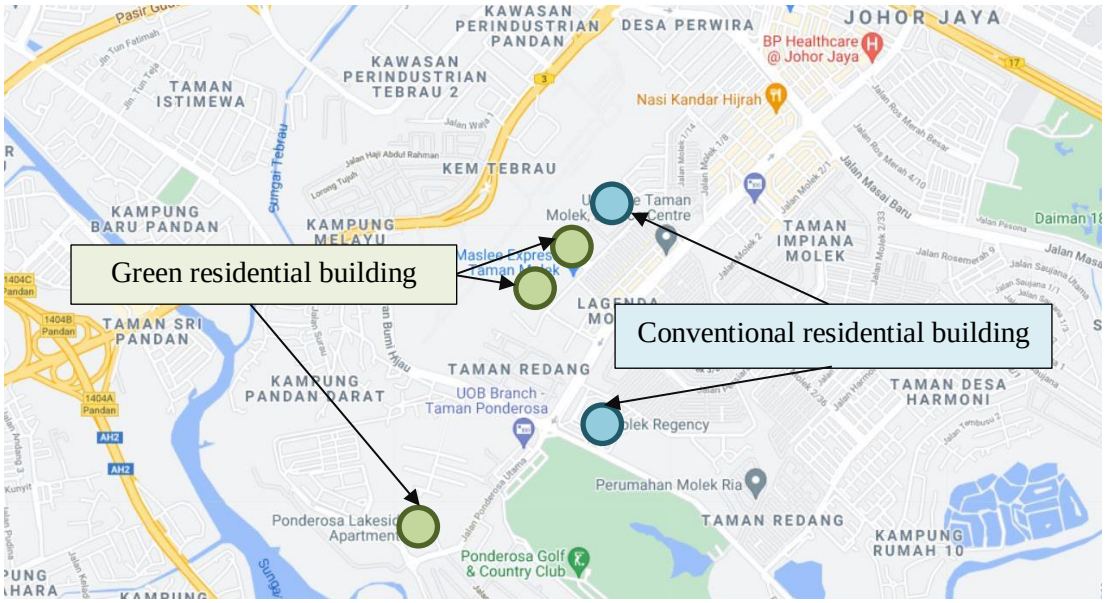

Figure 1.1 Location of selected case study in Johor Bahru

1.6.2 Property type

The type of property in this study is selected based on a few criteria, including green building certified by the Green Building Index (GBI) and the availability of property transaction data. To date, there are only a few buildings that are certified by Green Building Index (GBI). Within the study area, there are 3 certified green residential buildings located in Johor. A residential building can be defined as a development where the building or land is divided into different lots or 'parcels. Residential strata properties include high rises such as flats, apartments, condominiums, townhouses, as well as landed homes in gated and guarded (G&G) communities.

Based on the list issued by Green Building Index, the majority of the green residential are the stratified type of green residential. Moreover, this research focuses on stratified green residential buildings. Transaction data of residential buildings used in the regression analysis is readily available compared to commercial property, which is considered strictly confidential. These data consist of transaction market prices from 2014 to 2019, including floor level, built-up size, date of transactions, and address.

1.6.3 Type of green element

There are two types of green elements categorized in this research which are tangible green elements and intangible green elements.

1.6.3.1 Tangible green elements

The practice of valuation to determine a property value is based on the inspection of several building structures, specifically roof, ceiling, wall, and floor (Ibrahim et al., 2014). The building envelope is defined as building components that form major parts of the building, including roofs, walls, windows, and floor, which act as the interface or physical separator between indoor and outdoor environments. Hence, this research focuses on green building envelope implemented on stratified green residential building as the tangible green elements, which are the green roof, solar water heating, solar photovoltaics, turbine ventilator, roof skylight, light shelf, green wall, window skin façade glazing, and window external shading.

1.6.3.2 Intangible green elements

Intangible elements are the nonphysical source of value (claims to future benefit) generated by innovation or human resource practices and often interact with tangible and financial assets to create value and economic growth (Lev, 2000). Examples of intangible elements of the property are location, neighborhood, and accessibility.

1.7 Significance of the research

The benefits of this research are as follows;

(d) This research is significant for the local authority to use and support sustainable agenda by promoting green building development at the local level.

(e) This research can provide insight to the local authority on the green property tax assessment system and thus encourage the development of green property tax incentives.

(f) This research explores the valuation field and contributes to new knowledge in valuing green properties by considering the effect of green elements on the property.

(g) The developer is encouraged to participate in green building development to gain economic benefits of green building such as energy-saving and water-saving.

(h) This research promotes awareness to society as the society will receive the environmental benefit of green building development as green building can enhance and protect ecosystems and biodiversity.

1.8 Research methodology

This research adopts qualitative and quantitative methods. The research methodology consists of data collection and data analysis for each objective. Data for objective 1 is collected from the journal, conference paper, and books and analyzed through systematic analysis in order to list the tangible and intangible green elements of residential property.

Besides, data for Objective 2 are collected from various resources. Site inspection on case studies will provide several checklists: the list of facilities, the list of tangible green elements, and the list of intangible green elements of the selected

case studies. Property transaction data will be collected from Jabatan Penilaian dan Pentaksiran Harta (JPPH). These collected data are used as independent variables to measure the percentages of the effect of green elements on property value.

These percentages are important to be derived as they are used to estimate total property tax revenue gained by local authorities in implementing green elements on the residential building under their administration area. Hence, results from objective 2, which are the positive and negative effects of green elements on residential value in percentages form, are directly calculated with local authority property tax assessment revenue.

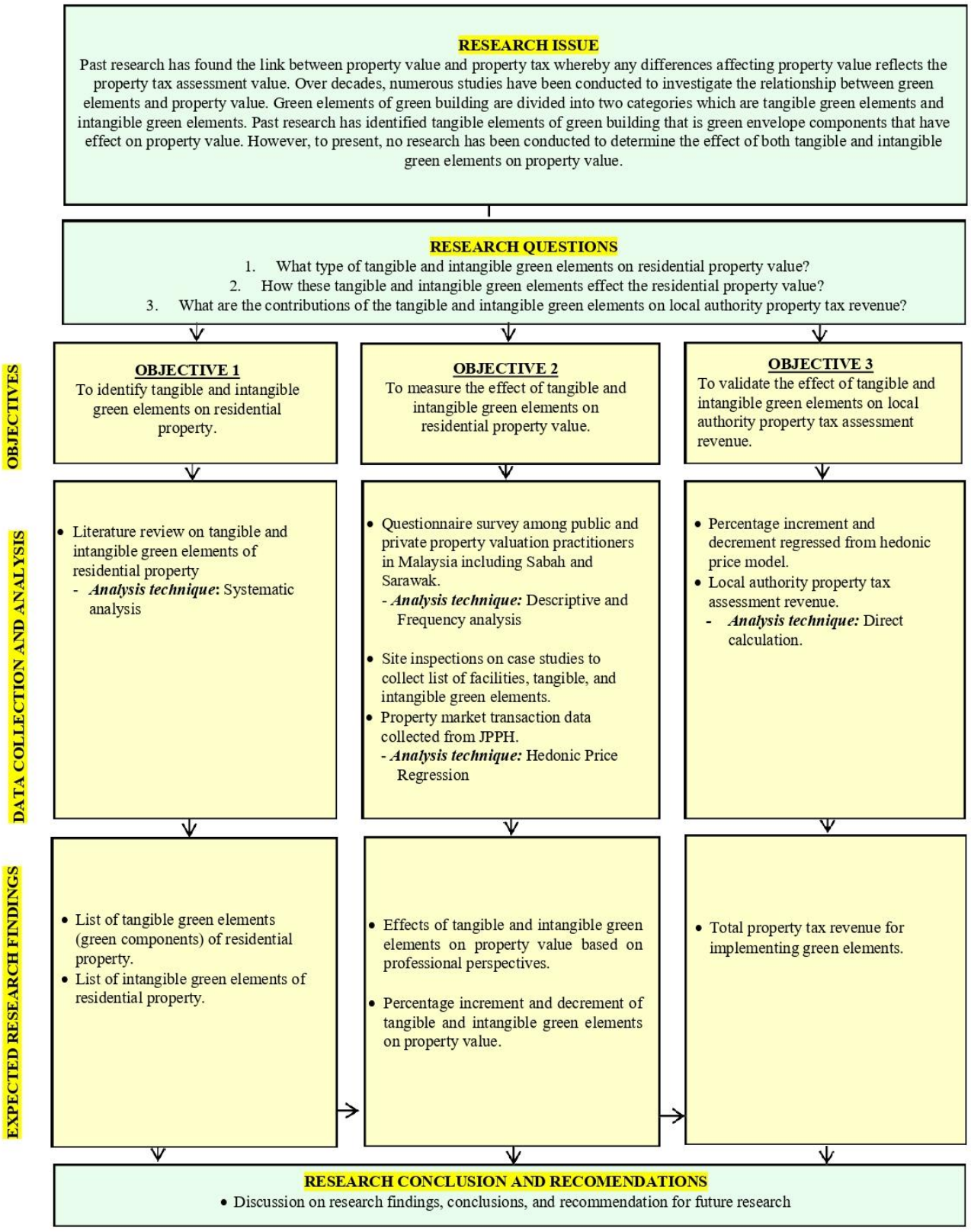

Figure 1. 2 Research flow chart

1.9 Thesis organization

This thesis consists of eight consecutive chapters starting from chapter 1 to chapter 8. Chapter 1 consists of topics on research background, problem statement, research objectives, research area, and significance of the research. Chapter 2 consists of a detailed literature review on property tax assessment and its function; this chapter also reviews tangible, intangible factors affecting residential property value.

Furthermore, chapter 3 consists of a literature review on green building, the relationship between green building and value, and the derivation of tangible and intangible green elements of the residential building. Research methodologies are further explained in Chapter 4. Data collection and data analysis are discussed according to the constructed objectives.

Chapter 5 of this thesis covers the findings of objective 1, which is the effect of tangible and intangible green elements on property value. This chapter consists of the analysis of the collective response from the questionnaire distribution. Chapter 6 consists of the analysis and results of the hedonic price model for the tangible and intangible green elements of green residential building

Chapter 7 includes the topics on contributions of green elements on local authority property tax revenue. An estimation of the overall total monetary increment for local authority property tax revenue is calculated and explained in this chapter. The last chapter of this thesis summarizes the research findings, recommendations for future research, limitations faced in conducting this research, and conclusions.

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