THE INFLUENCE OF LANDSCAPE ON HOUSING PRICE: A STUDY ON GATED AND GUARDED HOUSING SCHEMES

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BY

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A research project submitted in partial fulfillment of the requirement for the degree of

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work, and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university,or other institutes of learning.

(3) The word count of this research report is 32,762.

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TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

PREFACE

This study was inspired by a long-standing interest in the complex link between housing costs and landscape in gated and guarded communities. With urbanisation growing and green spaces disappearing, one important but little-researched facet of real estate dynamics is the impact of landscape on residential property valuation. Motivated by the growing popularity of eco-friendly living, sustainability, and the significant influence of beauty on real estate prices, this research aims to clarify the complex relationship between landscape characteristics and home costs in the context of gated and guarded communities. This journey has been both enlightening and challenging, and I am grateful for the guidance of my esteemed mentors, Dr Chin Hon Choong and Dr Cheng Chin Tong, whom expertise has been instrumental in shaping the trajectory of this research. With humility and enthusiasm, we present this study in the hopes that it will serve as a stepping stone towards fostering more sustainable and aesthetically pleasing living environments for communities worldwide. By exploring this uncharted territory, we hope to contribute valuable insights to the field of urban planning, real estate economics, and environmental psychology.

ABSTRACT

In the world with swift variations in the economic, social, and technological advancement, the homebuyer and the proprietorship of residential housing had been rehabilitated and differentiated from the basic users to a user which factoring many considerations when purchasing the property. Homebuyers are willing to pay more premium for attractive landscapes and views. However, there is a present of research gap where there is no study that factors the characteristics of Gated and Guarded Schemes in Malaysia. As such, this study explores the amenities values contributed by these landscape and scenic view features towards the housing price using the Hedonic Pricing Model. In particular, this study will be emphasized on how landscape attributes is measured and how it contributes to the housing price. The Hedonic Pricing Model are performed using the Multiple Regression Analysis (MRA) based on a detailed fieldwork and study on 1012 landed Gated and Guarded residential properties transacted between 2015 to 2023 in a residential district. Landscape and scenic view attributes are measured from several dimensions such as duration, walking distance and radius to landscape and visibility of scenic view. This paper describes how such dataset modelled and compared. Different models were built to study on the effect of landscape toward the housing price based on different measurement of distance to landscape. The results suggested that there would be implicit prices on the landscape and scenic view can be extracted from housing price based on the different measurement of distance to landscapes and visibility of scenic views being measured. Finally, the results shown that the landscape and scenic views are multi-dimensional in influencing housing price. To illustrate, distance to landscape would possess negative relationship with the housing price, where the visibility of scenic view would possess positive relationship with the housing price. These results indicated the crucial of environment amenities towards the housing price. A good understanding of the impact of these variables is important for the landscape planning decisions and the valuation of Gated and Guarded Community. This study concludes by commenting upon the important of including landscape and scenic views amenities in the Hedonic Pricing Model and considers the main limitation in a wider range of study.

Keywords: *Hedonic Pricing Model, Landscape, Scenic Views, Multiple Regression Analysis*

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This chapter aims to deliver an overview of the entire study. The main aim and goal of this study is to investigate and examine the influence of landscape on the housing prices. This study would focus mainly on the landed Gated and Guarded housing schemes. Therefore, this chapter starts with the background of the study, followed by the problem statement, research questions, research objectives, scope of study, significance of the study, research methodology, chapter arrangements and conclusions.

1.1 Research Background

Landscape, a captivating tapestry woven from the threads of nature and human influence, unveils the rich and diverse character of our surroundings. The landscape contributes a vital part of the quality of life for humans everywhere, including the residents in urban areas and those who are living in the countryside; in rural areas and high-quality areas, in areas that are acknowledged as outstanding beauty and mundane areas (Déjeant-Pons, 2006). Beyond mere geography, it includes the contours of the terrain, the flourishing of vegetation, the wandering of water bodies, and the intricate dance between natural forces and human activities. However, people living in the city may tend to focus more on how the urban landscape affects the quality of life. Urban inhabitants or dwellers spend most of their time indoors (Mirza et al, 2020) and contact outside the world may only take part or be limited to their neighbourhood area and what they see through windows. Therefore, the quality of life of the urban dwellers is correlated with the neighbourhood landscape (Alvarez & Müller-Eie, 2022). and the visual quality of their windowscapes (Mirza & B 2018).

As looking into the residential real estate, a house is the basic and essential need for the human to be served as a shelter and habitat. This is to ensure that the human being is protected or habituated from the hazard such as natural disaster and threat. As time goes by, due to the enhancement on the quality of life and affordability, there is apprehension of the preference towards diverse alternative and selection of residential estate by different people. As such there are more variety of residential houses being constructed to cater the needs of the consumers and market. As such, the residential properties transaction is often reflecting the variances in the favoured traits and characteristics of houses and would possess different value to a particular house within.

In the world with swift variations in the economic, social, and technological advancement, the homebuyer and the proprietorship of residential housing had been rehabilitated and differentiated from the basic users to a user which factoring many considerations when purchasing the property. As an example, the residential housing market had transformed from a protective and habitual type design to an aesthetical and environment quality type design. As such, these characteristics and variations influenced to the value of a real estate housing will not just simple be the aspects from property itself; however, the buyer are willing to pay more for environmental aspects of the surrounding of the house. To illustrate, many people would show favourite and preference over warm and lively natural environment over the cold brick building environment due to the facts that this miscellaneous landscape element would influence the resident in a different way in terms of value and psychological effects. To support this, a study from Jim and Chen (2009) had proven that homebuyers are inclined to pay more premium on the appealing landscapes and scenic views.

Real estate market is one of the most promptly developing markets that attract tons of investment (Renigier-Biłozor, 2015). The housing real estate is special as it cannot be differentiated with supplementary commercial products as of the two pricing conditions (Rahadi et. al., 2022). Property price determinations is a vital part in housing developing process as it will impact the profit return of the property developer and the alternative of residential property for the homebuyer (Byrne, 2002). Other than that, property price will also be affected by scarcity, usability, and transferability. There are many attributes that effects the value of a property. As first condition, natural inherent conditions of the products and goods,

such as the property's shape, location, and physical status, can affect the demand for purchases while also indirectly affecting the value of the property (Rahadi et. al., 2022). The second condition is that the property developer created in order to increase the property's value through design, security measures, and facility development. However, as part of their pricing strategy, the developers will include a predetermined profit margin and pertinent property expenses in the property's selling price (Bryson & Lombardi, 2009). Hence, the property price may increase due to the marked-up price of the developer's expenses. However, the developers will also look for beneficial features of the property that help to balance or rationalized the selling price and facilities provided of the property. As an example, the property with more facilities and amenities will be sold at a higher price. As looking from perspective of consumer on the purchasing of residential estate, the homebuyers may consider several necessary characteristics of the residential property. In the physical factor, consumer may consider on the property area, building facilities, quality construction, and land area (Sigit et al., 2018). The price will later be affected by the demand, usability, and scarcity. This may cause the price of the property to fluctuate due to the market conditions in a specific location.

As looking into the consumer's point of view, the classified attributes that determine values of the residential real estate are location, structural, and neighbourhood factors (Chin and Chau, 2002). The locational attributes include the access to social and economic facilities (Distance from CBD, views of seas, lakes, or river); structural traits include the floor area and floor heights; neighbourhood attributes which is the quality of the neighbourhood (Income of residents, proximity to good school, hospital, and crime rate). These attributes will be correlated with the consumer's purchasing decisions which also will cause increase or decrease the housing price (Chin and Chau, 2002). Besides, some of the attribute such as neighbourhood characteristics, accessibility and environmental quality is also a function to the property values of the residential property.

As looking internationally, the price of the property in the international housing market is different in terms of the culture, economics, legal structure, and spatial distribution. Hence, this is the reason why the value of real estate property is always correlated with location, location, and location theory (Hui et al., 2007).

As the urbanisation process occurs across the world, people are less likely to have convenience access to entirely natural areas. Hence, how the landscape development and inhabitants effect the physical condition and well-being of the residents as result to have a growing need and concern to be understand by each party. An increasing number of demonstrate reflect a correlation between the green space within the neighbourhood vicinity and occupier's health and wellbeing (Mitchell & Popham, 2008; Maas et. al., 2009). Not only that, but there is also study that shows that forest or green environment can improve in efficiently resting and calming of human body, stress management, and the prevention of disease (Park, et. al., 2010). Moreover, urban stress may be one of the health issues by urban dwellers which can cause mental or physical health problems. However, through some of the studies, it is suggested that efficient green landscape management may offer chances and prospect to safeguard or eliminate the health issue for the urban popularities. Besides, the findings also highlight the indication that emphasizes and highlights the importance of access to landscape when developing future blueprint, layout, and plan for a sustainable urban environment (Thompson et al., 2016). Though natural landscape has many optimistic and positive influences on human being, the present and existing movement in the real estate development of cities does not consider the capability of the green environment to the cultivating of work quality and living environment that may or will impact the residents' wellbeing and health (Elsadek et al., 2020). Some real estate developer may focus more on maximizing the profit rather than the wellbeing of the residents. In the pursuit of economic gains, some developers may prioritize the construction of dense, utilitarian structures, leading to urban landscapes dominated by monotonous blocks of buildings. In such cases, the importance of thoughtful landscape planning, green spaces, and community amenities may be overlooked. Furthermore, urban lifestyles which include longer, and tense office periods which cause the indoor leisure facilities to involuntary and unintended separated from nature. This would cause negative impacts on society and individual wellbeing and cheerfulness (Lewis, 1996). However, there are also conscientious developers who recognize the value of creating well-balanced and sustainable communities. Urban planning trends are evolving towards a more integrated and integral approach.

Due to the evaluation of the residential market and its prospective homebuyers on residential estate preferences, landscape and scenic view is commonly defined as an influential feature and factors serving many neighbourhoods. This aesthetic landscape and appealing scenery

would have contributed to the home occupier's living quality and to attract visitor or tourist to leisure area (Mathews et al, 2004). As looking into the residential market in Malaysia, it is interesting that the scenic view and landscape had become an element to be included and considered when buying or developing a residential property. It seen in the present development and construction in Malaysia where the housing development is promoting a greener landscape and improved landscape management within the residential development by several real estate developers. This had become the main attraction of the residential development which is attracting new homeowners. As a country with unique geographical location, the residential housing in Malaysia is undeniably be rewarded with the comprehension and gain of natural appealing and beauty around Malaysia. This is due to the natural scenic views surrounded; as such, this had been utilized by the real estate developers to develop and construct the residential products via the natural landscape and view adapted by the property itself. To illustrate the above factors, the waterfront development in Malaysia can be seen as a deep-rooted happening and scenario that can be opined. This statement can be cited by a study from Yassin et al (2010), it had stated that residential waterfront development in Malaysia would have significant impact through the advantages of water features towards the development land; whilst the researchers also found out that there are increasing demand on waterfront property which encouraged property developer to initiate construction in the proximity of waterfront area. As such, it is said that providing an attractive, well-maintained, and well-structured landscaping and better proximity to the waterfront development would features in which both features would incorporate as a "unique selling point". From the billboards and flyers of the pre-launching or lunched housing development in Malaysa, most developers would utilize the "view and landscape" as a keyword such as clubhouse facilities, green landscape, sea view, mountain view, river view and etc as a feature of their key product.

1.2 Problem Statement

Besides, understanding the profound influence of landscape on housing price is deemed to be important as it may help the real estate housing market on several factors. Firstly, by understanding the influence of landscape on housing price, it may assist in the value determination. This fair value would encourage the developers or the local authority to have

more weight on the requirements for landscape and a harmony of built and natural environment. As mentioned above, the homebuyers are willing to pay more premium for the aesthetic landscapes and scenic views (Jim & Chen, 2009). As such, Landscape aesthetics would have significant impact and effect on the perceived value of the property. Thus, emphasizing and considering the landscape factors in setting premium in the primary real estate market by developer can ensure fairer pricing that reflects the true value of a property in term of location, amenities, and environmental attributes. Besides, by emphasizing the importance of landscape in residential property development, it would encourage the developer and local authorities to prioritize green spaces, sustainable design, and the preservation of natural features. This would directly foster a more harmonious relationship between the built and natural landscape, promoting both ecological sustainability and community well-being. Besides, financial institutions would play a significant and crucial role in shaping the development patterns through their financing models. This can be done by incentivizing projects that prioritize or integrating landscape and environmental sustainability such as park, garden, and other green landscape infrastructure in their development. Financial Institutions develop financing models that guide their lending practices and policy. Basically, these models would focus primary on the financial viability of individual properties or developments. However, there growing recognition of the need to incorporate and integrate broader environmental and social factors into financing decisions (Fu, et al., 2023). As such, while venturing into climate change adaption, there should be a further need to reconsidering the financial model on the impact of landscape on housing prices and the long-term sustainability of real estate investments rather than on individual housing only.

However, issue arise where the valuation and development of real estate properties often overlook the significant influence of landscape on housing prices. This would later lead to disparities in fair value determination, inadequate integration of landscape and scenic view attributes into the built environment, and insufficient consideration of environmental factors in financial models. As such, there would be a pressing need to address shortcomings and redefine the approach to property valuation, development practices and financing mechanisms.

Besides, the problem to be attended and addressed in this study is the absence of valuation and study evidence on the landscape of the gated-guarded housing scheme. Based on the current

literature, most of the landscape valuation studies around the world are built around the study of high rises such as condominiums and apartments (Soltani et al., 2023; Tachaiw at et al., 2023; Su et al., 2021; Hasanah et al., 2018; Schlapfer et al, 2015) and normal landed property such as single-family home (Belej et al., 2023 & Cho et al., 2009). As an evidence, chapter two had provided a master table on some research result of the previous research. Not only this, but although several studies in the overseas countries have provide evidence that homeowner are willing to pay more premium for appealing views of natural landscapes; however, the measurement of the housing value and quality rarely gives thoughtful consideration to landscape and views.

The previous study on landscape does not consider the characteristics of the gate-guarded housing scheme. Based on Blakely & Snyder (1997), a gated guarded community is defined as a residential area that has restricted and controlled entrée in which some of the public spaces are privatised; there are usually walls and fences designed as a security perimeter which controls the entrances to prevent the penetration of non-residents into the community. The gated guarded community is different from normal residential as they have their common facilities and amenities where the private residential ownership agreed to share the common properties and residents are to bear the maintenance fee and management cost for the privatised facilities (Adnan et al., n.d). With this, the gated guards had better maintenance and management; hence, the landscape influences on housing prices cannot be based on previous studies.

It appears that there may be a potential research gap in the current understanding of the valuation of gated and guarded housing schemes compared to normal housing developments. While the reasons for the difference in valuation have been discussed, there may be an opportunity for a more detailed and comprehensive study to explore this topic further. The existing literature may not sufficiently address specific nuances, methodological considerations, or the dynamic interplay of factors influencing property valuation in these distinct types of residential developments.

To determine definitively if there is a research gap, a thorough review of existing literature, academic studies, and hedonic analysis to the valuation of gated and guarded housing scheme would be applied for this study. This review would help identify any limitations or areas where the current body of knowledge falls short.

1.3 Research Question

Thus, in this study, the primary issue that arise and delivered here is to investigate on the correlation between landscape and gated and guarded housing scheme's value. There could be or could not be different level of influence by the landscape on the gated-guarded property value, whether inversely or adversely, by the type of the landscapes and scenic views available in the study area. As such questions arise on:

- What is type of the landscape that would influence the price of the Gated and Guarded housing scheme?
- How to quantify the impact of landscape on the housing price of the gate-guarded housing scheme?'

This inquiry seeks to review the intricate relationship between the carefully curated landscape within the gated and guarded communities and the valuation of residential property's price within these settings. By exploring the specific characteristics of the surrounding environment, encompassing green spaces, recreational areas, and overall aesthetic considerations, this research aims to provide a profound considerate and understand on the impact to the landscape attributes exert on the value of the property.

1.4 Research Objectives

As such, this research attempts to study and examine the relationship and connection linking the landscape design, the scenic view and housing prices of gated-guarded communities. This leads to the objectives which are:

(1) To investigate the impact of different landscape on housing prices of gated-guarded housing scheme.
(2) To construct hedonic pricing model on the effect of landscapes, scenic views and other attributes on the gated guarded housing's value using regression analysis.

The study employed a qualitative approach which mainly on the hedonic pricing analysis on the influence of landscapes. The hedonic pricing analysis on the landscape effect will be done using the Multiple Regression Analysis supported and assisted with Statistical Package for the Social Sciences (SPSS) tool.

1.5 Scope of Study

Contrasting with the objectives of the research and study, this subsection had been established and finalized which included the study area, method of analysis and mandatory data.

1.5.1 Study Area

In this study, the data collected will be concentrating on the locality of Kuala Selangor, State of Selangor, which is the study area for the current research. Three main Gated

and Guarded Schemes had been selected to be the study area such as Eco Grandeur, Taman Saujana Utama, and Maple Hill Park. The data are restricted and controlled to a reasonably modest and limited geographic area to control for change, variation, and alteration in other exogenous and unwanted influence from other housing factors such as public transport and accessibility, effect of CBD etc.

These Gated and Guarded schemes are selected due to its differentiation and diversity of landscape giving plenty and lots of opportunity to explore the influence of landscape characteristics on the housing prices. Besides, as the quality of both Gate and Guarded schemes differed, it can also further explore on whether the quality of landscape effect the housing price of the Gated and Guarded schemes. As a brief, the study area had provided different quality and number of facilities and landscape in each scheme which formed unique landscape and views.

The gated and guarded schemes in this study will exclude and ignore the non-landed high rise Strata Properties such as apartments and condominium. The landed schemes will only be considered for analysis due to the scarcity and lack of access to collect data on the strata properties unit in the study area. To improve the data controlling, the data collected will meet the below standard and criteria:

a) The zoning and land use of the property inspected is landed residential.
b) The transaction data collected will be within the year 2015 to the year 2023.

1.6 Significant of Study

The present study is significant as it addresses and provide another angle of landscape on gate guarded scheme in term of knowledge. The aim for the current study is to obtain further perception on the effect of landscapes and scenic views on the Gated and Guarded Schemes' value. In response, this finding will be useful in planning for Gated and Guarded Schemes'

residential development and construction. This planning would not only be useful in terms of estimating the housing premium but also to provide the minimum basic facilities and amenities inquired and preference by the homeowner and prospective buyer. Given that the gated-guarded community development in cities is growing and expanding (Roitman, 2015), this can aid the developer, policy makers, and researchers to have better understanding on the landscape in gated-guarded residential development. As looking into the developer perspective, the improve understanding on the perspective on landscape can help developer to balance out the facilities and amenities provided in the gated guarded community and the price premium. This can avoid the excessive of profit margin which can be a barrier to the consumer to purchase the property. By providing this study, developers would understand more about the supply and demand for the gated-guarded environment housing. With this, developers will be well-informed about the budget to construct different level of quality landscape, which create pleasure and prices that consumers would be willing to pay for such goods.

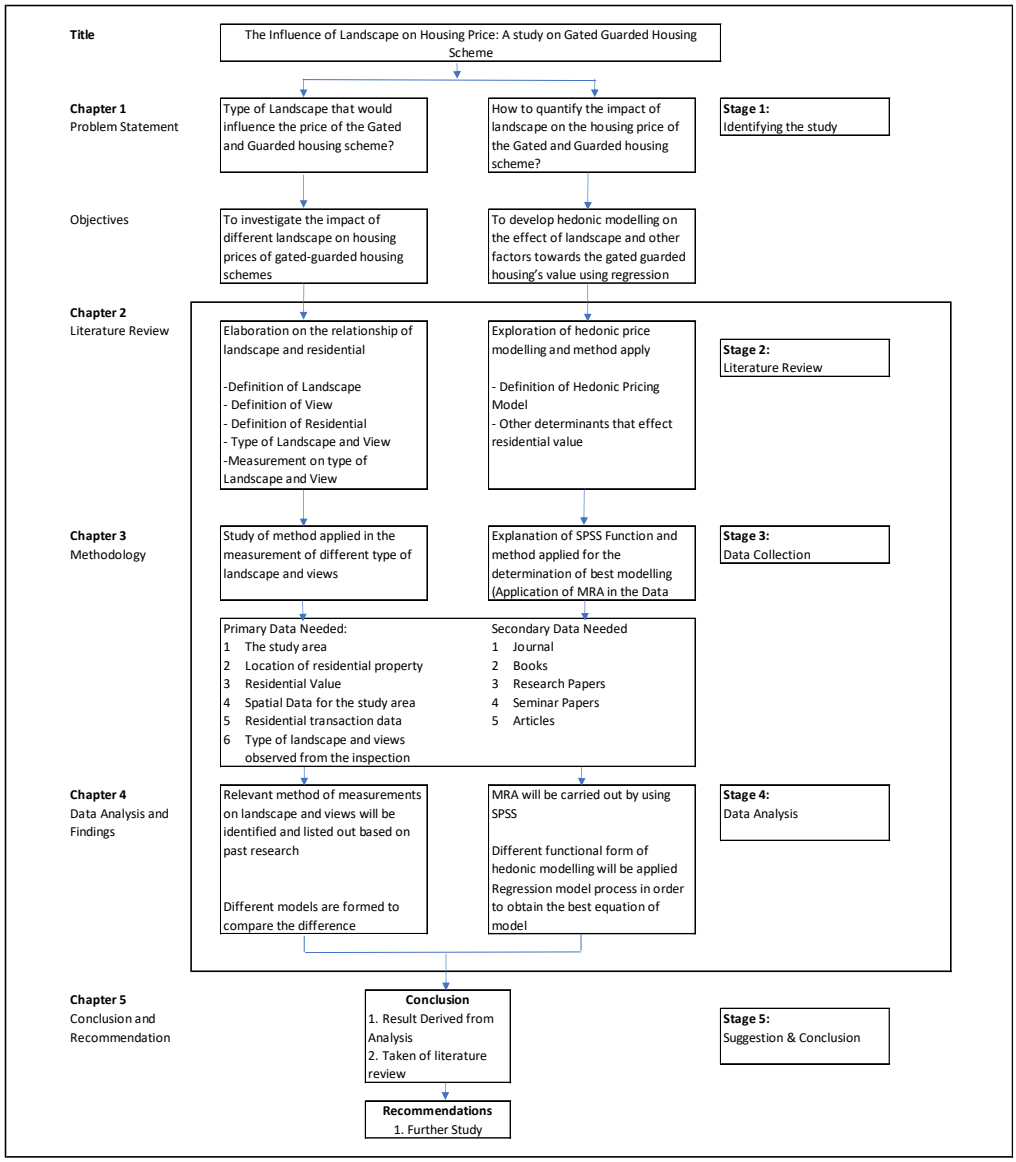
As looking into the policy maker perspective, the Town, and Country Planning Department in some urban areas in Malaysia had issued a standard for 'Gated Community and Guarded Neighbourhood' to deliver elementary guidelines for developers and management body of the gated-guarded community (Ministry of Housing and Local Government, 2014). However, with this study, policy maker can understand more about the sufficient requirements for development of landscape of the gated-guarded community. In actuality, policy makers can compare the social gains of different policy proposals and the consequences of various residential land uses by evaluating the economic value and benefits of various landscapes and scenic views.

Other than that, this study would also be advantageous and provide valuable insight to several associations and individuals such as real estate investor, homeowners, academic researchers, as well as valuers. This study expected every individual and organization mentioned to be concerned, taking considerations, and exploring extra features about the embedded and hidden value of landscape and scenic view on fundamental facility provided in Gated and Guarded Housing Schemes. This well-understanding on the correlation between landscape, scenic views and Gated and Guarded Schemes' property value will allow them to have knowledge to determine the added value and factor to be considered for residential investment.

1.7 Study Flow Chart

For a clearer and definable stages to achieve the objective of this research, a flow chart on the research will be exemplified as in Figure 1.1 below:

Figure 1.1: The Methodology of Study Flow Chart.



Stage 1: Study Identification

It is essential to identify the study and the associated problems before starting any research. To meet the stated research objectives, it is critical to select the appropriate topic for discussion. One of the crucial things that needs to be completed and taken into consideration at this point is choosing the appropriate techniques. A study field will be selected, and a brief description of the research will be elaborated based on literature and personal experience. In addition, the parameters of this investigation's scope and limitations will be determined.

Stage 2: Literature Review

The definitions of terms, variables, and items of facts and phenomena will then be further explained and discussed in the literature review. The use of an analysis tool will be justified in terms of the hedonic pricing model, which has been used in previous research to address academic issues. Additionally, this phase will determine every element that affects the property price value in relation to the influence of the surrounding environment and picturesque vistas. The variables that were found will subsequently be used as the independent variables in this investigation. Additionally, this chapter will cover other pertinent topics such as the analysis's measurement, the software employed, and specifics of each study that will be covered in the methodology and analysis chapter. These are the instruments to accomplish the study's goals.

Stage 3: Data Collection and Analysis

The selected subject area for this study will be included in the area of Kuala Selangor District under the authority of Majlis Perbandaran Kuala Selangor (MPKS). The data collected will be mainly on the three gated and guarded schemes located within the vicinity of Kuala Selangor

District. The data collection by site inspection and fieldwork will obtain useful information that will be utilized in Chapter 4. The collected data will then be further investigated. In addition, an inspection of this study region will be carried out to pinpoint the specific residential properties that are situated and encircled by various landscape types and levels of scenic views. To facilitate insightful research and observations, more data will be incorporated, such as the distance to nearby parks, central parks, clubhouses, and other amenities. The Statistical Package for the Social Sciences will be used to arrange the acquired data in a methodical tabulation (SPSS). Regression analysis will be used thereafter to examine the tabulated data.

Stage 4: Conclusion for the Current Study

This study's last phase will provide convincing proof from the earlier phase. After deliberating over the results, a study conclusion will be chosen. In this latter phase, research recommendations will also be made.

1.8 Chapter Arrangements

In this research endeavour, the structure of the thesis is meticulously organized to facilitate a comprehensive exploration of the relationship between landscape attributes and housing prices within gate-guarded housing schemes. Each chapter will serve individually to explain and transmit the useful information of several attributes that is needed in this study. The purpose of arranging and dividing sections in this study is to serve as guidelines and direction, and aid in term of composing and structuring the chapter in this study. Not only that, but division of chapters would also ensure that the research is within the topic with clear and concise manner. As a brief, there would be five main chapter laid out in this study.

1.8.1 Chapter 1: Introduction

The introduction sets the stage by outlining the research problem, presenting the research questions and objectives, and emphasizing the impact of the study. Fundamentally, this chapter would draft a clear description and all necessary execution procedures the study.

1.8.2 Chapter 2: Literature Review

Following this, the literature review critically examines existing scholarship on the subject, identifying gaps and establishing a theoretical foundation for the research. The theoretical framework chapter elucidates the chosen conceptual framework, providing a theoretical lens through which the investigation will be conducted. The literature review is divided into five key discussions. This covers residential properties, the surrounding area and its picturesque vistas, other factors that affect the value of homes, and the hedonic model's application logic. Later, the type and quality of landscape and scenic view will be examined, along with definitions and concepts from earlier research projects. The type, quality, distance to facilities, and breadth of view variables related to the landscape and scenic vistas from the gated, guarded scheme property will be the main topics of debate. This chapter will provide a quick overview and explanation of the Multiple Regression Analysis (MRA) hedonic pricing model application, which will be utilised in the upcoming chapter.

1.8.3 Chapter 3: Research Methodology

Moving forward, the research methodology chapter articulates the research design, data collection methods, and sampling procedures, ensuring transparency and replicability.

Subsequently, the data analysis chapter engages with the results obtained from the research, offering interpretations and insights into the influence of landscape attributes on housing prices. The step and method of data collection and analysis will be the main components that explained in this chapter. The method to collect data is being discussed on the overview of the study area, site inspection, identification type of landscape and type of views involved, and the process of measurement utilized in the current research on landscape and view effect. The data investigation procedure will cover the explanation on the formation of hedonic pricing model applied.

1.8.4 Chapter 4: Data Analysis and Findings

The discussion chapter examines the significance of these findings and places them in the context of the larger conversation by synthesising them with the body of current research. This chapter will include the findings and analysis of the data. The SPSS will be used to evaluate the data gathered from fieldwork inspections in order to ascertain how scenic views affect the home value of gated and guarded developments. The purpose of this analysis is to specifically accomplish the goals.

1.8.5 Chapter 5: Conclusion

The conclusion chapter encapsulates the key discoveries, emphasizes their significance, and suggests potential avenues for future research. The result of the study will be discussed. The inference and decision will be made out from the result and outcomes. Besides, recommendations will be discussed to provide suggestion to resolve the issue statement and ideas for other researchers for further study.

1.9 Conclusion

To sum up, Chapter 1 is mainly focusing on the background of the study, problem statement, research questions and objectives, significant of study, research flow chart, research methodology and chapter arrangement, which will serve as an overview and direction of the current study on the relationship between the landscapes and the housing price of the Gated and Guarded Housing Schemes. While the following chapter will examine the collected articles and journals to gain a further and profound understanding of the influence of landscape on the housing prices.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

In brief of chapter 2, current study embarks on a comprehensive exploration of the multifaceted concept of landscape, delving into its diverse dimensions and inherent complexities. Recognizing that landscape serves as a dynamic canvas, shaped by natural processes, human interventions, and cultural influences, this chapter endeavours to define the parameters that encapsulate the essence of landscape within the context of residential environments. By scrutinizing the intersection of physical features, ecological systems, and human interactions, the chapter aims to establish a nuanced understanding of how landscapes contribute to the property prices. Furthermore, the exploration will extend to the introduction of hedonic pricing model in estimating landscape effect. Hedonic Pricing Model will be the main qualitative method applied to study on the effect of landscape on the gated-guarded housing schemes' housing premium.

Moreover, this chapter will comprise and involve the assessment of previous research on the correlated topic of landscape and scenic view effects continued by a list of other attributes that will influence the housing premium and hedonic pricing model utilized in the earlier studies. The examination of preceding research and literature will contribute to outline the formation of the variables included and hedonic pricing model in this chapter. Not only this, the literature analysis on the landscape and scenic view.

2.1 Definition of Landscape

The concept of landscape has been discussed as early in Europe during the Renaissance and the Age of Discovery; in the fifteenth century appeared the first pictorial representation of landscapes, highlighting the visual character and scenery and the utilization of landscape as an expression of human ideas, belief, thoughts, and feelings (Antrop, 2013). The creation of landscape later appeared simultaneously with a new style of garden design and urban lifestyle. The work '*landscape*' is origin and derived from the Dutch *landschap;* the polysemous word '*landscape*' provide at least two meaning in the English: either the view of natural scenery, or its painted representation within a picture (Förster et al. 2012). Besides, 'Landscape' can have different understanding and meaning from different people (Swaffield, 1991):

- *Landscape is all around us.*
- *Landscape is the appearance of the whole, and interrelationship of all things the landscape contains.*
- *Landscape is the concerned on the combination, use and manipulation of land and water relationship on or about the land.*

Swaffield (2019) had also categorized the meaning of landscape into three broad categories: 'Landscape as land', 'interactive landscape', and 'perceptual landscape'. Firstly, 'landscape as land' is focus directly on the physical features of land. Secondly, 'interactive landscape' refers to the inter-relationship between individual, social group, and land. Lastly, 'perceptual landscape' refers to the view and scenery derived from land.

2.1.1 The Evaluation of Landscape in Property Development

As according to Laurie (1975), landscape evaluations can be defined as the comparative relationship between landscapes in accordance with assessment of visual quality; the assessment in this context serve as the process of recording visual quality via the aesthetic appreciation of fundamental visual characteristics and quality within the

landscape. Each landscape has its own unique characteristics and qualities, the viewer will tend to take note on the aesthetic and ecological considerations according to their perceived capabilities and values. The aesthetic quality is a primary attribute of any landscape and building development. The aesthetic quality can be divided into two parts: building visual aesthetic quality which is related to the style, design, volume, and quality of buildings; the landscape visual aesthetic quality which is determined by the visibility of surrounding landscape, landscape aesthetic degree and user's preference (Zhu et al., 2022). The evaluation and analysis of visual and aesthetic quality has been a common and generative topic of landscape research. This can be seen where researchers have investigated the components that contribute to landscape aesthetic and visual quality. As an example, Zhang et al (2013) had gave attention to the visual landscape, studying the physical aspects of landscape such as urban green spaces; Kent and Schiavon (2020) had studied on the aesthetic window view; and some others may study on aesthetic concept like naturalness or scenic view, and cognitive variables such as mystery, complexity, and diversity.

In recent year, the increased concern about environment sustainability and quality experienced has affected the importance of landscape quality (Panagopoulos, n.d). Therefore, it is not surprising that community and researcher had increase interest in landscape quality. Other than that, authors will also suggest on the landscape components that appreciate the value of individual's landscape. Beyond informal qualitative assessments of landscapes, there is a cautious practice of landscape evaluation, undertaken scientifically to gather data that can be utilized in the development of planning or conservation strategies. Government may be concerned about the assessment of landscape spurred extensive research and this field of study strives to attract substantial attention from practitioners engaged in the practical application of landscape studies. Hence, in both the informal and research contexts, there are difficulties aligned with linking evaluation to subjective judgements. To contrast, research or informal study may demonstrate why hilly landscape is regarded as 'superior' to flat landscape in the countryside.

2.2 Definition of Scenic Views

As referring to Oxford English Dictionary (2008), scenic view can be defined as visual, sight or view appearance of the natural and man-made features on a landscape considering the appearance, especially when referring to the picturesque or beautiful sight. It can also be denoted as a description, interpretation and portrayal of the pleasing natural views and scenery. This could include the views of waterbody, mountains, park, forest, or even city skylines which is vary depending on the location of the property. As such, a scenic view may be a stationary vantage point, or a scenery seen as a person travels along the roadway, waterway, or other path. The scenic view can be sight to a far sway scenery or to a near object.

From a different perspective, scenic view can also be defined as the visible aesthetic of the natural beauty and environment, which provide and relate the views of attractive, magnificent, and significant natural scenery (Suhardi et al, 2006). There will be an interactive relationship between the landscapes and human; human essentially assess and evaluate landscapes by creating preference based on adjacent stimuli and human cultural (Derya, 2021). As such, the consideration and thought has been given to play up the role of human evolution and perception in determining landscape preferences and aesthetics. However, the landscape and scenic view should be limited to the outdoor environment both natural and built, which would directly assert by the occupier and user of those environment amenities (Hull & Revell, 1989). Besides, Hull and Revell also stated that scenic view is the subdivision of landscape amenities, which can be observed from location A (Vantage Point) to other surrounding direction. Hence, scenic views can be concluded as scenic appreciation generated and formed via observation. It can be both natural and built environment from one focal and central standpoint that provides inspiring panoramas and pleasing environment.

2.3 Landscape Design for Residential Properties

Landscape design for residential properties should be in contrast with the ambiance of ecological environment and the enhancement of both the local climate of residential and the quality of environment. Landscape is getting more and more essential part of the environment design and development. Landscape in residential property may include topography, vegetation and associated plants, water bodies, and spatial configuration. This is one of the most visual needs of resident and people (Shahli et al, 2014). Human-nature interactions lead human beings to have complementary preferences on surrounding landscape and environment as a pleasing landscape may benefit people mentally and physically. This understanding and preference of surrounding landscape provide challenge for policymaking and implementation in residential property. Theoretically, landscape design acts as a problem-solving process through enhancing the quality of nature with human landscape (Hussain, et. al., 1970). Landscape design can be defined as the art and science of managing and elevating outdoor space via the placement of human structures in agreeable and useful relationships with natural environment. According to William and Tilt (2016), Landscape design is the art of constructing and developing property for its highest use and enjoyment.

2.4 Relationship Between Landscape and Residential Property

Where the forest was cleared, land and roads were built. Big houses and tall buildings went up. Turf was laid down on bare soil. People started to move in. This is where the modern and urban landscape had entered people's eyes. The landscape can be categorized into two types of values which include use values (highest and best use of the land) and non-use values (aesthetic and ecological functions) (Rulleau & Mahieu, 2012). In the phenomena where more and more buildings were built and the greenery had become a rare scene in the urban areas, people start to cherish the natural landscape and environment. The evidence can be provided where people reveal a preference for natural over built environment (Kaplan & Austin, 2004). This

preference to natural environment is often showed by consumer home-buying behaviours and decisions in the residential market. As mentioned above, the real estate is not only about the internal attributes, but there are also equal important in location and environment quality (external attributes). Among the external traits, views from the household unit could supply amenities to residents. With this, it can be concluded that people are willing to pay more for pleasant view of natural elements around their home.

There are many factors of landscapes that affecting and influencing property value and price (Hussian et al., 2014). According to Luttik (2000), the largest increase in house price is due to environmental factors and the house price varies by type of landscape of a particular house. An appealing environment is likely to impact the housing price. As such, landscape planning would play a significant role in developing and setting premium for the residential housing.

Landscape planning can be defined as a continuing process that strives to achieve the best use for human of the limited area of the earth's surface while sustaining the productivity and beauty (Vaníček, 1974). Other than that, landscape planning should also cope with the purpose of reconciling competing land uses without damaging the natural and cultural resources (Crowe, 1997). Besides, landscape planning is the process of designing, planning, managing the natural and man-made elements on a piece of land. This can be done via the application of cultural and scientific knowledge with involvement of resources conservation so that the resultant environmental serves a useful, enjoyable, and healthy intention (Garret, 1964). Landscape management and development involves enhancing, beautifying, and coordinating spaces in consideration of fundamental design principles, contributing significantly to the cultural identity, and influencing the overall quality of the surroundings. Its impact extends to economic prosperity, as well as occupant's physical and mental well-being. The successful design of landscapes is a necessary element in proposed building plans, and its presence significantly impacts the overall value of a property. Landscape is one of the elements which lead to highest and best return on property value. For instance, fountains, green spaces, garden, patios, and paths add value to the surrounding property.

With the focus on the profound impact of natural and built environment on human experiences, there is some relationship between landscape and property value. The allure of plants lies in their sensory attributes, encompassing fragrance, texture, and movement in response to the wind. Additionally, the visual appeal of plants is manifested through the admiration of their fruits, flowers, and the diverse array of birds and insects they attract. Furthermore, individuals derive aesthetic pleasure from the intricate patterns of light and shadow generated by plants, appreciating the dynamic interplay between these elements. The evolving nature of plants, as they grow and transform throughout the seasons, contributes to the overall aesthetic appeal of landscapes. This exploration recognizes the multi-faceted influence of natural environment on human perception and acknowledges the importance of such factors in evaluating the impact of landscapes on property values. Landscape can also provide practical and realistic low-cost alternative to counter number of site problems. With a successful landscape planning, it can aid in preventing soil erosion (Aslam et al., 2020), windbreak (Mehmet & Sinem, 2016), and increase privacy to the occupant. Landscape is one of the few improvements that is cost-effective for installation (Akinyemi et al., 2020). Landscaping increases the attractiveness of the external appeal, which is an important first impression buyers get when purchasing a property. Hence, a considerable market premium is associated with properties boasting an extensive proportion of lawn coverage and distinctive features like well-arranged flower beds, rock plants, and the inclusion of hedges.

While looking into the scenic view perspectives, it is also one of the attributes that would affect the housing price (Mittal & Byahut, 2017). To illustrate, premium for oceanfront view were found to have positive attribute (Noblejas et al, 2023). Besides, Lakefronts views (Hasanah et al, 2018), riverfront view (Cho et al, 2011), and urban village view (Hasanah et al, 2018) have also shown a positive contribution of premium to the housing prices, among other types of views. When both proximity to facilities and the view of the amenities are accounted, it will contribute a higher premium value to the residential property (Mittal & Byahut, 2017). To illustrate, when homes were found to have both accessibility to ocean and scenic view of ocean, premium were found to be 147% (Benson et al, 1997). As such, it can be concluded that scenic views among the environmental attributes would mean a lot to home buyers as they tend to pay for higher price for the good views (Jim & Chen, 2010).

2.5 Type of Landscape and Scenic Views that Influence the Housing Price

In stark contrast to the bustling urban landscape, the embrace of nature landscapes in residential properties introduces a harmonious balance, providing solace and a connection to the organic world. Gardens, parks, and natural surroundings play a pivotal role in shaping the ambiance of a residential space. Beyond mere aesthetics, nature landscapes contribute to the physical and mental well-being of inhabitants, creating serene retreats within the urban sprawl. A well-designed garden can serve as a private oasis, offering a sanctuary for relaxation and contemplation. In suburban and rural settings, residential properties often boast expansive lawns, wooded areas, or proximity to natural wonders like lakes and mountains. These natural elements become an extension of the home, fostering a sense of tranquillity, and promoting a healthier lifestyle. The integration of nature into residential design goes beyond exterior spaces; large windows, open floor plans, and sustainable materials all work cohesively to bring the outdoors inside. Nature landscapes in residential properties not only offer aesthetic appeal but also serve as a testament to the intrinsic human need for connection with the environment.

The scenic view in a residential property is not merely a physical opening but a portal that connects the interior with the external world, framing moments of beauty and offering a unique perspective on the surroundings. The significance of a scenic view transcends its functional role as a source of natural light and ventilation; it becomes a living artwork, ever-changing with the seasons and the time of day. A well-placed window can transform a room, turning it into a canvas that captures the essence of the urban or nature landscape beyond. In suburban and rural settings, windows open to lush greenery, rolling hills, or picturesque vistas, fostering a deep connection to the natural environment. The design of windows, whether expansive floor-to-ceiling installations or strategically placed smaller frames, becomes a deliberate choice in shaping the resident's experience within the home. The interplay of light and shadow, the changing colours of the sky, and the seasonal variations visible through the window create a dynamic and ever-evolving visual narrative, enriching the residential living experience.

By looking both the landscape and scenic view in an economic point of view, these amenities services are public goods without a market price as it is unable to be transacted directly in the market. Despite its characteristic as a public good, landscape and view are not equivalent and consistent. It is varied and differed by quality and type in each residential housing unit (Benson et al, 1998). There are several research done in the overseas which had classified and segmented the landscape and scenic views according to natural and built environments. It is founded out that on the people would prefer landscape and view of natural environments over the built environment (Scott and Canter, 1997). However, the type of landscapes and scenic views can be differentiated and expended into detail prior to the landscapes surrounded. This can be further segmented and discussed as follows: -

2.5.1 Waterbodies

Looking into the waterbody factor, there are several studies done by the overseas researchers using the water view and proximity to waterbody as one of the variables to study the relationship of view, landscape, and housing prices (Yang et al., 2020 & Cho et al., 2009). However, the definition of waterbodies should be clearly stated and classified in the study of landscape and scenic view due to the variety in nature that would or may yield and produces different outcome towards the housing prices.

Water had played a large fraction and is vitally crucial in the development of landscape and architecture, this can be seen where building started to develop by taking the advantage of the waterbody to enhance their functional design, capture the spirit and genius of the place, and improve the aesthetic of that place (Garrod and Willis, 1992). By looking into the development of waterbody and waterfront in Malaysia, it can refer to the land fronting on to water where it would form a zone of interaction between urban construction and the waterbody and waterfront area (Yassin et al., 2016). In the context of landscape, water bodies would range from lake, river, sea which contributed to the framework of natural living habitat. While cited the study from Breen and Rigby (1994), the waterfront development would not necessarily need to directly have waterfront but

only a look as if the property is attached to the water. As such, it can be concluded that property with commanding view of water can be considered as waterfront property. To further explore the waterbody features, the type of waterbodies had proven to contribute to the formation of scenic views are identified and discussed as below: -

2.5.1.1 Lake

A lake can be defined as an enclosed waterbody (dominantly freshwater) that is surrounded by land with no direct access to the sea (Mitra et al., 2014). A lake is generally an earth surface that is a flooded large area that generally contain nutrients that can breed aquatic life or would generate an ecosystem. It can be a form of an open flowing like a river or stagnant. Generally, lake receive the water from rainfall, streams, and groundwater. In an urban context, lake is usually manmade. It may consider as a lake when it has a considerable size and localised in a basin that surrounded by land. Based on the definition above, lake would not flow to the ocean, but it is larger and deeper than the ponds. The view of lake is essentially pleasing as aesthetic amenities due to its natural flowing of water than provide a sense of calmness.

Several research have been done in the previous study over the years regarding the lake front properties and lake view amenities and how it contributes to the value of residential properties (Xiao et al., 2019; Jiao & Liu, 2010; Schlapfer et al,2015). This research done have shown that the proximity to lake and lake view would yield the positive impact to the residential house price. The outcome of the study may be possibly due to the appreciation of lake view and aesthetic by most of the people as pleasing view.

2.5.1.2 River

According to the National Land Code 1965, river is defined any river, creek, stream or other natural watercourse, and any branch of the river, distributary or deviation made from it. Geographically, a river is a ribbon-like waterbody that flows downward from the gravity force. A river can be shallow or deep, wide, or narrow. River can simply mean of natural water course of freshwater that flowing towards an ocean, lake, sea, or another river. A flowing waterbody that is smaller than a river will be called as stream, creek, or brook.

In the research of river front and river view conducted by several researchers, it had found out that river front development and visibility of river view would also contribute a premium to the housing development. As referring to research conducted by Jim and Chen (2007), a river view would yield positive impact to house price ranging from 7.3% to 13.7% comparing to the properties have no river view. As looking into the river front development, a study conducted by Schlapfer et al (2015) had also proved that proximity to river would also affect the housing price of the residential property.

2.5.1.3 Sea

Sea is referring to a large expanse of salt water connected with the ocean. It is a portion of the ocean that is partially surrounded by the land. The sea is a fundamental part of hydrosphere, establishing an important aspect of Earth's ecosystem and climate system. Oceans and seas are terms that are often used interchangeably; however, oceans typically referring to the larger bodies of saltwater while the seas typically referring to smaller bodies of saltwater that would be enclosed by land partially. A sea can be interconnected with oceans or entirely enclosed by the continents. Sea is vital in regulating the Earth's temperature, breeding diverse marine life, and influencing the economics of the country.

From the past studies of landscape and scenic views, sea landscapes and sea views had been studied among the researchers. All the researchers had shown a statistically significant of negative impact of distance to sea and positive impact on sea views towards the housing price. For more detail on the study, it will be tabulated in the further session of this study.

2.5.2 Mountain

A mountain is defined as a natural elevation of the earth surface towering abruptly from the surrounding level and attaining an altitude which, relatively to the adjacent elevation, is impressive or notable. Briefly, a mountain can be a large continent that stretches above the surrounding land in a limited area usually in the form of peak. In Malaysia, mountain is usually aesthetic and provides greenery to the eyesight due to the nature of mountain that wild grown with flora.

However, based on the findings of study, there are very least or few research that carried out on the influence of mountain landscape towards the residential properties. However, if looking into the mountain view, due to appreciation of greenery among the residents, it is believed that mountain will yield some premiums to the housing price as well. The positive impact of mountain view had been proved by the study of Hasanah et al (2018).

2.5.3 Open Space

Open space is defined as any land whether enclosed or not which is laid out or reserved for setting out completely or partially as a public garden, park, recreational ground, or as a public place. Open space is usually referred to describe areas such as open space preserve, and open space reservation that are yet to be largely undeveloped or

minimally developed and are accessible to the public. Similarly, the term green space is often used in the same manner to refer the same structure as well.

The purpose of an open space usually includes the preservation of a community or regions' rural natural environment. The open space usually provides numerous benefits to the community and the environment such as recreational, biodiversity, ecosystem services, agriculture, and visual and aesthetic value. Commonly, open space areas would also provide communities scenic views (Irwin, 2002). There are many different kinds of open spaces that are being investigated and considered by scholars as scenic vistas for residential properties. It has been demonstrated prior to previous study that residential properties with an open environment and a view of open areas will fetch a premium (Liisa Tyrväinen, 1997; Janeczko et al., 2022). In detail, the type of open space observed is summarized as in Table 2.1 with a simple definition:

Table 2.1: Type of Open Space Observed (Author's Interpretation).

Type of Open Space	**Description**
Park	Area of vacant land constructed, designed, constructed, and conserved as a garden or park that provide recreational amenities and facilities to the nearby residents.
Private Garden or Ground	Enclosed area that are normally reserved for private recreational use.
Neighbourhood Garden Space	Green spaces in business parks are examples of landscapes that offer visual amenities or divide various building or land uses for safety, aesthetic, or environmental reasons. They are also used for social or informal activities.
Children's Playing Spaces.	Children's play area which are usually linked with the nearby neighbourhood area. Provide safe and accessible area for the children to have fun.
Sports Facilities	Specifically designed area, constructed, and designed for designated sport such as basketball court, swimming pool, bowling greens, and golf course, etc.

Green Space	Undeveloped or formerly developed regions that still have remnants of their natural habitats or that were intended for the planting of plants and animals, such as wetlands and woodland areas.
Others	Vegetable garden and Graveyards

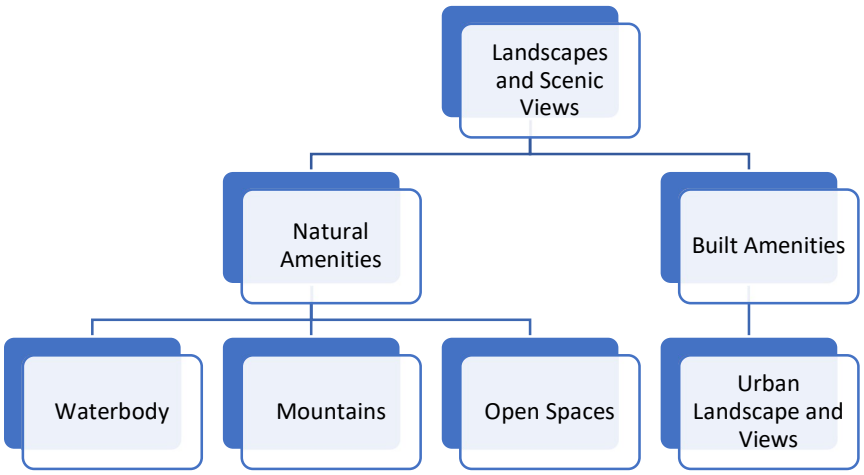
2.5.4 Urban Landscape

This type of landscape usually referring to the constructed environment of cities and towns, including the infrastructure, physical structures, and spatial layout. Urban landscapes may encompass a wide variety to elements that shape the character and functionality of urban areas. This may include building and structures such as residential, commercial, industrial, and institutional buildings; streets and transportation such as streets, roads, sidewalks, bike lanes, and public transportation; and parks such as urban parks, plazas, and squares. Different urban landscape would yield differently to the housing price of the residential property. It may greatly refer to the usability and aesthetic of a certain landscape that may enjoyed by the occupiers.

2.5.5 Summary on the Types of Landscapes and Scenic Views

Based on the above explanation and definitions on the different types of landscapes and scenic views, the type of landscapes and scenic views are summarized as below:

Figure *2*.1: Type of Scenic Views



2.6 Study and Result from Previous Research

The result and study based on previous research that are relevant to this topic related to landscape and scenic view will be reviewed, summarized, and tabulated as in the table below. Each table will project the findings of previous research on based on landscape. However, the conclusion on the study matters towards scenic views is not yet decided, where it will further be discussed in Chapter 3 in order to determine the type of landscape and scenic variables to be studied.

2.6.1Detailed Previous Research on Landscape and Scenic Views

Table 2.2: Sea and Beach Related Landscape.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Distance to Coastline	(-)
2	Dahal et al. (2019) [46]	Landed Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Stream	(-)
3	Dai et al. (2023) [29]	Single-Family House	1998 - 2016	Israel	Housing Price	Distance to Coast	(-)
4	Fernandez & Bucaram (2019) [18]	Apartment	2000 - 2016	New Zealand	Housing Price	Distance to Beach	(-)
5	Fernandez & Bucaram (2019) [18]	Apartment	2001 - 2016	New Zealand	Housing Price	Distance to Coastal Feature	(-)
6	Fernandez & Bucaram (2019) [18]	Apartment	2002 - 2016	New Zealand	Housing Price	Distance to Marine Area	(-)
7	Hamilton & Morgan (2010). [44]	Residential	2006	Florida, USA	Housing Price	Distance to Beach	(-)
8	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	Sea Views	(+)
9	Jim & Chen (2009) [19]	Apartment	2005 - 2006	Hong Kong	Housing Price	Distance to Seashore	(-)
10	Jim & Chen (2009) [19]	Apartment	2006 - 2006	Hong Kong	Housing Price	Panoramic Sea View	(+)
11	Jim & Chen (2009) [19]	Apartment	2007 - 2006	Hong Kong	Housing Price	Partially Sea View	(+)
12	Noblejas et al. (2023) [2]	Single Family House	2007 - 2023	Marbella, Spain	Housing Price	Sea Views	(+)
13	Shi et al (2022) [7]	Apartment	2015	Zhu Hai, China	Housing Price	Distance to Seaside	(-)
14	Yang et al. (2020) [8]	Residential	2017	Xiamen, China	Housing Price	Distance to Sea	(-)
15	Yang et al. (2020) [8]	Residential	2017	Xiamen, China	Housing Price	Distance to Wu Yuan Bay	(-)

Table 2.3: Other Waterbody Related Landscape.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Belcher et al (2019) [25]	Condominium	n. d	Singapore	Housing Price	Freshwater	(+)
2	Cho et al. (2009) [14]	Single House Family	1999 - 1991	Tennessee	Housing Price	Distance to water body	(-)
3	Cho et al. (2009) [14]	Single House Family	1999 - 2001	Tennessee	Housing Price	Distance to water body	(-)
4	Cho et al. (2011) [13]	Apartment	2013	Seoul, Korea	Housing Price	Han River Views	(+)
5	Dahal et al. (2019) [46]	Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Stream	(-)
6	Dahal et al. (2019) [46]	Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest River	(-)
7	Dahal et al. (2019) [46]	Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Other Water Body	(+)
8	Fernandez & Bucaram (2019) [18]	Residential	2000-2016	Auckland, New Zealand	Housing Price	Distance to Water Way	(+)
9	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Wet Land	(+)
10	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	River View	(-)
11	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	Lake View	(+)
12	Huang et al. (2021) [16]	Housing Complex	NA	Wuhan, China	Housing Price	Distance to Yangtze River or Han River	(-)
13	Jiao & Liu (2010) [22]	Apartment	NA	Wuhan, China	Housing Price	East Lake	(+)
14	Jiao & Liu (2010) [22]	Apartment	NA	Wuhan, China	Housing Price	Rivers	(-)
15	Jiao & Liu (2010) [22]	Apartment	NA	Wuhan, China	Housing Price	Lakes	(-)
16	Jim & Chen (2009) [19]	Apartment	2005 - 2006	Hong Kong	Housing Price	Pool	(+)
17	Lee et al. (2020) [12]	Apartment	NA	Seoul, Korea	Housing Price	River View	(+)

18	Liisa Tyrväinen (1997) [5]	Apartment	NA	North Karelia, Finland	Housing Price	Distance to Water Course	(-)
19	Liu et al. (2019) [6]	Apartment	2016 - 2017	Chongqing, China	Housing Price	Distance to Yang Tze or Jialing River	(-)
20	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Distance to Lake	(-)
21	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Lake View	(+)
22	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Distance to River	(-)
23	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Wetland	(+)
24	Shi et al (2022) [7]	Single Apartment, Two-room house, multiple bedroom villa	2015	Zhu Hai, China	Housing Price	Pool	(+)
25	Wen et al (2015) [37]	High Rise Property	2012	Hangzhou, China	Housing Price	Distance to Qiantang River	(+)
26	Wen et al (2017) [40]	High Rise Property	NA	Hang Zhou, China	Housing Price	Distance to West Lake	(-)
27	Xiao et al. (2019) [1]	Terraced	2015	Hang Zhou, China	Housing Price	Distance to Lake	(-)
28	Yang et al. (2020) [8]	Normal Landed Residential	2017	Xiamen, China	Housing Price	Waterbody	(+)
29	Yang et al. (2020) [8]	Normal Landed Residential	2017	Xiamen, China	Housing Price	Distance to Wu Yuan Bay	(-)

Table 2.4: Green Spaces and Park Related Landscape.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Managed Tree	(+)
2	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Parkland	(+)
3	Bottero (2022) [36]	Apartment	2016 - 2019	Brisbane	Housing Price	Distance to urban Park	(+)
4	Bottero (2022) [36]	Apartment	2016 - 2019	Brisbane	Housing Price	Distance to Recreational Urban Park	(-)
5	Bottero (2022) [36]	Apartment	2016 - 2019	Brisbane	Housing Price	Distance to Sport Urban Park	(-)
6	Chen et al. (2023) [37]	High Rise Property	2019	Beijing, China	Housing Price	Distance to Green Spaces	(-)
7	Chen et al. (2023) [46]	Normal Residential	2017	Beijing, City	Housing Price	Distance to the Nearest Green Spaces	(-)
8	Cho et al. (2009) [14]	Single House Family	1989 - 1991	Tennessee	Housing Price	Distance to Nearest Greenway	(-)
9	Cho et al. (2009) [14]	Single House Family	1989 - 2001	Tennessee	Housing Price	Distance to Nearest Park	(-)
10	Cho et al. (2009) [14]	Single House Family	1989 - 1991	Tennessee	Housing Price	Distance to Nearest Sidewalk	(-)
11	Cho et al. (2009) [14]	Single House Family	1999 - 2001	Tennessee	Housing Price	Distance to Nearest Greenway	(-)
12	Cho et al. (2009) [14]	Single House Family	1999 - 2001	Tennessee	Housing Price	Distance to Nearest Park	(-)
13	Cho et al. (2009) [14]	Single House Family	1999 - 2001	Tennessee	Housing Price	Distance to Nearest Sidewalk	(-)
14	Cho et al. (2011) [13]	Single-Family House	Economic Boom	NA	Housing Price	Distance to Nearest Sidewalk	(-)
15	Cho et al. (2011) [13]	Single-Family House	Economic Boom	NA	Housing Price	Distance to Nearest Park	(+)
16	Cho et al. (2011) [13]	Single-Family House	Economic Recession	NA	Housing Price	Distance to Nearest Sidewalk	(-)

17	Cho et al. (2011) [13]	Single-Family House	Economic Recession	NA	Housing Price	Distance to Nearest Park	(+)
18	Cho et al. (2011) [13]	Apartment	2013	Seoul, Korea	Housing Price	Green Views	(+)
19	Dahal et al. (2019) [47]	Landed Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Public Park	(-)
20	Dai et al. (2023) [29]	Apartment	1998-2016	Israel	Housing Price	Distance to Park	(+)
21	Dai et al. (2023) [29]	Apartment	1998-2017	Israel	Housing Price	Distance to Natural Green Area	(+)
22	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to DOC reserve	(-)
23	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Regional Reserve	(-)
24	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Ecological Area	(+)
25	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Marginal Strips	(-)
26	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Parks Maintained Not Owned	(+)
27	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Parks Owned Not Maintained	(+)
28	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Neighbourhood Park	(+)
29	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to volcanic Park	(+)
30	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Other Park	(+)

31	Franco & MacDonald (2018) [35]	Apartment	2007	Lisbon, Portugal	Housing Price	Distance to Forest	(-)
32	Franco & MacDonald (2018) [35]	Apartment	2007	Lisbon, Portugal	Housing Price	Distance to Park	(-)
33	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	Mountain View	(+)
34	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	Garden View	(+)
35	Huang et al. (2021) [16]	Housing Complex	NA	Wuhan, China	Housing Price	Distance to Nearest Big Green Space	(-)
36	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Celestynów, Poland	Housing Price	Distance to Forest	(+)
37	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Celestynów, Poland	Housing Price	Forest Boundary (Forest Edge Contour)	(-)
38	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Celestynów, Poland	Housing Price	Number of landscape Components	(-)
39	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Józefów, Poland	Housing Price	Distance to Forest	(-)
40	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Józefów, Poland	Housing Price	Forest Boundary (Forest Edge Contour)	(-)
41	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Józefów, Poland	Housing Price	Number of landscape Components	(+)
42	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Otwock, Poland	Housing Price	Distance to Forest	(-)
43	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Otwock, Poland	Housing Price	Forest Boundary (Forest Edge Contour)	(-)

44	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Otwock, Poland	Housing Price	Number of landscape Components	(+)
45	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Karczew, Poland	Housing Price	Distance to Forest	(-)
46	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Karczew, Poland	Housing Price	Forest Boundary (Forest Edge Contour)	(+)
47	Janeczko et al. (2022) [15]	Undeveloped Residential Land	2011-2016	Karczew, Poland	Housing Price	Number of landscape Components	(-)
48	Jiao & Liu (2010) [22]	Apartment	NA	Wuhan, China	Housing Price	Green Space Ratio of the Residential Estate	(+)
49	Jiao & Liu (2010) [22]	Apartment	NA	Wuhan, China	Housing Price	City Level Parks	(+)
50	Jiao & Liu (2010) [22]	Apartment	NA	Wuhan, China	Housing Price	District Level Parks	(-)
51	Jiao & Liu (2010) [22]	Apartment	NA	Wuhan, China	Housing Price	Hills	(+)
52	Jim & Chen (2009) [19]	Apartment	2005-2006	Hong Kong	Housing Price	Distance to the Nearest Mountain	(+)
53	Kong et al (2007) [24]	Cluster House	NA	Jinan City, China	Housing Price	Distance to Nearest Park	(+)
54	Kong et al (2007) [24]	Cluster House	NA	Jinan City, China	Housing Price	Distance to Scenery Forest	(+)
55	Lee et al. (2020) [12]	Apartment	NA	Seoul, Korea	Housing Price	Green Views	(+)
56	Liisa Tyrväinen (1997) [5]	Apartment	NA	North Karelia, Finland	Housing Price	Distance to Forest Park	(+)
57	Liisa Tyrväinen (1997) [5]	Apartment	NA	North Karelia, Finland	Housing Price	Distance to recreational area	(-)
58	Liisa Tyrväinen (1997) [5]	Apartment	NA	North Karelia, Finland	Housing Price	Green Space	(-)
59	Liu et al. (2019) [6]	Apartment	2016 - 2017	Chongqing, China	Housing Price	Mountain View	(+)
60	Liu et al. (2019) [6]	Apartment	2016 - 2017	Chongqing, China	Housing Price	Peninsula Landscape View	(+)

61	Liu et al. (2019) [6]	Apartment	2016 - 2017	Chongqing, China	Housing Price	Distance to Urban Park	(-)
62	Morancho (2003) [20]	Normal Residential	NA	Castellon, Spain	Housing Price	Distance to Nearest Urban Green Area	(-)
63	Morancho (2003) [20]	Normal Residential	NA	Castellon, Spain	Housing Price	Garden View	(-)
64	Noblejas et al. (2023) [2]	Single Family House	2007-2023	Marbella, Spain	Housing Price	Natural Land View	(-)
65	Norzailawati et al (2015) [38]	Terraced	1999 - 2013	Subang Jaya, Malaysia	Housing Price	Distance to Green Spaces	(-)
66	Sachs et al. (2023) [39]	Single Family Home	2009-2011	Maryland, US	Housing Price	Distance to Park	(+)
67	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Forest	(-)
68	Schlapfer et al (2015) [23]	Apartment	2001-2008	Switzerland	Rent	Open Space	(-)
69	Schlapfer et al (2015) [23]	Apartment	2001-2009	Switzerland	Rent	Distance to view	(-)
70	Schlapfer et al (2015) [23]	Apartment	2001-2010	Switzerland	Rent	Urban Park	(+)
71	Schlapfer et al (2015) [23]	Apartment	2001-2011	Switzerland	Rent	Hiking Trails	(+)
72	Schlapfer et al (2015) [23]	Apartment	2001-2012	Switzerland	Rent	Bike Trails	(+)
73	Shi et al (2022) [7]	Single Apartment, Two-room House, Villa	2015	Zhu Hai, China	Housing Price	Distance to Huafa Exercise Park	(-)
74	Shi et al (2022) [7]	Single Apartment, Two-room House, Villa	2015	Zhu Hai, China	Housing Price	Distance to Martyrs' Park	(-)
75	Shi et al (2022) [7]	Single Apartment,	2015	Zhu Hai, China	Housing Price	Distance to Xiangshan Park	(-)

		Two-room House, Villa					
76	Soltani et al. (2023) [33]	Apartment	n. d	Tehran, Iran	Housing Price	Distance from the Nearest Green Space and Park	(+)
77	Soren et al. (2006) [11]	Single-Family House	NA	Minnesota, USA	Housing Price	Distance to Neighbourhood Park	(-)
78	Soren et al. (2006) [11]	Single-Family House	NA	Minnesota, USA	Housing Price	Distance to Special Park	(-)
79	Su et al. (2021) [28]	Apartment	NA	Beijing, China	Rent	Distance to Greening Amenities	(+)
80	Su et al. (2021) [28]	Apartment	NA	Beijing, China	Rent	Distance to Leisure Facilities	(+)
81	Su et al. (2021) [28]	Apartment	NA	Shang Hai, China	Rent	Distance to Leisure Facilities	(+)
82	Su et al. (2021) [28]	Apartment	NA	Hangzhou, China	Rent	Distance to Leisure Facilities	(+)
83	Su et al. (2021) [28]	Apartment	NA	Wuhan, China	Rent	Distance to Leisure Facilities	(+)
84	Tyrväinen & Miettinen (2000) [38]	Terraced House	n.d.	Salo, Finland	Housing Price	Distance to wooded recreation area	(-)
85	Tyrväinen & Miettinen (2000) [38]	Terraced House	n.d.	Salo, Finland	Housing Price	Distance to forested area	(-)
86	Wen et al (2015) [37]	High Rise Property	2012	Hangzhou, China	Housing Price	Distance to Park	(-)
87	Wu et al. (2022) [31]	Normal Residential	NA	Shenzhen, China	Housing Price	Distance to Community Parks	(+)
88	Wu et al. (2022) [31]	Normal Residential	NA	Shenzhen, China	Housing Price	Distance to City Parks	(+)
89	Wu et al. (2022) [31]	Normal Residential	NA	Shenzhen, China	Housing Price	Distance to Natural Parks	(+)
90	Wu et al. (2022) [41]	Normal Residential	NA	Shenzhen, China	Housing Prices	Distance to Community Park	(+)
91	Wu et al. (2022) [41]	Normal Residential	NA	Shenzhen, China	Housing Prices	Distance to City parks	(+)
92	Yang et al. (2021) [26]	Office Building	2010 - 2017	New York City, USA	Housing Price	Distance to Park	(+)

Table 2.5: CBD Related Landscape.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Belcher & Chisholm (2018) [43]	Apartments	2014	Singapore	Housing Price	Distance to Central Area	(-)
2	Chen et al. (2023) [37]	High Rise Property	2019	Beijing, China	Housing Price	Distance to CBD	(-)
3	Chen et al. (2023) [46]	Normal Residential	2017	Beijing, City	Housing Price	Distance to CBD	(-)
4	Cho et al. (2011) [13]	Apartment	Economic Boom	NA	Housing Price	Distance to CBD	(-)
5	Cho et al. (2011) [13]	Apartment	Economic Recession	NA	Housing Price	Distance to CBD	(-)
6	Huang et al. (2021) [16]	Housing Complex	NA	Wuhan, China	Housing Price	Distance to CBD	(-)
7	Kong et al (2007) [24]	Cluster House	n. d	Jinan City, China	Housing Price	Distance to CBD	(-)
1	Liu et al. (2019) [6]	Apartment	2016-2017	Chongqing, China	Housing Price	Distance to CBD	(-)
8	Soltani et al. (2023) [33]	Apartment	NA	Tehran, Iran	Housing Price	Distance to CBD	(-)
9	Soltani et al. (2023) [33]	Apartment	NA	Tehran, Iran	Housing Price	Distance to Nearest local CBD	(-)
10	Wen et al (2015) [37]	High Rise Property	2012	Hangzhou, China	Housing Price	Distance to CBD	(-)
11	Wen et al (2015) [37]	High Rise Property	2012	Hangzhou, China	Housing Price	Distance to New CBD	(-)
12	Xun et al. (2021) [45]	High-rise apartment	2014	China	Housing Price	Distance to CBD	(-)

Table 2.6: Town and City Related Landscape.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Distance to Centre	(-)
2	Belej et al. (2023) [30]	Single-family home	2008-2019	Poznan, Poland	Housing Price	Distance from Centre	(-)
3	Cho et al. (2009) [14]	Single Family House	1989 - 1991	Knox County, Tennessee	Housing Price	Distance to Downtown Knoxville	(-)
4	Cho et al. (2009) [14]	Single Family House	1999 - 2001	Knox County, Tennessee	Housing Price	Distance to Downtown Knoxville	(-)
5	Cho et al. (2011) [13]	Apartment	2013	Seoul, Korea	Housing Price	Distance to Gangnam-gu boundary	(-)
6	Geoghegan. (2002) [4]	Normal Landed Residential	NA	Maryland, USA	Housing Price	Distance to Washington DC	(-)
7	Geoghegan. (2002) [4]	Normal Landed Residential	NA	Maryland, USA	Housing Price	Distance to Baltimore	(-)
8	Geoghegan. (2002) [4]	Normal Landed Residential	NA	Maryland, USA	Housing Price	Distance to nearest town	(+)
9	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Price	Distance to City Centre	(-)
10	Lee et al. (2020) [12]	Apartment	NA	Seoul, Korea	Housing Price	Distance to Gangnam	(-)
11	Liisa Tyrväinen (1997) [5]	Apartment	NA	North Karelia, Finland	Housing Price	Distance to town	(-)
12	Morancho (2003) [20]	Normal Residential	n. d	Castellon, Spain	Housing Price	Distance to Town Centre	(-)
13	Nurul et al (2014) [42]	Single Storey Terrace, Double storey Terrace, Double Storey Semi Detached, Bangalow	n. d	Botanical Garden, Labuan	Housing Price	Distance to Town	(+)
14	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Inner City Location	(+)

15	Yang et al. (2021) [26]	Office Building	2010 - 2017	New York City, USA	Price	Distance to Metro	(+)

Table 2.7: Commercial and Service-Related Landscape.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Belcher & Chisholm (2018) [43]	Apartments	2014	Singapore	Housing Price	Distance to Nearest Cooked Food Centre	(-)
2	Belcher & Chisholm (2018) [43]	Apartments	2015	Singapore	Housing Price	Distance to Nearest Major Shopping Mall	(-)
3	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Distance to Nearest Major Shopping Mall	(+)
4	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Distance to Cooked Food Centre	(-)
5	Chen et al. (2022) [32]	Normal Residential (Landed and High Rise)	2013-2015	London, UK	Housing Price	Distance to the Nearest Leisure or Sports Centre	(+)
6	Dahal et al. (2019) [47]	Landed Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Shopping Centre	(-)
7	Dai et al. (2023) [29]	Apartment	1998-2016	Israel	Housing Price	Distance to Commercial Centres	（+）
8	Dai et al. (2023) [29]	Apartment	1998-2016	Israel	Housing Price	Distance to Employment Centres	（-）
9	Dai et al. (2023) [29]	Apartment	1998-2016	Israel	Housing Price	Distance to Industry	（+）
10	Kong et al (2007) [24]	Cluster House	NA	Jinan City, China	Housing Price	Distance to Nearest Plaza	(+)
11	Liisa Tyrväinen (1997) [5]	Apartment	NA	North Karelia, Finland	Housing Price	Distance to Shop	(+)
12	Liu et al. (2019) [6]	Apartment	2016-2017	Chongqing, China	Housing Price	Distance to Government Service Centre	(-)
13	Nurul et al (2014) [42]	Landed Residential	NA	Botanical Garden, Labuan	Housing Price	Distance to Commercial Centre	(+)
14	Nurul et al (2014) [42]	Landed Residential	NA	Botanical Garden, Labuan	Housing Price	Distance to Workplace	(+)

15	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Distance to Service	(-)
16	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Large building	(-)
17	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Industry	(-)
18	Soltani et al. (2023) [33]	Apartment	NA	Tehran, Iran	Housing Price	Distance to Nearest Social Services	(-)
19	Soltani et al. (2023) [33]	Apartment	NA	Tehran, Iran	Housing Price	Distance to Nearest Administrative Services	(-)
20	Su et al. (2021) [28]	Apartment	NA	Beijing, China	Rent	Distance to Shopping Facilities	(+)
21	Su et al. (2021) [28]	Apartment	NA	Beijing, China	Rent	Distance to Leisure Facilities	(+)
22	Su et al. (2021) [28]	Apartment	NA	Beijing, China	Rent	Distance to Commercial Facilities	(+)
23	Su et al. (2021) [28]	Apartment	NA	Shanghai, China	Rent	Distance to Shopping Facilities	(+)
24	Su et al. (2021) [28]	Apartment	NA	Shanghai, China	Rent	Distance to Leisure Facilities	(+)
25	Su et al. (2021) [28]	Apartment	NA	Shanghai, China	Rent	Distance to Commercial Facilities	(+)
26	Su et al. (2021) [28]	Apartment	NA	Shenzhen, China	Rent	Distance to Shopping Facilities	(+)
27	Su et al. (2021) [28]	Apartment	NA	Shenzhen, China	Rent	Distance to Leisure Facilities	(+)
28	Su et al. (2021) [28]	Apartment	NA	Hangzhou, China	Rent	Distance to Shopping Facilities	(+)
29	Su et al. (2021) [28]	Apartment	NA	Hangzhou, China	Rent	Distance to Leisure Facilities	(+)
30	Su et al. (2021) [28]	Apartment	NA	Wuhan, China	Rent	Distance to Shopping Facilities	(+)
31	Tyrväinen & Miettinen (2000) [38]	Terraced House	n.d.	Salo, Finland	Housing Price	Distance to Centre of Salo	(-)
32	Tyrväinen & Miettinen (2000) [38]	Terraced House	n.d.	Salo, Finland	Housing Price	Distance to Local Shopping Centre	(-)
33	Wen et al (2017) [40]	High Rise Property	NA	Hang Zhou, China	Housing Price	Distance to Wulin Square	(-)

34	Wen et al (2017) [40]	High Rise Property	NA	Hang Zhou, China	Housing Price	Distance to Qian Jiang Centre	(-)

Table 2.8: Airport and Public Transport.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Belcher & Chisholm (2018) [43]	Apartments	2014	Singapore	Housing Price	Distance to Nearest Train Station	(-)
2	Belcher & Chisholm (2018) [43]	Apartments	2014	Singapore	Housing Price	Distance to Nearest Bus Interchange	(+)
3	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Distance to Nearest Train Station	(-)
4	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Distance to Nearest Expressway Entrance	(-)
5	Belej et al. (2023) [30]	Single-family home market	2008-2019	Poznan, Poland	Housing Price	Distance to Nearest Airport	(-)
6	Chen et al. (2022) [32]	Normal Residential (Landed and High Rise)	2013-2015	London, UK	Housing Price	Distance to Nearest Bus and Coach Station	(-)
7	Chen et al. (2022) [32]	Residential (Landed and High Rise)	2013-2015	London, UK	Housing Price	Distance to Nearest Underground Station	(-)
8	Chen et al. (2023) [37]	High Rise Property	2019	Beijing, China	Housing Price	Distance to Subway	(-)
9	Chen et al. (2023) [46]	Normal Residential	2017	Beijing, City	Housing Price	Distance to Subway	(-)
10	Cho et al. (2009) [14]	Single-Family House	1989-1991	Knox County, Tennessee	Housing Price	Distance to Nearest Railroad	(+)
11	Cho et al. (2009) [14]	Single-Family House	1999-2001	Knox County, Tennessee	Housing Price	Distance to Nearest Railroad	(+)
12	Cho et al. (2011) [13]	Apartment	Economic Boom	NA	Housing Price	Distance to Nearest Railroad	(+)

13	Cho et al. (2011) [13]	Apartment	Economic Recession	NA	Housing Price	Distance to Nearest Railroad	(-)
14	Cho et al. (2011) [13]	Apartment	2013	Seoul, Korea	Housing Price	Distance to Subway	(-)
15	Dahal et al. (2019) [47]	Landed Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Airport	(+)
16	Dahal et al. (2019) [47]	Landed Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Active Railroad	(+)
17	Dai et al. (2023) [29]	Apartment	1998-2016	Israel	Housing Price	Distance to Train Stations	(+)
18	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	Distance to Railway Station	(-)
19	Huang et al. (2021) [16]	Housing Complex	NA	Wuhan, China	Housing Price	Distance to the Nearest Rail Transit Station	(-)
20	Jim & Chen (2009) [19]	Apartment	2005 - 2006	Hong Kong	Housing Price	Distance to Public Transport	(+)
21	Lee et al. (2020) [12]	Apartment	NA	Seoul, Korea	Housing Price	Distance to Subway	(-)
22	Liu et al. (2019) [6]	Apartment	2016-2017	Chongqing, China	Housing Price	Distance to Subway Station	(-)
23	Liu et al. (2019) [6]	Apartment	2016-2017	Chongqing, China	Housing Price	Distance to Railway Station	(-)
24	Soltani et al. (2023) [33]	Apartment	NA	Tehran, Iran	Housing Price	Distance to Nearest BRT Station	(+)
25	Su et al. (2021) [28]	Apartment	NA	Shanghai, China	Rent	Distance to Transit Facilities	(+)
26	Su et al. (2021) [28]	Apartment	NA	Shenzhen, China	Rent	Distance to Transit Facilities	(+)
27	Su et al. (2021) [28]	Apartment	NA	Hangzhou, China	Rent	Distance to Transit Facilities	(+)
28	Tachaiwat et al. (2023) [34]	Condominium	NA	Thailand	Property Investment	Mass Transit Accessibility	(-)
29	Tachaiwat et al. (2023) [34]	Condominium	NA	Thailand	Property Investment	Domestic Transportation	(-)
30	Yang et al. (2020) [8]	Residential	2017	Xiamen, China	Housing Price	Distance to Airport	(+)
31	Yang et al. (2020) [8]	Residential	2017	Xiamen, China	Housing Price	Bus Access	(+)
32	Yang et al. (2020) [8]	Residential	2017	Xiamen, China	Housing Price	Distance to BRT Station	(-)

Table 2.9: Accessibility and Amenities Related Landscape.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Belcher & Chisholm (2018) [43]	Apartments	2014	Singapore	Housing Price	Distance to Nearest Motorway Distance to Coastline	(-)
2	Belcher et al (2019) [25]	Condominium	NA	Singapore	Housing Price	Distance to Top Primary School	(-)
3	Belej et al. (2023) [30]	Single-family home market	2008-2019	Poznan, Poland	Housing Price	Distance to Nearest Primary School	(-)
4	Chen et al. (2022) [32]	Normal Residential (Landed and High Rise)	2013-2015	London, UK	Housing Price	Distance to the Nearest Leisure or Sports Centre	(+)
5	Chen et al. (2022) [32]	Normal Residential (Landed and High Rise)	2013-2015	London, UK	Housing Price	Distance to the Nearest Medical Care Centre	(-)
6	Chen et al. (2022) [32]	Normal Residential (Landed and High Rise)	2013-2015	London, UK	Housing Price	Distance to Nearest Primary School	(+)
7	Cho et al. (2009) [14]	Single-Family House	1989-1991	Knox County, Tennessee	Housing Price	Distance to Nearest Sidewalk	(-)
8	Cho et al. (2009) [14]	Single-Family House	1999-2001	Knox County, Tennessee	Housing Price	Distance to Nearest Sidewalk	(-)
9	Cho et al. (2009) [14]	Single-Family House	1989-1991	Knox County, Tennessee	Housing Price	Distance to Nearest Golf Course	(-)
10	Cho et al. (2009) [14]	Single-Family House	1999-2001	Knox County, Tennessee	Housing Price	Distance to Nearest Golf Course	(-)
11	Cho et al. (2011) [13]	Apartment	Economic Boom	NA	Housing Price	Distance to Nearest Sidewalk	(-)
12	Cho et al. (2011) [13]	Apartment	Economic Boom	NA	Housing Price	Distance to Nearest Sidewalk	(-)

13	Cho et al. (2011) [13]	Apartment	Economic Boom	NA	Housing Price	Distance to Nearest High School	(-)
14	Cho et al. (2011) [13]	Apartment	2013	Seoul, Korea	Housing Price	Distance to Primary School	(-)
15	Cho et al. (2011) [13]	Apartment	2014	Seoul, Korea	Housing Price	Distance to Middle School	(-)
16	Dahal et al. (2019) [47]	Landed Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest primary or Secondary Road	(+)
17	Dahal et al. (2019) [47]	Landed Residential	2002 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Public School	(+)
18	Dai et al. (2023) [29]	Apartment	1998-2016	Israel	Housing Price	Distance to Toll Gate	(-)
19	Dai et al. (2023) [29]	Apartment	1998-2017	Israel	Housing Price	Distance to Road	(-)
20	Dai et al. (2023) [29]	Apartment	1998-2018	Israel	Housing Price	Distance to Schools	(-)
21	Fernandez & Bucaram (2019) [18]	Normal Residential (Landed)	2000-2016	Auckland, New Zealand	Housing Price	Distance to Golf Course	(+)
22	Huang et al. (2021) [16]	Housing Complex	NA	Wuhan, China	Housing Price	Distance to the Nearest Hospital	(-)
23	Huang et al. (2021) [16]	Housing Complex	NA	Wuhan, China	Housing Price	Distance to Nearest High-Profile K-12 School	(-)
24	Jim & Chen (2009) [19]	Apartment	2005 - 2006	Hong Kong	Housing Price	Club	(+)
25	Kong et al (2007) [24]	Cluster House	NA	Jinan City, China	Housing Price	Education Dimensity	(-)
26	Kong et al (2007) [24]	Cluster House	NA	Jinan City, China	Housing Price	Education Environment	(+)
27	Lee et al. (2020) [12]	Apartment	NA	Seoul, Korea	Housing Price	Distance to Primary School	(-)
28	Lee et al. (2020) [12]	Apartment	NA	Seoul, Korea	Housing Price	Distance to Middle School	(-)
29	Liisa Tyrväinen (1997) [5]	Apartment	NA	North Karelia, Finland	Housing Price	Distance to school	(+)
30	Liu et al. (2019) [6]	Apartment	2016-2017	Chongqing, China	Housing Price	Distance to Bridge Entrance	(-)
31	Sachs et al. (2023) [39]	Single-family House	2009-2011	Maryland, US	Husing Price	Distance to Road	(+)
32	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Distance to Road	(-)

33	Schlapfer et al (2015) [23]	Apartment	2001-2008	Switzerland	Rent	Distance to Highway	(+)
34	Schlapfer et al (2015) [23]	Apartment	2001-2009	Switzerland	Rent	Distance to Road	(-)
35	Schlapfer et al (2015) [23]	Apartment	2001-2009	Switzerland	Rent	Distance to Highway	(+)
36	Soltani et al. (2023) [33]	Apartment	NA	Tehran, Iran	Housing Price	Distance to Nearest Educational Services	(-)
37	Soltani et al. (2023) [33]	Apartment	NA	Tehran, Iran	Housing Price	Distance to Nearest Healthcare Services	(+)
38	Soren et al. (2006) [11]	Single-Family House	NA	St. Pual	Housing Price	Distance to Golf Course	(+)
39	Wen et al (2017) [40]	High Rise Property	NA	Hang Zhou, China	Housing Price	Living Facilities	(+)
40	Wen et al (2017) [40]	High Rise Property	NA	Hang Zhou, China	Housing Price	Sports Facilities	(+)
41	Wen et al (2017) [40]	High Rise Property	NA	Hang Zhou, China	Housing Price	Distance to University	(+)
42	Wen et al (2017) [40]	High Rise Property	NA	Hang Zhou, China	Housing Price	Distance to Educational Facilities	(+)
43	Wu et al. (2022) [31]	Normal Residential	NA	Shenzhen, China	Housing Price	Distance to Kindergarten	(+)
44	Wu et al. (2022) [31]	Normal Residential	NA	Shenzhen, China	Housing Price	Distance to Primary School	(+)
45	Wu et al. (2022) [31]	Normal Residential	NA	Shenzhen, China	Housing Price	Distance to Middle School	(-)
46	Wu et al. (2022) [31]	Normal Residential	NA	Shenzhen, China	Housing Price	Distance to General Hospital	(+)
47	Wu et al. (2022) [41]	Residential Property	NA	Shenzhen, China	Housing Prices	Distance to Kindergarten	(+)
48	Wu et al. (2022) [41]	Residential Property	NA	Shenzhen, China	Housing Prices	Distance to Primary School	(+)
49	Wu et al. (2022) [41]	Residential Property	NA	Shenzhen, China	Housing Prices	Distance to Middle School	(-)

50	Wu et al. (2022) [41]	Residential Property	NA	Shenzhen, China	Housing Prices	Distance to General Hospital	(-)
51	Xun et al. (2021) [45]	High-rise apartment	2014	China	Housing Price	Distance to Key elementary or Secondary School	(+)
52	Yang et al. (2020) [8]	Residential	2017	Xiamen, China	Housing Price	Distance to Zhongshan Road	(-)

Table 2.10: Other Landscapes.

No.	Author	Type of Property	Period / Duration	Country	Dependent Variable	Independent Variable	Coefficient (+) (-)
1	Dahal et al. (2019) [47]	Landed Residential	2001 - 2015	Alabama, USA	Housing Price	Distance to the Nearest Bayou	(+)
2	Dai et al. (2023) [29]	Apartment	1998-2016	Israel	Housing Price	Distance to Cemeteries	(+)
3	Franco & MacDonald (2018) [35]	Apartment	2007	Lisbon, Portugal	Housing Price	Distance to Cemetery	(-)
4	Hamilton & Morgan (2010). [44]	Single-Family House	2006	Pensacola Beach	Housing Price	Distance to Nearest Access Point	(-)
5	Hamilton & Morgan (2010). [44]	Single-Family House	2006	Pensacola Beach	Housing Price	Angular View of Gulf from Property	(+)
6	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	Urban Village View	(+)
7	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	Sport Centre View	(+)
8	Hasanah et al (2018) [27]	Apartment	NA	Indonesia	Housing Price	Street View	(+)
9	Jim & Chen (2009) [19]	Apartment	2005-2006	Hong Kong	Housing Price	Street View	(-)
10	Jim & Chen (2009) [19]	Apartment	2005-2007	Hong Kong	Housing Price	Building View	(-)
11	Noblejas et al. (2023) [2]	Single Family House	2007-2023	Marbella, Spain	Housing Price	Other Views	(-)
12	Noblejas et al. (2023) [2]	Single Family House	2007-2023	Marbella, Spain	Housing Price	Old Town View	(+)
13	Nurul et al (2014) [42]	Single Storey Terrace, Double storey Terrace, Double Storey	NA	Botanical Garden, Labuan	Housing Price	Distance to Fire bridged	(-)

		Semi Detached, Bangalow					
14	Nurul et al (2014) [42]	Single Storey Terrace, Double storey Terrace, Double Storey Semi Detached, Bangalow	NA	Botanical Garden, Labuan	Housing Price	Distance to Religious Centre	(+)
15	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Cultural Object	(+)
16	Schlapfer et al (2015) [23]	Apartment	2001-2007	Switzerland	Rent	Undisturbed Area	(+)
17	Soltani et al. (2023) [33]	Apartment	NA	Tehran, Iran	Housing Price	Distance to Nearest Tourist Services	(-)
18	Soltani et al. (2023) [33]	Apartment	Na	Tehran, Iran	Housing Price	Distance to Nearest Cultural-artistic Services	(-)
19	Soren et al. (2006) [11]	Single-Family House	NA	St. Pual	Housing Price	Distance to Cemetery	(-)
20	Tachaiwat et al. (2023) [34]	Condominium	NA	Thailand	Property Investment	Sustainable Technology	(-)
21	Wen et al (2017) [40]	High-rise apartment	NA	Hang Zhou, China	Housing Price	Distance to Grand Canal	(-)

2.7 Residential Housing

A residential property is defined as building which includes slab and column, equipment and tool that are utilized partially or fully build or constructed for the purpose and usage of human living. Residential is a structure serving as an isolated shelter or residence for more than one occupier, notably for a group of family member whether big or small. Residential property may specifically be the real estate designed and utilized for housing purposes. Due to the rapid development, the residential housing had now evolved from physical habitation of human to a valuable asset that serves for social expenditure, as an investment and attachment to real estate growth and development.

Housing is one of the most vital components to a human in providing habitation, protection, balminess, personal spaces, also to provide a place for the dwellers to rest (Henilane, 2016). Residential properties are typically scrutinised as a long-lasting enduring goods that would last in market for a long-run equilibrium (Goodman, 1978). The transaction of residential housing in the market often reflects on the preference characteristic and type of houses and the value-added premium to the house. Where there is an interesting phenomenon that different places would possess and interest in different type of residential property. As such, the supply and demand of the residential property would fluctuate or differ according to the location.

2.7.1 Types of Residential Property

Housing in gated and guarded schemes can be differentiated and split into different category based on the housing characteristic such as the design, size, and type. This housing typology can be referred to the classification of residential buildings, according to its link with physical composition, concentration of development and degrees of formality (Poh and Yun, 2018). There are many types of house and residential properties in Malaysia. The most found housing topologies in Malaysia cities can be found in Malaysia National Property Information (NAPIC) as a manual and instruction.

The NAPIC had categorized the residential properties into four segments, mainly high-rise, terrace, semi-detached housing, and detached housing in the housing price index.

For further understanding on the types of residential property, it can further divide them into Townhouse, apartment, condominium, flat, terrace house, semi-detached house, detached house, and cluster house. This categorisation will consider the unique physical form and features, other than the fact that this type of residential units is commonly found in the urban market. The explanation for each type of residential properties is provided as below:

Table 2.11: Types of Residential Property (NAPIC).

Types of Housing	**Definitions**	**Examples**
Townhouse	Two distinct dwellings constructed on top of one other; each unit has its own strata title. A separate stairway leads to the top units. These homes are usually "half" stories tall, both the upper and lower sections.	
Apartment	Multi-storey building that holds a Strata Title. It is considered as a medium to lower-end type building. It usually come with simple facilities such as playground and simple landscaping. It can be gated or non-gated.	

Condominium	Multi-storey building that's holds a Strata Title. It is considered as a mid to luxury type strata building. It is equipped with well-equipped facilities such as Olympic size swimming pool, tennis court, gymnasium, etc. It also comes with advance security force and covered car parking.	
Flat	Strata building that is cheaper and affordable. High-rise apartment that has no lift to the upper elevations. Least and minimum facilities such as basic playground, outdoor parking.	
Terrace house	May also referred to "linked house", constructed linearly as a row, sharing common bearing walls. Would have open spaces or setback on the frontier or rear of the property.	
Semi-D housing	Compromise of two units of houses sharing one regular wall, with each other having a larger frontage and side garden.	
Detached house or Bungalows	Refers to landed properties that are standalone building. It had larger compound surrounding the house.	
Cluster house	Refers to a stand-alone home that unites back-to-back with another home and has a party wall shared with it. It often has an open area in front and on one side.	

2.7.2 Gated and Guarded Housing Schemes

Gated and guarded schemes which often referred to as gated communities or guarded neighbourhood are a type of residential developments in Malaysia that offer additional security, amenities, and facilities beyond the traditional housing estates. Gated and guarded communities have emerged as a new urban form and trend in the modern and urban settlements (Hanif, et al., n.d). In general, the concept and practice of a gated and guarded community indicates that communities construct a "fortress" around the community to improve safety and provide refuge from criminal activities. However, as times goes by, the concept of gated and guarded schemes had also taken into consideration the landscape design and development into the gated and guarded schemes. As looking into various development and construction in Malaysia, development had considered green and urban landscape into their development. As such, the community in the gated and guarded schemes would have private facilities and amenities that only can enjoyed by the residence themselves. As a brief, the gated and guarded schemes can be developed with any type of property; however, it should be constructed with gate in its whole development.

2.8 Determinants of Residential Attributes on the Influence of Housing Value

Every home is different and has a special set of features, according to Garrod and Willis (1992). The value of these traits determines the premium that potential purchasers are willing to pay for a given residential property. Three main categories may be identified when applying the hedonic pricing model to the current study: structural, neighbourhood and demographic, and environmental factors. These factors determine the price of a home. Housing variables (e.g. number of rooms, age, condition of building, etc.)

1. Neighbourhood and demographic variables (e.g. population density, crime rate, quality of management, etc.)

2. Environmental Factors (Air quality, green percentage, and Ratio, etc.)

Based on the previous research, the study has reviewed on the attributes which would contribute to the value of residential property. This is further list down and tabulated as in the tables below. The summary of these is relatively important to determine the significant attributes and variables that would be utilized in the model of study. These enable the study to identify the data to be collected and included in the analysis part. These will be further discussed as in Chapter 3.

2.8.1 Summary on Attribute Factors

Table 2.12: Parcel and Building Related Attributes

Author	Parcel & Building Related CV	Coefficient	%
Geoghegan. (2002) [4]	Lot Size	(+)	0.05
Geoghegan. (2002) [4]	Building Age	(+)	0.05
Geoghegan. (2002) [4]	Size of House	(+)	0.05
Geoghegan. (2002) [4]	Number of Stories in House	(+)	0.05
Geoghegan. (2002) [4]	Average Good	(+)	0.05
Geoghegan. (2002) [4]	Good	(+)	0.05
Geoghegan. (2002) [4]	Very Good	(+)	0.05
Liisa Tyrväinen (1997) [5]	Apartment Size	(+)	0.00
Liisa Tyrväinen (1997) [5]	Number of Room	(-)	0.00
Liisa Tyrväinen (1997) [5]	Building Age	(-)	0.00
Liisa Tyrväinen (1997) [5]	Flat Roof	(-)	0.00
Liisa Tyrväinen (1997) [5]	Renovation	(-)	0.00
Liu et al. (2019) [6]	Building Age	(-)	0.00
Liu et al. (2019) [6]	Elevator	(+)	0.00
Liu et al. (2019) [6]	Floor Area	(+)	0.00
Liu et al. (2019) [6]	Quality of Developer	(+)	0.00
Shi et al (2022) [7]	Lot Size	(+)	0.01
Shi et al (2022) [7]	Parking	(+)	0.01
Shi et al (2022) [7]	Quality of Decoration	(+)	0.01
Yang et al. (2020) [8]	Floor Area	(+)	0.01
Yang et al. (2020) [8]	Age	(-)	0.01
Yang et al. (2020) [8]	Building Heights	(+)	0.01
Yang et al. (2020) [8]	Number of Room	(+)	0.01
Du et al. (2018) [10]	Floor Area	(-)	0.1
Du et al. (2018) [10]	Parking Space	(+)	0
Du et al. (2018) [10]	Building Age	(-)	0.01
Du et al. (2018) [10]	Total Number of Apartment	(-)	0.05
Du et al. (2018) [10]	Quality of Developer	(+)	0.01
Soren et al. (2006) [11]	Lot Size	(+)	0
Soren et al. (2006) [11]	Number of Bathrooms	(+)	0
Soren et al. (2006) [11]	Building Age	(-)	0
Lee et al. (2020) [12]	Floor Area	(+)	0.01
Lee et al. (2020) [12]	Floor Level	(+)	0.01
Lee et al. (2020) [12]	Building Age	(-)	0.01
Lee et al. (2020) [12]	Number of Apartment	(+)	0.01
Cho et al. (2009) [14]	Floor Area	(+)	0.01
Cho et al. (2009) [14]	Building Age	(-)	0.01

Cho et al. (2009) [14]	Stories	(+)	0.01
Cho et al. (2009) [14]	Garage	(+)	0.01
Cho et al. (2009) [14]	Bedroom	(+)	0.01
Cho et al. (2009) [14]	Brick	(+)	0.01
Cho et al. (2009) [14]	Pool	(+)	0.01
Cho et al. (2009) [14]	Fireplaces	(+)	0.01
Cho et al. (2009) [14]	Condition Quality	(+)	0.01
Huang et al. (2021) [16]	Floor Area	NA	NA
Huang et al. (2021) [16]	Parking Lot	(+)	0
Huang et al. (2021) [16]	Building Furnish	(+)	0
Jim & Chen (2009) [19]	Building Age	(-)	0
Jim & Chen (2009) [19]	Floor Level	(+)	0
Jim & Chen (2009) [19]	Floor Area	(+)	0
Jim & Chen (2009) [19]	Number of Bedroom	(+)	0
Morancho (2003) [20]	Lot Size	(+)	0
Morancho (2003) [20]	Balcony Size	(+)	0
Morancho (2003) [20]	Number of Rooms	(+)	0
Morancho (2003) [20]	Building Age	(-)	0
Morancho (2003) [20]	Parking Lot	(+)	0
Jiao & Liu (2010) [22]	Stories	(+)	0.05
Jiao & Liu (2010) [22]	Number of Bathrooms	(+)	0.1
Jiao & Liu (2010) [22]	Number of Rooms	(+)	0
Jiao & Liu (2010) [22]	Floor Area	(+)	0
Belcher et al (2019) [25]	Floor Area	(+)	0.001
Belcher et al (2019) [25]	Stories	(+)	0.001
Belcher et al (2019) [25]	Building Age	(+)	0.001
Belcher et al (2019) [25]	Number of Condominium	(-)	0.001
Belcher et al (2019) [25]	Richness of Facilities	(+)	0
Yang et al. (2021) [26]	Building Age	(-)	0
Yang et al. (2021) [26]	Floor Numbers	(-)	0
Yang et al. (2021) [26]	Renovated	(-)	0
Hasanah et al (2018) [27]	Number of Bedrooms	(+)	0.01
Hasanah et al (2018) [27]	Floor Numbers	(-)	0.01
Hasanah et al (2018) [27]	Floor Area	(+)	0.01
Hasanah et al (2018) [27]	Total Floor	(+)	0.01
Hasanah et al (2018) [27]	Building Age	(+)	0.01
Hasanah et al (2018) [27]	Unfurnished	(-)	0.01
Su et al. (2021) [28]	Total Area	(+)	0.01
Su et al. (2021) [28]	Number of Rooms	(+)	0.01
Su et al. (2021) [28]	Storey Level	(+)	0.01
Su et al. (2021) [28]	Structure	(+)	0.01
Dai et al. (2023) [29]	Elevation	(+)	0.005
Dai et al. (2023) [29]	Building Age	(+)	0.005

Dai et al. (2023) [29]	Number of Room	(-)	0
Dai et al. (2023) [29]	Floor Level	(+)	0.005
Belej et al. (2023) [30]	Plot Area	(+)	0
Belej et al. (2023) [30]	Building Area	(+)	0
Belej et al. (2023) [30]	Condition	(+)	0
Wu et al. (2022) [31]	Plot Ratio	(+)	0
Chen et al. (2022) [32]	Flat	(-)	0
Chen et al. (2022) [32]	Semi-Detached	(-)	0
Chen et al. (2022) [32]	Terraced	(-)	0
Chen et al. (2022) [32]	Newly Built	(+)	0
Soltani et al. (2023) [33]	Number of Rooms	(+)	0
Soltani et al. (2023) [33]	Age of Building	(-)	0
Bottero (2022) [36]	Bedroom	(+)	0
Bottero (2022) [36]	Bathroom	(+)	0
Bottero (2022) [36]	Carpark	(+)	0
Chen et al. (2023) [37]	Building Age	(+)	0
Chen et al. (2023) [37]	Bedroom	(+)	0.05
Chen et al. (2023) [37]	Bathroom	(+)	0.01
Chen et al. (2023) [37]	Housing Size	(-)	0.01
Chen et al. (2023) [37]	Elevator	(+)	0.01
Chen et al. (2023) [37]	Storey	(-)	0.01
Chen et al. (2023) [37]	Window Orientation	(+)	0.01
Tyrväinen & Miettinen (2000) [38]	Floor Area	(-)	0
Tyrväinen & Miettinen (2000) [38]	Building Age	(-)	0
Wen et al (2017) [40]	Building Area	(+)	0
Wen et al (2017) [40]	Building Age	(-)	0
Wen et al (2017) [40]	Decoration Degree	(+)	0
Wen et al (2017) [40]	Orientation	(+)	0
Wen et al (2017) [40]	Floor Location	(-)	0
Wu et al. (2022) [41]	Plot Ratio	(+)	0
Nurul et al (2014) [42]	Lot Size	(+)	0
Nurul et al (2014) [42]	Age of Building	(-)	0
Belcher & Chisholm (2018) [43]	Room numbers	(+)	0
Belcher & Chisholm (2018) [43]	Storey	(+)	0
Belcher & Chisholm (2018) [43]	Building Age	(-)	0
Hamilton & Morgan (2010). [44]	Bathroom	(+)	0.01
Hamilton & Morgan (2010). [44]	Building Size	(+)	0.1
Hamilton & Morgan (2010). [44]	Building Age	(-)	0.01
Xun et al. (2021) [45]	Building Area	(+)	0.01
Xun et al. (2021) [45]	Floor Area	(+)	0.01
Xun et al. (2021) [45]	Bedroom	(+)	0.01

Chen et al. (2023) [46]	Building Age	(+)	
Chen et al. (2023) [46]	Number of Bathrooms	(+)	0.05
Chen et al. (2023) [46]	Number of Bedrooms	(+)	0.01
Chen et al. (2023) [46]	Housing Size	(-)	0.05
Chen et al. (2023) [46]	Storey	(-)	0.01
Chen et al. (2023) [46]	Window Orientation	(+)	0.01
Chen et al. (2023) [46]	Elevator	(+)	0.01
Dahal et al. (2019) [47]	Bedrooms	(-)	0.01
Dahal et al. (2019) [47]	Bathroom	(+)	0.01
Dahal et al. (2019) [47]	Parking Lot	(+)	0.01
Dahal et al. (2019) [47]	Fireplaces	(+)	0.01
Dahal et al. (2019) [47]	Housing Area	(+)	0.01
Dahal et al. (2019) [47]	Building Age	(-)	0.01

Table 2.13: Density and Demographic Related Attributes.

Author	Density and Demographic CV	Coefficient	%
Geoghegan. (2002) [4]	Population Density	(-)	0.05
Geoghegan. (2002) [4]	Resident with Bachelors' Degree	(+)	0.05
Geoghegan. (2002) [4]	Median Income	(+)	0.05
Liu et al. (2019) [6]	Quality of Property Management	(+)	0.00
Shi et al (2022) [7]	Quality of Community Management	(+)	0.01
Shi et al (2022) [7]	Quality of Living Facilities	(+)	0.01
Shi et al (2022) [7]	Quality of Community Environment	(-)	0.00
Yang et al. (2020) [8]	Residential District Environment	(+)	0.01
Yang et al. (2020) [8]	Population Density	(-)	0.01
Yang et al. (2020) [8]	Job Density	(+)	0.01
Du et al. (2018) [10]	Quality of Property Management	(+)	0
Soren et al. (2006) [11]	Density	(-)	0
Soren et al. (2006) [11]	Median Income	(-)	0
Soren et al. (2006) [11]	Crime	(-)	0
Soren et al. (2006) [11]	Population less than 18 years old	(+)	0
Soren et al. (2006) [11]	Population more than 65 years old	(+)	0
Cho et al. (2009) [14]	Home Density	(-)	0
Cho et al. (2009) [14]	Vacancy Rate	(-)	0
Cho et al. (2009) [14]	Unemployment Rate	(-)	0.01
Cho et al. (2009) [14]	Change in Population Density	(-)	0
Huang et al. (2021) [16]	Population Density	(-)	0
Soltani et al. (2023) [33]	Literacy Rate	(+)	0
Soltani et al. (2023) [33]	Employment Rate	(+)	0
Soltani et al. (2023) [33]	Ownership	(+)	0
Soltani et al. (2023) [33]	Migration	(-)	0
Wen et al (2017) [40]	Property Management	(+)	0

Dahal et al. (2019) [47]	Poverty	(-)	0.01
Dahal et al. (2019) [47]	Vacancy	(-)	0.01
Dahal et al. (2019) [47]	Recreation	(+)	0.01
Dahal et al. (2019) [47]	Median Age	(-)	0.01

Table 2.14: Landscape Development Related Attributes.

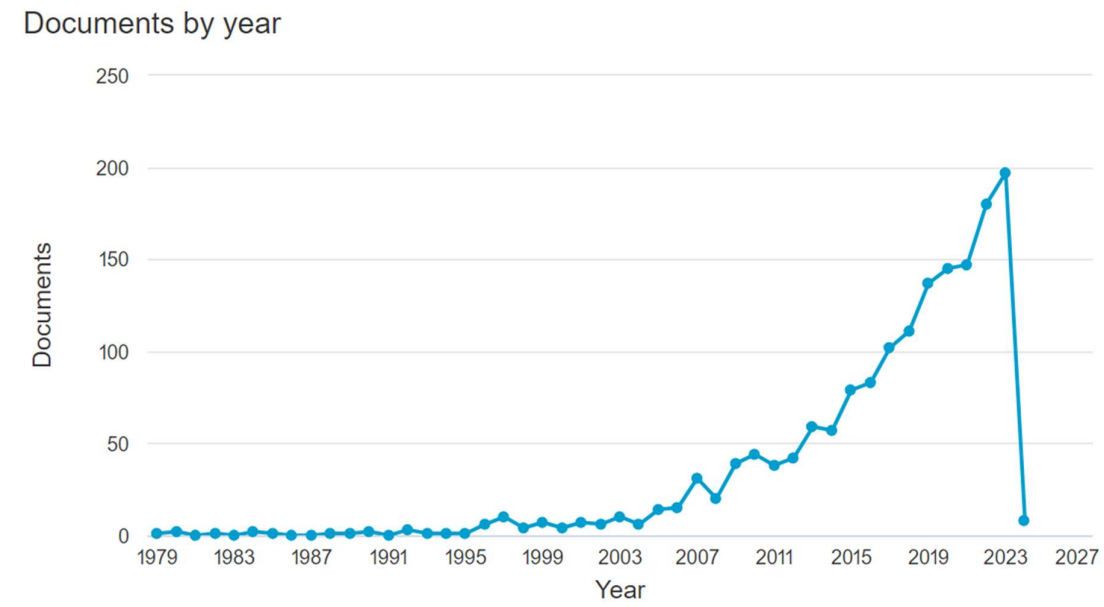
Author	Landscape_CV	Coefficient	%
Geoghegan. (2002) [4]	Development Open Land	(+)	0
Geoghegan. (2002) [4]	Permanent Open Space	(+)	0
Liisa Tyrväinen (1997) [5]	Landscape Percentage	(+)	0
Du et al. (2018) [10]	Green Percentage	(+)	0.01
Huang et al. (2021) [16]	Land Use within each apartment	NA	NA
Huang et al. (2021) [16]	Green Space Ratio	NA	NA
Morancho (2003) [20]	Urban Green Size	(+)	0
Jiao & Liu (2010) [22]	Green Space Ratio	(+)	0
Jiao & Liu (2010) [22]	Air Quality	(-)	0
Kong et al (2007) [24]	Type of the Nearest Public Green Space	(+)	0
Kong et al (2007) [24]	Patch Richness of the Neighbourhood Land-Use	(-)	0
Belej et al. (2023) [30]	Percentage of Green Areas	(+)	0
Chen et al. (2023) [37]	Green Space Size	(+)	0.01
Chen et al. (2023) [46]	Landscape Shape	(+)	0.01
Chen et al. (2023) [46]	Green Space Size	(+)	0.01

Table 2.15: Transaction and Time Related Landscape.

Author	Transaction & Time Related	Coefficient	%
Shi et al (2022) [7]	Management Fees	(+)	0.01
Cho et al. (2009) [14]	Real Estate Market Season	(+)	0.01
Cho et al. (2009) [14]	Prime Rate	(+)	0.05
Huang et al. (2021) [16]	Management Fees	(+)	0
Hasanah et al (2018) [27]	Urgent Sale	(-)	0.01
Su et al. (2021) [28]	Rental Option	(+)	0.01
Wu et al. (2022) [31]	Management Fees	(+)	0.1
Wu et al. (2022) [41]	Management Fees	(+)	0.01

2.9 Journal Article Studies on Landscape

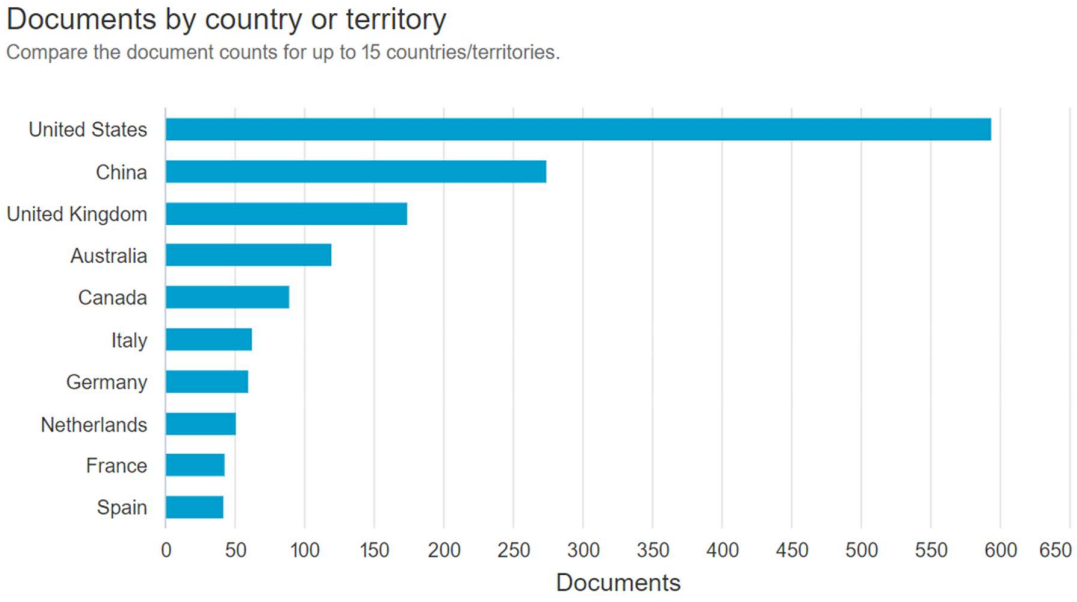
Figure 2.2: Article on Landscape Influencing Housing Price over 1979 to 2024.



The study on landscape influencing housing price had become more and more crucial in today world. The correlation between landscape and housing prices has garnered significant attention in recent years, reflecting a growing recognition of the multifaceted impact that the surrounding environment can have on property values. Researchers and urban planners alike have delved into this complex relationship to better understand how various landscape features contribute to the overall appeal and market value of residential properties. This can be seen where there are an increasing number of studies on the landscape influence on housing price over the past decades. As of the figure 1 above, there is a swift increase in the relevant article starting from year 2003 to year 2023. The aspect of these research focuses on the aesthetic appeal of landscape, urban planning, and its direct influence on housing price. Hence, the researcher is taking more consideration on the landscape of the residential housing market to provide a better developed housing scheme to cater and segment the consumer base.

Other than that, in the era of smart cities and technology advancements, researchers are also exploring how innovative landscape designs, incorporating smart and sustainable infrastructure, can influence the housing price. Homes in areas with cutting-edge landscape features that prioritize sustainability, connectivity, and smart urban planning may witness increased demand and subsequently higher valuations. Hence, this rising trend on providing better landscape residential housing by urban planners, real estate professionals, and policymakers had made this topic more important. As can be seen, there are a total of 204 article on the landscape influence topic as in year 2023.

Figure 2.3: Article on Landscape Influencing Housing Price by Country.



In an era marked by rapid urbanization and shifting societal preferences, the relationship between landscape and housing prices has emerged as a pivotal factor influencing real estate dynamics worldwide. The influence and effects of natural surroundings on housing values is a nuanced phenomenon, reflecting the diverse preferences, cultural nuances, and environmental considerations unique to each country. The significance of this study becomes apparent as countries grapple with the challenges of sustainable urban development, climate change, and

the ever-growing demand for housing. The global real estate landscape is undergoing a transformative shift, with researchers, policymakers, and investors recognizing the crucial role that natural environments play in shaping the economic and aesthetic dimensions of the housing market. As looking into the figure 2 above, the United State has the highest article record with 593 articles in total as of 2023. This is later followed by China with 273 articles in total on the relevant topic.

As looking locally, Malaysia has a very limited study on the influence of landscape toward the housing price. This can be seen where there is only a record of 17 article in total as of the year 2023. With the lack of study in this relevant topic, it can cause some barriers to academic progress and limited research understanding on this topic. Professionals in various fields often rely on research findings to inform decision-making processes. A shortage of study can make it challenging for policymakers, practitioners, and industry leaders to make informed and evidence-based decisions.

2.9.1 Analysis Across Distinct Temporal Periods

Landscape analysis across distinct temporal periods provides a captivating lens through which to observe the evolving tapestry of our surroundings, reflecting the dynamic interplay of human activities, cultural shifts, and environmental considerations. Before the transformative era of 1990, landscapes bore witness to a world shaped by traditional architectural styles and a slower pace of development. The landscape analysis of residential housing across distinct temporal periods unveils a fascinating narrative of architectural evolution, lifestyle preferences, and societal demands. Before 1990, residential landscapes echoed traditional design principles, with homes often characterized by timeless architectural styles and spacious green surroundings. The period from 2000 to 2010 witnessed a paradigm shift as rapid urbanization led to a surge in high-density living, marked by the rise of condominiums and compact housing solutions. The subsequent decade, from 2011 to 2020, saw a pronounced emphasis on smart and sustainable residential development. Energy-efficient homes, eco-friendly

designs, and a focus on community-centric living became prevalent themes. As delving into the current epoch, from 2021 to the present, the landscape analysis of residential housing is shaped by a renewed commitment to resilient and adaptable living spaces. Homes are increasingly designed to integrate technology seamlessly, promoting connectivity and enhancing the overall quality of life. The exploration of these temporal periods in residential landscapes offers profound insights into how our homes have not only adapted to societal changes but have also played a pivotal role in shaping the very fabric of the communities and urban.

a) Before 2000

Looking into the landscape studies before 2000, there are a total of 44 articles on the landscape topics as according to Scopus's database (Scopus, n.d). Via these articles, most of the study focuses on the natural and rural landscape. This may include the study on farm and vegetation landscape, forest and wood landscape, mountain landscape, and waterbody. From these articles, it can be presumed that the trend before 2000 is more toward the natural landscapes. This may be a reasonable presumption to make as there was generally a greater trend toward the preserving and appreciating natural landscapes compared to later years. However, there are also a trend of urbanization landscape study as of the late 90s. This is where the urbanization awareness start taking place into the landscape study. As looking into the articles by country, most article studied the landscape of United Kingdom, United Stated of America, and European Union.

It is significant taken into consideration that this trend was not uniform across all regions. Development pressures, industrialization, and urbanization still led to significant alterations of natural landscapes in many areas. Other than that, attitudes towards the environment can vary depending on cultural, economic, and politic factors.

b) 2000 to 2010

As looking into the landscape studies between 2000 to 2010, there article on landscape topics had boost to 196 studies counts in total. After 2000, while environmental awareness continued to boost in many circles, there were also rival influences such as population growth, urban expansion, and economic development that sometime placed greater strain on natural landscapes. Via these academic period, urban landscapes had become a trend towards the community. This is where the urban landscape and natural landscape balance to sustain the community growth while acknowledging the growth and protection of nature. With this, the urban green spaces and implementation of urban land use had been the study area of most of the country. As of the document counts by country, United States, European Union, United Kingdom has dominated in the landscape study. However, there are more east and middle east region to study on this topic (Scopus, n.d). This includes China, Hong Kong, and Israel.

c) 2011 to Current

As of the current study on landscape, the trend became wider array compared to the last few decades. There has been a continued attention on environmental issues, including attitudes toward natural landscapes. Some of the key trends include the climate change awareness, urbanization and green spaces, sustainable development goals (SGDs), and technology. The period after 2010 saw an acceleration of technological advancement, globalization, and consumerism, which also significant impacts on the environment. As an example, there are study on the off and on shore wind turbines towards the property value. Besides, there are also improved studies on the urban landscape planning to a more sustainable future. 'How would the limited land area cater the large number of urbanization and migration whilst balancing the nature aspect, social aspect and community aspect.' This is where the study of sustainable landscape came in. As looking into the document counts by country, United States, United Kingdom, China,

and the European Union dominated in the landscape studies. More countries investigated the landscape studies such as Malaysia, Africa countries, and India.

2.10 Hedonic Pricing Model in Estimating Landscape Effect

The hedonic pricing model is utilized here to value landscapes in the gated-guarded housing communities. The real estate industry is closely tied to the economic well-being of a nation, and a robust housing sector often catalyses growth across various economic domains. Investigating the factors influencing property prices is imperative, given that a thriving demand for housing has a ripple effect on multiple sectors. Consequently, understanding these variables is crucial as the acquisition of residential property involves both an investment and a consumption decision. However, unlike other consumption goods, the residential market is distinctive because it exhibits the characteristics of durability, heterogeneity, and fixed spatial. Thus, to model this differentiation, the hedonic pricing model had been introduced (Chin & Chau, 2002). The hedonic pricing model analyse the relationship between the observed prices and observed characteristics (Rosen, 1974). Hence, the price of one property relative to another will differ with other unit of different attributes inherent. The relative price of a house will then be summed up all its marginal or indirect prices estimated through regression analysis.

The Hedonic Pricing Model represents a powerful tool for assessing the impact of landscape features on property values. Within this framework, the pricing of a property is viewed as a sum of its various attributes, with landscape elements playing a significant role. This model dissects the components of a property, considering factors such as the quality of the surrounding environment, green spaces, and aesthetic characteristics. The hedonic pricing model has been used extensively in analysing the housing market. Numerous studies have utilised this technique to examine the relationship between the landscaping and the price of properties (Liu et al., 2019; Shi et al., 2022; Yang et al., 2020, Breunig et al., 2019). This is because the market price of the real estate can be determined by the buyers' preference of the housing units in term of locational, structural, or neighborhood attributes (Freeman, 1979). Based on findings, most of these hedonic pricing model study on landscape are inclined towards the market in Western Country and China. Only a few were conducted in the southeast region, such as in Singapore (Belcher et al., 2019; Belcher & Chisholm, 2018) and in Malaysia (Norzailawati et al., 2015).

This study will review the literature on the utilization of hedonic pricing model on landscape issue in housing markets and identifies a list of variables to be included in the models.

Every attribute possesses an implicit value that can be approximated using the hedonic equation as follows:

$$Price = f(S, A, N, E) + \varepsilon$$

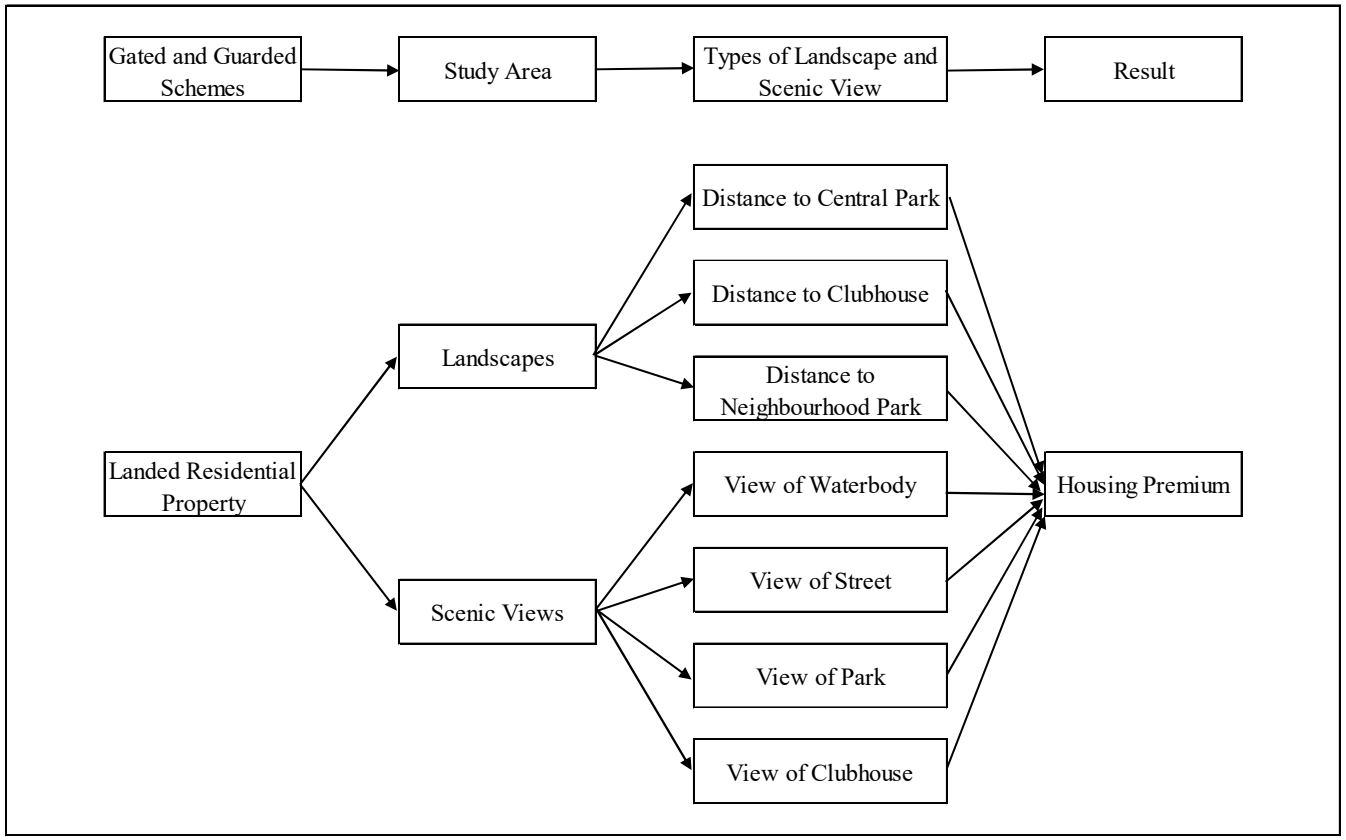
Or

$$Price = f(\chi) = \beta 0 + \beta sXs + \beta AXA + \beta NXN + \beta EXE + \varepsilon$$

Where β is the coefficient vector for each attribute which measures its impact on the housing price. As ε is the vector of random error terms.

2.11 Theoretical Framework

Figure 2.4: Theoretical Framework for the Current Study.



2.12 Conclusion

In conclusion, the literature review had gone through in detail on the definition of landscape and scenic views. Besides, the study also take consideration on the review of previous studies on the landscape and scenic views topic on residential properties. The literature review also introduced the residential segment property, housing types, housing prices, and factor affecting housing price. Not only this, but the current study also reviewed the hedonic pricing model that would be utilized in the later chapter. These literature review stated would be beneficial to broaden the knowledge on landscape which would be used in the methodology section in Chapter 3.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

In this chapter, it will emphasize on the study methodology of the current research. This may consist of general processes from data collecting process to techniques of analysing the data. Analytically, this chapter will contrast how the research objectives of this study is being transformed into a practical approach. The set of steps or techniques used in research to accomplish the study's goals is known as the research methodology. It is a crucial guideline in this study, mainly to determine the variables to be gathered and variables measurement to be applied. Besides, this chapter also involved detailed explanations regarding data collection, data sampling, the method used, data analysis by Multiple Regression Analysis (MRA) and the formation of the hedonic model.

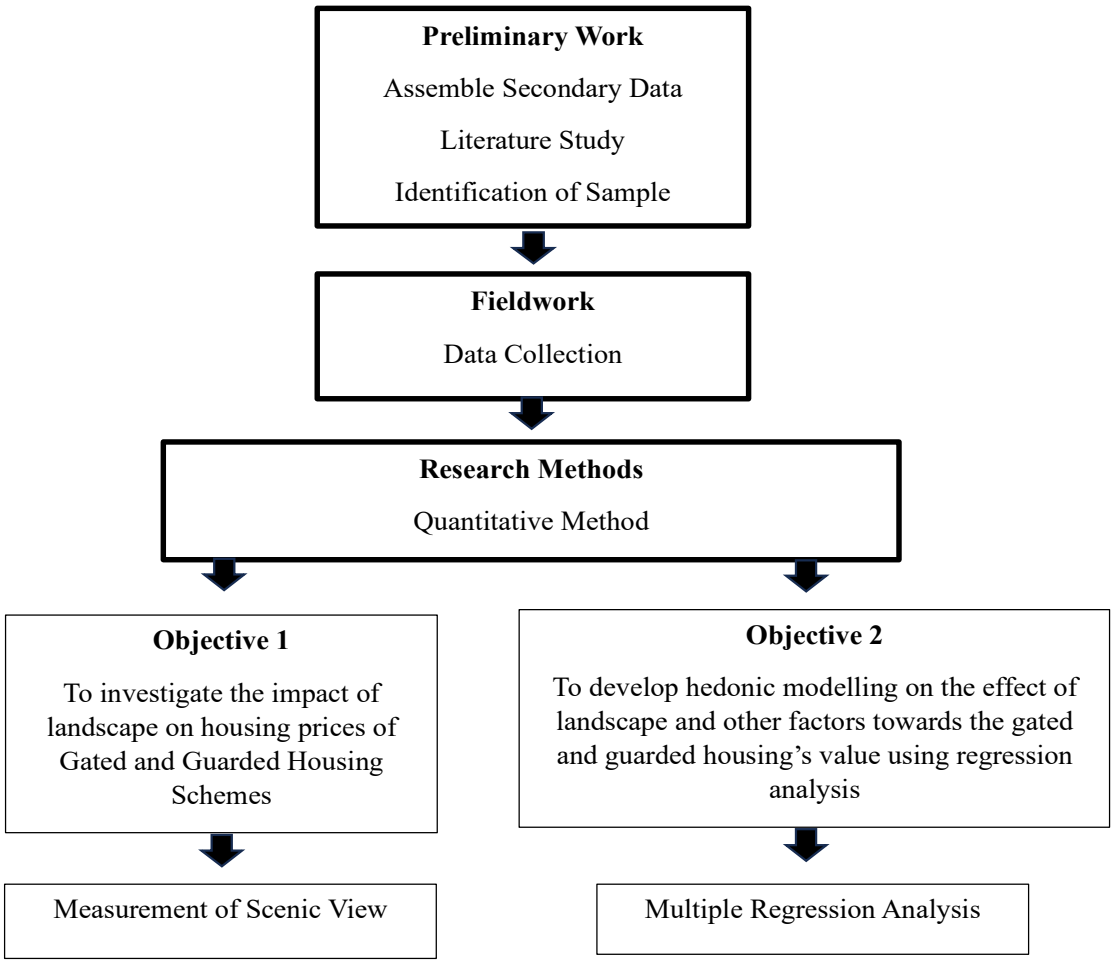
The observation method was adopted in collecting the primary data. This is done by inspection of the selected site. In addition, the literature study completed in Chapter 2 will serve as the foundation for the hedonic modelling. In order to investigate the method of measuring the type and quality of landscape towards the gated-guarded community and to develop a hedonic modelling on the effect of scenic views and other factors towards the value of the gated-guarded community using the regression analysis, Multi Regression Analysis (MRA) was used in this study.

3.1 Research Flow Chart

To gain the result of this study, there are several stages of the research procedure, which must be developed before the data is collected and analysed. It is fundamental to outline the data needed appropriately to ensure and guarantee the validity and reliability of results. Through

well-organized steps in research, all the arguments and contentions that arise can be diminished. Besides, it also makes sure that the data gathered would have the best quality and beneficial to the explanation of the variables discussed in this study. The flow chart of this research will be demonstrated as in the figure below.

Figure 3.1: Flow Chart of the Research.



3.2 Research Methodology

In this study, the observation and discussion on research methodology are according to the objectives of this study. This included the investigation of the influence of landscape on the premium of gated-guarded communities and developing the hedonic pricing model on the consequence of landscape, scenic view, and other attributes on the housing premium utilizing the regression analysis.

3.2.1 Objective 1: To investigate the impact of landscape on housing prices of gated-guarded communities.

The stud had come with the first objective to investigate the influence of landscape on housing prices of gated-guarded communities. This objective is achieved through the literature review specifically on the scenic view. This is done by analysing the previous studies on the impact of landscape towards the property. Besides, the method of measurement of the type and quality of scenic views will be observed. The measurement of the type and quality of the scenic views had been identified for the current study.

3.2.1.1 Identification of Landscape and Scenic Views Variables

Based on the literature view from various journals, all the considered variables for landscape and scenic views are tabulated in the table below. An analysis based on the result of past research in Chapter 2 will also be discussed. The table is shown as below for the list of variables for scenic view:

Table 3.1: List of Variables for Landscape and Scenic View.

Item	Types of Assessment	Variables of Landscape
Location	Geographic Orientation	• Area of Sea • Area of River • Area of Lake • Area of Mountain • Area of Urban Landscape
Position of Property	Distance and Proximity Assessment	• Sea • River • Lake • Mountain • CBD, Town, and City • Commercial Area
Type of Views	Simple View Assessment	• Waterbody • Mountain • Green Space • Urban View • Street View
Quality of Views	Visual Impact Assessment	• 4-ways Classification – Waterbody • 4-ways Classification-Mountain • Proximity from the Landscape or View • Position of Property from Scenic View in Vicinity

3.2.1.2 Method of Measurement

The measurement of the variables is crucially vital in current study of this research. For different types of scenic views and landscapes, there are different methods of measurement needed for the assessment of the variables of scenic views. In Table 3.1, the assessment of landscape and scenic views is categorized and segmented into three categories, basically location, position of property and scenic view. In this study, the geographic orientation in this study context is crucially important for the forming of the hedonic model. Hence, it must be included in the variables of the model to test the locational effect towards the property.

The method of measurement should also be clarified before the data collection is carried out. Practically, this is vital to avoid uncertainty and doubt during the data collection process and period. In the observation of the study, the data needed to gather would be the geographic orientation of the property and the distance to amenities such as in the surrounding urban landscape or the natural landscape. As for the visibility towards the scenic views, some properties may not have any visibility towards the scenic views or proximity towards the amenities or greens, but the housing price might be impacted by the locational factor of the property nearby instead of the factors that need to be observed. With this, it must be included in the data collection for further analysis.

Looking into the distance and proximity assessment, the measurement is relatively simple where the study needs to identify the duration, distance and radius taken to the amenities from the properties. In this study, the data of walking duration, the walking distance and radius towards the amenities and greens are being observed. It is made sure that the walking distance towards the amenities and greens is the shortest duration.

For simple view assessment, the measurement is reasonably simple whereby the study only needed to identify the presence of scenic views observable from the property inspected, while ignoring the different visibility levels of scenic views. The presence of

general views is being recognized and characterized as green space, garden, clubhouse, street view and building view in this study. For further study purposes, the dummy method is utilized for these variables, where the presence of these scenic views will be coded with “1” or “0”. When measuring variables that aren't usually quantified on a numerical scale, such as qualitative or categorical variables, the dummy-variable approach provides a simple and useful paradigm for calculating and counting the information contained in those variables (Balestra, 1990). In brief, the dummy method of measurement is applied to distinguish different types of scenic views.

Other methods of measurement applied in this study on the effect of landscape and scenic view are proximity from the landscapes or views and the position of property from scenic view in the vicinity. For the proximity from scenic view, the dummy method will be utilized where the scenic views observed from the property are coded as “1” if it is within 50m proximity from the property; otherwise, “0”. Looking into the position of the property from a scenic view, it needs to be identified and coded with a dummy method. The property located at the frontage of view observed or next to the borderline of where the amenities are located will be identified and coded as “1”, and vice versa.

To sum up, the method of measurement for a scenic view, and the distance to amenities and greens are listed below in Table 3.2. The table is summarized from the literature review as discussed in Chapter 2. These will serve as the variables used for further data collection and analysis, where comparison will be done concerning the distance to landscape, simple view, and visual impact assessment. The dummy method is adopted as a unit of measurement, where coding of “1” and “0” are served.

3.2.1.3 Data Analysis Technique

To achieve the first study objective, the journal of previous journal is studied in order to summarize the view and location variables for the current study. The summary is listed and structured in Chapter 2. The variables for scenic view and proximity to landscape factors are being allocated into different models for the test. This will later be analysed in independent and separate models using Multiple Regression Analysis (MRA) to observe the differences between the method of measurement towards the model outcome. Since both objectives are dependent and inseparable, this part of the data analysis technique shall be done in contrast with Section 3.2.2.

The analysis and test for the research of this objective will be performed in simple two steps. First and foremost, a basic model is set up by applying the structure of the building, neighbourhood and demographic factors, and management fee factors of the studied gated-guarded community. The standard enter method is applied for the variable selection which was justified through a Stepwise approach. Variables that do not contribute to a better model performance or are not important to the study will be eliminated in this stage.

Once Model 1 is tabulated, they will be forced into other models, this will include different types and quality of environmental factors. Later, both the Enter method regression methods are applied for the final variable selection. Different combinations for the type, scenic views and proximity to landscape factors arrangement were tested to determine the model that defined the most variance and adjustment of the study data. Other than that, this is to identify the measurement on the type of the landscape effects by selecting the most proper model which provides the best explanation of the variety of data.

3.2.2 Objective 2: To develop hedonic modelling on the effect of landscape and other factors towards gated-guarded communities value using regression analysis.

The second objective of this study is to formulate the best hedonic model on the influence of landscape factors, visibility of view factors, and other attributes factors towards the value of gated-guarded communities using regression analysis. Generally, it is to test and examine the effect of landscape factors and scenic views on the property price. Objective 2 is achieved via the observation conducted on 1,012 gated-guarded communities transacted in the past ten years within the district of Kuala Lumpur and mainly on three gated-guarded schemes which include Eco Grandeur, Saujana Utama, and Maple Hill. The Multiple Regression Analysis (MRA) model is adopted and applied in obtaining the study results. The study's methodology will be covered in the sections that follow.

3.2.2.1 Data Collection

The primary and secondary data are being utilized and collected to accomplish and reached the second objective of current research. Looking into the primary data collection, observation and inspection were conducted to obtain the data about the other factors of each gated-guarded community that are unable to be obtained through the transaction data. This may include data such as distance of property to amenities, etc. In the section that follows, the observation will be discussed in more detail.

Other than that, the secondary data utilized is the property transaction data for all landed Gated and Guarded Schemes properties in the particular and designated study area obtained from the database of Jabatan Penilaian dan Perkhidmatan Harta (JPPH). The residential name, property type, address, building size, land area, interest kind, and

transaction price are all included in the property transaction data that was acquired for this study.

3.2.2.2 Identification of Samples

Based on the variables utilized for the current study, a sage technique of sampling process taken on the gated-guarded community is essential. For the current research to be efficiently conducted, the gated-guarded communities from the district of Kuala Selangor are taken into consideration. However, it is impractical and impossible to study the entire population of the gated-guarded community in the area of Kuala Selangor. Hence, concerning all the landscape factors and scenic view factors that are considered in this study, the sample is merely focused on the gated-guarded communities in Eco Grandeur, Taman Saujana Utama and Palm Hill Park. This assisted to eliminate the requirement to gather information on picturesque vistas in places where the influence of those views is insignificant. The significant of choosing these three gated and guarded schemes is due to the reason that they are place near to each other. Besides, as the district of Kuala Selangor is far away from the city centre or CBD, the data collected will be prone to effect of city centres and CBD while focusing on the landscape and scenic view itself.

Based on the cluster sampling method, three gated-guarded community schemes/townships are studied in this research and all the transacted properties for the past ten years within the schemes are selected as the samples of the study. The study will focus on the properties that are maintained adequately and are within the schemes mentioned above. For more detailed information about the three gated-guarded communities, the table below will describe accordingly some factors of the development. The Eco Grandeur Township will serve as the main study area for this research. This is because Eco Grandeur is properly planned and well-maintain.

Table 3.2: Study Area 1_Eco Grandeur.

Gated-Guarded 1:	Eco Grandeur
	
Developer	Eco World
Launching Date	Year 2016
Development Size	1,400 acres
Development Type	Integrated Township
Available Residential Property	Semi-Detached House and Detached House
Landscape Provided	1) Dragonfly Park 2) Club House within each Neighbourhood. 3) Cycling Track and Walking Trails

Table 3.3: Study Area 2_Bandar Saujana Utama.

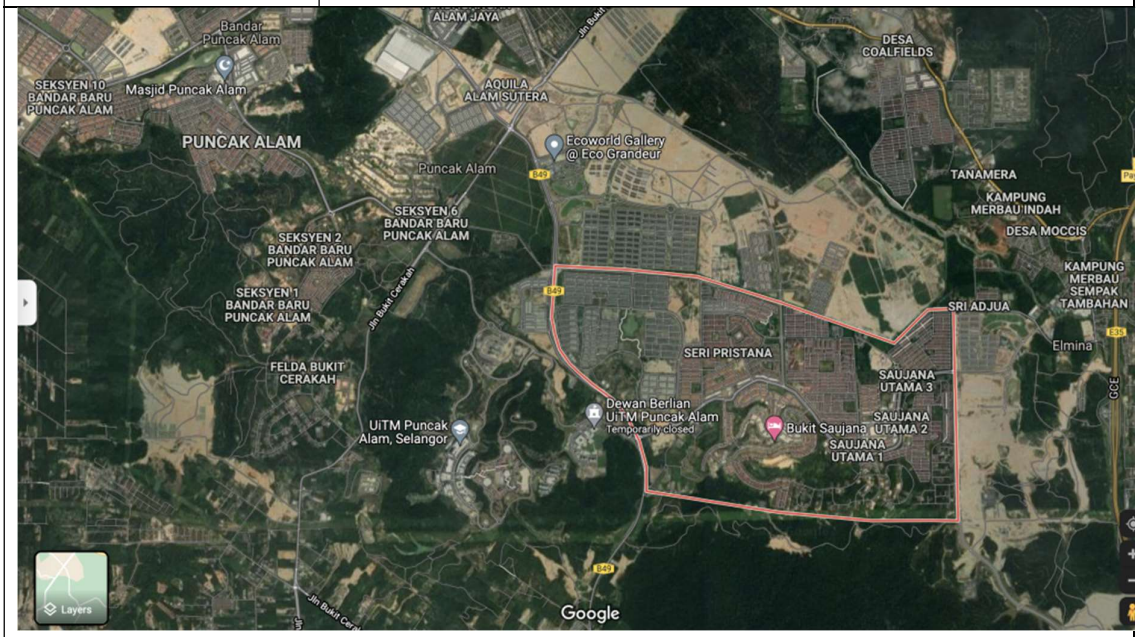
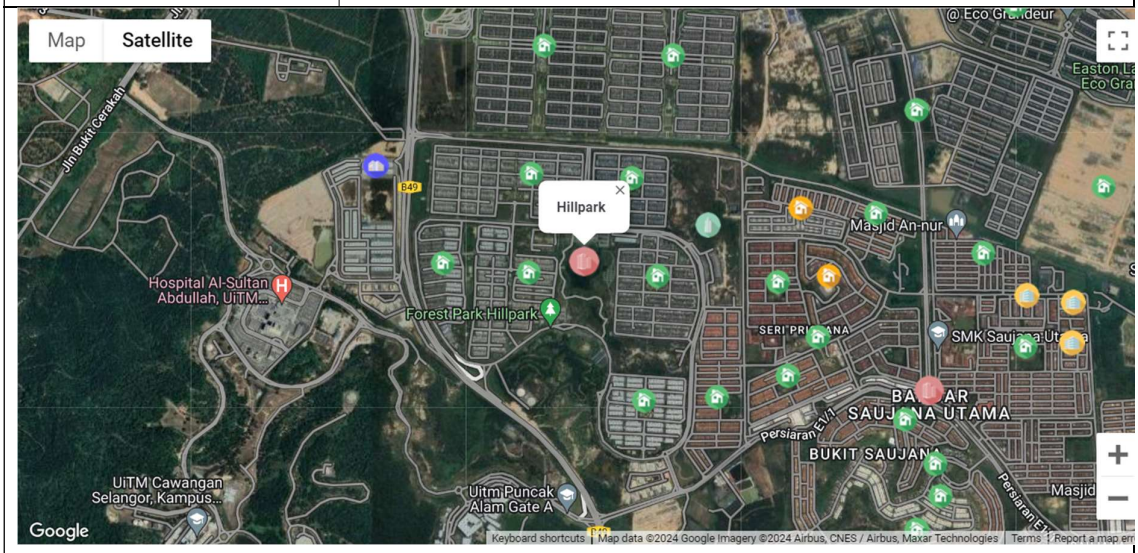
Gated-Guarded 2:	Bandar Saujana Utama
	
Developer	Glomac Bhd
Launching Date	Year 1997
Development Size	1,100 acres
Development Type	Mixed Development
Available Residential Property	Terrace House and Linked Bungalow
Landscape Provided	1) Children's playground

Table 3.4: Study Area 3_Maple Hill Park.

Gated-Guarded 3:	Bandar Hill Park
	
Developer	MKH Berhad
Launching Date	-
Development Size	550 acres
Development Type	Mixed Development
Available Residential Property	Linked Homes and Garden Homes
Landscape Provided	1) 50acres forest and central lake park

These three gated and guarded schemes were utilized to further discover and contrast the influence of landscape and scenic views on the housing premium. Based on the previous study on the influence of landscape, scenic views, and housing price, it had shown to be statistically significant Besides, these three gated and guarded schemes were constructed differently in term of the landscape provided and quality. As an example, the Eco Grandeur is welly fitted with the facilities and proper landscape planning; the Maple Hill Park is averagely fitted with facilities and normal landscape planning, while the Bandar Saujana Utama is poorly fitted with facilities and with no landscape planning. As such, these three schemes can project the quality of different gated and guarded schemes in Malaysia. To quantify the quality variables in the Multiple Regression Analysis (MRA), a dummy variable will be utilized. A rank of

three will indicate a high quality of landscape; rank of two will indicate a medium quality of landscape; and rank of one will indicate a low quality of landscape. Hence, a thorough study based on each gated and guarded scheme will be tested in the next chapter to see whether each gated and guarded scheme with different quality will be influenced by landscape or not.

3.2.2.3 Fieldwork

The site inspection on the study area will commence after the samples have been identified. Observation and site inspection are among the crucial steps to be conducted in order to obtain primary data. Not only this, but site inspection can also aid in understanding better the properties and their attributes. The state of each landed residential property under study can be observed and examined in order to achieve this. The criteria of the gated and guarded community analysed, including the building's size (storey), design, and condition, will be confirmed based on the observation made.

Other than the structural attributes of the gated-guarded community studied, other crucial factors related to accessibility, neighbourhood and environmental elements were also collected during the site inspection. To illustrate, the measurement of distance to neighbourhood green, distance to neighbourhood park, distance to clubhouse, visibility of scenic view etc will be collected during the fieldwork. Before the site inspection proceeded, transaction data for the residential property was important to be identify and understand. As such, the transaction data for each data will be plotted in the map for clearer identification during the site inspection. This is to enable the study in acquiring and confirming the information provided by JPPH to run the analysis of the study.

3.3 Data Analysis Method

To build the hedonic pricing model analysis in this study, Multiple Regression Analysis (MRA) will be utilized. It's critical to follow the regression model procedure after the data gathering phase in order to create a high-quality regression model. Finding the optimal equation for the hedonic model is crucial to the study. There could be four primary stages to the procedure, which include:

i) Data Collection and Quantification
ii) Data Cleaning
iii) Reduction of Variables
iv) Model Refinement
v) Model Validation

d) Stage 1: Data Collection and Quantification

For the study of gated-guarded communities, the data required will include primary and secondary data. The primary data collection is done via the observation and site inspection. The observation and site inspection were conducted to obtain useful ground information. As looking into the other hand, secondary data collected should comprise of all the required transaction data for the gated-guarded community for the past five years. It is obtained from JPPEH due to the reliability of the source of data provided. After the data have been collected, an initial checking on the data characteristic and condition, diagnostics for relationship and strong relations between variables will be identified. After the authentication and validation, the data will be reorganized and key-in into a systematic spreadsheet format utilizing the Microsoft Excel.

In this study, two fundamental measures of the variables will be used. These include the ordinal variable, which contained multiple categories that were represented by an index, and the index, which is an interval or ratio variable. As an example, the interval variables are the building and land sizes. As for the ordinary variables, the study includes conditions of the building, building age, type of tenure, type of residential property, level of visibility on scenic views, distance to amenities, etc.

Data quantification will be processed to convert the data into explicit encrypting or dummy. This process can allow the data to be able to compute into the final regression model. Basically, the ordinal variables are being computed and calculated by utilizing the Coding Method, Rank-ordering method, or Dummy Method in the current study. Variables of the landscape effects and scenic view can be referring as to the table 3.5 while table 3.6 shown below will portrait the description of the other variables.

Table 3.5: Landscape and Scenic View Variables.

Landscape Variables	**Unit of Measurement**	**Description of Measurement**
Proximity of Landscape		
Distance_MR	Metre	Distance to Major Road
Duration_CP	Minutes	Duration to Central Park
Distance_CP_WD	Metre	Walking Distance to Central Park
Distance_CP_SL	Metre	Radius to Central Park
Duration_Clubhouse	Minutes	Duration to Club House
Distance_CH_WD	Metre	Walking Distance to Club House
Distance_CH_SL	Metre	Radius to Club House
Duration_NP	Minutes	Duration to Neighbourhood Park
Distance_NP_WD	Metre	Walking Distance to Neighbourhood Park

Distance_NP_SL	Metre	Radius to Neighbourhood Park
Duration_C	Minutes	Duration to Commercial
Distance_C_WD	Metre	Walking Distance to Commercial
Distance_C_SL	Metre	Radius to Commercial
Simple View Assessment		
V_WB	Dummy (Yes=1)	Presence of waterbody view from the property
V_STREET	Dummy (Yes=1)	Presence of a street view from the property
V_Park	Dummy (Yes=1)	Presence of park / street on the property
V_CH	Dummy (Yes=1)	Presence of Clubhouse from the property
Quality of Landscape		
Quality	Dummy (1,2,3)	If high quality = 3; if medium = 2; if low = 1

Table 3.6: Other Variables Considered in the MRA.

Variables	**Unit of Measurement**	**Description**
Independent Variables:		
L_Area	Square Metres	Land Area
B_Size	Square Metres	Building Size
B_Age	Years	Building Age
D_Major	Kilometres	Distance to Major Road
D_Com	Kilometres	Distance to Commercial Area

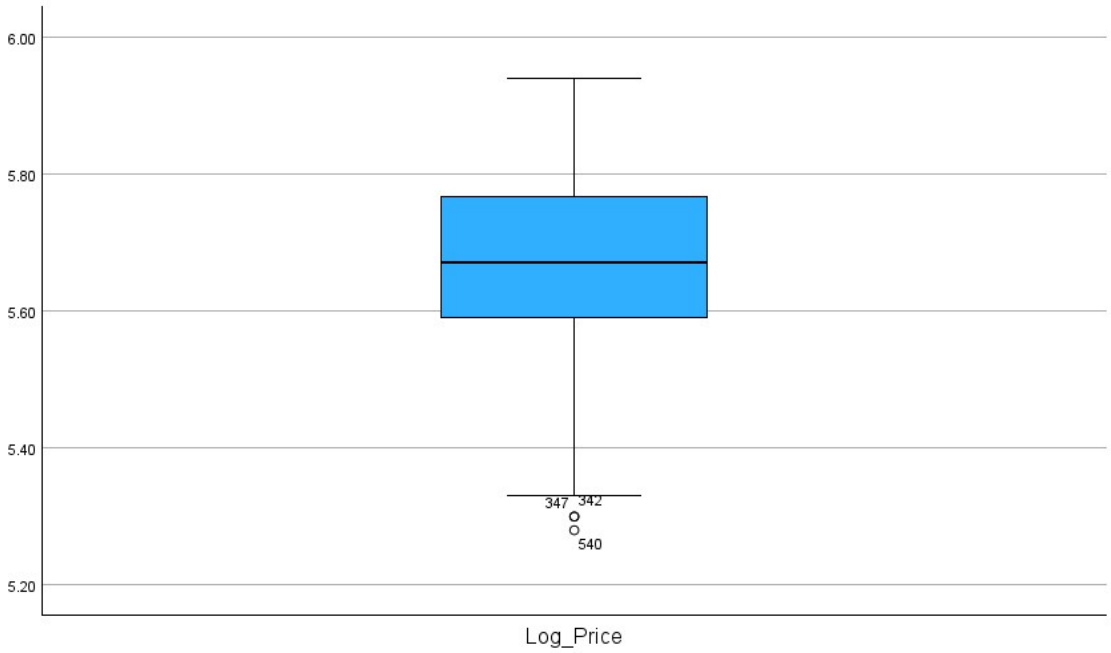
Based on the literature review, there are several variables that can influence the price of the residential property. This may include factors such as the property itself, demographics factors, transaction and management fees, and landscape and

environmental factors. For this study, the item in each variables needs to be collected, selected, and measured are tabularized in an efficient and effective layout by applying the Statistical Package for the Social Sciences (SPSS).

e) Step 2: Data Cleaning

Once the data is collected, a data cleaning process would be utilized to remove the outliers before running the Multiple Regression Analysis (MRA). The data cleaning process is by utilizing the box plot model to clear the outliers. Outliers which are data points that significantly deviate from the rest of the data. It can unduly influence the results of regression analysis. As they are too big or too small data in the dataset, it may lead to disproportionately affect in the estimation of regression coefficients, leading to biased and unreliable parameter estimates. Besides, outliers can distort the fit of the regression model to the data, this would lead to poor model performance and inaccurate predictions. By removing the outliers in the dataset, the regression model can better capture the underlying relationship between the independent and dependent variables. As such, it would result in a more accurate representation of data. This process in determining the outliers is done by the utilizing the SPSS software, where the outliers will only be determined via the housing price, dependent variable of the study. This is because the housing price is the most important factors in this study and would affect the overall outcome of the model.

Figure 3.2: Outlier Analysis via Boxplot (Leaf-and-Stem) analysis.



f) Stage 3: Reduction of Independent Variables

The independent variables under investigation are examined after they have been confirmed in the preceding phase. Since not all variables are essential to the problem, certain independent variables are finally eliminated at this point. This is due to the inclusion of these variables may lead to problematic issues due to the duplication of other independent variables in the list or measurement errors. Hence, control variable for the group variables should also be chosen and removed as well.

During this stage, it is needed to eliminate any inappropriate data from the test model. The procedure was essential since there was a chance that during the data gathering phase, minor and insignificant explanatory variables might be included. Thus, the Enter approach is a regression approach being used in the study that takes into account all of the independent variables but ignores the possibility of multicollinearity.

Multicollinearity arises from multiple linear regression analysis including various important variables that are not only correlated with dependent variables but also with each other (Shrestha, 2020). The multicollinearity issue would happen if there were two or more explanatory variables in the regression procedure that also happened to be correlated. The perfectly collinear situations are those in which it is easy to figure out the relationship's effect. Because of this, estimating a suitable regression model when the model shows perfect multicollinearity would be challenging. To deal with this, correlation analysis is being evaluated and utilized in this analysis to project and remove the problem of multicollinearity occurred in the regression model. If the correlation matrix between two independent variables is between 70% and 100%, then one independent variable may account for the observed values of the other. In this study, in order to produce an accurate and reliable result, only the independent variables which happen to have correlation above 70% will be removed.

For this analysis, multicollinearity in screen the list of affecting factors for the consideration of independent variables studied will only be employed. Due to the level of intricacy involved, no other test than the Multiple Regression Analysis tests will not be conducted in this study.

g) Model Refinement and Selection

There would be several optimal regression model equations if the number of independent variables was reduced, where each independent variable was recognised to be crucial to the model. At this point, a more thorough investigation of the interaction effects is preferred. Eventually, a list of the best equation models is chosen by statistical exercise validation after verifying and numerous corrective activities.

h) Model Validation

Model Validation procedure is comparatively important after the model selection process. In this phase, the applicability of the regression function derived from the regression model and the reasonableness of the regression coefficients are assessed. It will entail comparing the model's results with those of independent variables. In this study, comparison on the research results with theoretical expectation will be applied and discussed. After going through the model regression process as stated above, there will be 48 independent variables indicated to be consistent and significant in predicting the housing price of the gated-guarded community units in the study area. These variables are shown in Table as follow:

Table 3.7: Selected Variables for the MRA.

Dependent Variable			
1.	Housing Price		
Independent Variables			
2.	L_Area	17.	Duration_Clubhouse
3.	B_Size	18.	Distance_CH_WD
4.	Y_2015	19.	Distance_CH_SL
5.	Y_2016	20.	Duration_NP
6.	Y_2017	21.	Distance_NP_WD
7.	Y_2018	22.	Distance_NP_SL
8.	Y_2019	23.	Duration_C
9.	Y_2020	24.	Distance_C_WD
10.	Y_2021	25.	Distance_C_SL
11.	Y_2022	26.	View_WB
12.	Y_2023	27.	V_WB
13.	Distance_MR	28.	V_STREET
14.	Duration_CP	29.	V_Park
15.	Distance_CP_WD	30.	V_CH
16.	Distance_CP_SL	31.	Quality

3.4 Hedonic Pricing Model

In this study, the hedonic regression model of housing price was anticipated using MRA. The dependent variable in this study was housing price, whereas the above-mentioned independent factors were carried out. Freeman (1979) stated that the hedonic regression model technique assumes that the property is bought as a package of inherent attributes. The specification of the hedonic model is shown as the equation as follows:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \ldots + \beta_k X_{ki} + \varepsilon$$

Where,

Y_1 = the value of the dependent variables which are the property price for the *i*th observation.

$X_{k\ i}$ = the value of the independent variables which are the condition of the building, design of the building, distance to CBD, proximity to landscape, etc for the *i*th observation.

ε = the value of a random fluctuation or error for the *i*th observation.

B_0 = a parameter that represents the population regression intercept or is meant the mean of Y when the values of $X_1, X_{2\ldots}, X_k$ are all equal to zero.

B_j = a parameter that represents the slope of the population regression surface with respect to the *j*th independent variable, or it indicates the change in the mean value of Y for a unit increase in the independent variable X_j, when all other independent variables are held constant.

3.5 MRA Accuracy Test

A relative indicator of the direction and intensity of a linear relationship between the variables is the correlation coefficient (R). The correlation coefficient will fall between -1 and +1. The value of r will be close to one if there is a strong positive linear link between the variables; if there is a strong negative linear relationship, the value of r will be close to one. The value of r will be around zero in cases where there is either no relationship at all or a weak association between the variables.

The dependent variable's change is measured by the coefficient of determination, or R2. The independent variable and the regression line provide an explanation for it. In the event when r = 0.9, the R^2 values will equal 0.81, or 81%. According to this finding, variations in the independent variable account for 81% of the variation in the dependent variable. However, the remaining 19% of the variety will continue to be puzzling.

The impact of introducing extra independent variables into a multiple regression equation is captured by the adjusted R^2 value. It assists in preventing the analysis from becoming overfit. The two R^2 values are extremely close when N is large. When a variable is introduced to the regression equation, the modified R^2 will have a lower value. This is because the unexplained variation always diminishes, albeit its associated degrees of freedom may be able to counteract this decline. The adjusted R^2 investigates whether the additional variables that are not significant will contribute to the model. Thus, R^2 should always be analyse together with Adjusted R^2 during the test.

The significance of each coefficient of the independent factors in predicting the dependent variables will also be ascertained using the T-statistic or T-test. Positive or negative results are the two possible outcomes of the t-test. The critical value of t from the T-Statistic table, which is established by the degrees of freedom and confidence level, is compared to the estimated t-value in order to evaluate if each individual coefficient deviates significantly from zero. The independent variables in the equation determined the degree of freedom in this investigation,

where the alpha level was set at 0.05. An elevated t-value beyond the t-table's critical value signifies a greater significance of the independent variable with respect to the dependent variable. In the t-table, the independent variable is less important in comparison to the dependent variable if the t-value is less than the critical value. Generally, essential independent variables' t-stat values should fall into the range of more than +2 or smaller than -2, and the significant value should be less than 0.05.F-statistics is a hypothesis test that deals with the significant of independent variables that estimates the dependent variable that are like the T-Statistics. The value of F-statistics is derived from a standard statistical test used in ANOVA and regression analysis to determine if the differences between the means of two populations are significantly different.

3.6 Conclusion

The research flow chart and technique were delineated in the chapter. The primary tasks required to meet both study objectives are outlined in the research flow. Since objectives 1 and 2 are related, the data collection and analysis strategy serve as an explanation of this study methodology. In order to accomplish the goals, hedonic analysis uses Multiple Regression Analysis (MRA).

Before the adoption of MRA, samples need to be collected and observation will be conducted to obtain relevant data for analysis. There will be about 1,040 units of transacted residential property from the gated-guarded schemes in Sungai Buloh have been identified as the samples of this study.

The MRA procedure was also detailed in this chapter. In order to lower the likelihood of errors, it has been highlighted how crucial it is to complete the regression process before doing the MRA. The four main phases of analysis are going to be variable selection, variable reduction, model refining, and model validation. 46 independent variables that are shown to be consistent and significant in influencing the pricing of gated-guarded community properties will be added

to the model after the appropriate screening procedure and multicollinearity considerations have been taken into account.

Finally, this chapter discusses the MRA metrics in order to clarify the model's importance. The T-test, Adjusted R^2, Coefficient of Determination (R^2), and Correlation (R) were among these metrics. The accomplishment of the study's goals is facilitated by the research flow and technique, which are significant directives.

CHAPTER 4: DATA ANALYSIS AND FINDINGS

4.0 Introduction

This chapter project the conclusion of accurate data collection and analysis, providing valuable insights into the research questions and objectives outlined in this thesis. After the discussion on the research methodology as in previous chapter, this chapter will further discuss on the data testing and result of the study. Chapter 4 will be the most important stage among all as it explains and support the analysis result and finalizes the analysis. The analysis outcome would be crucial pertaining and relating to the achievement of the research objectives. The objectives of this study will be achieved via the Multiple Regression Analysis technique.

The descriptive statistics of the gathered data and the anticipated relationship between explanatory independent variables and dependent variables will be the main topics of this chapter. Chapter 3 contained a list of the dependent and independent variables utilised in MRA. Regression modelling is processed and used to distinct models in order to investigate the impact of landscape and scenic views on each research region, so fulfilling both objectives. Diagnostics for multicollinearity is mentioned. Lastly, the regression results are discussed whilst suitable variables for proximity to landscape and scenic views are be adopted in the formation of hedonic model. Therefore, both objectives will be achieved with a conclusion on the result of analysis at the end of this chapter.

4.1 Data and Descriptive Statistics

In this study, the transaction data for 1012 units of landed residential properties within the Gated and Guarded schemes are collected from the database of Jabatan Penilaian and Perkhidmatan Harta (JPPH). All the residential units are from three Gated and Guarded

Schemes located in mukim Ijok in the district of Kuala Selangor. The study area was selected due to the proximity of each scheme and will not be influenced by other factors such as the proximity to city centre.

Descriptive statistic of the sample is tabulated as in table 4.1. As shown in the table, housing price for the landed residential properties within the study area are ranged from RM189,100 to RM880,000. This wide range differences are probably due to the differences on the development and type of the housing property studied. The mean or averaged land area of the selected unit of study is 150.28 square metres while the building size is averaged at 143 square metres.

Table 4.1: Central Tendencies of Measurement.

Statistics

		Log Price	Transaction Price	Land Area	Building Size
N	Valid	1012	1012	1012	1012
	Missing	0	0	0	0
Mean		5.6809	498001.5929	150.2827	133.2364
Median		5.6721	470000.0000	143.0000	122.8050
Mode		5.65	450000.00	130.00	109.38
Std. Deviation		.11819	137523.64504	41.35945	93.14187
Minimum		5.28	189100.00	99.80	54.33
Maximum		5.94	880000.00	395.00	1399.31

Besides, the details such as the date of transaction will also be captured in the descriptive statistics. Other than that, the distance to nearest major road ranges from 120 metres to 3500 metres, while the distance to nearest commercial ranges from 25 metres to 1690 metres.

The residential samples based on each gated and guarded schemes in the study area are as follows:

Table 4.2: Frequency of Data based on Residential Samples.

Study Area	Frequency	Percent (%)
Bandar Saujana Utama	436	34.5
Maple Hill Park	310	24.6
Eco Grandeur	265	20.9
Total	1012	100

4.1.1 Sample Profile

There were about 1012 cleaned transaction data collected from three Gated and Guarded schemes. The neighbourhood involved in this study consisted of various neighbourhood The neighbourhood involved in this study involved are listed as follows:

1) Eco Grandeur: Avenham Garden, Graham Garden
2) Maple Hill Park: Jalan Ceri, Jalan Mapel, Jalan Meranti, Jalan Palma, Jalan Pinang, Jalan Rhu, Jalan Zaitun
3) Bandar Saujana Utama: Jalan Anggerik, Jalan Bidara, Jalan Cemara, Jalan Chengal, Jalan Dedap, Jalan Flora, Jalan Jati, Jalan Kemboja, Jalan Lili, Jalan Mawar, Jalan Meranti, Jalan Selasih, Jalan Seri Pagi, Jalan Teratai.

4.2 Expected Direction of Explanatory Variable to Dependent Variables

Before the MRA is distinguished, the expected direction of the explanatory variable (independent variable) to the housing price (dependent variable) is predicted based on the literature review as mentioned above. Table 4.3 tabulates the expected relationship and outcome between the transaction price of the residential unit in a gated and guarded schemes with the explanatory variables.

Table 4.3: Expected Sign for Each Variables.

	Independent Variables	Expected Sign		Independent Variables	Expected Sign
1.	Land Area	+	16.	Distance to Clubhouse (Duration)	-
2.	Building Size	+	17.	Distance to Clubhouse (Walking Distance)	-
3.	Y_2015	+	18.	Distance to Clubhouse (Radius)	-
4.	Y_2016	+	19.	Distance to Neighbourhood Park (Duration)	-
5.	Y_2017	+	20.	Distance to Neighbourhood Park (Walking Distance)	-
6.	Y_2018	+	21.	Distance to Neighbourhood Park (Radius)	-
7.	Y_2019	+	22.	Distance to Commercial (Duration)	-
8.	Y_2020	+	23.	Distance to Commercial (Walking Distance)	-

9.	Y_2021	+	24.	Distance to Commercial (Radius)	-
10.	Y_2022	+	25.	View of Waterbody	+
11.	Y_2023	+	26.	View of Mountain	+
12.	Distance to Major Road	-	27.	View of Street	+
13.	Distance to Centre Park (Duration)	-	28.	View of Park/Garden	+
14.	Distance to Centre Park (Walking Distance)	-	29.	View of Clubhouse	+
15.	Distance to Centre Park (Radius)	-	30.	Quality of Landscape	+

The table 4.3 shows the independent variables which are estimated to have positive correlation with the transaction price of the residential in gated and guarded community include land size, building area, transacted year, presence of waterbody, mountain, street, park/garden and clubhouse view, and the quality of landscape.

The predicted association between the variables is projected by the expected sign displayed in the above table. The relationship (positive and negative, for example) gives the transaction price no meaningful significance. It is not always the case that the positive sign indicates that the independent variable in that relationship has a larger value, or vice versa.

4.3 The influence of Landscape and Scenic View on Gated and Guarded Community

In this section, the influence of landscape and scenic view on the housing price of gated and guarded community will be examined and analysis using the Multiple Regression Analysis (MRA). Before MRA is performed there are several steps to be taken and implemented. Firstly, multicollinearity diagnostics will be tested utilizing the corelation analysis to determine the

relationship between independent variables as mentioned above. After contemplating and applying multicollinearity, MRA is executed by using the linear regression method. The results of each gated and guarded schemes are tests, followed by the discussion on regression result obtained.

4.3.1 Multicollinearity Diagnostics

Problem would arise when the independent variables had too high corelation with each another. As such, the bivariate correlation will be utilized to judge the seriousness of multicollinearity problem occur from the independent variables of the current test.

The purpose of the correlation test was to identify and eliminate multicollinearity in the regression model. When the correlation between two independent variables reaches 100%, it is considered extreme multicollinearity; at 80% and higher, it is considered near extreme multicollinearity. These multicollinearities would mean that there are not perfect linear relationships but strong among the independent variables. Therefore, these extreme variables should be removed from the regression model. As such, the correlation between two variables that is lesser than 0.8 would be adopted as it shows collinearity is very less likely to occur (Shrestha, 2020). After the analysis, some of the independent variables were highly correlated among each other. As such, it is removed from the regression analysis.

The occurrence of extreme multicollinearity and near-extreme multicollinearity among the independent variables after the test. Accordingly, independent variables with high correlation with each other should be removed and avoid from being included in the same model. Therefore, the independent variables are removed to avoid the issues of multicollinearity. The remaining variables will be brought forward to the Multiple Regression Analysis.

4.3.2 Outliers Diagnosis

Outliers in a dataset would be a statistical issue when running the Multiple Regression Analysis (MRA) as the test would be highly sensitive to the outliers. As such, outliers' removal from the dataset is an essential step in MRA as a single outlier might lead and advance to invalid or incorrect adjustments (Ramos et, al., 2017).

As such, the "box plot" or the box-and-whisker plot would be utilized to remove the outliers in the dataset to avoid error and reduce sensitivity to the MRA. It examined the outlier among all dataset in this study. For a better outlier removal, the box-and-whisker plot is carried out based on the gated and guarded schemes. As such, each outlier as per gated and guarded schemes would be remove accordingly. If there are valuers that fall above or below the interquartile range of the dataset, this value will be removed and excluded. This outlier test is mainly done to the transaction price (dependent variable) as it would highly affect the outcome of the regression test if the outliers were not removed. As such, the outcome of the outlier's diagnosis based on each scheme are as follows:

Figure 4.1: Leaf-and-Stem Analysis for Eco Grandeur.

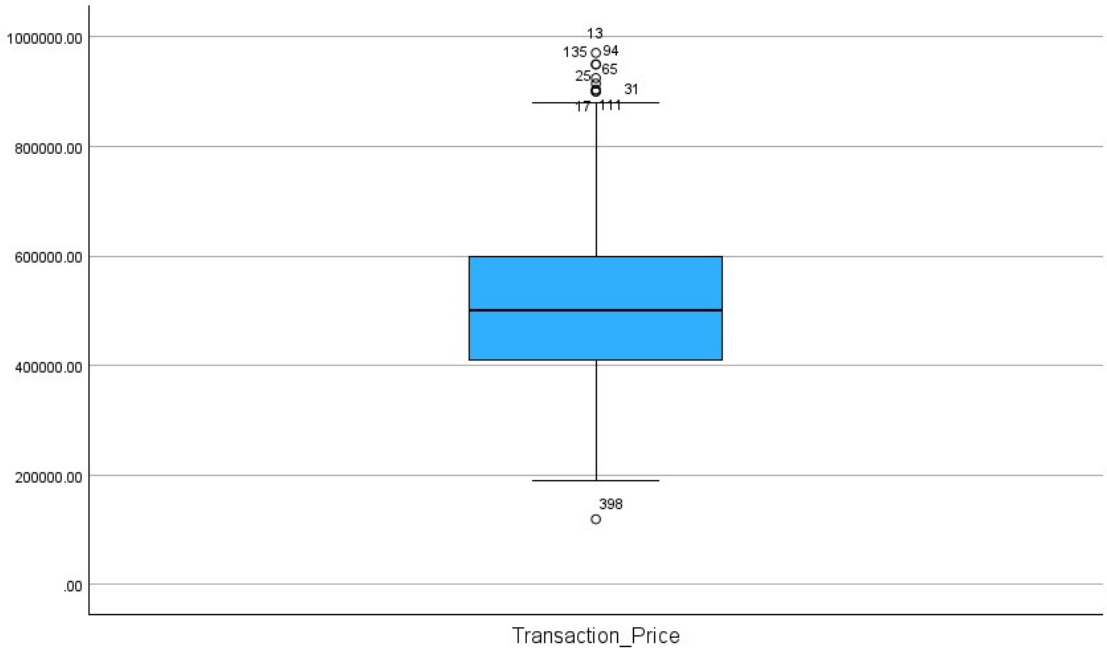


Figure 4.2: Leaf-and-Stem Analysis for Maple Hill Park

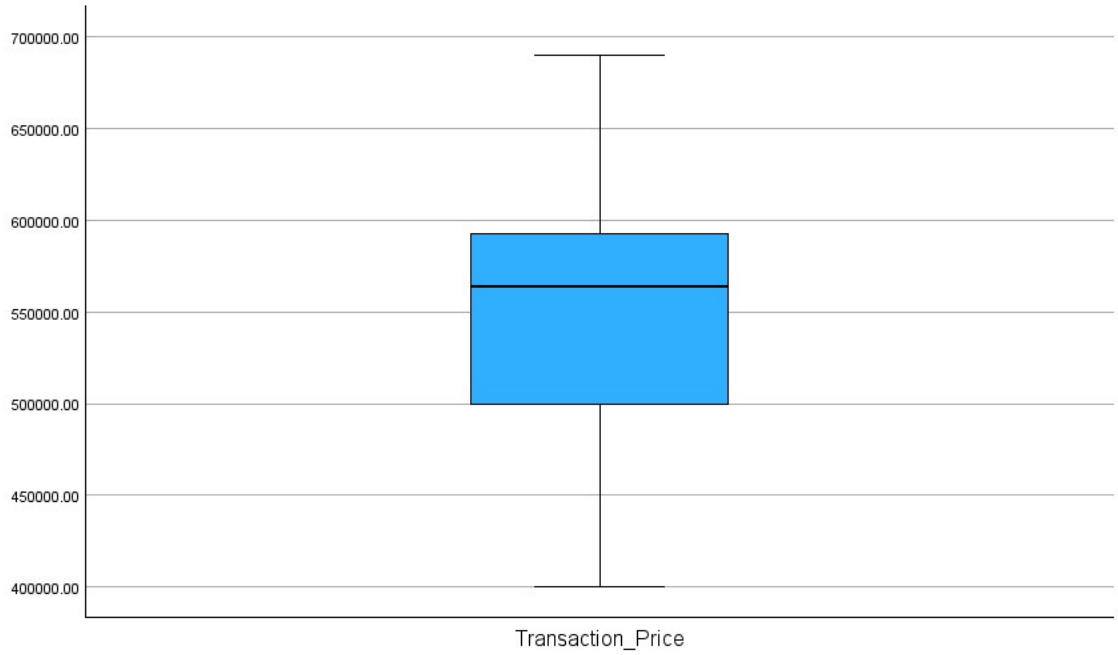
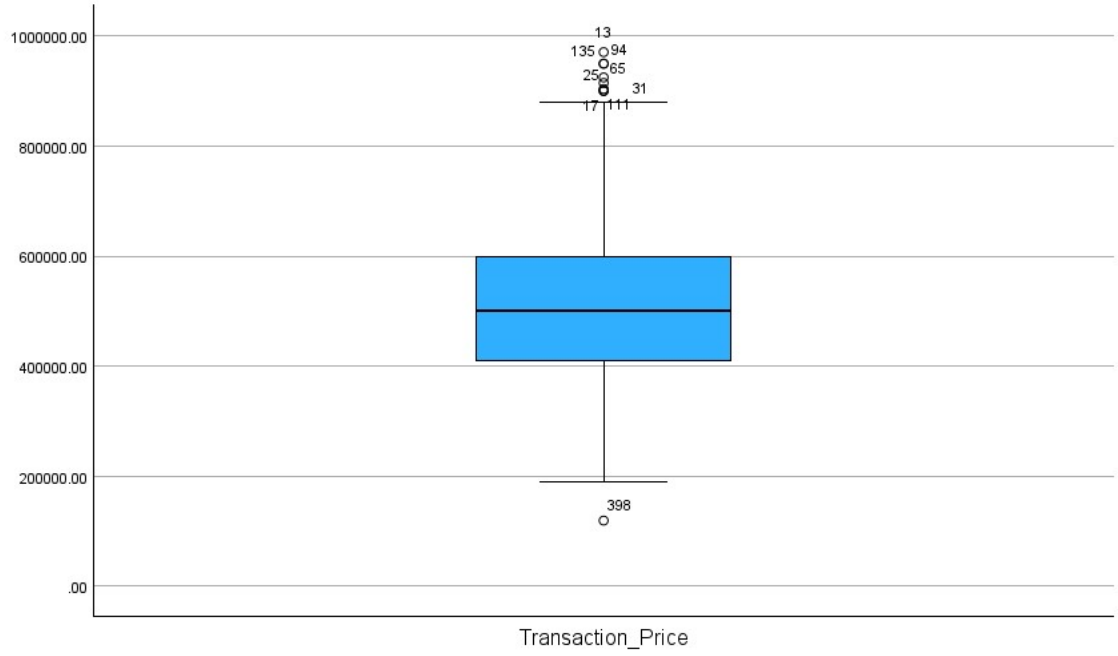


Figure 4.3: Stem-and-Leaf Analysis for Bandar Saujana Utama.



4.3.3 The Development of Hedonic Price Model

After reducing the independent variables and removing the outliers, MRA can be conducted to make the results on the objectives. As such, enter method of regression analysis was conducted and implemented. Enter method is applied in this analysis and study as it will help to avoid the possibility of information lost. By applying the enter method, the data were regressed collectively without taking into consideration the least extreme multicollinearity factor that existed and occur among the independent variables. Although the individual effects of each predictors had impact on the outcomes due to multicollinearity; however, multicollinearity is not a problem to derive the "overall" effect of the combined predictors using the enter method. In the current investigation, the coefficients of the linear equations were estimated using linear regression using one or more independent variables that best predicted the values of the dependent variables.

Besides, the application of dummy variables should also be cautious, as too much dummy variables would lead to a situation of extreme multicollinearity. Therefore, some of them should be eliminated from the model and the excluded category should be the reference category instead of applying all of them to the regression analysis, since each coefficient compared a particular category to the reference category. For example, the quality of the landscape is collected in two method which is dummy method by ranking their quality and categories of landscape such as high, medium, and low quality individually. To deal with this, the study chooses to exclude the individual landscape quality if the ranking method of landscape quality is being applied. The same technique applied to other dummy variables.

4.4 MRA Models for Different Gated and Guarded Schemes

The data is being regressed into separate models by each Gated and Guarded Schemes using the enter method to observe the effect of landscape and scenic view contributed to each gated and guarded scheme. At the same time, each model would include the same determinant of housing price as well. The detail of model output is being tabulated in the below table 4.4. In this session, only brief details of models that contribute significant comparison for each gated and guarded scheme for this study is being discussed. The variables for each model are shown in Table 4.4 whilst the result for each gated and guarded scheme are projected as in Figure 4.4, 4.5 and 4.6 below. Each model will show and project different quality of landscape available and provided in the vicinity. Looking into scheme 1, Eco Grandeur with well and fully fitted facilities and amenities within the vicinity. While scheme 2, Maple Hill Park had been only fit with average facilities and amenities. Lastly, scheme 3, Bandar Saujana Utama had the least facilities and amenities with only neighbourhood park is being offered. The quality of landscapes is determined by the facilities provided and landscape planning available within the Gated and Guarded Schemes. To illustrate, Eco Grandeur possesses the highest quality of landscape due to the well facilitated and organized landscape. While Maple Hill Park would possess a medium quality landscape due to the averagely facilitated and organized landscape. Lastly, Bandar Saujana Utama with the lowest quality landscape due to the minimum facility provided and unorganized landscape. As such, the model would demonstrate and project the landscape effect to the Gated and Guarded Scheme with different quality of landscape. The models studied for each gated and guarded scheme would be show the best outcome available.

Table 4.4: Variables Selected in Each Model based on Gated and Guarded Schemes.

Scheme 1: Eco Grandeur		Scheme 2: Maple Hill Park		Scheme 3: Bandar Saujana Utama	
1.	Land Size	1.	Land Size	1.	Land Size
2.	Building Area	2.	Building Area	2.	Building Area
3.	Date of Transaction	3.	Date of Transaction	3.	Date of Transaction
4.	Distance to Major Road	4.	Distance to Major Road	4.	Distance to Major Road
5.	Duration to Central Park	5.	Duration to Central Park	5.	Duration to Neighbourhood Park
6.	Walking Distance to Central Park	6.	Walking Distance to Central Park	6.	Walking Distance to Neighbourhood Park
7.	Radius to Central Park	7.	Radius to Central Park	7.	Radius to Neighbourhood Park
8.	Duration to Club House	8.	Duration to Neighbourhood Park	8.	Duration to Commercial
9.	Walking Distance to Club House	9.	Walking Distance to Neighbourhood Park	9.	Walking Distance to Commercial
10.	Radius to Club House	10.	Radius to Neighbourhood Park	10.	Radius to Commercial
11.	Duration to Neighbourhood Park	11.	Duration to Commercial	11.	View of Park
12.	Walking Distance to Neighbourhood Park	12.	Walking Distance to Commercial		
13.	Radius to Neighbourhood Park	13.	Radius to Commercial		
14.	Duration to Commercial	14.	View of Waterbody		
15.	Walking Distance to Commercial	15.	View of Mountain		
16.	Radius to Commercial	16.	View of Street		
17.	View of Waterbody	17.	View of Park		
18.	View of Park				
19.	View of Clubhouse				

Figure 4.4: MRA Result for Scheme 1: Eco Grandeur.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	6.712	.455		14.760	<.001	5.815	7.609
	Land_Area	.001	.000	.557	12.443	<.001	.001	.001
	Building_Size	5.416E-5	.000	.286	6.769	<.001	.000	.000
	y_2019	.000	.009	-.001	-.022	.983	-.018	.018
	y_2020	-.050	.009	-.291	-5.573	<.001	-.068	-.032
	y_2021	-.047	.008	-.321	-5.886	<.001	-.063	-.031
	y_2022	-.028	.009	-.147	-3.075	.002	-.047	-.010
	y_2023	-.029	.022	-.049	-1.294	.197	-.073	.015
	Log_Distance_MR	-.006	.063	-.007	-.093	.926	-.130	.119
	Duration_CP	.006	.004	.347	1.372	.172	-.003	.014
	Log_CP_WD	-.247	.120	-.492	-2.054	.041	-.485	-.010
	Log_CP_SL	-.008	.029	-.020	-.270	.788	-.064	.049
	Duration_Clubhouse	.004	.007	.084	.578	.564	-.010	.018
	Log_CH_WD	.020	.081	.035	.247	.805	-.139	.179
	Log_CH_SL	.010	.020	.028	.505	.614	-.029	.049
	Duration_NP	.002	.004	.041	.503	.616	-.006	.009
	Log_NP_WD	.033	.057	.230	.579	.563	-.080	.146
	Log_NP_SL	-.052	.067	-.340	-.777	.438	-.184	.080
	Duraton_C	9.616E-5	.002	.005	.049	.961	-.004	.004
	Log_C_WD	-.158	.096	-.156	-1.656	.099	-.347	.030
	Log_C_SL	.038	.034	.075	1.115	.266	-.029	.106
	View_WB	.009	.021	.018	.426	.671	-.033	.051
	View_Park	.002	.012	.013	.183	.855	-.022	.027
	View_CH	.005	.007	.029	.693	.489	-.008	.018

a. Dependent Variable: Log_Price

Figure 4.5: MRA Result of Scheme 2: Maplehill Park.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	5.109	.203		25.167	<.001	4.709	5.509
	Land_Area	.001	.000	.386	6.666	<.001	.001	.001
	Building_Size	-3.519E-6	.000	-.012	-.276	.783	.000	.000
	y_2016	.019	.031	.087	.628	.531	-.041	.080
	y_2017	.077	.030	.415	2.550	.011	.017	.136
	y_2018	.053	.029	.437	1.815	.071	-.005	.111
	y_2019	.048	.029	.377	1.657	.099	-.009	.106
	y_2020	.038	.029	.205	1.302	.194	-.019	.095
	y_2021	.025	.029	.181	.858	.392	-.033	.083
	y_2022	.037	.029	.214	1.279	.202	-.020	.095
	y_2023	.063	.033	.185	1.948	.053	-.001	.127
	Log_MR	-.167	.049	-.342	-3.386	<.001	-.070	-.264
	Duration_NP	-.006	.003	-.269	-2.253	.025	-.001	-.012
	Log_NP_WD	-.005	.020	-.028	-.262	.793	-.045	-.034
	Log_NP_SL	-.044	.017	-.212	-2.572	.011	-.077	-.010
	Duration_CP	-.007	.003	-.555	-2.481	.014	-.002	-.013
	Log_CP_WD	-.030	.070	-.101	-.429	.668	-.167	-.107
	Log_CP_SL	-.062	.036	-.224	-1.719	.087	-.134	-.009
	Duration_C	-.012	.002	-1.075	-5.506	<.001	-.017	-.008
	Log_C_WD	-.098	.049	-.396	-2.004	.046	-.002	-.194
	Log_C_SL	.003	.025	.015	.123	.902	-.046	.052
	VIEW_WB	.025	.010	.165	2.485	.014	.005	.044
	VIEW_MOUNT	-.003	.009	-.020	-.396	.692	-.020	.014
	VIEW_STREET	.028	.008	.226	3.705	<.001	.013	.043
	VIEW_PARK	.013	.006	.123	2.315	.022	.024	.002

a. Dependent Variable: Log_Price

Figure 4.6: MRA Result of Scheme 3: Bandar Saujana Utama.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	5.348	.067		79.667	<.001	5.216	5.479
	Land_area	.000	.000	.348	11.058	<.001	.000	.001
	Building_Area	.002	.000	.686	16.823	<.001	.002	.002
	y_2016	.009	.008	.041	1.094	.275	-.007	.026
	y_2017	.020	.009	.084	2.259	.024	.003	.037
	y_2018	.013	.009	.055	1.418	.157	-.005	.030
	y_2019	.022	.008	.106	2.725	.007	.006	.037
	y_2020	.039	.008	.193	4.914	<.001	.024	.055
	y_2021	.049	.007	.275	6.616	<.001	.035	.064
	y_2022	.048	.007	.302	6.643	<.001	.034	.062
	y_2023	.090	.009	.350	9.612	<.001	.071	.108
	Log_MR	.021	.008	.107	2.607	.009	.005	.038
	Duration_NP	-.001	.002	-.024	-.424	.672	-.005	.003
	Log_NP_WD	-.001	.021	-.003	-.028	.978	-.041	.040
	Log_NP_SL	-.014	.020	-.075	-.699	.485	-.053	.025
	Duration_C	.002	.001	.100	1.187	.236	-.001	.005
	Log_C_WD	-.003	.022	-.012	-.144	.886	-.047	.040
	Log_C_SL	-.039	.015	-.170	-2.608	.009	-.069	-.010
	VIEW_PARK	.003	.007	.017	.452	.652	-.011	.018

a. Dependent Variable: Log_Price

From the result tabulated in Table, the adjusted R^2 for all model 1 (Eco Grandeur) and model 2 (Maple Hill Park), had shown a figure of 0.749 and 0.611 respectively. Which meant that 74.9% of the difference in housing price can be explained by Model 1while 61.1% can be explained by Model 2. Besides, Moel 3 (Bandar Saujana Utama) had also shown an adjusted R^2 of 0.616 which is a total of 61.6% can be explained by the model 3. As such, each three model from different Gated and Guarded Schemes can be a good model to explain the variance of sample data studied.

From the model above, each model will be analysed and checked with F-value to check the goodness of model fit. To illustrate, the F-value of each model will be tabulated in the table 4.5 below:

Table 4.5: Goodness of Fit for Each Models based on Gated and Guarded Schemes.

	Model 1	Model 2	Model 3
R^2	0.775	0.649	0.630
Adjusted R^2	0.749	0.611	0.616
F-Value	29.398	17.255	46.799

From the best regression of three models, each model had shown different variable that tested to be statistically significant in affecting the housing price at 99% and 95% level. From the Model 1, only the distance to central park had shown a negative coefficient and significant at 95% level; while other landscape and scenic views variables does not show any significant at 99% or 95% level. While looking into model 2, variables which are significant at 99% and 95% level and had a positive coefficient include view of waterbody, view of street and view of park; while, the variables which are significant at the 99% and 95% level and had negative coefficient includes duration to major road, walking distance to neighbourhood park, radius to neighbourhood park, duration to central park, walking distance to central park, radius to central park, duration to commercial and walking distance to commercial. While looking into model 3, the distance to major road had shown a positive coefficient and significant at 95% level; while negative coefficient for radius to commercial which significant at 95% level.

4.5 Discussion on Regression Results on Each Gated and Guarded Scheme

The regression result on the effect on landscapes, scenic views, and other attributes towards each gated and guarded scheme's housing value are stated as the figure and table above. By utilizing the regression analysis to look into the effect of landscapes and scenic views on each gated and guarded scheme, the result had shown differently on each of the scheme. As mentioned above, the study area comprising of three different schemes is indicating different quality of landscapes and scenic views that possessed by each parcel in each scheme. However, the quality of landscape is purely determined and assumed based on author own interpretation

and assumptions during the field work and site visit. Based on the results of regression analysis, there would be a difference effects of the landscapes and scenic views on each Gated and Guarded Scheme. In this chapter, only the landscapes and scenic views effect that shows statistically significant (99% and 95% significance level) will be discussed.

As looking into the landscape effect of Eco Grandeur, the Gated and Guarded Scheme had only shown a statistically significant at 95% level in the MRA result on the walking distance to central park. Based on the result, the walking distance to central park had shown a negative relationship with the housing price, where the further the distance to central park the lower the price premium added to the residential parcel itself. Based on the result, there would be an increase of 21.89% if the walking distance between central park decreased. As looking into others landscape and scenic views variables, the MRA does not shows any significant data. While looking into the MRA result of Maple Hill Park, the landscapes and scenic views had shown more effects on the housing prices which can be seen where the variables are statistically significant in the model. Based on the result, the variables that shown statistically significant at the level of 99% and 95% level are stated as the table 4.6 below.

Table 1.6: Effect of Landscapes and Scenic Views on Maple Hill Park.

Landscapes and Scenic Views Variables	Effects on Housing Premium
Duration to Neighbourhood Park	Decreased by 6.76% (If the duration to Neighbourhood Park increased.)
Radius Distance to Neighbourhood Park	Decreased by 4.30% (If the radius distance to Neighbourhood Park increased.)
Duration to Central Park	Decreased by 1.19% (If the duration to Central Park increased)
Visibility of Waterbody	Increased by 2.53% (If there is visibility of waterbody view)
Visibility of Street View	Increased by 2.84% (If there is visibility of Street View)

Visibility of Park	Increased by 1.31% (If there is visibility of Park View)

Based on the result above, the effect of landscapes and scenic views may be deemed important in contributing the housing premium to Maple Hill Park. This can be seen where there had the most significant variables as compared to the other two models. The result is also satisfactory based on the expected result as mentioned above.

While looking into the last model on Bandar Suajana Utama, the only result that shown that there will be a significant data at 95% confidence intervals is the walking distance to neighbourhood park. The walking distance to neighbourhood park had shown a positive relationship with the housing price, where the further the distance to neighbourhood park, the higher the housing premium added to a housing parcel. To illustrate, there would be an increase of 0.1% if the distance to neighbourhood park increased. However, this result had shown inversely with the expected result of study. This can be explained where the housing price would impact the housing price negatively due to the perception of homeowners where they think that the park would possess a risk of crime and poor maintenance of the park would have possessed a negative impact the housing price (Iqbal, 2012). To further enhanced this point, it had shown a sense of poor maintenance and a risk of crime during the fieldwork to the study area as compared to the other township. Although the property is Gated and Guarded in that area; however, there are still some areas that is not gated properly which outsiders may easily enter to that area. As such, this may possibly increase the risk of crime rate in that area. While comparing to the other two township, the neighbourhood park in that area is not properly maintained where the grass is not trimmed, and facility provided are also not well maintained. As such, this may negatively impact the decision of homebuyer to consider the property around the neighbourhood park.

4.6 Overall Landscape Effect on Gated and Guarded

To evaluate the landscape effect to the overall gated and guarded scheme, the whole dataset would be analysed together for three gated and guarded schemes. To differentiate between the quality of each landscape, a dummy variable for quality of landscape had been created. As an example, the high-quality landscape would be given 3, medium quality landscape would be given 2, and poor-quality landscape would be given 1. The data would be regressed into multiple models based on the proximity to landscape. To illustrate, as the study had taken into consideration the duration, walking distance and radius of the landscape, these variables would be separated and divided into different models to avoid the occurrence of multicollinearity problem.

Figure 4.7: Model 1_Duration to Landscape.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	5.782	.087		66.401	<.001	5.611	5.953
	Land_Area	.001	.000	.234	13.591	<.001	.001	.001
	Building_Size	1.768E-5	.000	.015	.896	.371	.000	.000
	y_2016	.031	.012	.064	2.548	.011	.007	.054
	y_2017	.053	.013	.102	4.157	<.001	.028	.078
	y_2018	.066	.011	.200	6.056	<.001	.045	.088
	y_2019	.061	.011	.186	5.657	<.001	.040	.082
	y_2020	.037	.011	.111	3.465	<.001	.016	.059
	y_2021	.044	.011	.149	4.120	<.001	.023	.065
	y_2022	.054	.011	.147	4.864	<.001	.032	.076
	y_2023	.088	.014	.139	6.418	<.001	.061	.115
	Log_Distance_MR	-.041	.010	-.093	-3.960	<.001	-.061	-.020
	Duration_CP	-.002	.000	-.318	-5.344	<.001	-.002	-.001
	Duration_Clubhouse	-.002	.000	-.513	-3.660	<.001	-.003	-.001
	Duration_NP	.003	.001	.047	2.447	.015	.001	.005
	Duraton_C	-.002	.001	-.120	-3.134	.002	-.003	-.001
	View_WB	.040	.010	.073	4.083	<.001	.021	.060
	View_STREET	-.013	.012	-.020	-1.086	.278	-.038	.011
	View_Park	.011	.005	.035	1.967	.050	.000	.021
	View_CH	-.004	.006	-.014	-.711	.477	-.016	.007
	Quality	.023	.026	.153	.861	.390	-.029	.074

a. Dependent Variable: Log_Price

Figure 4.8: Model 2_Walking Distance to Landscape.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	5.658	.117		48.502	<.001	5.429	5.887
	Land_Area	.001	.000	.239	13.569	<.001	.001	.001
	Building_Size	2.142E-5	.000	.018	1.068	.286	.000	.000
	y_2016	.033	.012	.068	2.669	.008	.009	.057
	y_2017	.053	.013	.103	4.109	<.001	.028	.079
	y_2018	.070	.011	.211	6.276	<.001	.048	.092
	y_2019	.064	.011	.196	5.827	<.001	.043	.086
	y_2020	.039	.011	.116	3.566	<.001	.018	.061
	y_2021	.047	.011	.158	4.313	<.001	.025	.068
	y_2022	.057	.011	.155	5.000	<.001	.035	.079
	y_2023	.089	.014	.141	6.344	<.001	.062	.117
	Log_Distance_MR	-.032	.010	-.073	-3.166	.002	-.052	-.012
	Log_CP_WD	-.058	.015	-.150	-3.803	<.001	-.088	-.028
	Log_CH_WD	-.001	.019	-.003	-.037	.971	-.038	.037
	Log_NP_WD	.003	.006	.011	.539	.590	-.009	.015
	Log_C_WD	-.020	.010	-.054	-1.989	.047	-.039	.000
	View_WB	.045	.010	.081	4.473	<.001	.025	.064
	View_STREET	-.003	.012	-.005	-.264	.791	-.027	.020
	View_Park	.013	.006	.044	2.179	.030	.001	.025
	View_CH	-.002	.006	-.008	-.398	.691	-.014	.009
	Quality	.109	.015	.739	7.321	<.001	.080	.138

a. Dependent Variable: Log_Price

Figure 4.9: Model 3_Radius to Landscape.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	5.675	.081		70.484	<.001	5.517	5.833
	Land_Area	.001	.000	.230	13.472	<.001	.001	.001
	Building_Size	3.137E-5	.000	.027	1.593	.112	.000	.000
	y_2016	.032	.012	.068	2.712	.007	.009	.056
	y_2017	.051	.013	.099	4.037	<.001	.026	.076
	y_2018	.065	.011	.197	5.967	<.001	.044	.087
	y_2019	.063	.011	.194	5.866	<.001	.042	.085
	y_2020	.038	.011	.111	3.496	<.001	.017	.059
	y_2021	.045	.011	.153	4.241	<.001	.024	.066
	y_2022	.054	.011	.148	4.884	<.001	.033	.076
	y_2023	.087	.014	.138	6.341	<.001	.060	.114
	Log_Distance_MR	-.030	.010	-.069	-3.123	.002	-.049	-.011
	CP_SL	-3.866E-5	.000	-.158	-3.752	<.001	.000	.000
	CH_SL	-5.745E-5	.000	-.440	-2.956	.003	.000	.000
	NP_SL	2.272E-5	.000	.019	.960	.337	.000	.000
	C_SL	-4.117E-5	.000	-.145	-4.030	<.001	.000	.000
	View_WB	.030	.010	.054	2.911	.004	.010	.050
	View_STREET	-.005	.012	-.007	-.408	.683	-.029	.019
	View_Park	.009	.005	.029	1.610	.108	-.002	.020
	View_CH	-.006	.006	-.019	-.958	.338	-.017	.006
	Quality	.054	.024	.368	2.304	.022	.008	.100

a. Dependent Variable: Log_Price

Table 4.7: Goodness of Fit for Each Model.

	Model 1	Model 2	Model 3
R^2	0.790	0.783	0.785
Adjusted R^2	0.785	0.777	0.780
F-Value	148.085	141.858	143.646

From the result tabulated in Table 4.7, the Adjusted R^2 for Model 1 and Model 2, are 0.785 and 0.777 correspondingly, which meant that 78.5% of the difference in the housing price can be explained by Model 1, while 77.7% of the difference in the residential price can be enlightened by Model 2. As looking into Model 3, the Adjusted R^2 is 0.780, where 78% of the housing price different can be clarified. As such, all three models had shown an averagely significant adjusted R^2 values, this had indicated that the models are variability in the dependent variables. This can illustrate that the variables included in the model are collectively explaining a significant portion of the variability in the dependent variables of the landscapes, scenic views, and other attributable variables.

For the model, the study would investigate the model with F-value to check the goodness of model fit. Each model had achieved a total of 148.085 for model 1, 141.858 for model 2, and 143.646 for model 3 with the p-value below than 0.001 for all models. This had shown that all models are statistically significant in terms of fitness.

From the result of the three models, some variables had shown statistically significant in affecting the housing price at 99% and 95% level. These variables had shown differently in the coefficient (Positive or Negative) at the significant level of 99% and 95%. To further illustrate, table 4.8 below will better illustrate on the positive and negative coefficient at different significant level: -

Table 4.8: Statistically Significant Landscape Attributes based on Each Model.

Model 1	Model 2	Model 3
Positive Coefficient at 99% and 95% significance (+)		
Land Area	Land Area	Land Area
Year of Transaction	Year of Transaction	Year of Transaction
Duration to Neighbourhood Park	View of Waterbody	View of Waterbody
View of Waterbody	View of Park	Quality of Landscape
View of Park	Quality of Landscape	
Negative Coefficient at 99% and 95% significance (-)		
Duration to Major Road	Walking Distance to Major Road	Radius to Major Road
Duration to Central Park	Walking Distance to Central Park	Radius to Central Park
Duration to Clubhouse	Walking Distance to Commercial	Radius to Clubhouse
Duration to Commercial		Radius to Commercial

4.7 Regression Results on Overall Effect of Landscape

The second goal of this research is to use regression analysis to build a hedonic pricing model that takes into account the impact of landscape, scenic views, and other elements on residential property value. Predominantly, the hedonic pricing model is to examine the effect and influence of landscape and scenic views on the gated and guarded communities.

The significant values of distance to landscape and visibility of view had proved that they should be considered as one of the factors in determining the property value. In this research, distance to central park, clubhouse and neighbourhood park, and view of waterbody and park are found to be significant in affecting the price of the Gated and Guarded Schemes in different models. Based on the result, view of street and view of clubhouse does not contribute to any premium increase in housing price.

To illustrate the influence of landscapes and scenic views according to the model, a simple calculation and percentage is projected in the table 4.9 below. The price increase per square metre is calculated based on the mean price of the study area which is RM3320.00/ square metre. As such, the landscapes and scenic views effect that are statistically significant are tabulated as follows: -

Table 4.9: Effect of Landscape on Housing Premium (per square metre).

	Duration	**Walking Distance**	**Radius**
Landscape			
Central Park	Decreased by 0.2% (RM6.63/sq mt)	Decreased by 5.64% (RM187.08/sq mt)	Decreased by <0.001% (RM0.13/sq mt)
Clubhouse	Decreased by 0.2% (RM6.63/sq mt)	NS	Decreased by <0.001% (RM0.19/sq mt)
Neighborhood Park	Increased by 3% (RM9.97/sq mt)	NS	NS
Visibility of Scenic View			
View of Waterbody	Increased by 3.05% - 4.6% (RM101.11/sq mt – RM152.81/sq mt)		
View of Park	Increased by 1.11% - 1.31% (RM36.72/sq mt – RM43.44/sq mt)		
Quality of Landscape			
Quality	Increased by 5.55% - 11.52% (RM184.21 sq mt – RM382.34/sq mt)		

Based on the expected result and the result of this study and research, most of the type of landscapes and scenic views was satisfactory. However, looking into the variable of distance to neighborhood park, the duration (Model 1) and radius (Model 3) to neighborhood park had shown an unexpected result where it had shown a positive relationship with the housing price. This can be explained where the study data is dominated by the area of Bandar Saujana Utama where the neighborhood park is not well maintained. As mentioned above on the Model of Bandar Saujana Utama itself, this had further possessed a negative impact to the nearby property where the homebuyer may think that it is not safe, or the landscape does not possess any aesthetic scenery to the house. This had directly influenced the selling price of the particular parcel and indirectly effect result of the MRA.

Besides that, the distance to major road and the distance to commercial were considered as a variable that would also influence the housing premium of the Gated and Guarded Schemes. Both variables had shown a negative coefficient at a significant level of 99% and 95% in each model. To illustrate, the distance to major road would influence the housing price of the Gated and Guarded Schemes by 2.96% to 4.02%, where the further the distance to major road, the lower the housing premium added to the Gated and Guarded Housing Schemes. While looking into the distance to commercial, it would influence the housing premium by less than 0.0001% to 1.98%, where the further the distance to commercial, the lower the housing premium added to the Gated and Guarded Housing Schemes.

Not only that, but the quality of the landscape would also be considered as one of the variables that would affect the housing premium. As mentioned above, the quality of the landscape in this study assumes that how many landscape facilities had been provided and how well is the landscape planning in the schemes. Based on the models above, it had proven that this element would also influence the housing premium. Based on the study results, the quality of landscape would increase the housing premium by 5.55% to 11.52%.

Tables 4.10, 4.11 and 4.12 had shown the ANOVA output from the result of regression analysis for each model. The ANOVA table shows the significance level of the regression model. In these three models, the level of significance is at <0.001. This means that the final model constructed was significant and able to explain the data and variables perfectly. As such, all three models with different measurement of distance were acceptable for this study.

Table 4.10: ANOVA for Model 1.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.171	20	.459	148.085	<.001[b]
	Residual	2.437	787	.003		
	Total	11.608	807			

a. Dependent Variable: Log_Price

b. Predictors: (Constant), Quality, Duration_NP, Land_Area, y_2018, y_2023, y_2017, Building_Size, View_WB, View_Park, y_2022, y_2016, y_2020, View_STREET, View_CH, y_2019, Log_Distance_MR, Duraton_C, y_2021, Duration_CP, Duration_Clubhouse

Table 4.11: ANOVA for Model 2.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.087	20	.454	141.858	<.001[b]
	Residual	2.521	787	.003		
	Total	11.608	807			

a. Dependent Variable: Log_Price

b. Predictors: (Constant), Quality, Log_NP_WD, y_2022, Land_Area, View_WB, y_2023, y_2017, Building_Size, View_STREET, y_2020, y_2016, y_2018, View_Park, View_CH, y_2019, Log_Distance_MR, Log_C_WD, Log_CP_WD , y_2021, Log_CH_WD

Table 4.12: ANOVA for Model 3.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.109	20	.455	143.646	<.001[b]
	Residual	2.492	786	.003		
	Total	11.602	806			

a. Dependent Variable: Log_Price

b. Predictors: (Constant), Quality, Log_NP_SL, y_2022, Land_Area, y_2023, View_WB, y_2017, Building_Size, View_STREET, y_2020, y_2016, y_2018, View_Park, View_CH, y_2019, Log_Distance_MR, Log_C_SL, Log_CP_SL , y_2021, Log_CH_SL

Based on the model summary shown in the tables above, the value for R^2 was 0.790 for model 1, 0.783 for model 2 and 0.785 for model 3. This means that the independent variable was able to explain the dependent variable in each model for 79%, 78.3% and 78.5% of variance respectively. The remaining 21% for model 1, 21.7% for model 2, and 21.5% for model 3 were influenced by other unknown or undefinable factors. The Adjusted R^2 for these models was 78.5% for model 1, 77.7% for model 2, and 78% for model 3.

4.8 Hedonic Pricing Model

Based on the result for each three models, the hedonic pricing model on the influence of landscapes and scenic views toward the housing price will be projected as follows. The equation for each three models will be based on the mean price per square metre of the study area. As such, the three equations had been generated based on different measurement on distance to landscape.

Model 1: (Duration to Landscape)

$\gamma =$ RM3,320.00 + Land Area (RM3.32/sqm) + Building Size (RM0.06/sqm) + Year 2016 (RM104.53/sqm) +Year 2017 (RM180.71/sqm) + Year 2018 (RM226.51/sqm) + Year 2019 (RM208.82/sqm) + Year 2020 (RM152.14/sqm) + Year 2021 (RM149.34/sqm) + Year 2022 (RM184.24/sqm) + Year 2023 (RM305.40/sqm) - Distance to Major Road (RM133.37/sqm) – Distance to Central Park (RM6.63/sqm) – Distance to Clubhouse (RM6.63/sqm) + Distance to Neighbourhood Park (RM9.97/sqm) – Distance to Commercial (RM6.63/sqm) + View of Waterbody (RM135.49/sqm) – View of Street (RM404.72/sqm) + View of Park (RM36.72/sqm) - View of Clubhouse (RM13.25/sqm) + Quality of Landscape (RM77.24/sqm) + ε

Model 2: (Walking Distance to Landscape)

$\gamma =$ RM3,320.00 + Land Area (RM3.32/sqm) + Building Size (RM0.07/sqm) + Year 2016 (RM111.39/sqm) +Year 2017 (RM180.71/sqm) + Year 2018 (RM240.73/sqm) + Year 2019 (RM219.43/sqm) + Year 2020 (RM132.04/sqm) + Year 2021 (RM159.77/sqm) + Year 2022 (RM194.74/sqm) + Year 2023 (RM309.03/sqm) - Distance to Major Road (RM104.56/sqm) – Distance to Central Park (RM187.08/sqm) – Distance to Clubhouse (RM3.32/sqm) + Distance to Neighbourhood Park (RM9.97/sqm) – Distance to Commercial (RM65.74/sqm) + View of Waterbody (RM152.81/sqm) – View of Street (RM9.95/sqm) + View of Park (RM43.44/sqm) - View of Clubhouse (RM6.63/sqm) + Quality of Landscape (RM382.34/sqm) + ε

Model 3: (Radius Distance to Landscape)

$\gamma =$ RM3,320.00 + Land Area (RM3.32/sqm) + Building Size (RM0.10/sqm) + Year 2016 (RM107.96/sqm) +Year 2017 (RM173.71/sqm) + Year 2018 (RM222.97/sqm) + Year 2019 (RM215.89/sqm) + Year 2020 (RM128.59/sqm) + Year 2021 (RM152.81/sqm) + Year 2022 (RM184.21/sqm) + Year 2023 (RM301.78/sqm) - Distance to Major Road (RM98.12/sqm) – Distance to Central Park (RM0.13/sqm) – Distance to Clubhouse (RM0.19/sqm) + Distance to Neighbourhood Park (RM0.08/sqm) – Distance to Commercial (RM0.14/sqm) + View of Waterbody (RM101.11/sqm) – View of Street (RM16.56/sqm) + View of Park (RM30.01/sqm) - View of Clubhouse (RM19.86/sqm) + Quality of Landscape (RM184.21/sqm) + ε

4.9 Conclusion

The results based on the methods described in Chapter 3 were covered in this chapter. The Multiple Regression Analysis was utilized in this study to analyse the relationship between types of landscape and types of scenic view and other housing attributes towards the residential properties value in a Gated and Guarded Housing Scheme. The three primary methods used in this study to measure distance to landscape are duration, walking distance, and radius distance to landscape. Based on the regression output, the different distance to landscape and visibility of scenic view have influenced the property value in the study area differently. As looking into the distance to landscape, these attributes had shown a negative relationship with the housing price where the further the distance to landscape, the lower the housing price. While the visibility of view had positively influenced the property value in the study area. The MRA in this study was vital to observe and analyse the relationship in order to assist in forming the Hedonic Pricing Model. The result shown that other factors such as land area, date of transaction (year), distance to major road, and distance to commercial area would also contribute to the property value formation. Therefore, the property value would not only be influenced by the residential characteristic itself but also other external elements especially the landscapes and scenic views would influence the value of housing price. As a conclusion, landscapes and scenic views as an environmental attribute should be carefully measured and concluded in the hedonic pricing model to achieve the best residential property value.

CHAPTER 5: DISCUSSION, CONCLUSION, AND IMPLICATIONS

5.0 Introduction

In Chapter 4, data has been analysed and results were discussed. Both objectives of the research have been achieved and accomplished. The research report's last section, which summarises the work done, and the methods used in the study, will be covered in this chapter. This chapter will discuss the research's overall findings, and after reviewing the study's objectives, a conclusion will be produced based on those findings.

There will therefore be five main sections to this chapter: first, a summary of the statistical analysis; second, a discussion of the study's major findings, where those findings are connected to the accomplishment of the study's objectives; third, an analysis of the study's implications; and, finally, a discussion of the study's limitations and recommendations for further research before the study concludes.

5.1 Summary of Statistical Analyses

Table 5.1: Summary of Statistical Analysis.

		Log_Price	Transaction_Price	Land_Area	Building_Size
N	Valid	1012	1012	1012	1012
	Missing	0	0	0	0
Mean		5.6809	498001.5929	150.2827	133.2364
Median		5.6721	470000.0000	143.0000	122.8050
Mode		5.65	450000.00	130.00	109.38
Std. Deviation		.11819	137523.64504	41.35945	93.14187
Minimum		5.28	189100.00	99.80	54.33
Maximum		5.94	880000.00	395.00	1399.31

The study employed the central tendency measurement of constructs, including mean, standard deviation, minimum, and maximum, in the descriptive analysis section to examine the data gathered for the research. Via the findings, it had shown that the mean price of the three Gated and Guarded Schemes in the study area, which is located at the district of Kuala Selangor, is RM498,001.59 with the standard deviation of 137,523.65. In addition, it has an average land area of 150.28 square metre with a standard deviation of 41.36. While looking into the building size, the average building size was 133.24 square meters with a standard deviation of 54.33. Based on the result for this study, the price per square metre will be utilized for the findings and equation modelling, which is RM3,320.00 per square metre.

This study will utilize the Multiple Regression Analysis to assess the effect of landscapes and scenic views, land area, building size, year of transaction and quality of landscape on condominium price. Thus, the independent variables of this study will be the distance to landscapes, visibility of scenic views, floor area, transaction year, distance to major road, and

distance to commercial (denoted by X), while the housing price are the dependent variable (denoted by Y). Additionally, the study also performed the Bivariate Analysis to detect multicollinearity among the independent variables. Based on the current study's result, each model with different measurement of distance can be used to explained 79% for model 1 (Duration to Landscapes), 78.3% for model 2 (Walking Distance to Landscape), and 78.5% for model 3 (Radius distance to Landscape) of the variance in the data. Besides, Stem-and-Leaf analysis was also performed to detect the outliers of the data set. As of the result, there was no multicollinearity, as shown by the statistical significance of all computed coefficients and the positive results of the bivariate analysis. The positive coefficients at the significant level of 99% and 95% are the land area, year of transaction, distance to neighbourhood, view of waterbody, view of park. This had indicated that these variables would positively impact on property values. As looking into the negative coefficients that shows significant at 99% and 95%, this included the distance to major road, distance to centre park, distance to clubhouse and distance to commercial. This had shown that these variables would have a negative relationship with the property prices. However, this is worth noting that the positive and negative relationship does not indicates good or bad.

5.2 Discussion of Major Findings

Findings of the study are vitally important to the research, where it refer to the objective achievement that has been listed out in the first chapter. Conclusions can be drawn from the investigation and analytical analysis of the data gathered. In this section, the key findings of the objective of this study are divided accordingly and will be discussed in detail below:

5.2.1 Findings for First Objective

The first objective of this study is to investigate the impact of different landscape on housing price of gated and guarded housing. The goal was accomplished by a number of measures that were taken during the research process. First, the study had considered

and analyse relevant method of measurement for landscape and scenic views. Besides, literature review and studied on the influence of landscape had also been utilized to achieve the first objective. Then, it is further support by data collection and regression on different model to compare the suitable model or method to be applied for the measurement of landscape and scenic view.

Via the literature review, the session had shown several influencing factors that would affect and influence the housing price of the gated and guarded schemes. Firstly, the structural characteristics of housing such as land area, building size, year of transaction. Based on several study, the land area would show significant impact to the housing price when looking into the landscape effect (Jiao & Liu, 2010 & Hasanah et al, 2018). In addition, looking into building size, it also shown a positive impact with the housing price, where the bigger the building size, the higher the housing price (Wen et al, 2017). Additionally, the price of the residential property will change due to economic considerations like inflation, interest rates, and other things when the transaction year is advanced by one year (Wadu & Maqsood, 2022).

As looking into the landscape effects to the residential property, the distance to landscape and amenities would also affect the housing price. To illustrate, distance to sea (Fernandez & Bucaram, 2019), distance to waterbody (Cho et al., 2009 & Schlapfer et al, 2015) and distance to park (Soren et al., 2006) had shown a positive relationship to the housing price, where the nearest the residential property to the landscape, the higher the price of the property. However, when it come to the scenic view, it will show a positive relationship with the housing price, where the better the view, the higher the housing price of the property.

Besides, there are different models being tested to determine the method of measurement suitable to apply in this study. As the method of measurement could give impact on the housing price, it is vital to find the best method of measurement to study the landscape and scenic view effect to the gated and guarded property. The model is tested based on the duration, walking distance and radius to the landscape.

From the study conducted, it had proved that landscape and scenic view assessments would contribute different impact towards the housing price. Besides, different quality levels of gated and guarded schemes would have different impact on the landscape and scenic views. To illustrate, the gated and guarded schemes of Eco Grandeur that are well planned with facilities does not have much impact on the landscape, where it only shows significant in proximity to central park. However, if looking into the gated and guarded schemes of Maple Hill Park with medium quality of landscape, it had shown the cruciality of proximity to landscape and availability of scenic view that would affect the housing price.

As an overall impact of landscape and scenic view to the gated and guarded schemes, it is proved that the distance to central park, view of waterbody, and view of park contribute a significant impact to the housing price. This proved that different proximity to landscape and scenic view could convey different impact towards housing price.

5.2.2 Findings for Second Objective

The study aims to create a hedonic pricing model that considers the impact of landscape elements and other aspects on the value of house that is guarded and gated. In order to forecast the relationship between qualities and the value of guarded and gated housing, the hedonic pricing model was developed. To create models and identify the optimum equation that can statistically fit the relationship under study, the second objective's findings are based on Multiple Regression Analysis using SPSS software. Furthermore, the regression result confirms whether or not the independent variables—like building area, land size, and distance to a major road—have an impact on the gated and guarded schemes inside the study area. Based on literature review, there are several factors that have shown significant impact to residential property value as mentioned above. This study added detailed environmental factors such as proximity to landscape and visibility of scenic view as independent variables in regression. This is to compromise with and answer the second objective and overall research in this study. In this study,

the core of the research is to analyse the influence of landscape and scenic views with the gated and guarded schemes' residential property value.

Based on the regression analysis, different landscape and scenic view have different relationship towards the residential housing price. To illustrate, the proximity to landscape tends to have negative relationship towards gated and guarded property and visibility of scenic view would contribute positive relationship towards gated and guarded property. Besides, different model based on gated and guarded scheme was tested in this study which may contribute or represent different quality of landscape. While on the overall effect of landscape towards the Gated and Guarded schemes, the duration, and walking distance and radius to landscape had been tested separately as it may affect the outcome of the regression.

Consequently, the building of the model in the regression leads to the conclusion that one of the elements influencing the housing value of the gated and guarded schemes would be the landscape and scenic view. As a result, one of the elements that increased the transaction value in this study was the terrain and scenic views.

5.3 Implication of Study

The current study is significant since it will help and inform a variety of individuals, such as investors, developers, urban planners, valuers, and homebuyers. The study's findings can be utilised by developers to build a gated and guarded community with thoughtfully designed landscaping, which could have an effect on home prices. Additionally, by analysing the data, urban planners can pinpoint locations where utilising the terrain could potentially have a positive effect on property prices. However, valuers can make use of the study's data and include it into their models to provide more precise evaluations and understanding of the cost of guarded and gated developments. Finally, the study's findings can be used by investors and

buyers to make better investment and purchase decisions that reduce risk and enable the acquisition of the right kind of real estate.

5.4 Limitation of Study

The study has encountered and confronted some limitations where some improvements and suggestion can be made for the further research. The limitations of the study are shown as follows: -

(i) The scope of the study has only focused on landed residential properties in the district of Kuala Selangor area due to time constraints and lack of useful information. Since, the preference, demographics and other information vary from one area to another, this study cannot represent the entire gated and guarded scheme in other area will have the same effect.

(ii) Moreover, the type of housing selected within the vicinity is limited to landed residential. As landed residential properties such as terraced, semi-detached, and detached houses have different characteristics than the strata or high-rise properties, the findings cannot be represented that the high-rise properties would have a good impact on the landscape and views as of the result of this study.

(iii) Besides, the study encountered limitation on analysing and collecting data that may affect the housing price such as age of building and premium to construct the landscape. As such, the quality of landscaping in this study is based on author's perception and assumptions. The study may not be able to fully reflects its effect due to the factors that housing price may also be affected by other factors as mentioned above.

5.5 Recommendations for Future Research

Some recommendations and suggestions will be made for future research based on the study's limitations. The following are the suggestions for the forthcoming and future research: -

(i) The geographic coverage of the study area should be expanded and populated more in order to achieve a more perfect, precise, and comprehensive result and high reliability to represent the gated and guarded residential market in the Selangor region. However, additional factors such as crime rate, premium to build landscape, and the effect of CBD and public amenities can be considered if the geographical scope is extended and expanded as these factors will be significant in determining the landscape effect and market price.

(ii) It is advisable that the similar study can be conducted especially to include the influence of landscape and scenic views towards the high-rise property. This is because that the high-rise property would have different landscape and scenic view compared to the landed residential property. As such, by conducting the landscape effect towards the high-rise property can produce a significant result to represent the scenario of Malaysia as a whole, provide all the information is obtained.

(iii) Besides, it is also advisable that the similar study can be conducted especially in the district of Petaling Jaya or district in Pulau Pining. This is because the residential property in the area is surrounded by more variety of landscape and providing more pleasant views. As such, the study can provide significant result to represent more scenario of Malaysia provided that all information is obtainable.

(iv) Due to the limitation occurring on analysing and collecting data in this study, future research should try to include more variables that may affect the housing price such as the age of house, neighbourhood characteristic, and distance to CBD, etc. in order to create a better regression model to identify whether the landscape effect and scenic view could be one of the important factors that contribute to the housing price or not.

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