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## A Hybrid Property Pricing Model: The Case of Apartment Residents in Jakarta Indonesia

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*Submitted 04/11/19, 1st revision 30/12/19, 2nd revision 10/01/19, accepted 25/01/20*

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**Abstract:**

**Purpose:** This research initiates a property pricing model that involves various perspectives and consumer considerations in selecting properties, including aspects of sales comparison, investment, hedonic life style, brand equity, and digital life style.

**Design/Methodology/Approach:** The study investigates 222 residents of middle class apartments in Jabotabek (Great Jakarta). The study employs Structural Equation Modelling (SEM) to test the research hypotheses.

**Findings:** The research found that the price of apartments in the region is strongly influenced by a combination of multi aspects of sales comparison, investment, hedonic life style, brand equity, and digital life style.

**Practical Implications:** The research has implications for investment shows the weakest contribution to the apartment price.

**Originality/Value:** This study found that the price of apartments in the region is strongly influenced by a combination of multi aspects of sales comparison, investment, hedonic life style, brand equity, and digital life style.

**Keywords:** Property pricing model, Structural Equation Modelling (SEM), brand equity.

**JEL codes:** M14, M41.

**Paper type:** Research article.

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## **1. Introduction**

In calculating the price of a property, academics try to combine Hedonic and sales comparison methods to improve the bias on sample selection. Kiel and Zabel (1999) used a combination involving various property valuation methods to help eliminate the assessment bias, since existing valuation and pricing methods have important drawbacks. Some research to build residential property price formation model is done based on sales comparison variable. Research on the issue was initiated by Fisher, Geltner and Webb, (1994), Ellis (2011) and Grover (2013). The research on this variable focuses on estimating the property price index and the factors that drive it. Research on the formation of property prices is also done by including investment variables. Studies in this aspect are pioneered by Clapp and Giaccoto (2001) and Kurlat and Stroebel (2015). They focus on the determinants of property prices in terms of the implications and risks of property as an investment medium.

A review of the process of property price formation was also developed by Dipasquale and Wheaton (1996), which introduced Hedonic variables as determinants of price formers. This research essentially focuses on consumer preferences based on lifestyle in considering property prices. Research on this hedonic model was further developed by Wong, Lai, Ho, Chau, and Lam (2009). Further research on the model of recent property price formation highlights the effect of property brand equity. This study was pioneered by Punj and Moon (2002), Shoaib and Keivani (2015), who use the perspective of property use as a measure of brand effectiveness.

Research on the model of property price formation is also done with digital life style variables. Some researchers, such as Hernández-Muñoz, Vercher and Muñoz (2011), for example, style in the context of the influence of public wifi facilities on property prices. Furthermore, the development of life style issues as price determinants is also done in the context of the influence of smart applications, such as Chian Son Yu (2011), and Potts (2014) studies.

Based on the above explanation, the model of apartment property price formation is still partial. Thus, no previous research has holistically integrated the Sales Comparison, Investment, Hedonic, Brand Equity and Digital Life Style variables in the formation of property prices, especially apartments. Therefore, the authors intend to fill this literary gap to update the literature on the property field. This empirical research is conducted in Jakarta, Indonesia. The city, like most capitals of developing countries, faces with urban settlement problems in the midst of a fast growing population.

## **2. Literature Review**

This session exposes the theoretical relationships between the various variables that are considered potentially forming new theoretical relationships. The determinant

variables are adapted from the results of previous studies and allegedly affect the formation of property prices. The variable determinants of property prices are grouped into groups of variables, namely Sales Comparison, Investment, Hedonic, Brand Equity and Digital Life Style.

## **2.1 Sales Comparison Factor in Price**

A comparative approach to market / sales data is the process by which an estimate of market value is derived from an analysis of similar property market prices. The market value is used as a benchmark in comparing the properties to be assessed. The market value is derived from the comparison. The notion of the above is a summary of the results of studies conducted by Bokhari and Geltner (2011), Grover (2013), and Manganelli, De Paola and Del Giudice (2016). This approach can be well used to estimate the market price of a property, where the location, quantity and extent, historical price, physical structure and financing are the variables that determine the property price (apartment).

## **2.2 Investment Factor in Price**

The investment variable is used to assess or analyze the feasibility of an investment in a property. The specification of apartment properties whose value will increase from year to year and have the opportunity to lease make the apartment property as one of the attractive investment portfolio. Investment assessment is based on cash flow. The above is a summary of the results of the study of the contribution of investment variables to the formation of prices. Some of the leading studies that examine the above are Cho and Megbolugbe (1996), Reilly (2012), and Kurlat and Stroebel (2015). The literature study on investment considerations as the factor of apartment prices shows that the price of the apartment property at the beginning of the offer will differ significantly with the price after the apartment starts to build.

## **2.3 Hedonic Factor in Price**

Hedonic is an independent variable associated with its interpretation of the environment and its facilities. In the formation of hedonic-based pricing many studies suggest that the price of an apartment is not implicit but attached to the nature of the apartment product itself. This is due to the influence of infrastructure, facilities that can be used and the circumstances surrounding environment. Thus, it can be illustrated the contribution of hedonic factors in the formation of property prices of apartments. This is consistent with the results of the research of several experts, such as Jim and Chen (2009), and Ling and Archer (2012). Hedonic variables can explain the value of the apartment through the features of the property. Features of the property in hedonic variables are generally separated into three components namely the physical components, accessibility and the environment.

## **2.4 Brand Equity Factor in Price**

From the point of view of the brand owner, a good brand has the ability to form premium prices over competitors, and the ability to build customer loyalty. This can reduce marketing costs. Therefore, many leading companies are able to market their properties because of their strong brand-based. Stronger brands are more attractive to consumers than property with low brand reputation. This is the result of several studies, such as Meyvis, Goldsmith and Dhar (2012), Seven and Ling (2013), and Shoaib and Keivani (2015). Based on some of the above research, brand equity is the variable that makes up the price. The research also concludes that brand equity has a construct of brand awareness, brand association, perceived quality, and brand loyalty.

## **2.5 Digital Life Style Factor in Price**

Digital device based lifestyle now becomes a necessity. Lifestyle influences a person in determining the consumption choices. Digital lifestyle has become a part of increasing the value of property offered to consumers (Chian-Son Yu, 2011). Property that provides wifi access in public spaces is a property that provides the convenience of residents run a digital lifestyle based on the demands of his life. While on the other hand, developers need to spend to support the Digital lifestyle. The fee is charged to the consumer through the price of the apartment. The same applies to the smart application embedded by the property manager to support the security and comfort of the occupants. Similarly, the Triple Play service (the concept of a service pack contains three types of Digital services, i.e., internet, internet telephone, and cable television). This concept is summarized from previous research, including Hernandez-Munoz, Vercher and Munoz (2011), David and Victor (2013) and Potts (2014).

## **3. Methods and Hypotheses**

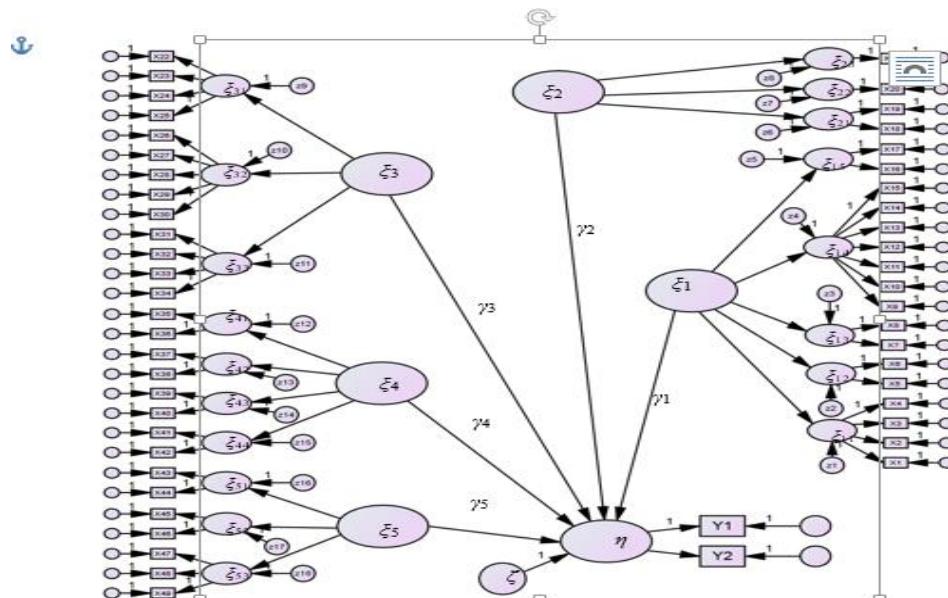
The research method in this study is a mixed method, where the quantitative approach is carried out in the first stage. The first stage results become the basis for the second stage process. In the second stage, researchers held a group discussion forum (FGD) to sharpen the explanation of the results from the quantitative research.

At the beginning of the quantitative study, the validity and reliability of the questionnaire were tested on 30 respondents before being distributed to the final respondent. The unit of analysis in this study is the owners of the middle class apartment properties in the areas of Jakarta, Bogor, Depok, Tangerang, and Bekasi. According to Colliers International Indonesia (2016), the annual total units (all classes) are at the range of 25,000 to 30,000 units. Questionnaires were distributed to respondents after the tested Validity and Reliability of the questionnaire items on 30 respondents. We processed the data using 250 sufficient responses. Gender respondents were 44.6% female and 55.4% male. The majority of respondents are

entrepreneurs (45.9%) and private employees (32%). The rest are civil servants (5.9%), independent workers (4.5%) and others (11.8%).

Data is processed using Structural Equation Modeling (SEM) in two stages. In the first stage, the measurement model was analyzed using a factor analysis method to confirm the correctness and accuracy of measured variables by defining latent variables. In the second stage, the authors analyzed the structural model using the path analysis method. Figure 1 illustrates the causal relationship of each of the latent variables studied. The normality of the data is tested before further testing is carried out. The results of the data normality test are indicated by the value of the critical ratio (cr) in the output assessment of normality. Data is said to fulfill the assumption of multivariate normality if the univariate skew index coefficient is between 0 to  $\pm 1.96$  and the critical value of the ratio is between  $\pm 2.58$ .

**Figure 1.** The causal relationship among the latent variables



The variables in this study use the concept of dimension, so the analysis of the measurement model uses second order confirmatory factor analysis (CFA). In the first stage, the validity and reliability tests were carried out to ensure the correlation analysis assumption between the manifest variable (indicator)  $> 0.5$ . Correlation between variables is measured based on communal coefficients, while reliability is measured based on the associated Alpha's cronbach's coefficient. In the quantitative test phase, the authors tested 6 hypotheses, namely:

*Hypothesis 1: Comparison Sales have an effect on forming apartment property prices;*

*Hypothesis 2: Investment has an effect on forming apartment property prices;*

*Hypothesis 3: Hedonic has an effect on forming apartment property prices;*

*Hypothesis 4: Brand Equity has an effect on forming apartment property prices;*

*Hypothesis 5: Digital Life Style has an effect on shaping apartment property prices;*

*Hypothesis 6: Hybrid models have an effect on forming apartment property prices.*

The results of quantitative research were then discussed in Focus Group Discussions (FGD) as a qualitative research process. The FGD involves several key stakeholders in the property business, namely the association of consumers, consultants, agents, and developer associations.

#### 4. Results and Discussion

##### 4.1 Preliminary Test Results

The value of communality explains how much an indicator can explain a construct. Of the 49 indicators of observed variables tested, all of them have good validity because their communality values are greater than 0.5. There are no indicators that need to be excluded from further testing. However there are three constructs that have indicators with a reliability value  $< 0.6$ , so that related indicators must be eliminated to increase construct reliability. The three constructs are constructs of sales comparison variables, namely the concept of location, the concept of physical structure and financing. Furthermore, validity and reliability tests were carried out through confirmatory factor analysis to obtain new loading factors and score factors. The test results show that all first factor loading values and second order loading factors  $> 0.5$ . These results explain that all measurement indicators and constructs that represent sales comparison have good validity.

After testing the validity of confirmatory factor analysis, the authors tested the degree of suitability of the variable indicators of sales comparison, investment, hedonic, brand equity, digital lifestyle and price. The test employs the construct reliability approach and extracted variance. Construct reliability is used to see the construct reliability of each dimension to the variables formed.

**Table 2. Construct Reliability and Variance Extracted of Latent Variables**

<b>Manifest Variable of factor analysis</b>	<b>Weight of 2<sup>nd</sup> Order</b>				
	<b>SC</b>	<b>I</b>	<b>H</b>	<b>BE</b>	<b>DL</b>
SCL	0.73				
SCJL	0.62				
SCHH	0.78				
SCSF	0.82				
IPP		0.83			
IRG		0.71			

HKB					0.86		
HJK					0.66		
HLN					0.62		
BEBA					0.72		
BEBN					0.75		
BEPQ					0.93		
BEBL					0.82		
DLPW					0.76		
DLSA					0.83		
DLTP					0.86		
$(\sum\lambda)^2$	8.703	2.372	4.580	10.368	6.003		
$\sum\lambda^2$	2.198	1.193	1.560	2.618	2.006		
$\sum\delta$	1.802	0.807	1.440	1.382	0.994		
CR	<b>0.828</b>	<b>0.746</b>	<b>0.761</b>	<b>0.882</b>	<b>0.858</b>		
VE	<b>0.550</b>	<b>0.597</b>	<b>0.520</b>	<b>0.655</b>	<b>0.669</b>		

**Source:** Processed data.

Table 2 indicates that the Construct Reliability (CR) value is greater than the recommended value, which is 0.70. The Table also shows that the Variance Extracted (VE) value of all variables > 0.5, which means that all variables contain more than 50% of information contained in the manifest variable. The results of the normality test show that all skew univariate index coefficients are between 0 and  $\pm 1.96$ . But there are two indicator variables that have critical values (c.r) outside of -2.58 and +2.58, namely BEBL40 and HLN3. Because the total value of kurtosis and multivariate is below 2.58, so overall it can be concluded that all the residual variables in this study have been normally distributed.

#### 4.2 Results of Goodness of Fit Test

The model match test results in the Structural Equation Modeling process are presented in the following Table 3.

**Table 3. Results of Goodness of Fit Test**

Goodness of Fit Index	Cutt-off	SC	Inv	BE	DL	Hedonic	Hybrid
Chi - Square	$\leq 117.18$	98.749	29.824	63.232	47.506	71.010	2.058.820
		Good	Good	Good	Good	Good	Good
Probability	$\leq 0.05$	0.000	0.000	0.001	0.001	0.000	0.000
		Good	Good	Good	Good	Good	Good
RMSEA	$\leq 0.08$	0.077	0,093056	0.064	0.072	0.076	0.078
		Good	Marginal	Good	Good	Good	Good
GFI	$\geq 0.90$	0,64444444	0,665972	0,654861	0,663889	0,656944	0,626389
		Good	Good	Good	Good	Good	Good

CFI	$\geq 0.90$	0,66458333	0,675694	0,674306	0,678472	0,666667	0,655556
		Good	Good	Good	Good	Good	Good
CMIN/df	$\leq 5$	2.669	4.971	1.916	2.159	2.291	3.134
		Good	Good	Good	Good	Good	Good

*Source:* Processed data.

Table 3 shows that the constructs used to form the models in this study have met the criteria of goodness of fit. Thus, a structural hybrid model that connects sales comparison, investment, hedonic, brand equity, and digital lifestyle models to prices. The results of Table 3 show that the form model is acceptable. This result also shows that the structural equation model formed is a good model. The Chi-Square measurement index, CMIN/df, GFI, CFI and RMSEA are within the range of expected values, thus the feasibility test of the SEM model has met the acceptance requirements.

### 4.3 Results of Hypothesis Test

After all assumptions have been fulfilled, the testing of the six hypotheses is carried out. The results of testing the 6 hypotheses of this study were interpreted based on the goodness of fit model and the value of the critical ratio (CR) results of SEM processing. R2 also shows the ability of exogenous variables to explain the endogenous variables.

Referring to Chi Square and CMIN/DF figures, the Sales Comparison, Investment, Hedonic, Brand Equity, and Digital Lifestyle models are declared fit to form prices. The Goodness of Fit Index (GFI) number of the models is also in the range of 0 to 1 so that they can be categorized as a good model.

Figures of Root Mean Square Error of Approximation (RMSEA) Sales Comparison, Hedonic, Brand Equity, Digital Lifestyle declared fit to form prices. The figures of the Goodness of Fit Index (GFI) in the Sales Comparison, Hedonic, Brand Equity, and Digital Lifestyle models are in the range between 0.05 and 0.08 so that the associated models are categorized as reasonable. The RMSEA value of the Investment model is greater than 0.08 so that it is categorized as an unfavorable model. All models are considered able to explain the formation of prices above 30%, except the Investment model.

The RMSEA value of the hybrid model, which was formed by integrating the five models, was between 0.05 and 0.08, so it was stated as a reasonable model. The hybrid model has a fairly close relationship with prices because it can explain the formation of prices of almost 70%. This figure is the highest compared to the other 5 models.

#### 4.4 Results of Focus Group Discussion

The authors conducted Focus Group Discussion (FGD) to obtain more in-depth explanations for the results of quantitative studies. The FGD was conducted using a purposive method, which presented practitioners, academics, and consultants. The FGD results are summarized and presented in Table 5.

**Table 5. Interpretation of FGD Results (Qualitative Research)**

Model	Finding during FGD
<b>Sales Comparison model</b>	<p>Sales comparison constructs are location, amount and area, historical price, physical structure and financing. Based on the results of the descriptive analysis, respondents' responses to the average index for variable dimensions were 54%. Consumers tend not to care too much about the benefits of alternative financing schemes offered by developers. Based on the results of the FGD, alternative financing schemes are considered to be less attractive to consumers because consumers have not benefited from the apartment they bought in the short term. Apartment sales begin with the pre-launch stage and construction will begin if 60% of the planned units have been sold. The financing scheme offered by apartment developers tends to be similar. In the FGD it was revealed that financing was not the construct dimension needed to build the apartment building model. The results showed that the location variable construct emphasized into the study was the ease of going to an apartment and a flood-free location. Both of these indicators have a high index, which is 77% for ease of going to apartments and 92% for flood-free locations. The results of qualitative research support this. Developers give high points to the ease of going to the apartment and the location is free of flooding when building an apartment. In addition, the FGD results indicate that some developers use psychographic indicators. In this indicator the developer pays attention to the specific character of the dominant consumer in an area. For example, Chinese consumers pay attention to fengshui, view and other factors that allow the price of apartment units to be different.</p> <p>Constructs of physical structure variables provide indicators of ease of parking that have an index of 0.75 (75%), apartment completeness of 0.77 (77%) and balcony buildings of 0.62 (62%). The physical features of buildings and balconies are widely known as one of the important factors in the minds of consumers that affect the price of apartments. The FGD results also revealed that consumers really take into account parking access. Middle segment consumers generally have more than one vehicle so they need an apartment building that can meet those needs. The parties involved in the FGD agreed that apartment units that provide access to parking spaces according to customer needs deserve a higher price compared to apartments that cannot provide it. This also applies to apartment units that are integrated with shopping centers.</p>

<b>Investment model</b>	Investment Constructions in this study put forward the resale value in consideration of consumer purchases. The results showed a resale index of 0.78 (78%). This number implies that consumers consider the possibility of the value of the apartment or its assets not dropping. In fact, consumers expect their asset prices to be higher when resold. The FGD revealed that consumers generally resell their apartments not in the near term after purchase. They generally state that apartment resale is around 5 years after purchase.
<b>Digital LifeStyle model</b>	There are 3 constructs or variable dimensions of the digital lifestyle that are of significant concern, namely public wifi, smart application and triple play. The highest average index is on broadband. that is equal to 0.82 (82%). Broadband reflects current needs, where internet access needs dominate. Everyone needs access to online media networks. Digital generation forms its own lifestyle. The need for broadband access has developed into dependency, so consumers always consider the existence and quality of broadband access to meet their lifestyle needs. In the FGD, all participants agreed that broadband or internet access is a necessity for today's people. This broadband requirement is increasingly crucial so it is highly considered when consumers analyze the amount of apartment prices offered. Consumers choose apartments also based on convenience and security. This factor is an indicator of the dimensions of the smart application. Technological developments encourage the emergence of innovation and creativity that makes it easy, provides comfort and improves consumer safety with its smart application. This is in accordance with the results of the study which showed that the smart application variable construct index was 0.63 (63%). The results of the study also revealed that the accessibility indicator has an index of 0.64 (64%). This ease of access is in line with technological developments, where interactions are no longer physical but are virtual. Public WiFi access allows interaction between neighbors or apartment owners not offline, but online

<b>Brand Equity model</b>	According to the marketing experts in the FGD, each property product experiences a cycle called the clock property. There is a phase up and down. The product phase towards the rising star point must go through the first brand awareness phase, where consumers are aware of related products. In the next stage, products enter the brand association phase in the minds of consumers. Furthermore, the product enters a deeper phase, namely perceived quality. All stages will end in the brand loyalty phase and brand equity. The results showed that variable constructs brand loyalty recorded a high index, namely consumer needs for products 0.78 (78%) and brand performance in meeting the needs of 0.74 (74%). Consumer needs and satisfaction with this product will foster consumer brand loyalty, Consumers realize that apartment development is very high risk, so consumers prefer product apartments to a trusted brand when buying an apartment.
<b>Hedonic Model</b>	Distance is a construct of variables or dimensions that are important in the formation of Hedonic variables, in addition to the dimensions of neighboring and environmental life. The results of the study found that the indicators included in the hedonic model were distance to worship facilities (63%), distance to the city center (68%), distance to the workplace (77%) and distance to learning facilities (65%). The results of qualitative research show that distance is important in consideration of apartment purchases. Consumers prefer apartments located near workplaces. This is in accordance with quantitative research. Furthermore, the distance to the learning place is also an important consideration for consumers who want to minimize the risks and costs of picking up their children's school. The unique thing is, according to the confirmatory results of the analysis factor, the distance to the shopping center is a less reliable indicator. The construct of the environment variable has two indicators with the largest index, namely indicators of road and supporting facilities (73%) and indicators of parks and public spaces (73%). Apartment businesses today tend to be oriented towards the concept of green building. Parks and public spaces are needed to support the achievement of green building. In the eyes of consumers, parks and public spaces are places to spend time on weekends with family. The experts consider this facility a facility sought by consumers in determining which apartment to buy.

Model Hybrid	
	<p>The Hybrid model combines several price-forming models. This model has the best ability to explain the formation of apartment prices. The results of the study prove that this hybrid model can improve the ability of the model to explain the formation of prices to 69.6%, the highest of all models.</p> <p>Based on the views of experts, the brand is the most important thing because the apartment building process has a very high risk. A recognized and well-known brand is the resultant of long-term ability to manage risk well. Therefore the brand becomes an important consideration that influences price formation in consumer perceptions. The more successful a brand builds and develops an apartment area, the stronger the brand has a bargaining power in setting prices.</p> <p>Investment is the weakest factor in price formation. The FGD concluded that investment terminology was the most prominent thing when the apartment was first introduced. Based on the results of the study, although the resale gain of investment is profitable, the amount is not more than 10% - 15% per year. Consumers tend to resell their apartment within a period of 5 years after purchase. The hybrid model is stated to be the most capable of explaining price formation because the model is able to explain 70% of the price of an apartment. The FGD revealed that the price formation process also requires a consumer's perspective, apart from the perspective of the developer so that price analysis is more comprehensive.</p>

## 5. Conclusion

This study was conducted to test the ability of sales comparison models, investment models, hedonic models, brand equity models and digital lifestyle models in explaining apartment prices, both partially and through a combination of models called Hybrid models. The study examines primary data from apartment residents in Jakarta and its surroundings.

The results of the study show that partially sales comparison models, investment models, hedonic models, brand equity models, and digital lifestyle models are able to explain prices. All of the price models passed the fit and proper test models. These models are also proven to be able to explain prices very well, except the investment model. The hybrid model, which is a combination of all the models, proved to be able to explain the price of the apartment very well. Hybrid models have been proven to be able to explain price formation are far better than partial models.

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