A Hedonic Pricing Model of Condominiums in Hua Hin Area, Thailand

Miss Panwalee Sakulvatana

An Independent Study Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Arts in Business and Managerial Economics
Field of Study of Business and Managerial Economics
FACULTY OF ECONOMICS
Chulalongkorn University
Academic Year 2021

ปัจจัยที่มีผลต่อการกำหนดราคาคอนโดมิเนียมในพื้นที่หัวหิน ประเทศไทย

น.ส.ปัญวลี สกุลวัฒนะ

สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
สาขาวิชาเศรษฐศาสตร์ธุรกิจและการจัดการ สาขาวิชาเศรษฐศาสตร์ธุรกิจและการจัดการ
คณะเศรษฐศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2564

Independent Study Title	A Hedonic Pricing Model of Condominiums in Hua Hin Area, Thailand
By	Miss Panwalee Sakulvatana
Field of Study	Business and Managerial Economics
Thesis Advisor	Assistant Professor WATCHARAPONG RATISUKPIMOL, Ph.D.

Accepted by the FACULTY OF ECONOMICS, Chulalongkorn University in Partial Fulfillment of the Requirement for the Master of Arts

INDEPENDENT STUDY COMMITTEE

..... Chairman
(Assistant Professor NIPIT WONGPUNYA, Ph.D.)

..... Advisor
(Assistant Professor WATCHARAPONG RATISUKPIMOL, Ph.D.)

..... Examiner
(Assistant Professor PANUTAT SATCHACHAI, Ph.D.)

ปัญวลี สกุลวัฒนะ : ปัจจัยที่มีผลต่อการกำหนดราคาคอนโดมิเนียมในพื้นที่หัวหิน ประเทศไทย. (A Hedonic Pricing Model of Condominiums in Hua Hin Area, Thailand) อ.ที่ปรึกษาหลัก : ผศ. ดร.วัชรพงศ์ รติสุขพิมล

การศึกษานี้มีวัตถุประสงค์เพื่ออธิบายคุณลักษณะโดยทั่วไปของคอนโดมิเนียมและวิเคราะห์หาคุณลักษณะสำคัญที่กำหนดราคาคอนโดมิเนียมในพื้นที่หัวหิน ขอบเขตการศึกษาอยู่ภายในพื้นที่อำเภอหัวหิน อำเภอชะอำและอำเภอปราณบุรีโดยที่คอนโดมิเนียมมีอายุไม่เกิน 10 ปี ข้อมูลที่เก็บเป็นข้อมูลแบบทุติยภูมิเก็บมาจากเว็บไซต์ที่รวบรวมข้อมูลเกี่ยวกับอสังหาริมทรัพย์และเว็บไซต์ทางการของคอนโดมิเนียม ข้อมูลมีทั้งหมด 126 ข้อมูลโดยที่ทั้ง 126 ข้อมูลเป็นรูปแบบของห้องที่เก็บมาจากคอนโดมิเนียม 44 แห่ง นำมาจัดในรูปแบบของแบบจำลอง hedonic pricing และใช้ OLS regression ในการวิเคราะห์ทางสถิติเพื่อหาปัจจัยที่มีผลต่อราคาที่มีนัยสำคัญทางสถิติ แบบจำลองในการศึกษานี้มี 2 แบบ โดยที่แบบจำลองแบบที่ 1 มีตัวแปรตามเป็นราคาเฉลี่ยต่อตารางเมตรของคอนโดมิเนียม ส่วนแบบจำลองรูปแบบที่ 2 มีตัวแปรตามเป็นราคาเริ่มต้นของคอนโดมิเนียม คุณลักษณะตามแบบจำลอง hedonic pricing แบ่งเป็น 3 ประเภทคือคุณลักษณะทางที่ตั้ง คุณลักษณะทางโครงสร้าง และคุณลักษณะทางสภาพแวดล้อม

ผลที่ได้จากการวิเคราะห์แบบจำลองที่ 1 ในส่วนของคุณลักษณะทางที่ตั้งมีคุณลักษณะที่มีผลต่อการกำหนดราคาคือความหนาแน่นประชากรและติดถนนใหญ่ ในส่วนของคุณลักษณะทางโครงสร้างมีคุณลักษณะที่มีผลต่อการกำหนดราคาคืออายุของคอนโดมิเนียม จำนวนอาคารในโครงการ จำนวนยูนิต จำนวนที่จอดรถ ห้องที่พร้อมเข้าอยู่ และ ห้องที่ตกแต่งครบพร้อมเข้าอยู่ ในส่วนของคุณลักษณะทางสภาพแวดล้อมมีคุณลักษณะที่มีผลต่อการกำหนดราคาคือ ค่าส่วนกลาง ระยะทางไปถึงชายหาดที่ใกล้ที่สุด ระยะทางไปถึงห้างสรรพสินค้าบลูพอร์ตหัวหิน และระยะทางไปถึงโรงพยาบาลที่ใกล้ที่สุด

ผลที่ได้จากการวิเคราะห์แบบจำลองที่ 2 ในส่วนของคุณลักษณะทางที่ตั้งไม่มีคุณลักษณะที่มีผลต่อการกำหนดราคาที่มีนัยสำคัญทางสถิติ ในส่วนของคุณลักษณะทางโครงสร้างมีคุณลักษณะที่มีผลต่อการกำหนดราคาคืออายุของคอนโดมิเนียม แสนสิริ(ผู้พัฒนาอสังหาริมทรัพย์) จำนวนอาคารในโครงการ จำนวนยูนิต พื้นที่ห้อง จำนวนเตียง และจำนวนที่จอดรถ ในส่วนของคุณลักษณะทางสภาพแวดล้อมมีคุณลักษณะที่มีผลต่อการกำหนดราคาคือ ระยะทางไปถึงชายหาดที่ใกล้ที่สุด และระยะทางไปถึงโรงพยาบาลที่ใกล้ที่สุด

จากผลการวิเคราะห์จากแบบจำลองทั้ง 2 แบบพบว่ามีความแตกต่างกันในคุณลักษณะสำคัญที่มีผลต่อการกำหนดราคาเฉลี่ยต่อตารางเมตรและราคาเริ่มต้นของคอนโดมิเนียม โดยผู้พัฒนาอสังหาริมทรัพย์ นักลงทุน นักท่องเที่ยวที่ต้องการที่พักระยะยาว และผู้ที่สนใจ สามารถใช้คุณลักษณะที่สำคัญนี้ในการพิจารณาในการลงทุนหรือซื้อคอนโดมิเนียมในพื้นที่หัวหินให้เหมาะสมตามแต่ละบุคคลหรือองค์กรได้

สาขาวิชา	เศรษฐศาสตร์ธุรกิจและการจัดการ	ลายมือชื่อนิสิต .....
ปีการศึกษา	2564	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

6384039029 : MAJOR BUSINESS AND MANAGERIAL ECONOMICS
KEYWOR D: Hedonic Pricing Model, Condominium, Hua Hin

Panwalee Sakulvatana : A Hedonic Pricing Model of Condominiums in Hua Hin Area, Thailand. Advisor: Asst. Prof. WATCHARAPONG RATISUKPIMOL, Ph.D.

This study aims to describe the characteristics of the condominiums in the Hua Hin area and also find which characteristics affect the price of the condominiums. The scope of the study is based on condominiums that are between 0 - 10 years and located in the area of Hua Hin district, Cha-Am district, and Pranburi district. The secondary data is collected from real estate websites and official websites of the condominiums. There are 126 observations that are 126 patterns of the unit within 44 condominiums. The hedonic pricing model and OLS regression are applied for analysis on 2 models with different dependent variables: the average price of the condominium and the starting price of the condominium. As a result of model 1, the average price of the condominium as a dependent variable, for the locational attributes, the significant characteristics are population density and on-the-main-street condominium. For structural attributes, the significant variables are the age of the condominium, the number of buildings, the number of units, the number of parking lots, the ready-to-move-in room, and the fully furnished room. For neighborhood attributes, the significant characteristics are common fees, distance to the beach, distance to the mall(Bluport Hua Hin), and distance to the nearest hospital. As a result of model 2, the starting price of the condominium as a dependent variable, for the locational attributes, there is no significant variable. For structural attributes, the significant variables are the age of the condominium, the developer: Sansiri, the number of buildings, the number of units, unit area, the number of beds, and the number of parking lots. For neighborhood attributes, the significant characteristics are distance to the beach and distance to the nearest hospital. In conclusion, the significant characteristics which determine the average price and the starting price of the condominium are different. Therefore, developers, investors, long-stay tourists, and other customers can use these significant characteristics to consider investing or purchasing the condominiums in Hua Hin area.

Field of Study:	Business and Managerial Economics	Student's Signature .....
Academic Year:	2021	Advisor's Signature .....

ACKNOWLEDGEMENTS

Many thanks to my advisor, Asst. Prof. WATCHARAPONG RATISUKPIMOL. This study would not have been possible without him.

Thank to my family, and my friend for supporting me.

Panwalee Sakulvatana

TABLE OF CONTENTS

Page

1. Introduction

Thailand, the popular tourism country in the South East Asia region, has become more attractive in property investment. The fast growth of this attraction is caused by straightforward foreign property ownership laws, a rapidly growing national economy, and a desirable lifestyle. The popular cities and provinces in Thailand for purchasing and investing in real estate are Bangkok, Chiang Mai, Phuket, Pattaya, Hua Hin, and Koh Samui (Fresh Property, 2019).

In this study, the Hua Hin area does not consist only of the Hua Hin district, but also the Cha-Am district Petchburi province, and Pranburi district Prachuap Khiri Khan province. They are Hua Hin district's neighborhood with not more than 30 minutes driving to the center of Hua Hin district's area. Therefore, the visitors who stay in Cha-Am district and Pranburi district can easily travel to Hua Hin district. Along with Hua Hin district's attracting tourism location and popular private beach, condominiums in Cha-Am and Pranburi district area often added Hua Hin within the name such as Bella costa Hua Hin which is located in Pranburi district, Baan San Ngam Hua Hin, and Q Seaside Hua Hin which are located in Cha-Am district.

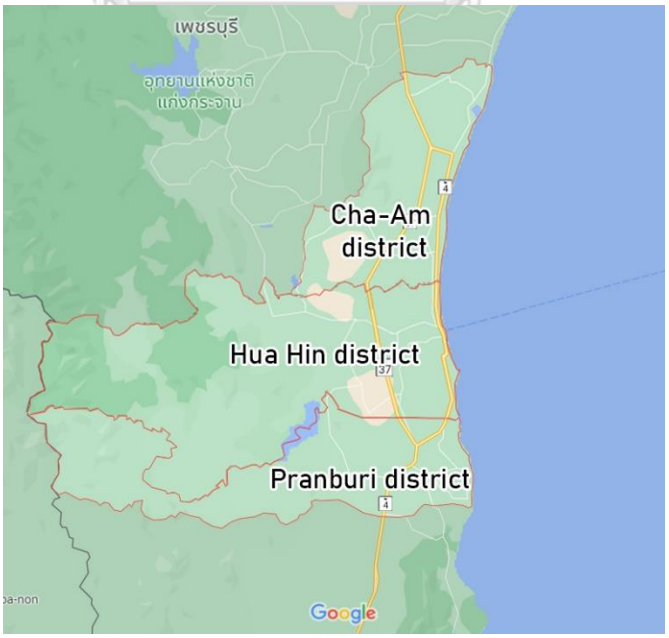

Figure 1: Hua Hin area in this study, source: Google Maps

Hua Hin district, one of the popular tourist locations, is a district in Prachuap Khiri Khan province. Hua Hin city is approximately 3 hours' driving from Bangkok. There are beautiful and amazing natural tourist attractions in and near Hua Hin city recommended by Thairath Online (2020) such as Hua Hin beach, Khao Takiab beach, Hin Lek Fai Mountain, Pa La-U waterfall, as well as man-made tourist locations such as the summer royal residence of King Rama IX, Klai Kang Won Palace, Rajabhakti Park, Khao Takiab temple, Huay Mongol temple, and Hua Hin night market. Different from some beach cities, Hua Hin preserved its Thai culture and its local charm while inviting tourists and western style. Hua Hin is a perfect blending of traditional and modernism.

Figure 2: Number of Thai Tourists in Hua Hin (2015 – 2018, source: Hua Hin Sup Siri

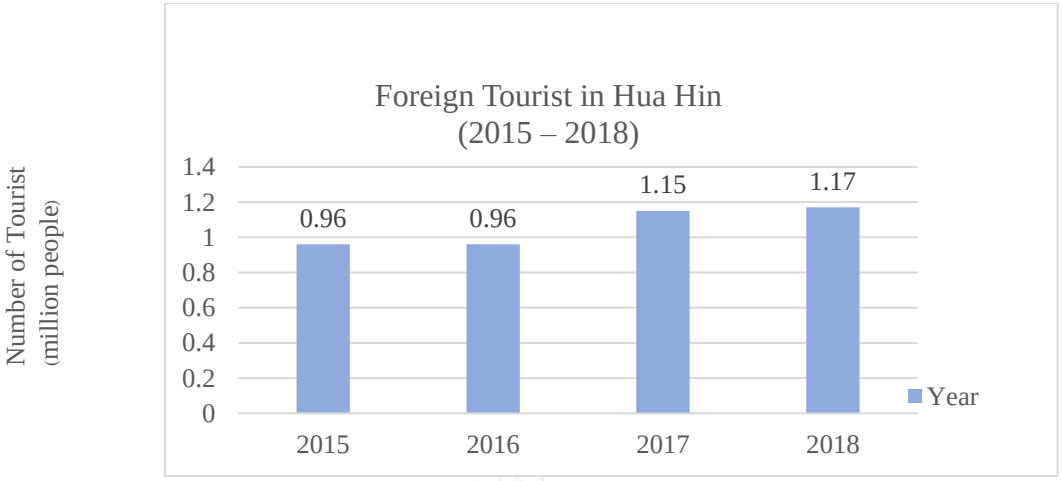

Figure 3: Number of Foreign Tourists in Hua Hin (2015 – 2018, source: Hua Hin Sup Siri

According to Hua Hin Sup Siri (2020), before the Covid-19 epidemic, the number of Thai tourists increase from 3.8 million people to 4.9 million people during 2015 – 2018. In the same way, foreign tourists increase from 0.96 million in 2015 people to 1.17 million people in 2018. These movements show that the Hua Hin area is a very popular destination for holiday trips which many Thai people are looking to escape the busy life in Bangkok. On the contrary, some popular tourist locations in Thailand are mainly driven by foreigners and there are a few Thai tourist who plan for a trip all the year. Therefore, they can suffer from low seasons (Thaiger ,2020). Together with the Hua Hin population of 64,692 people (Hua-Hin Municipality, 2019), Hua Hin is in the top rank for property investment. As a result, Hua Hin has more potential because of long-term stability and strong economic stimulation from both domestic and international markets.

In addition, Andrews, P. (2021) reported that there is the infrastructure that will connect Hua Hin to Bangkok and Chaing Mai metropolitan areas due to the Department of Rail Transport (DRT) resurrecting plans for a high-speed train to Hua Hin. The DRT aims to “develop a railway network to connect the whole country that supports seamless ‘multimodal’ transport”. The R-Map feasibility study will focus on two routes: Bangkok - Chiang Mai and Bangkok - Hua Hin. Around August 2022, the feasibility study for a high-speed train to Hua Hin is expected to be completed and it will be presented to Cabinet for approval. Other government transportation

infrastructure development projects are including of the elevated highway project on Highway No.35 of Thonburi - Pak Tho (Rama 2 Road), the Nakhon Pathom – Hua Hin double-track railway project that progress 84.86 percent, and the expansion of Hua Hin Airport. It will be designed as an international airport that supports direct international flights into and out of Hua Hin. This would attract more foreign tourists (Big Chilli,2021).

Overall, the condominium market in the Cha-Am – Hua Hin – Khao Tao (Nong Kae) area in the first half of 2021 was slowdown increase from 2020 due to the Covid-19 epidemic (Bangkok Post, 2022).

Hua Hin condominium market consists of 2 main groups. The first group is sea view condominiums which have a small supply. Buyers of this group mostly are wealthy and have cash in hand. This market segment maintains constant selling activity and it is not much affected by the Covid-19 situation. The second group is condominiums without sea view, most buyers of this group are middle class from Bangkok, other provinces, or local people who buy a second home. The market for non-sea view condominiums has kept slowing down since 2020 because they tend to be cautious about investing and saving their cash for an urgent situation.

Figure 4 New condominium units sold, 2011 – 1H 2021, Source: Knight Frank

New condominium units sold in the Cha-Am – Hua Hin – Khao Tao (Nongkae) were 280 units in the first half of 2021 which was low when compared to the previous year. In the past 5 years, on average, around 1,600 new units are sold in this area per year. Due to the Covid-19 situation, new projects are delayed and developers focus on market research to study the selling point of potential projects before making the decisions on the investment.

However, if the Covid-19 situation returns to normal, there will be more opportunities for Thai people and foreigners to resume purchasing condominiums in Cha-am – Hua Hin – Khao Tao(Nong Kae). They will have a safe location to live and escape possible future epidemics by purchasing a space for their workstation or investing in rental properties for the return of the tourism sector when the country reopens in 2022. Because of its proximity to Bangkok, popular tourist destinations, and infrastructural progress, the condominium market in Hua Hin will be one of the target sites. All these above factors will have a positive effect on the condominium market in Hua Hin in the future.

This study is interested in finding the factors affecting the price of condominiums and also study descriptive statistics of characteristics of a condominium in the Hua Hin area to prepare for investment in a time of the reopening country. This will benefit the developers and people who are interested in investment, also people who would like to purchase condominiums as a home.

2. Literature Review

A collection of implicit or "hedonic" pricing is defined by observed product prices and the particular amounts of features related to each product (Rosen, 1974). The characteristics of goods describe their value. The difference of price among goods is based on the relationship between observed price and observed characteristic and it identifies how customers prefer the products. Hargrave, M. (2021) mentioned that hedonic pricing is a model that identifies the characteristic that affects the market price. The market price is determined by both internal and external characteristics.

The factors with quantitative values are often estimated by the hedonic pricing model to find the impact on the market price. The hedonic pricing provides accurate data and has the ability to estimate the value, especially for property markets. And it is also flexible to adapt to determine other market goods. The customer's willingness to pay is obviously seen from the result of hedonic pricing. Monson (2009) mentioned that hedonic pricing is good to predict the implicit price and the real value of each characteristic even the traditional discounted cash flow models are not working. It is useful to the developer to make decisions about how to generate the highest value from the building's characteristics. Freeman (1979) used hedonic price to analyze property value from the environmental impact such as air pollution, water pollution and noise. Herath and Maier (2010) mentioned that the hedonic pricing model is used to estimate the demand for the value or the demand of the commodity.

Housing and real estate study has mostly used the Hedonic Price Method to analyze in recent past (Herath and Maier, 2010). For example, Hu, Chulasai & Phuangsaichai (2011) Conroy, Narwold, & Sandy (2013), Brandt & Maennig (2012), Mok, Chan, & Cho (1995), Diewert & Shimizu (2016), Kulkosa (2016), Pongprasert (2022), Thamrongsrisook (2011), Vichiensan et.al. (2022), Chuthamas (2016), Porna & Jittrapan(2018), Ek-akara (2014), and Rinchumphu et.al. (2020).

Hu, Chulasai & Phuangsaichai (2011) used the Hedonic Price method to find the effect of characteristics on housing price in the city of Kunming, China. They constructed the model in 3 functional forms including linear, log-log, and semi-log. 204 samples of data in 2009 are used to analyze. Finally, Hu, Chulasai & Phuangsaichai (2011) found that floor area and distance to Central Business District (CBD) mostly affected the price of housing for all three models. Floor area is positively significant to price while the distance to CBD is negatively significant to price. When comparing the effect on housing price of three attributes, the characteristics which are in the neighborhood attribute have less effect than in structural and locational attributes. Conroy, Narwold, & Sandy (2013) also founded a higher floor with a higher price for condominiums in San Diego by using the Hedonic Price method with 2395 condominiums sales in 2006 - 2011. An increase in 1-floor level results in a 2.2 percent increase in price. Brandt & Maennig (2012) studied the

impact of railway station on condominium prices in Hamburg, Germany. The study found that the rail system causes 4.6% increase in condominium price. Mok, Chan, & Cho (1995) studied the impact of structural, locational, neighborhood attributes on the condominium price in Hong Kong. 1,027 data is collected from condominium within 5-minute walk from mass rapid transit station. The study found the age of the building, the distance from CBD, and the floor level are significant to the condominium price. Diewert & Shimizu (2016) used a hedonic pricing model to find the factors that impact the selling prices of condominiums in Tokyo. The study found that the significant characteristics to the selling prices of condominiums are the floor area, the project's land area, the number of units, the number of stories, the height of the sold unit, the age of the condominium, and the amount of excess land.

About the study of hedonic price in Thailand, the popular related location mentioned by many studies are mass rapid transit stations in Bangkok such as BTS Skytrain (under Bangkok Metropolitan Administration (BMA)) and Metropolitan Rapid Transit or MRT (under Mass Rapid Transit Authority of Thailand (MRTA)). Kulkosa (2016) found that land price, proximity to BTS stations, location along BTS Sukhumvit Line, number of storey, car parking, and common fee are significant to the price of a condominium along the BTS Skytrain in Bangkok. Therefore, the characteristics of condominiums in each location result in various prices that investors are comfortable paying. Vichiensan et.al. (2022) and Pongprasert (2022) also studied hedonic prices of condominiums in Bangkok. Vichiensan et.al. (2022) studied the impact of mass rapid transit on condominium prices. Along with Kulkosa (2016), the urban mass rapid transit is statistically significant to the condominium price. In addition, the condominium price with 100-m to the mass rapid transit station is approximately 2.5 times more than around the mass rapid transit station in the suburb. Oppositely, Pongprasert (2022) studied the factors that related to luxurious condominiums around 1 km from mass rapid transit stations. The data of 55 luxurious condominiums with age 0 - 5 years are used to analyze. The study concluded that the number of units, percentage of the parking lot, private recreation park in the project area, common fee, street corner building, and distance to expressway are significant to luxurious condominiums within 1-km from a mass rapid transit station.

Thamrongsrisook (2011) studied the impact of rapid transit systems on condominium prices in Bangkok using a hedonic pricing model. The study found that the distance to the rapid transit system is negatively significant to the condominium prices for the entire area model but not for the clustered model. The other significant characteristics are the distance to the main street and facilities around that area.

Other cases in Thailand presented the overall factors that determine the hedonic price. Tochaiwat (2020) studied the characteristics that determine the price of second-hand condominium units in Bangkok with the 200 observations of second-hand condominiums that sold on the well-known real estate websites in Thailand. The study found that the inner Bangkok, high-rise building, digital door lock, distance to the mass rapid transit stations, cooker hob and hood, refrigerator, age of the condominium, distance to shopping mall, distance to convenience stores, fully furnished room, and the proportion of the number of parking lots to the number of units are significant to the selling prices. Chuthamas (2016) studied the factors that determine the price of a condominium in the North Bangkok zone. The data of 30 projects, 75-unit layouts are used to analyze with linear equation and semi-log linear equation. The significant characteristics are North Bangkok Zone, distance from a mass rapid transit station, floor level, number of bedrooms, fully furnished, number of the unit, project land area, ready to move in, common fee, and developer name. Both linear equation and semi-log linear equation gave the same direction of the result. Porna & Jittrapan (2018) also studied the characteristics of condominiums that affect the price of condominiums in Bangkok. The data of 38 projects, 160-unit layouts are used to analyze with a linear equation. The similar significant characteristics with Chuthamas (2016) are the inner Bangkok zone, fully furnished, the total area in the project, common fees. The different significant characteristics from Chuthamas (2016) are the number of parking lots and room size are statistically significant to the price of the condominium. Besides Bangkok, Ek-akara (2014) studied the factors that affect the price of condominiums real estate in Pattaya City. 390 samples within 5 areas of Pattaya - Wongamataya, Pattaya, Pratumnak, Jomtien, and Najomtien - are used to analyze. Ek-akara (2014) found that the characteristics which positively affect the condominium price are room area, suite type unit, shower area with shower

screen, floor level, sea view-unit, common fee, security system, and private beach. Due to location, special characteristics of condominiums in Pattaya are sea view and private beach which is important to determine the price. Rinchumphu et.al. (2020) used hedonic pricing model to predict the pre-sale house price in Chiang Mai, Thailand. The data is collected from 125 residential development projects and applied in semi-log functional model. As a result, the distance from the nearest department store, 4 ring roads, usable area in the building, land area, parking lot, detached house, the number of units, and fitness are significant to the pre-sale house price.

Previous studies emphasized Rosen (1974)'s study. Therefore, each condominium in a different location with different characteristics determines its value.

For this study, the case of the condominium in Hua Hin is similar to the case of Pattaya city by Ek-akara (2014) in beach location and tourist city, the important characteristics that need to focus on as same as mass rapid transit in Bangkok. Many previous studies in Thailand study about hedonic pricing of condominiums in Bangkok. Because of that, this study chooses the Hua Hin area which is one of the most interesting areas in Thailand for developers, investors, and long-stay tourists. The appropriate characteristics of condominiums in Hua Hin areas would determine the appropriate price of condominiums for those developers, investors, and long-stay tourists.

3. Methodology

Hedonic Price Method is the methodology used in this study. The value of products that can be described by their functions or characteristics or the different characteristics that generate the different prices of products (Rosen, 1974). Because the value of individual characteristics of buildings cannot be directly observed, hedonic pricing models are used to generate the impact of these characteristics on the market price. The statistical technique that used in this study is ordinary least square (OLS) regression analysis. This technique can be used to determine the effect of

independent variables on a single dependent variable. Collecting data of different buildings and performing a regression analysis to determine the relationship of each characteristic to the price, these influencing factors can add or subtract building value. And the result of this method will answer the value of the real estate in the market (Monson, 2009).

The Hedonic Pricing Model can be expressed as :

$$P = f(L, S, N) \quad (1)$$

Where,

P = the market price of the condominium

L = the locational attributes of the condominium

S = the structural attributes of the condominium

N = the neighborhood attributes of condominium

Locational attributes are characteristics that describe the location of property such as scenic view and population density of area. Structural attributes are the physical characteristics such as the number of buildings, number of stories, and unit area. Neighborhood attributes refer to socioeconomic and attractive places around the property area such as infrastructure.

When written in basic model with linear functional form:

$$P = a + \sum_{i=1}^{n} \beta_n X_n + \varepsilon \quad (2)$$

X represents characteristics or attributes, ε represents the error term.

However, Malpazzi (2003) recommended the semi-log functional form instead of the linear functional form. There are 4 reasons that semi-log functional form is better than linear functional form. First, the semi-log functional form allows the price to vary with particular characteristics or attributes. Therefore, value-added is allowed

to vary proportionally with the characteristics or attributes. Second, the coefficients of characteristics are simple interpretations in approximately percent change in price. The dummy variable is suitable with this functional form. Third, statistical problems such as heteroskedasticity and changing variance of the error term are often reduced by semi-log functional form. Finally, this functional form provides a simple estimation.

written in basic model with semi-log functional form :

$$lnP = a + \sum_{i=1}^{n} \beta_n X_n + \varepsilon \qquad (3)$$

This study estimates from 2 models using a semi-log functional form with the different dependent variables,

Model 1:

$$\begin{aligned} ln\, avgprice = {} & \alpha_0 + \alpha_1 chaam + \alpha_2 pranburi + \alpha_3 distbeach + \alpha_4 mainstrt + \alpha_5 age \\ & + \alpha_6 sansiri + \alpha_7 qhouse + \alpha_8 lh + \alpha_9 lpn + \alpha_{10} scasset + \alpha_{11} land \\ & + \alpha_{12} build + \alpha_{13} storey + \alpha_{14} unit + \alpha_{15} rmarea + \alpha_{16} bed \\ & + \alpha_{17} parking + \alpha_{18} ready + \alpha_{19} furn + \alpha_{20} fee + \alpha_{21} dairport \\ & + \alpha_{22} dnmarket + \alpha_{23} dmall + \alpha_{24} dhosp + \varepsilon \end{aligned}$$

The natural log of the average price is a dependent variable for model 1. The independent variables are the characteristics from 3 attributes – locational attribute, structural attribute, and neighborhood attribute – which are from Hua Hin area's condominium.

Model 2:

$$\begin{aligned} ln\, startprice = {} & \beta_0 + \beta_1 chaam + \beta_2 pranburi + \beta_3 distbeach + \beta_4 mainstrt + \beta_5 age \\ & + \beta_6 sansiri + \beta_7 qhouse + \beta_8 lh + \beta_9 lpn + \beta_{10} scasset + \beta_{11} land \\ & + \beta_{12} build + \beta_{13} storey + \beta_{14} unit + \beta_{15} rmarea + \beta_{16} bed \\ & + \beta_{17} parking + \beta_{18} ready + \beta_{19} furn + \beta_{20} fee + \beta_{21} dairport \\ & + \beta_{22} dnmarket + \beta_{23} dmall + \beta_{24} hosp + e \end{aligned}$$

The natural log of the starting price is a dependent variable for model 2. The independent variables on the right side are the same as model 1.

4. Data

Data is secondary data obtained from several websites including the official websites of the project and real estate websites such as Living Insider and Fazwaz. There are 126 observations which are 126 types of rooms within 44 condominium projects in the Hua Hin area. 0 - 10 years-condominiums located in the Hua Hin area are focused in this study.

4.1 Dependent variables

The dependent variables are average condominium price and, starting price for models 1 and 2 respectively. The average condominium price is represented by *avgprice* which is in baht per square meter. Starting price is represented by *startprice* which is in million baht. Starting price is the minimum price of each unit type of condominium.

4.2 Independent variables

The independent variables used for analysis in this study are divided into 3 categories which consist of locational attributes, structural attributes, and neighborhood attributes.

4.2.1 Locational Attributes

The main street is represented by *mainstrt* which is a dummy variable. If the condominium project is located on the main street, represent the data by 0. If the condominium project is on a sub street, represent the data by 1. The main street in this study is Phet Kasem Road or Highway no. 4.

Population Density is represented by *popdens* in people per square kilometer calculated from the population in a specific area divided by that area. Population density is 145.04 people per square kilometer for Hua Hin district, 123.43 people per square kilometer for Cha-Am district, and 102.89 people per square kilometer for Pranburi district.

4.2.2 Structural Attributes

The age of a condominium is represented by *age* which is in the year. The age is counted from the year in which the condominium is finished construction. In this study, the range of age is between 0 - 10 years.

The project's land area is represented by *land* measured in square meters.

Storey is represented by *storey*, and the number of storey is on average of all buildings because of the various storey of each building in the project.

The unit area is represented by *rmarea* measured in square meters. The minimum area of each room type is used to get along with the minimum price of the condominium.

The number of buildings, the number of units, the number of beds, and the number of parking lots are represented by *build*, *unit*, *bed*, and *parking* respectively.

Ready to move in is a dummy variable represented by *ready*. If the condominium is finished and ready for customers to move in, represent the data by 1. On the contrary, if it is not, represent the data by 0.

Fully Furnished is a dummy variable represented by *furn.* If the room is fully furnished, represented the data by 1. On the contrary, if it is not, represent the data by 0. The fully furnished room means that the developer provides all furniture including of interior design for customers.

4.2.3 Neighborhood Attributes

Common fee is represented by *fee* which is in baht per square meters per year.

Distance from the beach is represented by *distbeach* measured in kilometers. The data is obtained from measuring the distance from each condominium project to the nearest beach on Google Map. If the project is next to the beach, it will be 0 kilometer.

Distance from the airport, distance from the night market, distance from the shopping mall, distance from the nearest hospital is represented by *dairport*, *dnmarket*, *dmall*, *dhosp* respectively and they are measured in kilometers on Google Maps. In this case, the airport is Hua Hin airport and the shopping mall is Bluport, Hua Hin.

4.3 Expected signs

The expected signs after performing both model1 and model2 on OLS regression for each variable are followed in Table 1.

Table 1 Expectated sign

Variable	Expected Sign	Variable	Expected Sign
Locational Attributes		**Structural Attributes**	
popdens	+	*age*	-
mainstrt	+	*sansiri*	+
		qhouse	+
Neighborhood Attributes		*lh*	+
fee	+	*lpn*	-
distbeach	-	*scasset*	-
dairport	-	*land*	+
dnmarket	-	*build*	+
dmall	-	*storey*	+
dhosp	-	*unit*	-
		rmarea	+
		bed	+
		parking	+
		ready	+
		furn	+

For locational attributes, population density is expected to be positively related to the market price of the condominium because it relates to the more or less purchasing power in the location. The expected sign of the condominium next to the main street is expected to be the same way as population density. The easier approach may result in higher value.

For structural attributes, the age of the condominium is expected to be negatively related to the price due to the depreciation of the condominiums. For Sansiri, Q House, and Land and Houses, the expected signs are positively related to the price because their target is middle class income to the upper class income. On the contrary, because the target of SC ASSET is middle class and L.P.N. is middle class income to low class income, the expected signs are negatively related to the price. The project's land area is expected to be positively related to the price because the wider area has opportunities to create the value-added to the condominiums and also increase the cost of a project. The number of buildings and the number of stories are

also expected to be positively related to the price because they increase the cost of the structural part of the construction. Moreover, the higher storey creates a better scenic view. The number of units is predicted to be negatively related to the price because the private is one of the choices in purchasing the residence. The unit area and the number of beds are expected to be positively related to the price. If the unit is wider, it can provide a lot of function inside including of bed. Therefore, the price will be higher. The number of the parking lot is expected to be positively related to the price because it depends on the floor area of the building following the law and regulation, Building Control Act. The expected sign of ready-to-move-in units is positive because the developers always announce the promotion of pre-sale of condominiums to be cheaper than after the construction is finished. The fully furnished room is also expected to be positively related to the price because of the interior with beautiful design and furniture added value to the room. The developer also provides the promotion when customers choose this choice of purchasing.

For neighborhood attributes, the most important variable is the distance to the beach with a negative expected sign. The less distance to the beach causes the more value of the condominium. The distance to the Hua Hin airport, the distance to the night market, the distance to the mall or Bluport, and the distance to the nearest hospital are expected to be negatively related to the price because they are the facilities of Hua Hin and the attractive tourist place. For common fees, the expected sign is positive because it refers to the class of condominiums.

5. Empirical Result

The empirical result is estimated from two parts, first is descriptive statistics which provides the general characteristics of condominiums in the Hua Hin area. The second is ordinary least squares (OLS) Regression which analyzes significant characteristics of condominiums in the Hua Hin area.

5.1 Results from descriptive statistics

Table 2 Descriptive statistics

Variable	Mean	S.D.	Minimum	Maximum
Dependent Variable				
avgprice	91,056.70	36,269.70	45,000.00	250,000.00
startprice	7.29	8.55	1.02	48.70
Locational Attributes				
popdens	138.73	11.18	102.89	145.04
mainstrt	0.25	0.44	0	1
Structural Attributes				
age	6.03	2.88	0	10
sansiri	0.34	0.48	0	1
qhouse	0.05	0.21	0	1
lh	0.04	0.20	0	1
lpn	0.04	0.20	0	1
scasset	0.02	0.13	0	1
land	16,699.91	37,367.89	1,879.20	304,000.00
build	4.59	4.87	1	34
storey	7.83	4.66	2	26
unit	420.39	741.86	50	5997
rmarea	64.33	40.98	22.50	300.00
bed	1.70	0.75	1	4
parking	206.67	741.04	26	5997
ready	0.98	0.15	0	1
furn	0.78	0.42	0	1
Neighborhood Attributes				
fee	611.43	161.16	360.00	1,200.00
distbeach	0.61	1.41	0.00	10.20
dairport	12.12	5.72	1.50	26.30
dnmarket	9.47	6.54	0.75	25.00
dmall	9.03	8.16	0.40	28.20
dhosp	4.89	4.12	0.10	19.60

For the market price of condominiums, with the mean of average price, 91,056.70 baht per square meter, condominiums in the Hua Hin area are classified into the main class segment (70,000 - 100,000 baht per square meter) (Living Insider, 2020). The mean of starting price is 7.29 million baht with minimum 1.02 million baht and the maximum, 48.7 million baht which is a private penthouse unit.

For the locational attributes, the mean of population density is 138.73 people per square kilometers with the minimum, 102.89 people per square kilometer, in Pranburi district and the maximum, 145.04 people per square kilometer, in Hua Hin district. 25% of condominiums in the Hua Hin area are near the main street or Petchkasem road (Highway no. 4).

For the structural attributes, the average age of condominium within 0 – 10 years in the Hua Hin area is 6.03 years on approximately 16,699.91-square-meter project's land area. Different from Bangkok, the Hua Hin area's land vary in size. There is a large gap among the project's land area with a minimum of 1,879.20 square meters and a maximum of 304,000 square meters along with a large gap in the number of units and the number of parking lots. The average number of units is 420.39 units with a minimum of 50 units and a maximum of 5,997 units. While the average number of parking lots is 206.7 parking lots with a minimum of 26 parking lots and a maximum of 5,997 parking lots. The maximum number of project's land area, the number of units, and the number of parking lots are from the mega project in the Hua Hin area which is Energy Seaside City Hua Hin – Cha-Am. On contrary, the condominium with a minimum number of units and parking lots is Sansara Black Mountain Hua Hin and a minimum project's land area is The Sanctuary Hua Hin. The mean of the number of stories,7.83 stories, and the number of buildings,4.59 buildings, describe those condominiums in the Hua Hin areas mostly are low rise buildings (less than 23-m height or around 8 floors) due to law and regulation, Building Control Act, which is limited the design and building construction along the beach. Therefore, many developers decided to invest in more than one building in their project area. The developer which is dominant in the Hua Hin area's condominium market is Sansiri which owns 34% of condominiums. On the other

hand, Q house, Land and Houses, L.P.N., and SC Asset own together less than 10% of the condominiums. The characteristic of a sleeping area is a bedroom type with a wide room area, 64.33 square meters on average, instead of a studio type. The minimum unit's area is 22.50 square meters and the maximum is 300 square meters. 98% of condominiums in the Hua Hin area are ready to move in. Moreover, fully furnished units for sale are choices for the majority of developers with 78% of sale units. It can be observed that the condominium units in Hua Hin areas are designed in hotel and resort-style to attract long-stay tourists. Therefore, a fully furnished room plays an important role to create a unique design.

For the neighborhood attributes, the average distance from the condominium to the beach is 610 meters, the minimum distance is 0 meter next to the beach, and the maximum is 10.20 km far from the beach. Therefore, condominiums in Hua Hin are mostly near the beach which is the attractive point of the Hua Hin area, the beach cities. The average distance from the condominium to the night market is 9.47 kilometers with a minimum of 750 meters and a maximum of 25 kilometers. While the average distance from condominiums to the mall or Bluport is 9.03 kilometers with a minimum of 400 meters and a maximum of 28.20 kilometers. The condominiums in the Hua Hin area are quite far from the Hua Hin airport when comparing with other facilities. The condominiums are 12.12 kilometers, on average, far from the Hua Hin airport with a minimum of 1.50 kilometers and a maximum of 26.30 kilometers. According to Tooktee (2020), the average of common fee of condominiums in the Hua Hin area is on a main class segment (384 – 780 baht per square meters per year) related to the segment of condominium from the average price. The mean of the common fees is 611.43 baht per square meter per year with a minimum 360 baht per square meter per year and a maximum of 1,200 baht per square meter per year.

5.2 Results from OLS regression analysis

Table 3 Results from OLS Regression

	Model 1: lnavgprice			Model 2: lnstartprice		
	coefficient	p-value		coefficient	p-value	
const	9.91132	2.21e-030	***	-0.0078	0.9950	
popdens	0.00616	0.0880	*	0.00132	0.8570	
mainstrt	0.17042	0.0006	***	0.1401	0.1556	
age	-0.05443	1.29e-06	***	-0.06101	0.0058	***
sansiri	0.07092	0.1502		0.18014	0.0752	*
qhouse	0.11103	0.2682		0.18183	0.3756	
lh	-0.05252	0.6198		0.26255	0.2275	
lpn	0.13648	0.2729		0.00407	0.9872	
scasset	-0.0347	0.8113		0.38822	0.1943	
land	-0.00001	0.1111		-0.00002	0.2480	
build	0.0449	8.08e-05	***	0.04549	0.0448	**
storey	-0.00131	0.7896		-0.00218	0.8278	
unit	-0.00083	1.30e-05	***	-0.00097	0.0101	**
rmarea	-0.00001	0.9914		0.00952	5.11e-07	***
bed	0.01105	0.7927		0.35054	8.93e-05	***
parking	0.00098	0.0040	***	0.00138	0.0454	**
ready	0.37685	0.0046	***	0.17564	0.5116	
furn	0.11595	0.0187	**	0.01831	0.8543	
fee	0.00055	0.0012	***	0.00051	0.1355	
distbeach	-0.08874	7.59e-09	***	-0.08328	0.0048	***
dairport	0.00062	0.5507		0.01461	0.4938	
dnmarket	-0.03198	0.2140		-0.06039	0.2518	
dmall	0.0297	0.0888	*	0.03894	0.2742	
dhosp	0.03395	0.0021	***	0.04613	0.0386	**
	R-squared	0.8		R-squared	0.86	
	N	126		N	126	

There are significant characteristics from all three attributes for model 1, from only two attributes for model 2.

5.2.1 Result for model 1

According to the result of model 1, the average price of the condominium as a dependent variable, the characteristics which affect the average price of condominiums are from three attributes.

For locational attributes, there are both population density and the condominium located on the main street. Population density is positively significant to the average price as same as the expected sign. Therefore, if the population density increases by 1 person per square kilometer, the average price will increase by 0.6%. When comparing the population density of three districts, Hua Hin district has the highest population density with 145.04 people per square kilometer. Therefore, the value of the condominiums in the Hua Hin area increases higher than in the Cha-Am district and Pranburi district. The main street also follows the expected sign which is positive. Therefore, if the condominium is located on the main street (Phet Kasem road or Highway no.4), the price of condominium will be 17% higher than the condominium which is not located on the main street.

For structural attributes, there are the age of the building, the number of buildings, the number of units, the number of parking lots, ready-to-move-in rooms, and fully furnished rooms. It is surprising that all famous developers – Sansiri, Q House, Land and Houses, L.P.N., SC Asset – are not significant for the average price of condominiums. In the same way, the project's land area, the number of stories, the unit's area, and the number of beds are not significant to the average price. The age of the condominium is negatively related to the price as same as expected. Therefore, if the age of the condominium increases by 1 year, the average price of the condominium will decrease by 6%. The number of units is also negatively related to the price and it is the same as expected. By increasing 1 unit in the building, the average price of the condominiums decreases by 0.08%. On the contrary, the result of the number of buildings is positively significant to the average price of the condominiums as same as the expected sign. Therefore, by increasing 1 building, the average price of the condominium increases by 4.5%. The number of parking lots is positively related to the average price of condominiums as same as expected. By increasing 1 parking lot, the average price will increase by 0.09%. Ready-to-move-in

rooms and fully furnished rooms are also positively significant to the average price of the condominiums and are also the same as expected. If the ready-to-move-in room increases by 1 unit, the average price of the condominium will increase by 37.6%. And if a fully furnished room increases by 1 unit, the average price of the condominium will increase by 11.60%.

For the neighborhood attribute, the three characteristics that are significant to the average price consist of common fees, the distance to the beach, the distance to the mall or Bluport, and the distance to the nearest hospital. The common fees are positively related to the average price of the condominium as the same as expected. By increasing 1 baht per square meter per year, the average price of the condominium will increase by 0.06%. While the distance to the beach is also the same as expected, negatively significant to the average price of the condominium. Therefore, if the condominium is near the beach for each 1 meter, the average price of the condominium will increase by 8.8%. Distance to the mall (Bluport Hua Hin) and distance to the nearest hospital are different from expected. They are positively significant to the average price. If the condominium is one more kilometer far away from the mall and the nearest hospital, the average price will increase by 3% and 3.4% respectively.

5.2.2 Result for model 2

According to the result of model 2, the starting price of the condominium as a dependent variable, the characteristics which affect the starting price of condominiums are from only two attributes.

For structural attributes, there are the age of the building, the developer: Sansiri, the number of buildings, the number of units, unit area, the number of beds, and the number of parking lots. The number of buildings, unit area, the number of beds, and the number of parking lots are positively related to the average price. The age of the condominium is negatively significant to the starting price as same as expected and the directional sign on model 1. If the age of the condominium increases by 1 year, the starting price will increase by 0.6%. Different from the model of average price, Sansiri, one of the famous developers, is positively significant to the starting price of the condominium as same as the expected. Therefore, if the

condominium is developed by Sansiri, the starting price will increase by 7.5%. The number of buildings is also positively significant to the starting price of the condominium as same as expected and the directional sign on model 1. By increasing 1 building in the project, the starting price will increase by 4.5%. The number of units results in the same way as expected and model 1, a negative relationship. By adding one more unit, the starting price of the condominium will decrease by 0.1%. The unit area and the number of beds are positively significant to the starting price of the condominium. By increasing 1 square meter of unit area, the starting price increases by 0.95%. For the number of beds, an increase in 1 bed causes a 35.05% increase in the starting price of the condominium. The result of the number of parking lots is in the same direction as model 1 and the expected sign. By increasing 1 parking space, the starting price of the condominium will increase 0.13%.

For the neighborhood attribute, distance to the beach and distance to the nearest hospital are significant to the starting price of the condominium. The distance to the beach is negatively significant to the average price as the same as expected and model 1. Therefore, if the condominium is near the beach for each 1 meter, the average price of the condominium will increase by 8.3%. On the contrary, the distance to the nearest hospital is positively significant to the average price. If the condominium is one more kilometer far away from the nearest hospital, the starting price will increase by 4.6%.

6. Conclusion and Discussion

The characteristics which determine the average price and starting price of condominiums are different. The significant characteristics which impact the average price are from locational, structural, and neighborhood attributes. While the significant characteristics which impact the average price are from only structural and neighborhood attributes.

The characteristics that impact the average price are population density, the condominium located on the main street (Phet Kasem road or Highway no.4), the age of the building, the number of buildings, the number of units, the number of parking

lots, ready-to-move-in rooms, fully furnished rooms, common fees, the distance to the beach, the distance to the mall or Bluport, and the distance to the nearest hospital.

The characteristics that impact the starting price are the age of the building, the developer: Sansiri, the number of buildings, the number of units, unit area, the number of beds, the number of parking lots, the distance to the beach, and the distance to the nearest hospital.

The same significant characteristics in both models are the age of the building, the number of buildings, the number of units, the number of parking lots, the distance to the beach, the and distance to the nearest hospital.

Sansiri is the only one developer that affects the starting price of condominiums in Hua Hin. It may be because Sansiri is dominant in the condominium market in the Hua Hin area. On the contrary, other famous developers invest in less proportion when compared with Sansiri.

The one of significant characteristics needed to focus on from the neighborhood attribute, distance to the beach, emphasizes the attractive point of the Hua Hin area which is the beach. Hua Hin area has beautiful beaches with different feelings such as Hua Hin beach, Khao Takieb beach, and Cha-Am beach.

Some reasons or problems cause the longer distance to the mall, hospital, and, the higher price of the condominium.

Developers and investors can use these significant characteristics to consider valuable investments and make the decision. While long-stay tourists and other customers can use to consider which condominium is suitable for their condition.

Limitation and extension of future research

There are limitations in collecting data from the real estate websites and the official websites of each condominium. Some data cannot include in this study because all data of that condominium are not complete.

The future study needs to collect more data from sales representatives of condominiums through interviews and questionnaires and also expand the area for

collecting the data such as adding the whole area of Petchburi province and Prachuap Khiri Khan province. Moreover, the price of the property area of a condominium is interesting data for adding to the analysis. The future study can extend from this study for more complete and deeper in developers and investors part because, in the field of developer and investor, there is not only the sale price at the first-hand market of the condominium that needs to consider but also a rental market and a second-hand market. The future study can expand the study to other interesting areas such as Korat, Khon Kaen, Phuket, and the second-tier provinces for more benefits to developers, investors, long-stay tourists, and others customers. Finally, one of the strongest points of Thailand is many beautiful tourist locations that wait to explore. If the future study could expand in more provinces of Thailand, Thailand will have the benefit from these investment sectors and attract more consumers to invest in Thailand.

REFERENCES

Best Places to Buy Property in Thailand? (2019). Fresh Property. Retrieved 18 February from https://freshbangkok.com/best-places-to-buy-property-in-thailand/

25 places for Traveling in Hua Hin. (2020). Thairath Online. Retrieved 18 February from https://www.thairath.co.th/lifestyle/travel/1980160

Best Real Estate Projects in Hua Hin. (2020). The Thaiger. Retrieved 18 February from https://thethaiger.com/top-30-best-selling-real-estate-projects-in-hua-hin

Statistics of common fee of condominiums in Bangkok updated 2020. (2020). Tooktee. Retrieved 18 February from https://tooktee.com/article/?cid=1847

Analysis of Condominium Market in Cha Am – Hua Hin – Khao Tao as of 1H 2021, Finding that Condos by the Sea Still Being Bought by Those with Cash on Hand. (2021). Knight Frank. Retrieved 18 February from https://thailandproperty.knightfrank.co.th/news/condo-market-hua-hin-and-cha-am-1h-2021/

Hua Hin on double track for new golden era of tourism. (2021). The Big Chilli. Retrieved 18 February from https://www.thebigchilli.com/feature-stories/hua-hin-on-double-track-for-new-golden-era-of-tourism

State of Condominium Market in Cha-am – Hua Hin – Khao Tao Area in 2020. (2021). Knight Frank Retrieved 18 February from https://thailandproperty.knightfrank.co.th/news/condo-market-cha-am-hua-hin-2020/

Hua Hin area condo market slow : Pandemic brings halt to new project launches but prices hold steady. (2022). Bangkok Post. Retrieved 18 February from https://www.bangkokpost.com/business/2251195/hua-hin-area-condo-market-slow

Andrews, P. (2021). *Department of Rail Transport resurrects plans for a high speed train to Hua Hin*. Hua Hin Today. Retrieved 18 February from https://www.huahintoday.com/hua-hin-news/department-of-rail-transport-resurrects-plans-for-a-high-speed-train-to-hua-hin/

Brandt, S., & Maennig, W. (2012). The impact of rail access on condominium prices in Hamburg. *Transportation, 39*(5), 997-1017.

Chutamas, P. (2016). Factors determining condominium price in north Bangkok metropolitan Region. *Sri North Bangkok University Journal of Economics*(19(1)), 24-45.

Conroy, S., Narwold, A., & Sandy, J. (2013). The value of a floor: valuing floor level in high-rise condominiums in San Diego. *International Journal of Housing Markets and Analysis*.

Diewert, W. E., & Shimizu, C. (2016). Hedonic regression models for Tokyo condominium sales. *Regional Science and Urban Economics*, *60*, 300-315.

Duncan, M. (2008). Comparing rail transit capitalization benefits for single-family and condominium units in San Diego, California. *Transportation Research Record*, *2067*(1), 120-130.

Ek-akara, S. (2014). *Price determinant factors of condominium real estate in Pattaya City: Final research report Kasetsart University, Bangkok (Thailand)*]. *Faculty of Economics*.

Freeman, A. M. (1981). Hedonic prices, property values and measuring environmental benefits: a survey of the issues. In *Measurement in public choice* (pp. 13-32). Springer.

Hargrave, M. (2021). *Hedonic Pricing*. Investopedia. Retrieved 22 March from https://www.investopedia.com/terms/h/hedonicpricing.asp

Herath, S., & Maier, G. (2010). The hedonic price method in real estate and housing market research: a review of the literature.

Hu, X., Chulasai, L., & Phuangsaichai, S. (2011). Hedonic pricing model for housing market in city of Kunming, the People's Republic of China. *Chiang Mai University Journal of Economics*, *15*(1), 144-165.

Malpezzi, S. (2003). Hedonic pricing models: a selective and applied review. *Housing economics and public policy*, *1*, 67-89.

Mok, H. M., Chan, P. P., & Cho, Y.-S. (1995). A hedonic price model for private properties in Hong Kong. *The Journal of Real Estate Finance and Economics*, *10*(1), 37-48.

Monson, M. (2009). Valuation using hedonic pricing models.

Phona, C., & Chitraphan, P. (2018). Factor of pricing of real estate in the type of condominium hedonic price analysis. *1st National and International Symposium on Humanities and Social Sciences 2018*, 910-921.

Rosen, S. (1974). Hedonic prices and implicit markets: product differentiation in pure competition. *Journal of political economy*, *82*(1), 34-55.

Thamrongsrisook, C. (2011). The Influence of Rapid Transit Systems on Condominium Prices in Bangkok: A Hedonic price model approach. In.

Tochaiwat, K. (2020). *Hedonic price model of secondhand condominium units in Bangkok*. International Transaction Journal of Engineering, Management, & Applied ….

VITA

NAME	Panwalee Sakulvatana
DATE OF BIRTH	30 September 1993
PLACE OF BIRTH	Bangkok, Thailand
INSTITUTIONS ATTENDED	Samsen Wittayalai School Bachelor of Architecture, Faculty of Architecture, King Mongkut's Institute of Technology Ladkrabang
HOME ADDRESS	25/2 Soi Charoenporn 2 Pradipat Road Phyathai Phyathai Bangkok 10400