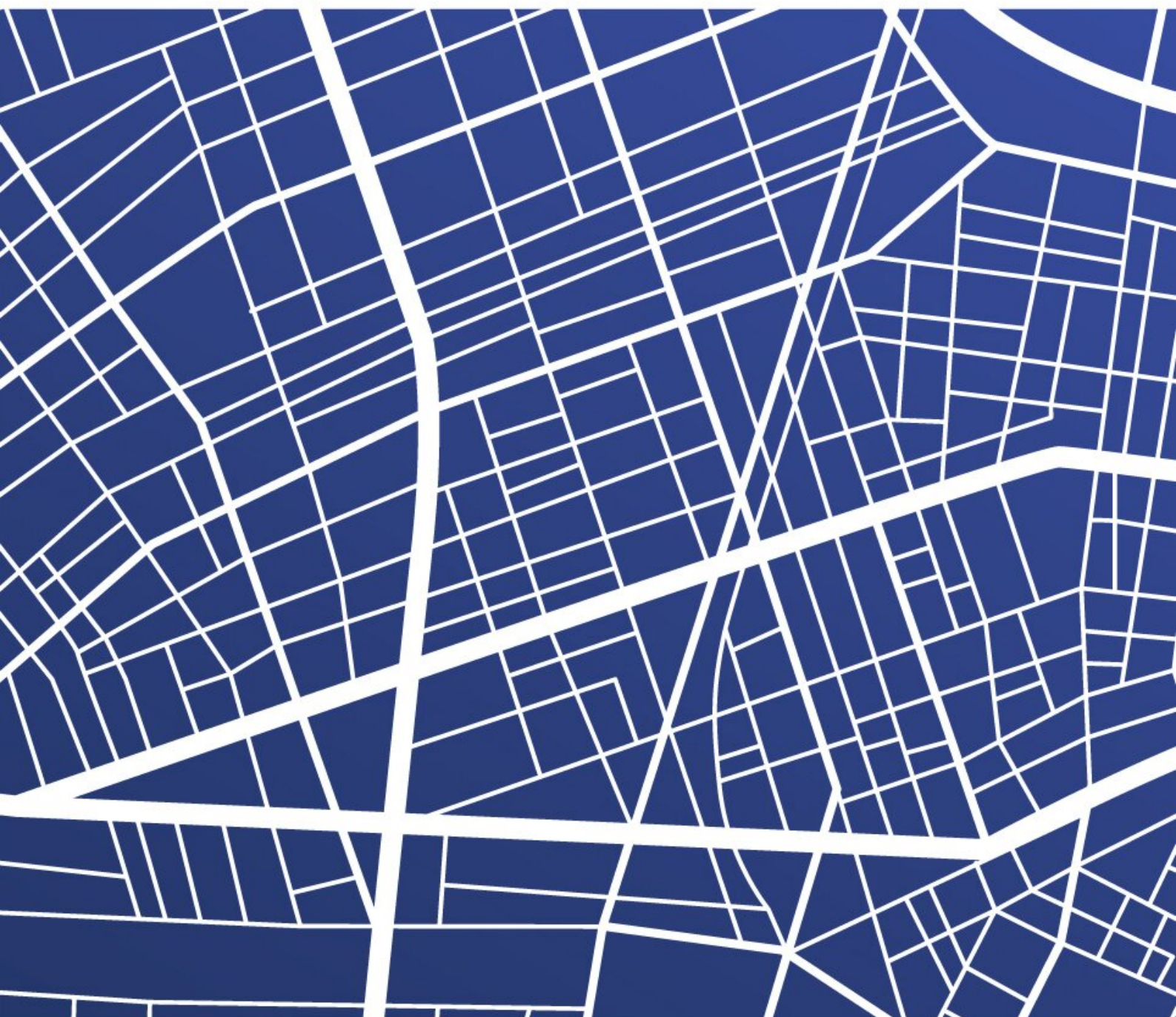


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TANGIBLE AND INTANGIBLE FACTORS INCORPORATED FOR INFRASTRUCTURE ASSET VALUATION

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Abstract

Infrastructure asset requires high building capacity for its operations. Its functions are also linked to other infrastructures. In this light, an asset's uniqueness in its design, operations, stakeholders' interest, and business growth affects its overall value. Therefore, valuation is a critical component of infrastructure assets. This is because specific components incorporate the approaches for valuing assets. This paper highlights the valuation method for infrastructure assets and identifies the tangible and intangible perspectives incorporated in infrastructure asset valuation. Thus, each tangible and intangible perspective were investigated and critically detailed in this paper. Identifying the tangible and intangible components in an asset is essential because it will affect the valuation methods that will be used to value the asset. Then, it will also be affected on the final value of the asset. The research findings are derived from a critical review of literature on tangible and intangible assets. This study adopted the qualitative approach, where a series of in-depth interviews were conducted with experts to get an insight into how these tangible and intangible perspectives influence asset valuation. This paper will enrich the current body of knowledge and benefit practitioners who could apply the study's output to real practice.

Keywords: Tangible assets, intangible assets, infrastructure asset valuation, property valuation, Malaysia

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INTRODUCTION

Infrastructure refers to the physical, interrelated systems and components that provide essential commodities and services to enhance a society's living sustainability (Fulmer, 2009). Infrastructures include roads, bridges, water supply, sewers, electrical grids, telecommunication, and transportation. According to Government Asset Management Policy (2009), assets are categorised into four categories: movable assets, immovable assets, live assets, and intellectual assets. In this light, infrastructure assets comprise both infrastructure and assets supporting each other commonly used by members of the society. The main goal of infrastructure management is to optimise the lifecycle value of infrastructure for its users, owners and other stakeholders.

In recent years, the concept of infrastructure assets valuation has been expanding as the infrastructure industry shifts into a performance-based decision-making paradigm and the innovation of smarter infrastructure. Subsequently, the intentions in intangible assets, including information and communication technology, continue to rise in their shares in advanced economics. The expansion of the intangible's economy reflects the importance of expanding asset valuation methods to capture tangible and intangible more explicitly in the future. On the other hand, the international valuation standard (2013) stated that only real property interests, infrastructure assets and plant equipment could be described as specialised public service assets as infrastructure assets possess specialised features by design, specification or location, reliable comparisons can rarely be made with the prices of similar assets in the market. Therefore, choosing the right method for infrastructure asset valuation has become the responsibility of real estate professionals. This has caused several problems to arise, particularly about the design of the building, the function, operation, and business growth within the assets, making it more challenging to determine the suitable valuation approaches to value an infrastructure asset. Therefore, the valuation of infrastructure assets should come under scrutiny. Valuers need to understand and adopt the right and most suitable approach in valuing infrastructure assets. Consequently, it is important to choose an approach that aligns with the goals and objectives for managing the infrastructure and reflects the true value of the asset. Junainah and Suriatini (2019) supported that the goal of the valuation process is to estimate the best possible value for a specific property. For this reason, an asset valuation methodology is needed to quantify the value of infrastructure assets by considering the tangibles asset and the intangible elements, including overall asset use.

LITERATURE REVIEW

Valuation of Special Property

The Malaysian Valuation Standards (MVS) 2019 defined specialised property as a property with a specialised nature. These properties are rarely transacted to continue their existing use, except as part of a business sale in occupation. The property is categorised as a ‘special’ due to the construction, arrangement, size or location of the property, or a combination of these factors, or maybe due to the nature of the plant, machinery and equipment provided in the buildings. Thus, a special property valuation is required by using specific valuation methods based on the property’s specific functions, operations, and the purpose of valuation. Moreover, MVS (2019) asserted that specialised properties are usually valued based on the Depreciated Replacement Cost (DRC). As mentioned in MVS (2019), DRC is defined as the current cost of replacing an asset with a modern equivalent asset with fewer deductions for physical deterioration, functional obsolescence and economic obsolescence. Therefore, it is subject to the cost of replacing the new asset by considering the physical, functional and economic obsolescence. Thus, this research further discusses the current valuation practice for infrastructure assets and how intangible elements are considered in conducting a valuation. In this light, the most suitable valuation method could be determined based on data derived from published reading materials (Abdul Halim, 2008).

A previous study by Michelle (2012) adopted the depreciation replacement cost method in highway valuation. Other than that, Nick French (2004) investigated the profit method and depreciation replacement cost method for hotel valuation, where depreciation replacement cost was applied to leisure properties, public hospitals, and public churches. Meanwhile, in a study on transportation terminals, Ratmoko (1997) adopted the cost method and profit method for airport terminal valuation; and Gutek (1990) also adopted the cost method and profit method for terminal transit valuation. Besides, Hall (1990) used the cost method, comparison method and profit method for an automatic car wash centre, and Healy and Berquist (1994) adopted the comparison method for tin mining valuation. Based on the studies reviewed, the preferable valuation methods adopted are cost and profit-based methods. In general, all valuation methods adopted for special properties would identify and categorise a different component that could be taken out during the valuation of tangible and intangible assets.

This study embarked on a case study of the Sultan Iskandar Custom, Immigration and Quarantine Complex (CIQ Complex) in Johor. The CIQ complex is a transportation terminal in Johor Bahru built to solve the traffic congestion issue in the Johor-Singapore Causeway. This study focused on a 3-storey office building located within the CQI Complex with a total area of 353,082.43 square feet. The building is located adjacent to the complex’s vehicle

deck of the complex. In this light, the vehicle decks in the complex are placed at different levels to isolate traffic flow. Heavy vehicles will use the outermost part, and the next level is for light vehicles such as cars and motorcycles, while the highest level is reserved for buses. The CIQ Complex also houses government offices. The development of the complex was listed under the National Key Target Level 1, which means that CIQ Complex is considered an essential infrastructure asset that serves an important function to the society and the relationship between Malaysia and foreign countries, specifically Singapore. Thus, in valuing this asset, all facilities and components of the building must be identified to ensure a comprehensive assessment that involves all facilities and components of the CIQ Complex. Issues related to intangible economic benefits also need to be highlighted as they also influence the infrastructure asset value.

Overview of Profit Method and Cost Method

The profit method is one of the five methods of valuation (Pagourtzi et al., 2003). It aims to provide a comprehensive valuation of any property (land and buildings), plant, equipment, machinery and movable asset. The profit method considers the specialised nature of the property and is based on the income and expenses relating to the business that includes tangible and intangible assets. It is important to note that this method is not a business valuation; it does share similarities to a discounted cash flow used to value a business and is based on the income and expenses of the business. However, at a certain point, the cash flow would be converted into a property rental split and capitalised after deducting property expenses to arrive at the property value.

Meanwhile, the cost method is used when the transaction data for the property is limited, or there is no transaction for the property. In theory, the cost method evaluates the property by dividing it into land and buildings. Based on A. F Millington (1975), the value of land should be added to the cost of the building to obtain the value of the property. For the first component, which is land, the value of this site will be determined by comparing the site's value against the value of other similar sites. If there is a difference between the comparison site and the valuation site, adjustments need to be made (Azhari Husin, 1996). On the other hand, to determine the second component, including building cost, estimates can be made by assuming the cost for rebuilding or refurbishing the building on the ground.

Tangible Factors of Infrastructure Asset Valuation

When the valuation is made, the asset components will be carefully considered to obtain the correct and accurate amount of value. The components of the asset will usually take into account the so-called tangible assets. Tangible assets are terms used in the valuation procedure for fixed assets, including machinery,

buildings and land, and current assets, such as inventory (Falls & Hosang, 2001). Other than identifying the methods adopted for infrastructure asset valuation, the use-value approach mentioned by Weldemicael (2017) could also be used to measure an asset’s intangible economic benefits. Thus, the tangible factors that influence infrastructure asset valuation are discussed and summarised in Table 1.

The critical literature review found eight elements subject to tangible factors that influence asset valuation: smart technology, land, buildings, plant and machinery, infrastructures, utilities, weight scales, and traffic management system.

Table 1: Tangible factors that influence infrastructure asset valuation

No.	Tangible Factors	Details	Authors
1	Smart Technology	Cameras at guide rail and barrier wall, loop detectors, communication equipment.	Amekudzi-Kennedy et. al. (2019); Alyami (2017) and Mian (2019)
2	Land	Vacant land value	Chen et al. (2005); Reynold (1986); Sherif Roubi (2004)
3	Buildings	Central office	Lutzkendorf and Lorenz (2011); Reynold (1986); Sherif Roubi (2004)
4	Plant and machinery	Equipment fittings, installations, apparatus and tools	Olawore (2011); Yusof et al. (2012); Reynold (1986); Sherif Roubi (2004)
5	Infrastructures	Pavement, bridges and drainage structures	Alyami (2017)
6	Utilities	Cable, hydro, gas, phone and water	Alyami (2017)
7	Weight scales	Truck weight station, batching machines and constant feeding belt scale.	Alyami (2017)
8	Traffic Management System	Route suggestion, accessibility network, data acquisition equipment	Souza et al. (2017); Shen and Chen (2012)

Source: Research Fieldwork (2020)

Intangible Factors of Infrastructure Asset Valuation

Apart from considering tangible assets in the calculation, intangibles assets are also an important aspect that needs to be studied and considered to evaluate a property. While intangibles assets are often overlooked, and their existence is rarely considered, they can influence the value in determining the more accurate value of an assessment conducted. Intangible assets comprise nonphysical assets,

and the intangible asset components will vary across the properties being assessed. Intangible assets are also monetary assets that manifest themselves according to their economic properties. It does not have physical substances but grants rights and economic benefits to its owner (Malaysian Valuation Standard, 2019). These assets derive their value from the rights inherent in their ownership. In this sense, these assets are considered intangibles because they cannot be seen or touched, yet they have the potential to possess value.

Table 2 list the intangibles factors incorporated in the infrastructure asset valuation. There are nine intangible elements, including safety, mobility, economic advancement, sustainability, social value, environmental quality, intellectual property, image/ goodwill and legal ownership.

Table 2: Intangible factors that influence infrastructure asset valuation

No.	Intangible Factors	Details	Authors
1	Safety	Resilience and Risk mitigation	Amekudzi-Kennedy et al. (2019); Dojutrek and Labi (2012); Weldemicael (2017); Juan Diego et al. (2015) and Prerna Singh (2018).
2	Mobility	Congestion mitigation, short distance to transit and traffic efficiency	Amekudzi-Kennedy et al. (2019); Dojutrek and Labi (2012); Juan Diego et al. (2015) and Prerna Singh (2018).
3	Economic Advancement	Demand drivers	Amekudzi-Kennedy et al. (2019); Dojutrek and Labi (2012); Frischmann (2012); Juan Diego et al. (2015) and Prerna Singh (2018).
4	Sustainability	Energy efficiency, functionality, serviceability, durability, indoor air quality, health friendliness and recyclability	Amekudzi-Kennedy et al. (2019); Solikin et al. (2019); Lutzkendorf and Lorenz (2011)
5	Social value	Service contributed to the community	Dojutrek and Labi (2012); Frischmann (2012)
6	Environmental Quality	Positive externalities, environmental risk	Dojutrek and Labi (2012); Lutzkendorf and Lorenz (2011); Frischmann (2012) and Solikin et al. (2019)

7	Intellectual property	Software, guidelines, methods, procedures and data.	Alyami (2017); Frischmann (2012)
8	Image/ Goodwill	Brand identity, brand meaning, brand responses and brand relationships	Alyami (2017)
9	Legal ownership	Patent, trademarks, copyrights, registered designs, brands, computer software	Frischmann (2012)

Source: Research Fieldwork (2020)

The purpose of a valuation also influences the forms of value factors (tangible and intangible) included in the valuation. Furthermore, aspects such as uncertainty and how one addresses it when valuing assets could influence the valuation results. Amekudzi (2019) addressed that not all types of value can be quantified. However, failure to quantify the various types of value does not invalidate their existence. To date, infrastructure asset valuation has largely been based on the infrastructure’s physical condition. Along similar lines, assets may be valued for their contribution to mobility, resulting in mobility-based value. Assets may also be valued based on their safety, economic and environmental benefits. These assets might not have any physical substances, but they possess economic benefits to their owner. Hence, they could be considered as adding to the assets’ value during valuation. Moreover, as different valuation methods are intended for different purposes and consider different components of tangible and intangibles assets, the inclusion of these assets may produce different results in the end.

DATA COLLECTION AND DATA ANALYSIS

Research methodology is very important in developing systematic research and aligned in achieving the objectives of the research. The research methodology for this research consists of three phases, defining the research development, the procedure for data collection, data analysis, and results for discussion. The data were collected through a series of in-depth interviews with experts in fields related to special property valuation and intangible factors. These experts have more experience and knowledge in their field. For example, in analysing safety factors and risk mitigation, the head of a building’s safety department will be able to provide the exact cost for a risk mitigation action plan and other plans. In all,

10 experts' valuation field, cost-benefit analysis and officers in charge of operations of the CIQ Complex were interviewed. The in-depth interviews with the experts were conducted on either a face-to-face basis or online interview via the Webex platform. All experts interviewed have successfully shared their thoughts and insights on the tangible and intangible factors of infrastructure asset valuation and how they influence the asset's value. The data analysis stage followed the data collection. Qualitative data analysis is the conceptual interpretation of the data set as a whole, using a specific analytic strategy to convert the raw data into a logical description and explanation of the phenomenon under study. This research adopted qualitative data analysis to analyse the data from the interview sessions with the experts.

RESEARCH FINDINGS AND DISCUSSIONS

Based on the research findings, there are two sections for the questions asked to the experts. The first section presents the expert's background and opinions on valuation methods adopted for infrastructure asset valuation. Based on the input from the in-depth interview, all experts agreed that the cost method is the preferred valuation method for infrastructure asset valuation. This is because the cost method is suitable for valuing a public infrastructure asset as it considers the land value by comparing the land value per square foot. Moreover, the method allows valuers to consider the depreciation for cost in determining the cost for building, plant, machinery and equipment.

The next part determined the most preferred methods for infrastructure asset valuation. This includes the tangible and intangible factors incorporated that enhance the infrastructure asset value. As infrastructure assets are considered special properties, they are rarely transacted. Hence, it is hard to find comparable data. All of the experts supported this notion during the interviews. In terms of intangible elements included in infrastructure asset valuation, all of the experts agreed that the cost method they adopted did not include the intangible elements. However, experts 3 and 8 opined that the intangible elements are already included in the price per square foot for the built-up area of the infrastructure asset. Thus, they opined that the intangible elements already influence the value by considering the building materials attached to the infrastructure asset. Two experts, experts 3 and 8, disagreed that the valuation findings did not picture the asset's real value. This is because the price per square feet for the built-up area of the infrastructure asset already includes the element of building materials, which also influences intangible factors that are environmental quality and sustainability. This is applicable especially for green buildings with sustainability features. The study found that the main concept to highlight in intangible asset valuation is an individual's willingness to pay (Solikin et al., 2019). The findings on tangible and intangible factors that should be incorporated into infrastructure asset valuation are shown in Table 3.

Table 3: Summary of Research Findings

No.	Early Research Hypothesis	No.	Research Findings
	Tangible factors:		Tangible factors:
1.	Smart technology	1.	Land
2.	Land	2.	Buildings
3.	Buildings	3.	Plant and machinery
4.	Plant and machinery	4.	Infrastructures
5.	Infrastructures		
6.	Utilities		
7.	Weight Scales		
8.	Traffic management system		
	Intangible factors:		Intangible factors:
1.	Safety	1.	Safety
2.	Mobility	2.	Mobility
3.	Economic advancement	3.	Economic and Social value
4.	Sustainability	4.	Sustainability (Environmental quality & image/goodwill)
5.	Social value	5.	Intellectual property
6.	Environmental quality		
7.	Intellectual property		
8.	Image/ goodwill		
9.	Legal ownership		

Source: Researcher (2020)

Table 3 lists all tangible and intangible factors identified during the critical literature review. The identified factors were verified through in-depth interviews with experts. Their insights and comments were derived regarding the tangible and intangible factors that influence infrastructure asset valuation. Out of the 8 tangible factors found from the literature, only 4 tangible factors actually influenced infrastructure asset valuation. In this regard, smart technology, utilities, weight scales and traffic management system could be categorised under plant, machinery and equipment (PME). This finding is in line with the MVS (2019) definition of PME, which includes any assembly of items that form part of utilities, building services installations, or a system configured of machines/technology employed or installed for a specific process.

On the other hand, out of 9 intangible factors identified in the literature review, the experts only verified 5 intangible factors that actually influence infrastructure asset valuation. This is due to the merge factor of social value that is also related to the economic value. The same goes for environmental quality and image/goodwill, which are considered part of the sustainability factor. Another factor, legal ownership, was withdrawn from the list as it does not influence the infrastructure asset valuation result.

CONCLUSION

In conclusion, the main research objectives have been achieved by identifying the most suitable evaluation method. This study has identified and verified both tangible and intangible factors influencing infrastructure asset valuation through in-depth interviews with the experts and found the most significant factors influencing infrastructure asset valuation. This paper will enrich the current body of knowledge and benefit practitioners who could apply the study's output to real practice.

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EXPLORING THE USAGE OF DIGITAL TECHNOLOGIES FOR CONSTRUCTION PROJECT MANAGEMENT

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Abstract

Digital technologies have recently started to enter the construction industry, gradually changing how infrastructure, real estate and other built assets are designed, constructed, operated and maintained. Being among the least digitalized sectors, it is predicted that digital technologies will substantially increase the productivity, decrease the costs, and improve site safety of construction projects. Thus, the primary objective of this pilot study is to explore the usage of digital technologies for the 12 components of construction project management. A total of 32 respondents participated in the online survey. The results indicate that the usage of digital technologies was significantly higher in the management of scheduling, documenting, designing, and assigning costs. The aspects for digitalized safety, stakeholders, equipment, and materials are room for further improvement.

Keywords: Digital Technologies, Construction Industry, Project Management

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INTRODUCTION

The construction industry is triggered by the world's megatrends such as the growing population, or the increasing demand for infrastructure and housing projects. The construction industry intends to improve the image of remarkably poor productivity by pursuing the Fourth Industrial Revolution (4IR), which involves the integration of digital technologies into all existing business areas. The digital transformation in the construction industry involves the introduction of Industrialised Building Systems (IBSs), Building Information Modelling (BIM), Augmented Reality (AR) and Virtual Reality (VR), and Unmanned Aerial Vehicles (UAVs), and has given a different elucidation of built environment to the public (Abdullah, Rashid, Tahar & Osoman, 2021; Ramu, Taib & Aziz, 2020; Chai, 2017).

Digitalisation has raised the production of the construction industry. IBSs manufacture distinct components and are ready to erect modular units off site. BIM is no longer restricted to dimensional modelling. Nevertheless, the BIM model can be shown in different platforms that can be consolidated with various digital devices. AR and VR are initially only beneficial for game design, but the idea was executed for training purposes in the built environment. Digitalisation will change nearly everything that allows the industry to improve to the newest, recognised innovative methods (Chai, 2017).

The Malaysian construction industry is advancing, although at a laggy pace. The idea of digitalisation has been highly acknowledged in the country. The Malaysian construction industry is in a transformation stage, changing from analog to digital. The preparedness of the stakeholders in connection with business model, finance, planning, operation, and maintenance of organization, together with the top management's commitment, are improving digitalisation. Nevertheless, the digital age progresses quickly, and the industry either accepts the megatrend to advance forward, or risks being left behind (Chai, 2017).

LITERATURE REVIEW

Digital Technologies: Barriers in Construction Project Management

The current practice of the construction industry makes digital evolution remarkably difficult. Construction companies find it even harder to develop digital solutions that can be applied to multiple projects. Often, the individual departments of a company will develop their own digital solutions, without coordinating with others (Koeleman, Ribeirinho, Rockhill, Sjodin & Strude, 2019).

Construction projects are usually fragmented throughout a project life cycle. The specialists of consultants normally operate in a small number of disciplines. Each stage of the project life cycle involves a different group of contractors and subcontractors. Therefore, it is extremely hard to develop digital

solutions across a construction project that requires coordinating changes among project stakeholders (Koeleman et al., 2019).

Construction projects have distinctive requirements that involve bespoke design and delivery approaches. These approaches are hardly repeated; therefore, it is difficult to initiate changes across several projects, because it involves thorough transformation. (Koeleman et al., 2019).

Typically, a new construction project engages a new arrangement of organizations working together. Project stakeholders are hardly regular. Contractors will have similar encounters at the company level, where workforce turnover is high. Instability at the project and company levels makes it difficult for construction companies and the involved parties to establish new working approaches and competencies that seamlessly transfer from one project to the next (Koeleman et al., 2019).

The large scale of construction companies is likely to be associated with departments adhering to their own procedures in preference to specific standards, especially since many have expanded by obtaining small-scale companies where project sites located far away from the company's headquarters. It is encouraging for supervising workers to implement new working approaches or use advanced technologies (Koeleman et al., 2019).

Digital Technologies: Trends in Construction Project Management

Experts foresee that construction programmes will be reduced persistently, as clients expect more efficiency in project delivery. Also, the shortage of skilled labour and raw materials will increasingly challenge those involved in construction projects. Therefore, construction companies are expected to integrate digital technologies into their processes in order to retain their competitive edge (Smartsheet, 2018).

Construction projects usually involve several phases before completion. It is normal to have changes due to project constraints, especially when waiting for information or an approval for implementation. As the changes may affect the scope of the project, the updated information must be instantly accessed by all the affected parties through digital devices and platforms. With real-time updating, project delivery performance and transparency will be improved as project managers will be able to know actual happenings at site, to monitor and make timely decisions if there are any site issues (Smartsheet, 2018).

Site safety is highly important for any construction project. Due to busy workload, workers may be reluctant or forget to report any spotted site safety issues. To reduce accident rates, contractors should make it convenient for workers to report safety issues by using their mobile phones to scan the QR codes on the on site safety signs. Alternatively, workers can take pictures attached to an online form as well. Once the issues are reported, the relevant parties, namely, site officers and construction managers, must conduct immediate inspection and

resolve them without any delay, to create a highly safer work environment (Smartsheet, 2018).

All project parties, regardless of whether they are based on site or at the head office, can access real-time and comprehensive project information if allowed by the company. There are many project documents such as contracts, documents, drawings, specifications, progress reports, requests for information, testing logs, inspection logs, master programmes, financial statements, progress claims, and interim certificates that make documentation easy for the project parties to access when needed by using cloud-based technology (Smartsheet, 2018).

There are many types of project deliverables in construction projects. It is crucial to access and share the status of work done in real-time by using cloud-based technology. All project parties are responsible for their outstanding work, as the other parties can view the status of each item and who is accountable for it. Many project documents require approval or sign-off before the work can be executed in construction projects. However, it is hard to obtain all the key project stakeholders to sit down and get the instructions signed by everyone physically. This can be overcome and expedited by collecting electronic signatures through circulation of the project documents (Smartsheet, 2018).

The shortage of skilled and knowledgeable workers is a common and long-standing issue in the construction industry. But this would not be a reason for construction companies to deliver a project with a longer lead time. Conversely, the contractor especially must retain the same speed and efficiency with a compact workforce, due to the competition getting increasingly fierce in the industry. To sustain the construction business, automating repetitive tasks by adopting reliable software is an option. For instance, BIM software would benefit construction companies by coordinating trades and subcontractors, detecting any clashes before construction begins, visualizing the entire project during preconstruction, and improving onsite collaboration and communication (Hall, 2018).

RESEARCH METHODOLOGY

Sampling Design and Research Procedure

This research was based on a pilot survey conducted using an online questionnaire. It was achieved through the following processes:

- 1) **Sample Definition.** This pilot study aims to explore the usage of digital technologies in construction-related companies. Therefore, the target respondents included the following construction practitioners: consultancy, construction businesses, property developments, construction materials, manufacturer and merchants, and other related parties with certain working experience in the industry and working in established construction-related companies that involve different types of construction projects such as

- commercial, industrial, infrastructure, residential, renovation or refurbishment.
- 2) Questionnaire Validation. In validating a survey, face validity was established. First, experts who understand the topic read through the questionnaire to ensure the questions effectively capture the topic under investigation. Second an expert in construction checked the survey for common errors like double-barrelled, confusing, or leading questions.
 - 3) Questionnaire Design. The questionnaire was created by using Google Forms. Google Forms provides a fast way to create an online survey. Once the online questionnaire is created, an invitation was sent out by the researcher to potential respondents for participation through email. The survey instrument was divided into two sections. Section A consists of questions about general responses on the usage of digital technologies when managing different components of construction projects, while Section B comprises questions concerning respondents' demographic information.
 - 4) Data collection. Data was collected from February to July 2019. The duration was about six months.
 - 5) Data analysis. Analysis of the data started in the month of August 2019. The Statistical Package for the Social Sciences (SPSS) software was used to check and analyze the data.

RESULTS AND DISCUSSION

The online questionnaire was sent out to construction practitioners through email. Only 32 respondents out of approximately 250 construction practitioners (or 12.8%) answered the online questionnaire. Fryrear (2020) mentioned that external surveys will generally receive a 10% - 15% response rate on average, and Hill (1998) suggested that 10-30 respondents for pilots in survey research will be sufficient for reporting the findings of a study. Table 1 summaries the respondents' demographics.

Table 1: Respondents' Demographics

Descriptions	Number of Respondents	Percentage
Nature of business		
Consultancy	10	31.3
Construction business	9	28.1
Property development	11	34.4
Building materials manufacturer	1	3.1
Building materials merchants	1	3.1
Others	0	0.0
Working experience in construction industry		
Less than 2 years	6	18.8
2 – 5 years	4	12.5

6 – 10 years	7	21.9
1 – 20 years	5	15.6
More than 20 years		
Number of company employees		
Less than 5	4	12.5
5 – 29	13	40.6
30 – 75	6	18.8
More than 75	9	28.1
Types of construction project		
Commercial	14	43.8
Industrial	1	3.1
Infrastructure	4	12.5
Residential	9	28.1
Renovation or refurbishment works	4	12.5
Others	0	0.0

The Cronbach Alpha's test was used to measure the reliability of the internal consistency of the scale. Next, the internal consistency links to the inter-relatedness of the item in a test by describing the same concept or structure. There is no lower limit to the coefficient of the Cronbach's Alpha value. The Cronbach's Alpha reliability coefficient normally varies between 0 and 1. The closer the coefficient is to 1.0, the more the internal consistency of the items in the rating scale. Moreover, the reliability of the test allows the researcher to reveal the amount of measurement error within the test (Tavakol and Dennick, 2011). The Cronbach's Alpha for the usage of digital technologies for construction projects management components was 0.948. The value indicated high reliability of internal consistency. Concisely, the variables were reliable, since all of Cronbach's Alpha values were over 0.700.

Statistical tests require that the data are normally distributed. Therefore, checking is always required if this assumption is violated. In this case, the null hypothesis is that the data is normally distributed, and the alternative hypothesis is that the data is not normally distributed. Two tests that are used for normality. For a dataset smaller than 2,000 elements, the Shapiro-Wilk test is used; otherwise, the Kolmogorov-Smirnov test should be used (MST, 2020). For this case, since it only has 384 elements in total, the Shapiro-Wilk test was employed. According to Table 2, most of the p-values were less than 0.050, and the null hypothesis was rejected. Hence, we conclude that this dataset did not come from a normal distribution

Table 2: Tests of Normality

Construction Projects Management Components	Shapiro-Wilk	
	Statistic	Sig.
Contract	.937	.061
Cost	.926	.031
Design	.904	.008
Document	.937	.060
Equipment	.861	.001
Materials	.876	.002
Performance	.935	.053
Productivity	.928	.034
Quality	.912	.013
Safety	.874	.001
Schedule	.893	.004
Stakeholder	.923	.026

The Friedman test is the nonparametric equivalent of a one-sample repeated measures design or a two-way analysis of variance with one observation per cell. Friedman tests the null hypothesis that k related variables come from the same population. For each case, the k variables are ranked from 1 to k. The test statistic is based on these ranks (Laerd, 2020). Table 3 shows the mean rank for each of the related groups. The Friedman test compares the mean ranks between the related groups, and indicates how the groups differ. It was included for this reason. Table 4 provides the test statistic (χ^2 value ("Chi-square"), degrees of freedom (df), and the significance level ("Asymp. Sig."), which are all required to report the results of the Friedman test. In this study, there was a statistically significant difference in digital technologies usage for construction project management components ($p=0.00$, <0.05). It is important to note that the Friedman test is an omnibus test to investigate whether there are overall differences, but does not pinpoint which groups in particular differ from each other (Laerd, 2020).

In the context of the Malaysian construction industry, there were higher digitalized practices for the management of schedule, document, design and cost, such as rescheduling works in real-time, alerting teams on critical items, key milestones through mobile platforms, submitting and processing Request for Information (RFI) in real-time, sharing site information, visualising construction drawings , updating and distributing drawings, designing information, and updating and tracking and changing log status, all done on mobile platforms. However, practices for safety, stakeholder, equipment, and materials were less digitalized, such as tracking and reporting safety incidents, alerting workers on

safety precautions, updating stakeholders' details, deploying and tracking construction equipment and machinery, identifying, tracking and locating materials, and updating materials wastage and excess, all mostly done on mobile platforms.

Table 3: Ranks

Construction Projects Management Components	Mean Rank
Schedule	9.38
Document	8.59
Design	8.20
Cost	7.61
Productivity	6.50
Performance	6.39
Contract	5.88
Quality	5.67
Materials	5.22
Equipment	4.89
Stakeholder	4.86
Safety	4.81

Table 4: Test Statistics

N	32
Chi-Square	87.516
df	11
Asymp. Sig.	.000

The results indicate that digital technologies were not commonly adopted in the construction stages in the Malaysian construction industry. It further shows that the industry is yet to catch up with digital transformation. This phenomenon may relate to the characteristics of the construction industry and the lack of commitment from top management and key stakeholders. To improve the performance of construction projects, construction companies should be committed to invest more in digital technologies. Also, the companies need to change the fundamental aspects of their structure, culture and information technology systems for seamless integration.

CONCLUSION

The construction industry is among the least digitalized industries that suffer from poor organization and productivity, complicated requirements, low profit margins, inadequate communication, and limited talent development. This situation should not be allowed to continue, as all the problems are critical, and

population growth, urbanisation and economic expansion are predicted to increase global demand for construction output by 85% by 2030 (Atom & CIOB, 2019). Therefore, the construction industry must embrace digital technologies and adopt new approaches to manage and deliver the projects for better success. This study has indicated that there was a statistically significant difference in digital technologies usage for construction project management components in the context of the Malaysian construction industry. The results show there were higher digitalized practices for the management of schedule, document, design and cost. However, practices for safety, stakeholder, equipment, and materials were less digitalized. Thus, it is recommended that construction players invest in more resources to enhance the digital technologies in a more holistic way, in order to enhance construction project delivery.

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INVESTMENT STYLES OF REIT PROPERTY PORTFOLIOS

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Abstract

Investment style, comprising generic-style and specific-style, is the real estate investment management approach adopted by REIT management in guiding the construction of their portfolios. These portfolios would have distinctive return and risk performance reflecting the stated risk and return underlying the investment vision. Using quantitative and qualitative approaches, this study identified the investment style of each M-REIT listed on Bursa Malaysia. Using the generic-style criteria and analysis, M-REITs are found to have pursued passive and value strategies aided by a top-down approach to their property portfolio management. Whilst results of the specific style analysis show that core portfolios have produced a lower risk-return ratio compared to value-added and opportunistic portfolios. These findings will benefit investors by guiding their investment decision making in constructing their investment portfolios and also in deciding ways to achieve diversification.

Keywords: Property portfolios, investment style, risk and return

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INTRODUCTION

Investing in diversified portfolios involves consideration of risk tolerance and style characteristics with an eye on systematic changes affecting investing opportunities in the overall investment landscape (Baum and Hartzell, 2012, Baum, 2015). Style is a statement of the approach adopted by a portfolio manager to real estate investment management reflecting the stated risk tolerance. According to Peyton (2008), style is usually expressed as a combination of:

- a) generic style (active or passive, top down or bottom up, value or growth),
- b) specific style (core, value-added or opportunistic)

This study focuses on the listed REIT sector in Bursa Malaysia. In December 2019, there are 18 listed REITs and 1 unlisted REIT in Malaysia. There are 5 Office REITs, 5 Retail REITs, 4 Mixed REITs, 2 Industrial REITs, 1 Healthcare REIT, 1 Hospitality REIT and 1 Education REIT in Malaysia.

The outcome of this research is particularly useful to retail and institutional investors, where the investment styles identified can assist them in making the right M-REIT investment decision making. Coupled with the knowledge on fundamental, technical and sentimental analysis of a particular M-REIT, investors will be able to benefit by developing the most suitable investment portfolio. For retail investors, the style box helps the investors to construct a diversified portfolio that reduces overall volatility and increase expected return.

The objectives of the study are:

- a) To determine the investment style of each M-REIT
- b) To determine the investment styles of M-REIT in general
- c) To identify the effect of investment style on the performance of M-REIT

LITERATURE REVIEW

According to Parker (2011), investment style is a clear statement of approach to property investment management to be selected by the REIT demonstrating the stated risk tolerance underlying the vision or goals of the REIT. Generally, investment style is articulated as a combination of generic style and specific style. Typically, generic style is classified into three categories, namely Active or Passive, Value or Growth, and Top-down or Bottom-up. On the other hand, specific style is divided into Core, Value-Added, and Opportunistic. This research has come up with a set of guidelines and criteria for the purpose of identifying the investment styles adopted by M-REITs.

Generic Style: Active or Passive

Active Style

The REIT manager seeks to actively manage an asset or portfolio of assets so as to add value and enhance returns above those achieved by a benchmark/index. The characteristics include but are not limited to: -

- a) The real estate e.g. shopping mall is occupied by tenants from various retails, trades and services e.g. TGV Cinema, Jaya Grocer, H&M, Padini, Haidilao, Tealive etc.
- b) The manager needs to actively source tenants to occupy most spaces within the real estate, say the occupancy rate is less than 90%. Thus, additional effort is required to attract tenants into the real estate.
- c) Tenant turnover is expected to be significant as there is a high likelihood a tenant would move out from the real estate.

Passive Style

The REIT manager seeks to replicate or follow a benchmark in order to approximate the risk-return of the benchmark. The characteristics include but are not limited to: -

- a) The real estate is occupied by single or multiple tenants which is from the same parent company with a large company size. For example: Nestle, KPJ Healthcare, DHL, Maxis and so forth. Generally, this applies to real estate such as corporate office, factories, hospitals, universities and government buildings.
- b) The manager needs not to actively source tenants to occupy the spaces within the real estate as the tenants are less likely to move out from the real estate due to high investment capital for the plants and machinery.
- c) The tenants have either long leases, usually more than 10 years, or a proven track record of consistent and successful tenancy or lease renewal.

Generic Style: Value or Growth

Value Style

The REIT manager focuses on real estate which are essentially mispriced, as well as offering the potential for abnormal income, capital and total returns over a predetermined future timeframe. The characteristics include but are not limited to:

- a) The real estate is generally located in emerging hotspots, non-prime or secondary areas such as Shah Alam, Setapak and Subang Jaya.
- b) It focuses on generating growth in rental income from its real estate.
- c) Typically, it comes with an active style of management e.g., adjusting tenant mix, repositioning, rebranding etc.

Growth Style

The REIT manager focuses on building a portfolio comprising real estate that offer the potential for growing income, capital and total returns over an undefined and usually longer future timeframe. The characteristics include but are not limited to: -

- a) The real estate is generally located in prime areas such as Central Business District (CBD), Kuala Lumpur City Centre, Golden Triangle and Petaling Jaya.
- b) It focuses on generating stable rental income from its real estate.
- c) Typically, it comes with a passive style of management i.e., buy and hold.

GENERIC STYLE: TOP-DOWN OR BOTTOM-UP

Top-Down Approach

The REIT manager studies the global, national, regional and local real estate markets to examine the optimal geographic areas and real estate sectors for investment, then seeking assets within such areas and sectors for property acquisitions. The characteristics include but are not limited to: -

- a) Market/Sector/Industry analyses are reported in the annual report of the REIT.
- b) Market news or headlines can be found in the company website.
- c) Specific style can be core, value-added or opportunistic.

Bottom-Up Approach

The REIT manager seeks to specifically consider the investment attributes of an individual real estate and their acceptability as the basis of acquisition. The characteristics include but are not limited to: -

- a) Building attributes e.g., location, accessibility, building quality and design.
- b) Surrounding neighborhood characteristics e.g., employment, amenities and facilities.
- c) Specific style is usually of opportunistic as it places more emphasis on individual opportunities e.g., mispricing of property.

SPECIFIC STYLE: CORE, VALUE-ADDED AND OPPORTUNISTIC

Core Style

The REIT manager emphasizes on existing, well-leased and high-quality real estate in established and matured markets. It generally reflects stable and predictable income flows from strong credit and reputable tenants. Other characteristics include but are not limited to: -

- a) The real estate is generally situated in prime areas e.g. Central Business Districts (CBD), Kuala Lumpur City Centre and Golden Triangle.

- b) It requires a relatively high proportion of total return from rental income and cash flow.
- c) Capital appreciation plays a lesser role.
- d) The real estate has an excellent tenant mix and tenant quality in terms of reputation, credit quality etc.
- e) It records a comparatively low distribution yield due to lower risk. As a rule of thumb, the yield is less than 5% per annum.

Value-Added Style

The REIT manager seeks to increase the value of the real estate investments. Often these real estates will have sub-optimal occupancy rate, operational issues or some physical obsolescence. Hence, significant expertise and experience in retenanting and rehabilitating the assets are required (Shilling and Wurtzbech, 2012). Other characteristics include but are not limited to: -

- a) The real estate is generally situated in non-prime areas such as Shah Alam, Georgetown, Johor Bahru and so forth.
- b) It focuses on capital appreciation of the real estate.
- c) It involves assets that require refurbishment or major enhancement resulting in repositioning.
- d) The real estate has a good tenant mix and tenant quality in terms of reputation, credit quality and so forth.
- e) It records a moderate yield due to moderate risk. As a rule of thumb, the yield is between 5% to 6% per annum.

Opportunistic Style

In this instance, the REIT manager is willing to take entrepreneurial risk in order to achieve out-sized returns by investing into real estate from ground up development, adaptive reuse, to emerging markets. Other characteristics include but are not limited to: -

- a) The real estate is generally situated in suburban or outskirts areas such as Sepang, Kajang, Ipoh, Seremban and Malacca. Overseas properties are also in this category.
- b) The real estate has a fair tenant mix and tenant quality in terms of reputation, credit quality and so forth.
- c) It records a relatively high distribution yield due to higher risk. As a rule of thumb, the yield is more than 6% per annum.

RESEARCH METHODOLOGY

Introduction

This section highlights the research methodology to examine the investment style of each individual Malaysia REIT, as well as the effect of specific investment style on the REIT performance.

Research Process

The total return of each REIT is calculated based on the average changes of monthly closing price and the income distribution of the respective REIT, which are annualised to arrive at its annual return.

Risk refers to the chance an outcome or investment's actual gains will differ from an expected outcome or return. To quantify risk, the standard deviation of the monthly returns is used to measure the volatility of a REIT and are annualised to obtain its annual risk.

Property portfolio information and data of the M-REITs are collected from 2018 annual reports. The information collected include name of property, type of property, size, acquisition date, purchase price, latest valuation and date of valuation, location, age etc. By combining the data collected with the sets of criteria for each investment style, the investment style adopted to manage each property is identified.

In addition, the monthly closing price since the IPO listings of each REIT listed in Malaysia is obtained, without any adjustment to any capital changes such as rights and bonus issues. Furthermore, any distribution by the respective REIT is also recorded in the month of its ex-date.

ANALYSIS OF RESULTS

Investment Styles of REITs in Malaysia

Generic Style: Active or Passive

Two-thirds of the properties owned by M-REITs are managed passively by the managers. Most of these properties, regardless of their types, are located in established areas such as Golden Triangle and Petaling Jaya. There are 145 properties being managed passively, as opposed to 73 properties being managed actively by REIT managers.

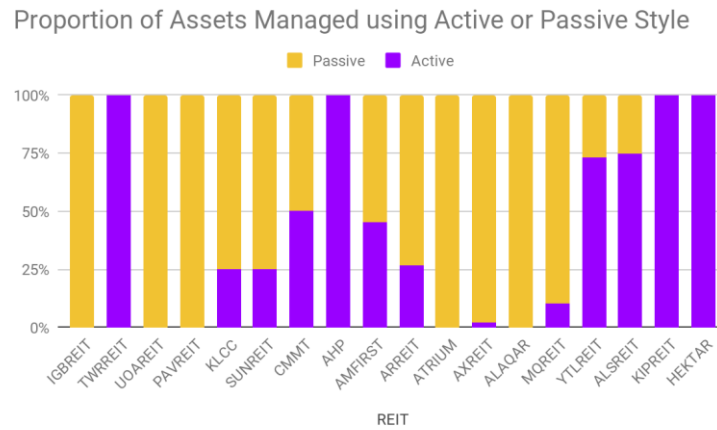


Figure 1: Breakdown of active and passive style properties

Figure 1 shows there are 4 REITs which fully manage their assets actively, namely AHP, HEKTAR, KIPREIT, and TWRREIT. The major characteristics of these REITs are that the real estate is located in non-prime areas (in the case of HEKTAR and KIPREIT) and tenant movement within the real estate is expected to be frequent (in the case of AHP and TWRREIT). Moreover, REITs like ALSREIT and YTLREIT actively manage most of their properties due to the nature of business which is in the food & beverage sector (i.e. ALSREIT) and hospitality sector (i.e. YTLREIT), where active management is required to ensure the stability and sustainability of the operation.

On the other hand, there are 6 REITs which passively manage all of their assets, namely ALAQAR, ATRIUM, AXREIT, IGBREIT, PAVREIT, and UOAREIT. The main characteristics of these REITs are that the assets are located in prime areas (in the case of IGBREIT, PAVREIT and UOAREIT) or tenant movement is expected to be less frequent due to the nature of business which mainly associated with industrial and hospital (in the case of ALAQAR, ATRIUM and AXREIT). Besides, REITs like ARREIT, KLCC, MQREIT and SUNREIT passively manage most of their assets, with a minority of them being managed actively so as to achieve higher return on investment.

Lastly, there are 2 REITs which manage their assets both actively and passively, namely AMFIRST and CMMT. These REITs owns and operates real estate which are situated in both prime and non-prime locations. In this category, the real estate is expected to generate growing return for the REIT as some risks are taken, with the establishment of a certain margin of safety.

Generic Style: Value or Growth

Two-thirds of the properties owned and operated by M-REITs are managed with the goal of enhancing the value of the assets; while one-third of the properties are managed with the goal of embracing growth of the assets. This result is mostly similar to the above-mentioned “Generic Style: Active or Passive”, where the value style is aligned with passive style (144 properties); while the growth style is aligned with active style (74 properties).

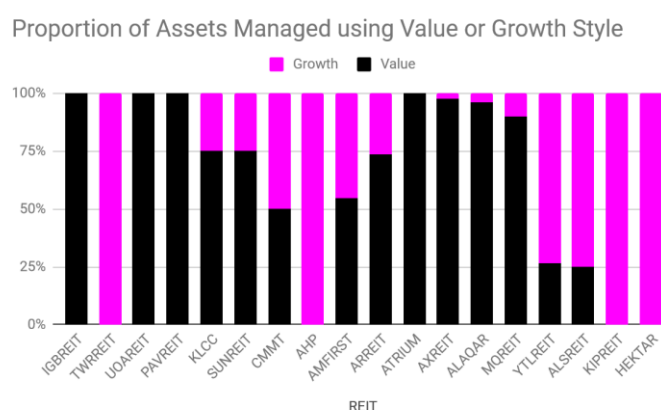


Figure 2: Breakdown of growth and value style properties

Based on Figure 2, there are 4 REITs which completely practice growth style in managing their assets, namely AHP, HEKTAR, KIPREIT and TWRREIT. Similar to the active style of management, the major characteristics of these REITs are that the real estate are located in non-prime, but growing areas such as Subang Jaya and Johor Bahru. Moreover, REITs like ALSREIT and YTLREIT also practice growth style in managing most of their properties due to the nature of business which is in the food & beverage sector (in the case of ALSREIT) and hospitality sector (in the case of YTLREIT), where active management is required to ensure the stability and sustainability of the operation. In return, the REITs are expecting significant appreciation in their capital so as to compensate their efforts and risks in managing these assets.

On the contrary, there are 6 REITs which practice value style in managing their assets, namely ALAQAR, ATRIUM, AXREIT, IGBREIT, PAVREIT, and UOAREIT. The main characteristics of these REITs are that the assets are located in prime areas. Besides, value style of management is also reflected in REITs like ARREIT, KLCC, MQREIT and SUNREIT so as to achieve constant returns from the properties in the form of rental income, resulting in consistent and positive cash flow being generated. Lastly, AMFIRST and CMMT are seen to practice both value and growth style when managing their

portfolio of assets, where they own and operate real estate which are situated in both prime and non-prime locations. In this category, the real estate is expected to generate both capital appreciation and rental income for the REITs.

Generic Style: Top-Down or Bottom-Up

In Malaysia, 151 out of 218 properties (69.3%) owned and operated by REITs are invested with the practice of top-down style to determine the market opportunity and risk when making management decisions. In contrast, 67 out of 218 properties (30.7%) are invested with the practice of bottom-up style to consider the investment attributes of an individual real estate and their acceptability as the basis of acquisition.

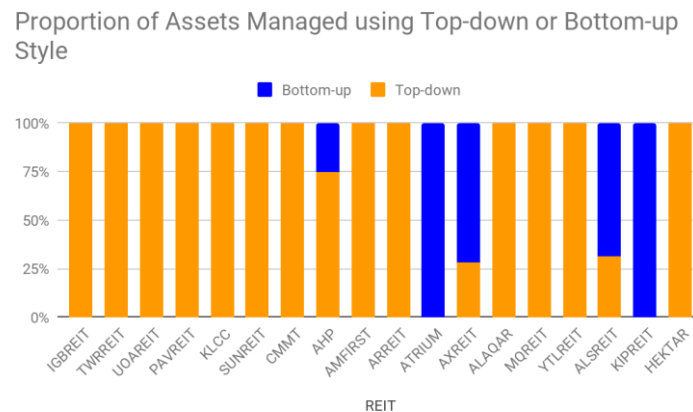


Figure 3: Breakdown of top-down and bottom-up style properties

Figure 3 shows that there are 13 REITs which fully practice top-down approach to examine market opportunity and risk when making management decisions, namely ALAQAR, AMFIRST, ARREIT, CMMT, HEKTAR, IGBREIT, KLCC, MQREIT, PAVREIT, SUNREIT, TWRREIT, UOAREIT, and YTLREIT. Detailed market/sector/industry analysis prepared by either professional property consultants and/or the management itself are found in the annual reports of these REITs. Besides, 75% of the assets (3 out of 4 properties) of AHP adopts the top-down approach when making investment or management decision.

On another note, bottom-up approach is practiced by 2 REITs, namely ATRIUM and KIPREIT, where the REIT manager seeks to specifically consider the investment aspects of an individual property and their acceptability as the basis of acquisition. Market/sector/industry analysis are absent in the annual report of these REITs. This is followed by ALSREIT and AXREIT, where the REIT managers practice bottom-up approach for the majority of their portfolio when making management decisions.

Specific Style: Core, Value-Added or Opportunistic

In Malaysia, most of the properties (40.4%) are managed with opportunistic style, followed by core style (33.5%) and value-added style (26.1%). AXREIT, ALSREIT and ALAQAR contribute approximately 57% of the total number of properties managed under opportunistic style; AXREIT and ALSREIT contribute 49% of the total number of properties managed under value-added style; SUNREIT and AXREIT contribute 30% of the total number of properties managed under core style. However, this statistic is greatly influenced by AXREIT, ALSREIT and ALAQAR as they own and operate a large number of properties, which comprise approximately 47% of the total number of properties owned and operated by REITs in the country.

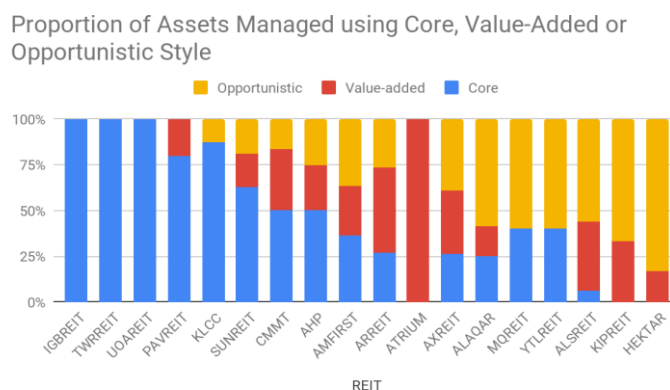


Figure 4: Breakdown of core, value-added and opportunistic style properties

Based on Figure 4, IGBREIT, TWRREIT and UOAREIT manage all of their assets using core style; while ATRIUM adopts value-added style to manage all of their properties. Other REITs that adopt core style include PAVREIT, KLCC and SUNREIT, where the real estate of these REITs is located in prime area or Central Business Districts (CBD) such as Bukit Bintang, Kuala Lumpur City Centre and Damansara. Excellent mix and quality of tenants are also a key similarity between these properties, resulting in a lower distribution yield due to lower risk. The excellent mix and quality of tenants are not only due to the strong management capability, but also due to the attractive and prime address that the properties are located at, resulting in higher quality tenants are interested to lease spaces within the real estate.

Furthermore, other REITs that use value-added style include CMMT, AHP, AMFIRST, ARREIT and AXREIT. The main similarities between these REITs are that capital appreciation is the focus. Besides, the situation of the properties managed by these REITs are mainly in non-prime locations such as

Shah Alam, Cyberjaya and Subang Jaya. In addition, some of the buildings require refurbishment or major enhancement before or after the acquisition of properties. Some examples include Sungei Wang Plaza, Summit Subang and HELP University Jalan Semantan. Due to the moderate level of risk involved, moderate distribution yield of 5-6% is required.

Lastly, REITs practicing opportunistic style are ALAQAR, MQREIT, YTLREIT, ALSREIT, KIPREIT and HEKTAR. In this instance, certain degree of entrepreneurial risk is taken, where the REITs are investing in ground up developments or real estate that require redevelopment and adaptive reuse. Generally, this asset class includes vacant land, properties located in overseas locations, non-conventional properties, as well as properties located in suburban or outskirts. Some examples include KPJ International College, Sydney Harbour Marriott, Segamat Central, and a parcel of vacant land with the Lot No. 173, Seksyen 58, Town of Kuala Lumpur. However, due to the relatively poor location, these properties appear to be less attractive in the eyes of quality tenants, thus having a fair mix and quality of tenants within the real estate. As a result, higher distribution yield is needed to compensate for the higher risk taken by the investors.

PERFORMANCE OF REITs IN MALAYSIA

Since the introduction of Bursa Malaysia REIT Index on 2 October 2017, the index has recorded a 3.25% decline from 1,015.11 to 982.10 as at 29 November 2019. Although such decline may develop a discouraging perception towards REITs in Malaysia, the index is only 2 years old and does not have sufficient time series data to prove the long-term performance of the asset class. Regardless, the real estate asset class will appreciate in the long run due to its inflation hedging characteristic and growing population in Malaysia.

In this research paper, the effects of specific investment styles on the performance of Malaysia REITs was studied. A summary of performance of Malaysia REITs in relation to the respective specific investment style is depicted in Figure 5.

Performance of M-REITs in Relation to Specific Investment Styles

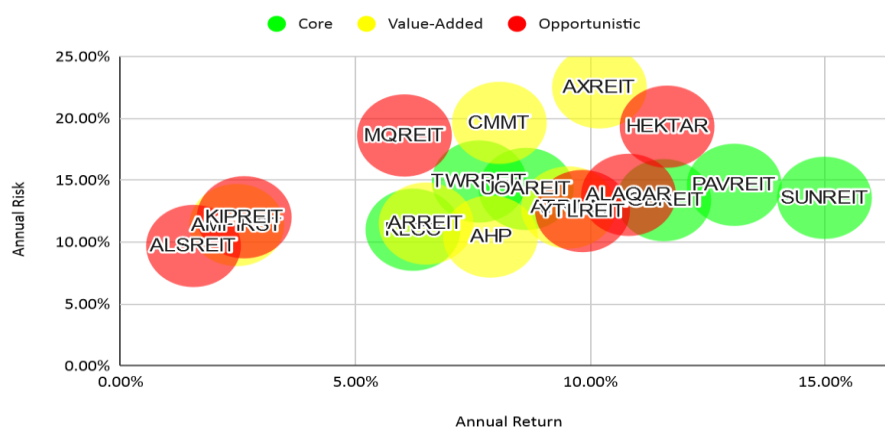


Figure 5: Performance of M-REITs in relation to specific investment styles (January 2006 to November 2019)

The annual risk of M-REITs range between 9.70% and 22.52% for the study period from January 2006 to November 2019; while its annual return ranges from 1.55% to 14.98%. In other words, the risks of investing in REITs in Malaysia is higher than its returns. A summary of the performance of each REIT is highlighted in Table 1.

Table 1: Risk and return of M-REITs (January 2006 – November 2019)

	Investment styles	Annual Return (%)	Annual Risk (%)	Risk/Return ratio	Average Risk/Return ratio
IGBREIT	Core	11.56%	13.40%	1.1592	1.4283
TWRREIT	Core	7.63%	14.91%	1.9541	
UOAREIT	Core	8.63%	14.31%	1.6582	
PAVREIT	Core	13.06%	14.64%	1.1210	
KLCC	Core	6.22%	11.01%	1.7701	
SUNREIT	Core	14.98%	13.59%	0.9072	
CMMT	Value-Added	8.06%	19.65%	2.4380	
AHP	Value-Added	7.87%	10.46%	1.3291	

AMFIRST	Value-Added	2.47%	11.39%	4.6113	2.2839
ARREIT	Value-Added	6.50%	11.51%	1.7708	
ATRIUM	Value-Added	9.53%	12.81%	1.3442	
AXREIT	Value-Added	10.19%	22.52%	2.2100	
ALAQAR	Opportunistic	10.81%	13.83%	1.2794	3.0215
ALSREIT	Opportunistic	1.55%	9.70%	6.2581	
HEKTAR	Opportunistic	11.63%	19.34%	1.6629	
KIPREIT	Opportunistic	2.63%	12.02%	4.5703	
MQREIT	Opportunistic	6.04%	18.63%	3.0844	
YTLREIT	Opportunistic	9.83%	12.52%	1.2737	

Overall, SUNREIT which has the lowest risk-return ratio was the best performer for the study period. On the other hand, ALSREIT has the worst performance and is the most volatile REIT among others, with a relatively low return accompanied by moderate risk. The average risk/return ratio of Core style REITs is 1.4283, followed by Value-added REITs at 2.2839, and Opportunistic Style REITs at 3.0215. The relative risk/return for these three investment styles is consistent with the investment adage – high risk high return and low risk low return.

Generally, the lower the risk/return ratio, the less volatile is the REIT. In the Core category, IGBREIT, PAVREIT and SUNREIT records a lower calculated risk/return than the average risk/return, indicating their capability in maintaining a greater stability among other REITs within the same category. Besides, in the Value-Added category, CMMT and AMFIRST records an above average calculated risk/return, representing their inability to maintain a lower volatility than the industry standards. Lastly, in the Opportunistic category, ALAQAR, HEKTAR and YTLREIT records a lower calculated risk/return than the average risk/return, indicating their ability to maintain a greater stability than their competitors in the industry.

CONCLUSION

In a nutshell, the results of our research reveal that most of the real estate portfolios are managed passively by the REIT managers to generate consistent rental income relying on long term leases. Besides, the value approach is adopted by majority of the REIT managers to achieve a greater potential of income or

return. Furthermore, more than two-thirds of the REIT managers practice top-down style to determine market opportunity and risk when making investment management decisions. Moreover, most REIT managers apply core style in managing their individual assets by focusing on existing, well-leased and high-quality properties in established key property sectors and prime locations.

Last but not least, the results of our research have been aligned with our hypothesis, where the Core style represents low risk, low return; while the Opportunistic style represents high risk, high return. For retail and institutional investors, the identified investment style portfolios of M-REITs give them the flexibility to choose from an array of investment portfolios that meet their investment mandates. If the investor is more conservative and risk averse, he might want to invest into REITs which practice Core investment style such as SUNREIT, PAVREIT, IGBREIT, TWRREIT, UOAREIT and KLCC. For an investor who has moderate tolerance towards risk, REITs under the Value-added category such as CMMT, AHP, AMFIRST, ARREIT, ATRIUM and AXREIT would be a suitable choice. Lastly, aggressive investors who are willing to take up more risk to bet for a better potential return can invest into REITs adopting Opportunistic investment styles such as ALAQAR, ALSREIT, HEKTAR, KIPREIT, MQREIT and YTLREIT.

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IDENTIFICATION OF FACTORS INFLUENCING LAND VALUE FOR STATE'S ASSETS MASS APPRAISAL PURPOSES: EVIDENCE FROM INDONESIA

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Abstract

Land value is an important element in a decision making. The estimation of land value conducted individually based on comparables. This approach often faces difficulties due to the large quantities of such assets with limited capacity of valuers. This research aimed to build a model to effectively identify the main property attributes that shape property value and quantify the effect of unobserved variables on value. We observed 628 property data in Jakarta collected by the Directorate General of State Asset Management (DGSAM) as part of their valuation activities in 2018. The results of this study provide an evidence that structural equation model (SEM) can be effectively used to identify property attributes that significantly affect property value, particularly for valuing state-owned assets.

Keyword: Land Value, Land Market, Residential Land JEL Code: R330, R210

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INTRODUCTION

The Indonesian government is required to publish annual audited financial report that contains information including assets' value. While the Minister of Finance Regulation No 111/PMK.06/2017 has mandated a valuation to comply to this task, the actual valuation process takes a long time to complete due to the sheer number of assets. A procedure to speed up the process is therefore essential.

Mass appraisal is a common technique for this purpose in ad valorem valuation (Riley, 2018). It involves the use of standardised procedure and statistical tests to value a large number of assets (Eckert, Gloudemans, & Almy, 1990, p. 303) and uses mathematical model (Riley, 2018) to replicate property market (McCluskey, 2018). Once the model building stage is completed, model accuracy is assessed under statistical procedures (McCluskey, 2018).

Another important aspect is consistency, which is considered challenging (Benjamin, Guttery, & Sirmans, 2004) when valuing properties in large quantities. Since inconsistency is generally undesirable in state-owned assets, mass appraisal can address this problem (McCluskey, 2018) through the use of standardised models (Jahanshiri, Buyong, & Shariff, 2011).

This research aimed to build a mass appraisal model for valuing state-owned assets in the form of vacant land and measuring the effect of unobserved variables on value. The research process in this paper is depicted in Figure 1 and detailed in the following section.

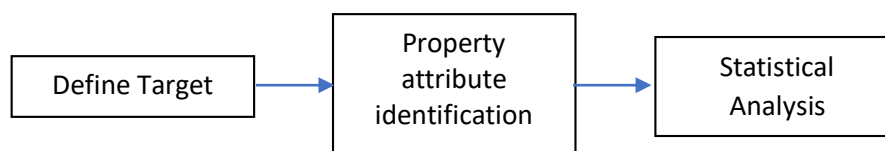


Figure 1: Research process

RESEARCH METHOD

Data Analysis Method

Regression analysis is a widely used tools in mass appraisal for its flexibility, ease of use, and acceptable accuracy level (Tretton, 2007). Unfortunately, regression analysis ignores locational attributes which significantly affect property value (Jahanshiri et al., 2011).

Another technique is the structural equation modelling (SEM). SEM is exceptional for evaluating the strength of observed variables, such as distance to CBD in representing unobserved constructs (Gallagher, Ting, & Palmer, 2008) such as location. Although widely used in social and economic studies (Gallagher et al., 2008), previous studies reported a limited application of SEM in mass appraisal (Liu and Wu, 2009; Freeman and Zhao, 2019).

Data Description

This research used 1,400 data records compiled by the Directorate General of State Asset Management (DGSAM). Unfortunately, this dataset consists of asking price with certain property attributes. The problem with asking price is that it is not the agreed arm's length price, and hence, fails to provide fair value comparison. In addition, as it represents the sellers' view, it tends to be on the higher side of the scale. Therefore, asking price per square meter that was higher than an upper fence was removed. Following Tukey (1977), the upper fence was calculated using equation (1).

$$\text{Upper fence} = Q_3 + (1.5 \times IQR) \quad (1)$$

Here, Q_3 is the third quartile and IQR (inter quartile range) is the difference between the first (Q_1) and the third (Q_3) quartile. In DGSAM's dataset, Q_1 and Q_3 can be calculated as IDR 8 million and IDR 27 million, respectively, so the IQR equals to IDR 19 million. As such, using equation (1), the upper fence is IDR 55.5 million. It means that all asking prices higher than IDR 55.5 million – 321 records in total – were removed. Additional outliers were also excluded based on the Mahalanobis distance criteria (Gallagher et al., 2008), leaving 628 records for analysis. It is considered sufficient because it satisfies the sample size recommended by Hair, Black, Babin, and Anderson (2013) and is larger than one used by Freeman and Zhao (2019). This process results in a set of data with asking price ranges between IDR 8,000,000/m² and IDR 55,147,000/m² ($Q_2 = \text{Rp. } 20,000,000/\text{m}^2$).

Model Building

This research follows the model development procedure from Gallagher et al. (2008) that includes model development, examination, and assessment.

Model Development

This research starts with a model developed by Liu and Wu (2009) and Freeman and Zhao (2019) illustrated in

Figure 3.

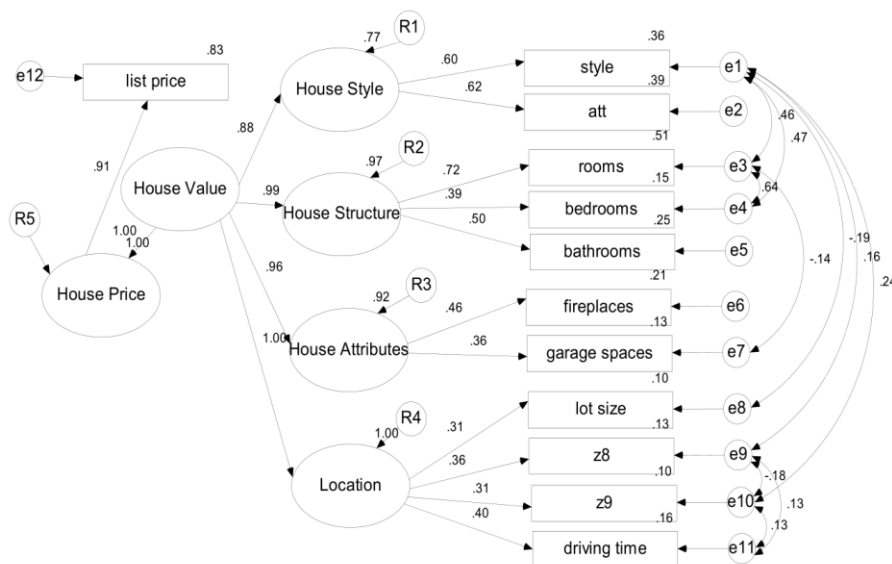


Figure 2: Base model

Source: Freeman and Zhao (2019)

Model Examination

In the DGSAM dataset, three latent variables – land structure, land attributes, and location – are chosen. Each variable comprises of at least three indicators (Table 1).

Table 1: Variable definition

Variable	Definition
Land Structure	
LS1	Area (m ²)
LS2	Slope (1. Yes, 0. No)
LS3	Elevation (1. below road 2. same with road 3. above road)
Land Attributes	
LA1	Road types (1. Residential street 2. Town road 3. City road 4. Province road 5. National road)
LA2	Road structure (1. other 2. concrete rebates 3. paving blocks 4. asphalt 5. good quality concrete)
LA3	Number of medical facilities
LA4	Waste management (0. Not available to 5. Well managed)
LA5	The width of the road (in meter)
LA6	Traffic flow (1. Two way, 2. One way, 3. Two way with separator)
LA7	Road condition (1. bad 2. average 3. good)
LA8	Clean water network (1. Yes 0. No)

Variable	Definition
LA9	Noise (1 noisy 2. average 3 quite)
LA10	Air quality (1 bad 2. average 3. good)
Location	
LO1	Distance to CBD (kilometre)
LO2	Transportation easiness (1. very difficult to 5 very easy)
LO3	Distance to transportation mode (kilometres)
LO4	Number of health facilities
LO5	Number of education facilities
LO6	Number of recreation areas

The relationship of these variables is show in Figure 3.

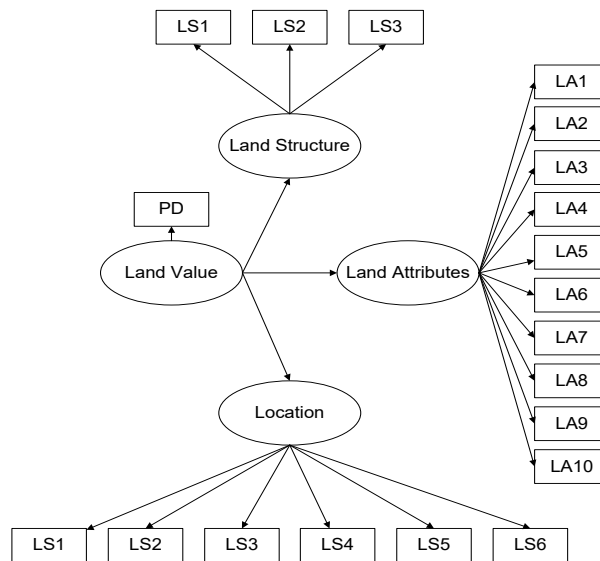


Figure 3: Final model

Model Assessment

The third step is model assessment. As seen in

Figure 3, it is hypothesised that land value is affected by land attribute, land structure, and location. These variables are latent as they cannot be directly observed and measured. SEM enables the use of latent variables without causing

measurement bias (Gujarati, 2009). Using the partial least square branch of SEM,¹ this research aimed to test the following hypothesis:

- H₁ : Land Style positively impact Land Value
- H₂ : Land Attributes positively impact Land Value
- H₃ : Location positively impact Land Value

To test the feasibility of the model, the first criterion that we looked at was discriminant validity. A construct that meets the discriminant validity criteria is one that explains a phenomenon not attributed to a different construct (Hair, Hult, Ringle, & Sarstedt, 2017) but captures the uniqueness of a construct. An indicator satisfies this criteria if it loads highest on its own construct (Hair, Sarstedt, Ringle, & Mena, 2012, p. 430). An example can be seen in Table 2 where LA1 (road type) has the highest cross loading with LAND ATTRIBUTE (0.65) compared to the rest of the constructs (for instance 0.35 for LAND STRUCTURE). Thus, we can conclude that all constructs in this research are unique.

Table 2: Cross loadings

	Land Attribute	Land Structure	Land Value	Location
LA1	0.65	0.35	0.51	0.36
LA10	0.69	0.50	0.46	0.50
LA2	0.73	0.40	0.51	0.35
LA3	0.81	0.49	0.6	0.49
LA4	0.79	0.46	0.61	0.44
LA5	0.76	0.46	0.51	0.48
LA6	0.61	0.39	0.31	0.41
LA7	0.8	0.54	0.58	0.55
LA8	0.73	0.52	0.54	0.54
LA9	0.75	0.50	0.52	0.56
LO1	0.5	0.67	0.44	0.81
LO2	0.5	0.64	0.43	0.81
LO3	0.41	0.53	0.3	0.71
LO4	0.43	0.56	0.38	0.75
LO5	0.54	0.53	0.46	0.75
LO6	0.49	0.47	0.35	0.7

¹ This approach is taken as it allows smaller sample size and does not rely on a strict assumption (Hair, Sarstedt, Hopkins, & Volker, 2014).

LS1	0.45	0.76	0.34	0.52
LS2	0.43	0.85	0.36	0.64
LS3	0.64	0.89	0.57	0.70
PD	0.71	0.53	1.00	0.53

Secondly, we looked at the model’s outer loadings. Hair et al. (2017) stated that indicators with high outer loadings tend to have more in common; hence, indicators with a factor loading of less than 0.4 should be excluded whereas those with an outer loading at least 0.7 should be retained. Lastly, indicators with an outer loading in between are acceptable for exploratory studies (Hair et al., 2012, p. 429), such as one reported in this paper. Thus, indicators used in this research satisfy these requirements (Table 3).

Table 3: Outer loadings

	Land_Attribute	Land_Structure	Land_Value	Location
LA1	0.65			
LA10	0.69			
LA2	0.73			
LA3	0.81			
LA4	0.79			
LA5	0.76			
LA6	0.61			
LA7	0.80			
LA8	0.73			
LA9	0.75			
LO1				0.81
LO2				0.81
LO3				0.71
LO4				0.75
LO5				0.75
LO6				0.70
LS1		0.76		
LS2		0.85		
LS3		0.89		

	Land_Attribute	Land_Structure	Land_Value	Location
PD			1.00	

Another criterion is the Average Variance Extracted (AVE). This measure explains how far indicators' variance is explained by their constructs. Hence, if an AVE of a certain construct is below 50%, the model is unable to satisfactorily explain the variance of the indicators because most of it remains in the model's error (Hair et al., 2017). Following this logic, therefore, EVA should at least be 0.5 (Hair et al., 2012, p. 429). Table 4 shows that the EVA of the model is at least 0.54. As such, we can conclude that the model proposed in this paper satisfies convergent validity as each construct explains most of the variance in their indicators.

Table 4: Average Variance Extracted

	AVE
Land_Attribute	0.54
Land_Structure	0.69
Land_Value	1.00
Location	0.57

Another important indicator is the composite reliability that measures an internal consistency of the model. Its values vary between 0 and 1. Hair et al. (2012) recommends to use 0.6 to 0.7 as a guide of an acceptable reliability value. This research therefore satisfies this criterion (Table 5).

Table 5: Composite reliability

	Composite Reliability
Land_Attribute	0.92
Land_Structure	0.87
Land_Value	1.00
Location	0.89

Table 6 presents the coefficients for each construct, indicating that all constructs significantly affect asking price ($t = 1.96$, $n = 628$).

Table 6: Coefficients for each latent variable

	Original Sample (O)	t statistics
Land_Value → Land_Attribute	0.71	15.66

	Original Sample (O)	t statistics
Land_Value → Land_Structure	0.53	6.84
Land_Value → Location	0.53	7.06

These results are consistent with the literature. For instance, location has been recognised as one of the most important factors affecting property value. Property can be seen as a place where activities are conducted (Fanning, 2014). As one activity relates to another, property with easy access to other property is highly sought as it drives customers’ preference (Thanaraju, Khan, Juhari, Sivanathan, & Khair, 2019), which leads to a higher demand and an increase in property value. It is therefore unsurprising that location affects house price significantly (Olanrewaju, Lim, Tan, Lee, & Adnan, 2018). Distance to transportation is another important feature in property location (Suhaimi, Maimun, and Sa’at, 2021). Similarly, other constructs reported in Table 6 have found support from the literature (Adair, Berry, & McGreal, 1996; Randeniya, Ranasinghe, & Amarawickrama, 2017). The main contribution of this paper is demonstrating a procedure to measure the effect of unobserved variables (e.g., location and land attributes) on land value, which is generally difficult to measure using popular tools, such as regression analysis. Next section provides a brief future research direction and concludes this paper.

CONCLUSION

This study provides statistical evidence that found – based on the sample included in this study – land attributes, land structure, and location are highly significant in affecting the state-owned land value. As such, DGSAM is suggested to adopt these variables in their proposed mass appraisal model. This paper also demonstrates that it is now possible to quantitatively measure the effect of unobserved variables like location or property attributes. Such measurement is difficult to accomplish using popular model building techniques, e.g., multiple regression analysis. The model in this paper can, however, benefit from more data transaction. Additional data should cover areas outside of Jakarta to test and improve the reliability of the model.

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PURCHASING DECISION OF PROPERTY BUYERS: THE HOUSING QUALITY, FINANCIAL CAPABILITIES, AND GOVERNMENT POLICIES STUDIES

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Abstract

There are generally three types of house buyers called owner-occupiers, investors, and speculators. However, various factors that affect their decision to purchase a house. The research aims to identify the main factors that will affect the purchase decision of property buyers. Factors such as environmental factors, financial factors, governmental factors, subjective norms, and physical design factors will affect their decision to purchase. The research technique used is quantitative research. Descriptive analysis and inferential analysis to analyse the hypothesis. Based on the findings, the factors that showed to be statistically significant are the environmental, governmental, and subjective norm factors. Environmental factor has a positive influence towards the purchasing decision of dwelling while governmental and subjective norm factor has a negative influence on the purchasing decision of residential properties. The regression model findings from this research show not only government-imposed regulation could significantly affect the purchasers' decision, however, environmental and subjective norm factors play a major role in this matter. This information is beneficial to developers that have the intention to construct dwellings in the future. Developers can take into consideration all the significant factors before deciding on the location for their future development.

Keywords: purchase decision, house buyers, environmental factors, financial factors, governmental factors, residential properties, inferential analysis

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INTRODUCTION

The Malaysian government has been putting effort into improving the housing sectors in terms of quantity and quality by providing incentives to the public and private developers. However recently, prices of houses have been shooting high up due to inflation and weakening Ringgit Malaysia while the salary of the household -is increasing at a slower pace. The existing gap between what the developers sell and what the households or individuals can afford is getting further as time goes on Atati (2014).

PROBLEM STATEMENT

According to Bank Negara Malaysia, BNM (2015), from the last five years, there is a shortfall in the supply of housing as shown from the mismatch between the growth rate of the housing supply and the increasing number of potential households. On average the total number of completed houses are 166,876, and approximately a total of 117,250 household increases simultaneously. Thus, this indicates that there will be a surplus of 49,626 units of houses annually. However, in the year 2010 to 2015, the completion of the total number of housings has been declining to approximately 80,089 units per year while the net increase of the number of households is on average 166,000 per year. This implies that from the year 2010 to 2015 there is a shortage of 85,911 units of houses (BNM, 2015). As mentioned by Zainun and Ismail (2015, p.1037) 'housing supply is not keeping up with demand'.

According to Hong Leong Investment Bank Research (2016), the National Property Information Centre (NAPIC) recorded that there was a drop of 5.7% in the transactions made in the year 2015. This decline is recorded to be the second-largest drop since the year 2002 which is placed after the drop that took place in 2009 of a percentage of 8.3. The surplus supply of houses is still on the inclining slope. In the year 2015, the supply of housing stocks has reached a total of 892,000 which is an increase of an additional 16% since 2004. This is the highest amount which is overall 18% of the existing stocks in Malaysia.

RESEARCH AIM AND HYPOTHESIS

The aim of this study is to understand which factors will affect the purchasing decision of dwellings among property buyers.

Hypothesis 1: Factors that affects the purchasing decision of residential properties among property buyers

H1a: Environmental factors will have a positive relationship with the purchasing decision of residential properties

H1b: Financial factors will have a negative relationship with the purchasing decision of residential properties

H1c: Governmental factors will have a negative relationship with the purchasing decision of residential properties

H1d: Subjective norm factors will have a positive relationship with the purchasing decision of residential properties

H1e: Physical design factors will have a positive relationship with the purchasing decision of residential properties

LITERATURE REVIEW

The decision of purchasing a house is complex and must into consideration a handful of factors as eventually will lead to long-term financial burdens such as a mortgage, day-to-day activities as well as social interaction, security and safety, and many more other factors (Litman, 2012).

Environmental Factor

Anuar and Muhamadan (2018) emphasized that the three main factors that a person should consider before purchasing a house are location, location, and location, especially the demand on the complete neighborhood facilities. Past researchers have identified the location as one of the main factors that will affect the purchase decision of homebuyers in countries such as Australia, the UK, and Ireland (Daly et al., 2003). Location factor can be commonly linked to the distance and convenience to local amenities such as public transport, health care center and etc (Tobi, Fathi & Amaratunga, 2018). Proximities will have a significant influence on choosing whether which residential property (Saw & Tan, 2014).

Neighborhood can be defined as a space whereby a community dwells together with similar interest (Choguill, 2008). Households will prefer to incur additional money for a dwelling that is in a good neighborhood with excellent indoor and outdoor qualities (Aini et al., 2017). Some of neighboring environment qualities such as the pollution level, crime, and safety level, and cleanliness are vital and will eventually affect the purchasing decision of the buyers (Tan, 2011a). Khalid et al. (2020) conducted research and proved that a gated community lowers the chances of any unwanted crime.

Financial Factor

Price can be defined as a type of payment where one party pays the other for their services or transactions done. In real estate, the price is set by the developers after doing relevant research in the market. According to Shinde, Gawande (2018) the price of residential properties is one of the factors to drive the demand of investors. Lower price dwellings will encourage more prospective buyers to purchase dwellings (Humphrey & Verdery, 2020). Fluctuation of the price of these dwelling is also affected by a set of factors such as exterior and interior or the dwell, location, facilities and many more (Rahadi et al., 2013).

According to Paramesran (2013), the banking systems in Malaysia have vied with one another to promote various types of loans that can be adjusted to suit their preference and thus increasing the demand and eventually the price of the houses. The financing sourcing from the housing sector is inclined by a compound annual growth rate (CAGR) of 10.6% from the year 1997 to 2012. In 1997, there was a total of RM 20.5 billion loans and it has increased to RM 95.2 billion by 2012 which is four times the amount in 1997 (Zandi et al., 2015). Kam et al. (2016) reported that the ability to widen the availability of these loans from the financial institutions depends on the supply of new housing. However, in the event when the government imposes stringent housing regulations, the demand for houses will decline as people will be unable to take long-term loans to purchase a house.

Interest rates are the cost of borrowing a loan or mortgage from a financial institution (Fields, 2018). It is a vital factor to determine how much to pay back with having a property or house. According to Chang et al. (2019), at the time when interest rates decline, it is very tempting to purchase a house. This is provided if the rates are reduced due to the weakened economic growth with other factors remaining, the prices of the house would not incline. Pembina Institute (2013) further supports that a low-interest rate for a mortgage would drive the demand for houses but if the supply of new units does not keep up, the price of the houses will eventually increase and would discourage people to purchase a house.

Governmental Factor

Real Property Gain Tax (RPGT) is the type of payment or charge originating from the disposal of the real properties and shares in those companies for real properties located in Malaysia. It is computed based on the money that is to be made by subtracting the disposal price and acquisition price (Geoffrey, 2014). From the Ministry of Finance (MOF) Malaysia stated that the tax imposed is based on the holding period of the property before selling it. The tax is associated with other costs such as professional fees, stamp duty, etc. (Zainuddin, 2015)

Developer Interest Bearing Scheme (DIBS), whereby the interest rates for the housing loan incurred during the construction phase will be absorbed by the developers. The result of this scheme is that is not necessary for the purchasers to cough out with other payment than the initial deposit during the period of construction (Paramesran, 2013). Since purchasers are still required to pay for the initial deposit, thus this is not a Build-Then-Sell (BTS) concept but a Sell-Then-Build (STB) concept. The initial cost that is to be incurred by the purchaser could be hefty as the cost comprises not only the down payment when the Sale and Purchase Agreement (S&P) is signed but as well as other costs (REHDA, 2014).

The Malaysia Government has been implementing various housing policies and housing programmes through various Malaysia Plans. The housing

policies introduced by the Malaysian Government was to provide more attention to the production and transportation of the houses through the participation of the private sectors.

Subjective Norm Factor

Tonglet et al (2004) defined subjective norm as to how an individual would allow or control the pressures put on him or her to do or not to do. Housing preferences are determined by many other factors such as religion, social status and relation, and many more (Jabareen, 2005). Social pressures such as influence from people surrounding one's everyday life, family members, friends, and acquaintance, or sometimes agents will affect the property buyer's perception on deciding what or whether to buy or not (Kam et al. 2018). For example, the perception of an individual may be affected by the persuasion from their family, or incentives offered by the government and thus opt to purchase a certain type of house. One of the most influential party is often to be one family members (Teoh, 2011). Research in the United States shows that spouse and children carry the highest influential level that will affect one's purchase decision for a dwell (Livette, 2007). It was further elaborated that among these two parties, children carry a high impact as adults would normally provide the best for their children.

Physical Design Factor

The physical design includes design, physical conditions, and the quality of the property. Based on Hurtubia et al. (2010), the features of a house such as the number of rooms and bathrooms would be considered first before deciding on purchasing, this is especially in western countries. The size of the living and dining hall, usable area of the house, and number of rooms are all considered under design factors (Tan, 2012). The purpose of purchasing residential properties affects the type of house to purchase. For example, purchasing a property to live in and purchasing as an investment has a significant difference. Speculators prefer buying smaller units in high-rise buildings as they tend to sell better later on (Kohler, 2013). Other design factors such as good ventilation and good lighting also contribute to the purchase decision of an individual (Sew & Chin, 2000).

RESEARCH METHODOLOGY

A research framework is developed in this research study based on the objective of this research study by having 5 factors and 28 items, as shown in Table 1 below.

Table 1: Items of the Factors Affecting Purchasing Decision of Residential Properties

Factors	Items
Environmental Factor	E1) Existence of shopping malls and food courts E2) Distance to workplace E3) Availability of local amenities E4) Existence of public transport E5) Safety/crime rate E6) Cleanliness of surroundings E7) Status level of neighbors E8) Noise level of surroundings
Financial Factor	F1) Price of house F2) Affordability F3) Ease to take a loan from banks F4) Time is taken to pay back the loan F5) Interest rates of loans
Governmental Factor	G1) Reinstatement of DIBS G2) Implementation of RPGT G3) Government housing schemes and policies
Subjective Norm Factor	S1) Permit suggestions from others S2) Influence from parents S3) Influence from friends S4) Influence from family members S5) Influence from property agents
Physical Design Factor	P1) Size of living room P2) Size of bedroom P3) Number of bedrooms and bathrooms P4) Size of compound P5) Size of kitchen and dining P6) Interior and exterior layout and design of house P7) “Feng Shui” of the house

Research Technique

This method emphasizes the statistical, mathematical, and numerical types of analysing the data compiled from various methods such as surveys and questionnaires. It puts its main focus on collecting numbers for its data and using it across different people to explain a particular occurrence (Babbie, 2010). A self-administrated questionnaire was used for this research. There are two broad categories of the format used in questionnaires which are the open ended or closed questions (Neuman, 2010). However, in this questionnaire, only closed questions were used to answer the objectives of this research. All questions were asked based on scale-response questions which is the Likert Scale. The questionnaire designed for this research study is divided into three sections where Section A is

the demographic profile of the respondents and Section B is the factors affecting the purchasing decision of residential properties among the respondents.

The research topic is to study the factors affecting the purchasing decision of residential property among property buyers. Since property buyers can be anyone of legal age and can purchase a property, thus the scope of this research will be on people living in Klang Valley which is one of the most urbanized places located in Malaysia. To have an equal and fair chance for every respondent of the population, a simple random sampling method is used in the study. Further from that, the snowball sampling method which is one of the non-probability sampling methods is also used to enhance the respondents' rate to get the statistic normality of the respondents achieve for a more significant statistic analysis output.

Method of Analysis

According to Zikmund et al. (2010), descriptive analysis is a method of presenting the data in a method that describes the characteristics of a population or sample. This type of analysis is commonly used to present the demographic profile of the respondents. There are various ways to present the data, one of the popular methods is by using the frequency charts either pie or bar. It is relatively simple to understand the charts at a glance. Frequency can be defined as the total number of respondents that answered for each category of choice. The frequency can be converted into a percentage to suit the data collected.

The average index method is used to calculate the mean of an item by multiplying the frequency by a weightage. This method of analysis is employed to rank the factors that affect the purchasing decision based on the level of importance that is measured using the Likert scale.

Logistic regression is used to test models to forecast the outcomes with binary options. The dependent variable in the hypothesis is the purchasing decision of residential property which is asked in the questionnaire as a binary question "Have purchased" and "Have not purchased". The independent variable on the other hand could be either be categorical or continuous data (Pallant, 2002). The independent variables which are the factors in this research are measured using Likert scales which are continuous.

DATA ANALYSIS

A total of 5,000 emails with the survey web link attached were sent out and a total of 386 surveys were filled in through google form. However, as this research only focus on respondents living in Klang Valley, the response was filtered and hence only an usable survey of 348 number of response is used for this research.

Average Index Ranking

Table 2 presents the mean or average index of five (5) factors that affect the purchasing decision of residential properties in Klang Valley. It is notable that from the table, the top 5 items that affect the purchasing decision of residential properties are the items for financial and environmental factors. The maximum score for each factor is five (5) with the selection of “Very Important” while the minimum score is one (1) with the choice of “Not Important”.

Table 2: The average index of each factor and its ranking

Factors Affecting Purchase Decision of Residential Properties		Mean	Ranking
F1	I would consider the price of the house before I purchase a residential property	4.8145	1
F2	I would consider the affordability of the residential property before I purchase it.	4.8024	2
E5	I would take into consideration the safety/crime rate of the area when I purchase a residential property	4.7581	3
E2	I would look at the distance to my workplace when I purchase a residential property	4.5605	4
F4	I would consider the time taken to pay back the loan before I purchase a residential property	4.5000	5

The price of a residential property is vital in determining whether or not one should purchase the property. This result is supported by Shinde, Gawande (2018), who mentioned that price is one of the main factors that drive the demand of purchasers. In Malaysia, the price index for houses has been increasing. As reported by BNM (2015), there is on 21 percent of residential properties have been launched at a price below RM 250,000.00 while residential properties at a price RM 500,000.00 are abundant in the market. This shows that the price of residential properties has a great effect on the purchasing decision for buyers.

Hickman et al. (2017) also stated that residential properties with lower prices will encourage more buyers to purchase residential properties as the property is said to be more affordable. The surplus of residential property that is not affordable tends to form part of the housing overhang problem in Malaysia. Housing affordability in Malaysia has been an issue that concerns everyone especially the Millennials who are people born in the early 1980s to 2000s.

The safety and crime rate of the surroundings is also an essential factor that will affect the purchase decision of buyers. This finding matches the statement made by Abdullah et al. (2020), who mentioned that household tends to voluntarily incur additional expenses such as having security guards on shift

for twenty-four (24) hours to guard the safety of the residents. This service can be commonly found in gated communities.

Placing fourth is the distance of workplace that affects the purchasing decision of the purchasers. Distance to work is one of the locational factors that has the most significant influence on selecting the correct residential property. This finding aligns with Karsten (2007) who reported that individuals who prefer to spend the minimum time to travel to their workplace tend to purchase a dwelling near their workplace. It is almost impossible to purchase a dwelling without making any long-term loans from financial institutions. Thus, it is the concern of many on the period that is needed to repay the loan to the financial institutions. Different financial institutions offer different mortgage loans with different repayment periods and interest rates (BLR) to suit the borrowers.

Logistic Regression

Table 3: Logistic Regression Results based on constructs

Variable	B-value	Wald	Significance	
Dependent				
Purchased a house (No/Yes)				
Independent				
1	Environmental Factors	1.128	8.042	0.005
2	Financial Factors	0.139	0.166	0.684
3	Governmental Factors	-0.548	9.753	0.002
4	Subjective Norms Factors	-0.512	6.172	0.013
5	Physical Design Factors	0.131	0.256	0.613

All items for each factor were computed into a construct to test against the dependent variable. Based on Table 3, it is shown that only three (3) constructs are proved to be statistically significant that has a p-value of less than 0.050. The three constructs are an environmental factor, governmental factor, and subjective norm factor. The coefficient or B-value of the predictor is 1.128 that indicates that there is an existence of a positive relationship between the environmental factor and the purchasing decision of residential properties. This can be interpreted as for every increase in score for the importance of the environmental factors, the likely hood that they have purchased a house increases by 1.128. This finding aligns with Tobi, Fathi & Amaratunga, 2018, who state that the distance and convenience to nearby amenities would greatly affect the purchasing decision of dwellings. Thus, respondents that choose the distance to local amenities as important when they are considering to purchase a house, would have purchased a house. The hypothesis is accepted.

The overall model for the governmental factor has a p-value of $0.002 < 0.050$ and a B-value of negative 0.548. It can be said that with a coefficient predictor of -0.548, it indicates that there is a negative influence between

governmental factors and purchasing decisions. Housing schemes and policies introduced by the Government are mainly for the Generation Y who are currently are facing homeownership issue as the prices of houses these days is very unaffordable towards them. Thus, these schemes are important to aid them to have their own dwelling (Zainun & Ismail, 2015). The hypothesis is accepted.

The subjective norm factor achieved a p-value of $0.013 < 0.050$ and a B-value of negative 0.512. It can be said that with a coefficient predictor of -0.512, it indicates that there is a negative influence between subjective norm factors and purchasing decisions. Teoh (2011) explained that parents are often one of the most influencing parties when purchasing a product. This could be because respondents who are affected by parents are individuals who still live with their parents and are under their parents' influence before making any decisions. The hypothesis is rejected.

CONCLUSION

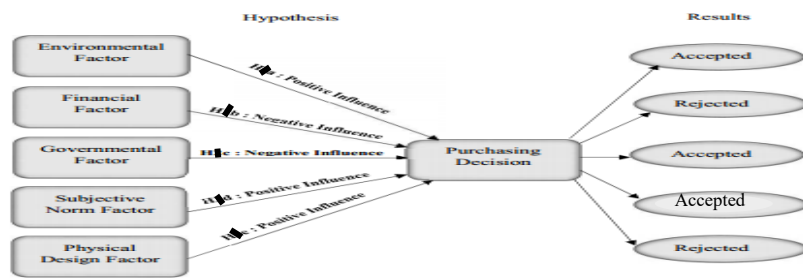


Figure 1: The summary of the findings for the hypothesis.

From the Regression model summary, refer to Figure 1, it can be concluded that three (3) of the hypotheses were accepted and only two (2) were rejected. Three (3) were proven to be statistically significant, which are the environmental, governmental, and subjective norm factors against the purchasing decision while the other two (2) were proven to be not statistically significant. Environmental factors such as distance of local amenities such as schools and hospitals, degree of cleanliness of the neighborhood and the status level of their surroundings influence their purchasing decision. Other than that, governmental factors such as housing schemes implemented by the government affect the lower and middle-income group as the schemes are mainly targeted towards these two groups of income. Subjective Norm factor such as influence from parents also has a significant influence towards the property buyers. Regardless of their age, people still consider advice or comments from their parents before considering purchasing a dwelling. Interestingly, the Financial factor does not play a role in

affecting the purchaser in their decision on buying a house because according to Shinde, Gawande (2018), the Financial factor has a lesser relationship in the purchaser decision because since the mortgage's loan to Value (LTV) Ratio is up to 70% for a borrower. Where in another word, a borrower can easily get a loan, which this phenomenon causes the logistic regression of the Financial factors tend to be non-significant in the hypothesis testing. The findings from this research are beneficial to developers that have the intention to construct dwellings in the future. Developers can take into consideration all the significant factors before deciding on the location for their future development. Governmental bodies shall take note of the importance of the housing schemes towards the low and middle-income group as it greatly affects their purchasing decision and aid in promoting homeownership.

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THE METHODOLOGICAL STRUCTURE FOR LEGAL RESEARCH: A PERSPECTIVE FROM THE MALAYSIAN LAND LAW AND ISLAMIC LAW

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Abstract

A legal research shall be secured with the idea to facilitate a future change; either in the law itself or in the manner of its administration from the production of ‘pure’ academic knowledge which is concerned legal doctrines. Therefore, this paper purpose is to propose a methodological structure for legal research within perspective Malaysian Land Law and Islamic Law to establish a regulation or amendment in the existing foundation. This paper adopts method of content analysis to understanding on the underlying reasons through expert opinions on the legal issues. The finding of this research revealed that a legal methodological framework is easily simplified in form of system theory approach. This type of methodological structure is common amongst the legal researchers, lawyers and legal scholars who embrace Pure and Applied Legal Research. The methodological structure for legal research in form of system theory shall make a better regulation proposal in the perspective of Malaysian Land Law and Islamic Law. By adopt this methodological structure; researchers shall propose new regulation or amendments as legal researchers, lawyers and legal scholars.

Keywords: framework, legal, research, land, methodology

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INTRODUCTION

“Methodology” implies more than the methods used to collect data. It is often necessary to include a consideration of the concepts and theories which underlie the methods (Wyse, 2011; Humanities, 2017). Methods of research can be divided into qualitative and quantitative research. Qualitative research primarily deals with exploratory research, used to investigate reasons, opinions and motivations that provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research (Tobi, 2013; Polit, Beck, and Hungler, 2001). The sample size is typically small, and the respondents are selected only to fulfil a given quota (Marshal, 1996). On the other hand, quantitative research is quantifying the problem by generating numerical data into useable statistics to quantify attitudes, opinions, behaviours, and other defined variables – and generalize results from a larger sample population (Miles and Huberman, 1994; Travers, 2005; Baur, 1965).

Through the legal doctrine and law studies, most of the methodology implies is system theory. There are number of research studies works using system theory such as Sarkawi, Ibrahim, & Abdullah, (2008), Ismail (2017) and Husain, (2014) who studies in Muslim personal law, an exposition, all India Personal Law Board in camp office of India and Esmaeili, (2010) who studies the relationship between the waqf institution in Islamic law and the rule of law in the Middle East. Researchers who adopt system theory approach in Malaysian Land Law and Islamic Legal Research are: Afendi and Sayuti, (2012) and Latip et.al., (2020) who study on the implication of legislation in waqf land registration from land acquisition aspect, while Omar, (2013) study on issues on waqf land administration in NLC and land office of Negeri Sembilan and other law in interrelated hierarchy. However, the framework is not clearly visualised. Therefore, this research is highlighting the approach to study the variety of legal doctrines involve in Islamic Law and Malaysian Land Law.

RESEARCH BACKGROUND

This paper proposes a research using legal doctrines in conducting the investigation. The legal doctrines and investigation are visualized in the form of system theory frame. The approach of system theory was firstly developed in the 19th century by Marx and Darwin and used by L. von Bertalanffy a biologist who investigated the principles common to all complex entities, and the (usually mathematical) models that used to describe them (Twente, 1960).



Figure 1: System Theory expansion

In the modern world, the system theory is expanded from the world of Pure Science Research (biologist) to the Socio-Legal research and further to the Islamic Legal Research which is accurately suitable to this research within the perspective of the Islamic Law and Malaysian Land Law. Based on Twente, (1960) a system can be said to consist of four things which are:

- i. **Input** in the form of elements or variables which is applied as attributes of relationships among its objects and systems exist in a feature the continual stages as Input
- ii. **Throughput** (processing), and
- iii. **Outputs**, which demonstrate the concept of which it uses to interact dynamically with its environment.
- iv. **Openness**, interact with its environment and receive information.

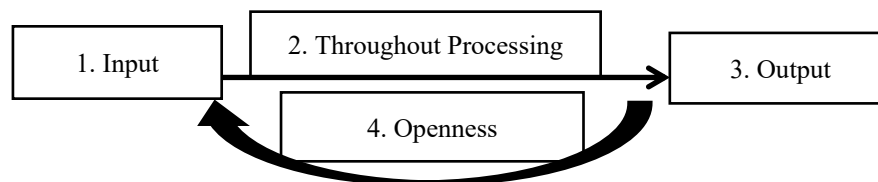


Figure 2: System Theory Holistic Approach

A system theory approach is a holistic approach, in which an entity is dealt with as a whole system that consists of a number of sub-systems (Twente, 1960). There are a number of system features that govern the analysis of a system into its sub-system components, and also define how these sub-systems interact with each other and the outside environment (Kumar, 2019; Auda, 2008). As the current research has evolved, the system theory approach is expanding to system theory of Islamic Legal Research as in Figure 3 (Auda, 2008). The system theory of Islamic Legal Research has proposed features that consist of:

- i. **Cognitive nature of the system** – is based on the construction of jurists cognitive faculty
- ii. **Wholeness** – is a system theory views every cause-and-effect relation as one part of a whole picture
- iii. **Openness** – is related to *ijtihad* (new judicial reasoning) or open to the new environment or flexibility to today's changing circumstances
- iv. **Interrelated hierarchy** based on categorization based on feature similarity and mental concept by practical *fiqhi* implementation
- v. **Multidimensionality** – is Contradictory of Dichotomies, Binary classification in the sense of realism and flexibility in the Islamic Law lead to conciliation between evidence

- vi. **Purposefulness** – is a fulfilment of society or in Islamic law it is referred as *maqasid al-shariah*. *Maqasid* of the Islamic Law are the objective/purposes behind Islamic ruling to people’s interests (*masalih*).

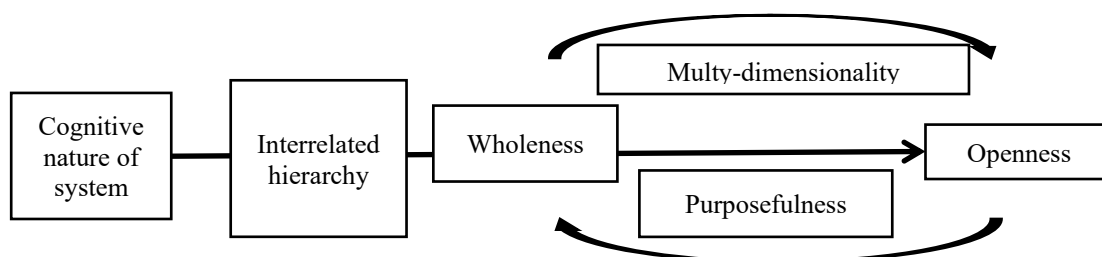


Figure 3: System Theory of Islamic Legal Research
 Source: Auda, (2008).

Another approach is the open texture of rules which is a process of legal reasoning. By using this approach, society would have no need for lawyers, and still less for legal scholarship. However, in order to manipulate the rules, one has to look into the rules of interpretation or rules of construction of the rules because some statutes appear ambiguous and the enacting legislature does not consider the exact situation. Changing the circumstances might be required so that the legislature did not foresee (Clark and Connolly, 2006). There are rules of statutory interpretation used to find the meaning of the language used in an Act which brought it into effect (Pacific, 2003; University, 2014). It is examined in the based on Table 1:

Table 1: Rules to Interpret Law

Source: (Knight, 2008; Pacific, 2003; University, 2014; Clark, 2006).

No.	Based	Rules to Interpret Law
1	Words Meaning	-Literal Rule, Golden Rule, Preambles and Purpose Clauses, Rule to Avoid Surplus age
2	History	-Mischief Rule, Legislative History, The Whole Act Rule, <i>Noscitur a Sociis</i> (“it is known from its associates”)-Role of Analogy
3	Purpose	-The Problem of Casus Omissus and the Ratio Legis, Canons of Construction

Rules are based on words must be given their ordinary, literal, grammatical meaning, day to day meaning words it uses the language of the ordinary citizen. There is a choice of meanings as a presumption that a meaning which produces an absurd. Which certain term or phrase is used multiple times throughout a statute, that term or phrase should be interpreted in a consistent manner. Many statutes begin with a preamble or a purpose clause which could help the researcher to understand the purpose of the Act. Some rules are based on history

which requires looking to what the law was before the statute was passed in order to discover what gap or mischief the statute was intended to cover. The court is then required to interpret the statute in such a way to ensure that the gap is covered. What a statute's history might suggest about the meaning of a word or phrase. This method is involving the method of the legal reasoning of a general rule to a specific case to another specific case.

Finally, there are rules based on purpose where the judges have to establish what the purpose is of the Act and should promote that purpose. Certain techniques of statutory construction have been used so often that they have become "formalized" into "canons." Unlike the tools provided in this handout, the canons are not particularly useful for discerning the meaning of a statute. In the end, the judge or researcher may use the method of open texture to manipulate the rules as long as it is following the interpretation and construction rules. The advantage of this method is the researcher may produce an efficient legal structure by the flexibility to manipulate the rules.

METHODOLOGY

This research is to study both communication and interaction between Islamic Law and Malaysian Land Law to formulate the methodology structure of legal research. The communication within the Islamic Law is to answer the concept of *maqasid syariah* in research. And the communication of the Federal Constitution, National Land Code, State Enactment and law pertaining land administration, will answer how the substantive law governing systems in Malaysia. All of the communication in law and legislation is analyzed using the literature collection by using the method of content analysis. In the content, the analysis contains several categories such as:

- i. **Syllogism**-The method of syllogism comprised three items to formulate a rule known as the major premise, the minor premise and the conclusion, (Farrar, 1997. p. 9, 30; Knight and Ruddox, 2008)
 - a. Major premise- identifies a general rule of law that requires a specified legal outcome when particular facts are present in a situation.
 - b. Minor premise- describes a particular factual situation including the current situation
 - c. Conclusion- states whether the rule in the major premise applied to the facts in the minor premise; and whether the specified legal outcome has any effect.

For example, within the Islamic Law, the syllogism goes as described in the below explanation:

- a. Major premise- Every legal research in Malaysia apply analysis of states regulation
- b. Minor premise- Enactments is a state regulation.
- c. Conclusion- Analysis of legal research in Malaysia involves states enactments.

As the historical research, will examine past events or combinations of events to arrive at an account of what has happened in the past (Banakar and Travers, 2005). Just like the earlier system theory, system theory of Islamic Legal Research also has a few elements to describe the complex entity within the system. By using these methods, researchers are formulating the framework as in Figure 5.

ANALYSIS AND FINDING; ADAPTING SYSTEM THEORY APPROACH IN MALAYSIAN LAND LAW AND ISLAMIC LAW

The researcher scrutinizes each law, determine the regularities and formulate a theory on abidingness and validity related to the concept of the law according to academia writing, journal, article, government support documents and books. System theory approach formulated based on rules of interpretation in broader generalizations of theories of law. Later, it detects patterns and regularities, formulate some tentative hypotheses (major and minor premises) to explore, and finally ends up developing general conclusions or theories as in Figure 5 (Crossman, 2011). This is a method to evaluate the value of the law to achieve the *maqasid al-shariah*. The rules of interpretation used in order to find the meaning of the legal communication in an Act, which brought it into effect, (Pacific, 2003; (Van and Hundley, 2001). In Islamic Law, the sources of references are Quran and *Sunnah* as the guidance in life and it is a duty to believe in these two. When Quran is silent, *Sunnah* is sought. However, when *Sunnah* is silent, one shall refer to the cognitive natures of Islamic Law which are:

- i. *Ijma'*- unanimous agreement of the Muslim community (Zahrah, 1959, p.372; Ramli, 1938, p.370),
- ii. *Qiyas*- comparison of the other original case (*asl*) toward proclaimed or rule/*hukm* (Kamali, 1998).
- iii. *Istihsan*- bringing the new case to another rule based on a stronger reason, (Kamali 1998).
- iv. *Istislah* is a rules based on public interest (Kamali 1998).
- v. *Urf* is a custom of a community (al- Tarabulsi, 1908).
- vi. Juristic Interpretation is the opinions of four scholars leading in four schools of law; Hanafi, Maliki, Syafie and Hanbali.
- vii. Fatwa- The Fatwa also is a point of Islamic law given by a recognized religious authority (Osman, 1982).
- viii. Judicial decisions which based on *obiter dictum* (purposive principal) and *ratio decendi* (binding principal) and jurists opinion which is followed by the judge (Islam, 1998, p. 336).

All the sources are known as interrelated hierarchy in system theory approach. Within Malaysian Land Law, the interrelated hierarchy is stand of Statutes the federal and states regulation which record in Act and Enactments

(written or unwritten law), Judicial Decision in court cases and Academic Opinion in Journal, Articles, books and source of secondary data. Wholeness of system theory is open to all legal sources either in Local Legislation and Foreign Country Law by using rules of interpretation. The system is also shown the characteristics of openness which it is possible to be improved by public and stakeholder within Interview and Pilot Study. The multidimensionality is refers as the system in open two ways direction to propose new rules based on existing local and foreign laws, Quran and *Sunnah* leads to *Maqasid al-Shariah*. Finally, the system is purposefulness which made the product of research is intent to public could be operate by validation of the hypothesis to same or different respondents as in Table 2 and Figure 5.

Table 2: The Expansion and Adaptation of Attributes in System Theory

Pure Science (biologist)	Socio- Legal	Islamic- Legal	Adaptation in Malaysian Land Law And Islamic Law
Complex Entities	Input	Cognitive nature of system	Communication; Source of Islamic Law, Land Law
		Interrelated hierarchy	-Islamic Law: <i>Ijma' Qiyas Istihsan Istislah Urf</i> Juristic Interpretation, Fatwa, judicial decisions -Malaysian Land Law: Statutes, Judicial Decision, Academic Opinion
	Throughput	Wholeness	Local Legislation and Foreign Country Law by using rules of interpretation
Mathematical Models	Outputs	Openness	Interview Experts and Pilot Study
		Multi- dimensionality	Proposal of new rules based on existing local and foreign laws, <i>Quran</i> and <i>Sunnah</i> and <i>Maqasid al-Shariah</i>
	Purposefulness	Validation of new hypothesis to same or different respondents	

Source: Author, (2020)

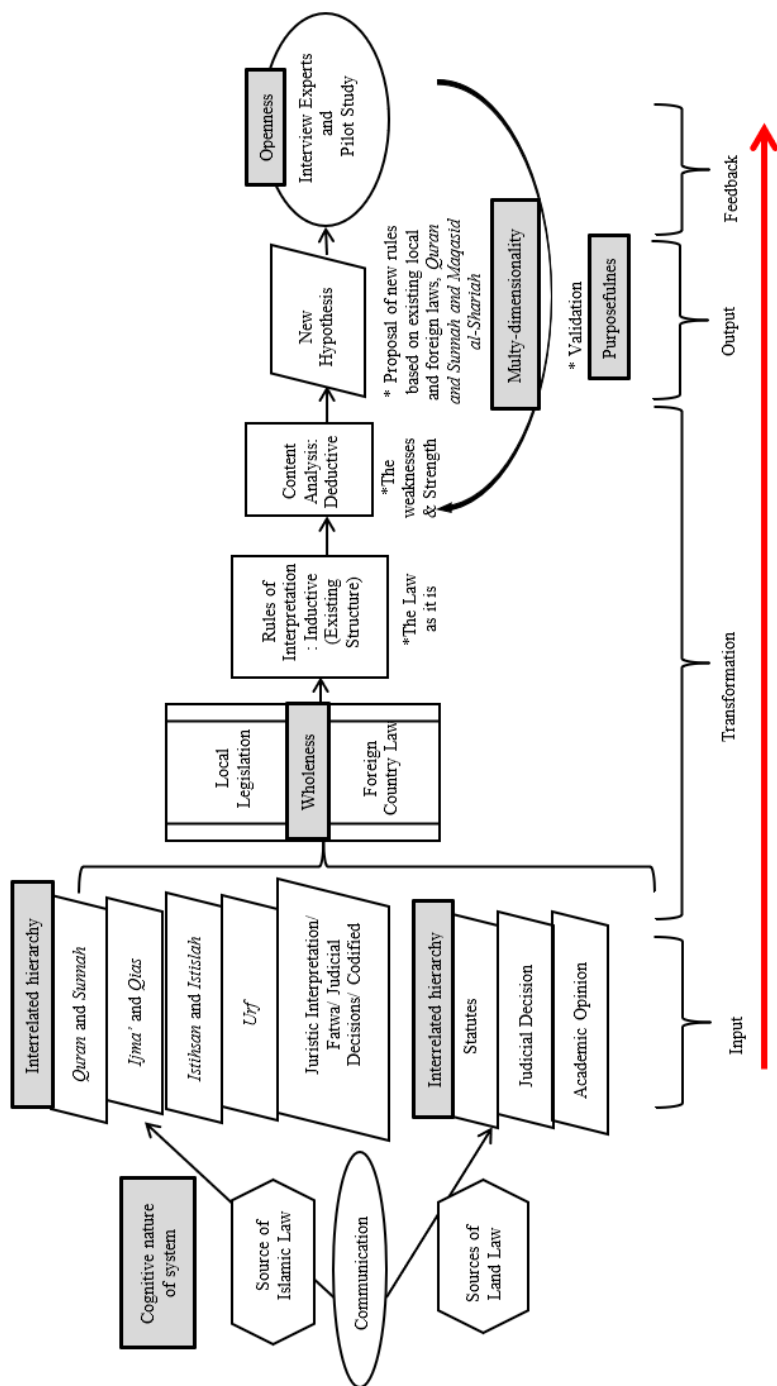


Figure 5: System Theory in Malaysian Land Law and Islamic Law (Copyright 2021)
 Sources: Sipan et al., (2021)

CONCLUSION

From all theories proposed by researchers in various field of social science, Islamic studies, legislation and jurisdiction, and biology science, this paper is proposing framework as in Figure 5 in order as guide to researchers who adopt Islamic law and civil law in their research. By using the framework, all the essential criteria in Islamic law are taken into consideration to proposed any Syariah compliance model or fundamental theories in the academician studies and practical industries of research and development (R&D). The limitation of this research is the formulated framework is only verified among the stakeholder and *fiqh* experts from academicians. This framework shall be taken further research to be exposed among the ulama and Muslim scholars and the *fatwa* community in order to become one of the best approaches to be adopt by the worldwide ideas. Hopefully, the finding of this paper is managed to contribute in the development planning of regulation which involved Muslim society and multi-racial community in various country.

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RESIDENTIAL BUILDING QUALITY MEASUREMENT AND THE RELATIONSHIP WITH HOUSE PRICES: A STUDY OF HOUSES IN KLANG

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Abstract

This research focuses on the particular aspect of residential building quality and aims to measure the relationship that affects houses prices in Klang. The researcher through the problem statement and literature review has noted that respondents have knowledge in measuring the quality of their own house, but measurement must be conducted on an empirical basis with evidence. The main research objectives were to identify residential building quality and to measure the residential building quality effect on houses prices. The sampling of the research was conducted on fifty houses, and the measurement was conducted with the help of Regression Analysis. The results obtained show a significant relationship between higher quality of residential buildings and higher prices that can be commanded. The findings also could help to improve the estimation of value for new and older houses in the sampled areas.

Keywords: quality measurement, residential house price, residential quality

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INTRODUCTION

In finding out the aspects of residential houses to be measured in the research, first, the researcher has to outline the arguments addressed by other researchers relating to residential buildings and the relationship with the prices. For the aspect of houses bought by buyers, most of the respondents' understanding was that higher house prices equate to higher house quality. Nevertheless, in urban areas, a high house prices sometimes did not correlate with the quality that the buyers received in turn making the purchase to be perceived as unsatisfying. This statement was also noted by Mohit, Ibrahim, & Rashid, (2010) stating that buyers who purchased houses from property developers and other sub-sale house sellers were not content with the qualities but proving it in an empirical way of low quality was difficult. Fauzi, Yusof, & Abidin, (2012) noted also that low residential building quality as was seen in Malaysia and buyers have no other choice than to receive their bought house from the property developers.

Mu, (2016) also stated that residential building quality can be neglected as developers usually did not measure properly their built houses before handing them off to buyers. Emmanuel, (2012) through his research also noted developers might enunciate their houses were of high quality but not being backed by any empirical data or benchmarking guidelines. Amin, Zubaidah, Abdul, & Kassim, (2015) also reported that residential building quality as was usually complained by house buyers. However, little standardised action was taken by developers in rectifying the issue. For these reasons, the researcher believes that there is a major research gap that needs to be addressed for the benefit of house buyers.

Iwata & Yamaga, (2008) also addressed that house buyers were not satisfied with the quality of their houses after moving in as the quality level was found to be unsatisfactory. These were also supported by Shuid, (2015) that stated that houses with sub-par quality were delivered to house buyers and eventually, many repairs had to be conducted afterwards. Bø (2018) also noted that house buyers often compare their residential buildings in other residential areas and it leads to some understanding regarding the quality of houses that they received. Based on the problems above, the researcher feels that the residential building quality needs to be addressed, and their relationship with the prices paid needs to be measured for the benefit of house buyers.

LITERATURE REVIEW

Residential Building Qualities

The quality of residential building is needed as it will look into the material aspect of the houses, and the buyers can ensure several elements to be available in their houses. Physicality can be reviewed as their quality, physical elements and functionality thus helping to develop a good quality residential area (Yazdanfar & Nazari, 2015). Besides this, Fattah et al., (2020) also denoted that residential dwelling features also contribute towards quality especially in the neighbourhood and residential areas. The researchers addressed the importance of various elements to be studied and measured thoroughly to achieve the outlined objectives.

The physicality of houses must be explained in terms of elements of functionality and housing quality correlations. House quality, thus, also needs to be improved for the well-being of house buyers. (Behzadfar & Saneei, 2012). Urban environments inclusion of residential buildings in Malaysia also needs to be justified and included as part of the measurement. The physical housing dimensions need to be placed where they become vital in dealing with the livelihood of house buyers and their satisfactions in a residential development (Elshater, 2012). Other than that, stakeholders also need to consider buyer's needs as stakeholders develop safety and accessibility regarding their housing conditions (Gobster & Westphal, 2004).

Hassan et al., (2021) in their research also found that there is a significant relationship between house prices and housing expenditure to maintain the building. The researchers saw this as part of residential building features that were also needed to become part of measurement indicators. Knowing house buyers needs will then align with optimal housing physical conditions and buyers can be satisfied with the residential building quality level and this can increase their live quality (Hamzehnejad et al., 2015).

Amenities of housing need to be looked at as the measurement of housing conditions such as external exterior, interior aspects, and community features of housing (Ezgi & Kahraman, 2013). Other than that, elements of amenities which include noise level, and transportation were built inside housing areas but due to financial limitations of buyers, these sometimes need to be sacrificed (Hui et al., 2007).

Literature Background of Residential Building Qualities relationship with House Prices

Based on the previous discussions, several research have shown relevance towards showing that residential building qualities that have relationships with house prices. Adeoye, (2016) believed that buyers can perceive house quality subjectively and houses with important qualities that need to be measured. Based on the explanation given by the previous researcher, it can be perceived that

residential building quality can be assessed through observation and perception, and house buyers can help in determining residential building quality level.

The discussion above was also supported by M. H. b M. @ Masri, Nawawi, Safian, & Saleh, (2017), with their research on the quality level that has measured the quality level of the residential building based on observations. N. Hamzah et al., (2011) in their statement also noted that the residential building quality must be measured thoroughly for best results of the relationship.

Morenikeji et al., (2017) also stated that housing quality needs to be discussed so that the measurement towards quality level will be sought and analysed rigorously. Another explanation made available from Manley, Ham, Bailey, & Simpson, (2013) verifies that residential building with high quality generally lacks the conditions afflicted by low quality work, lacklustre residential areas design and urban community issues. This information is needed as it will help to find out the influence on residential building quality measurement. Overall, the researcher intends that residential building quality to be understood, and the measurement of it on prices will be carried out in the research.

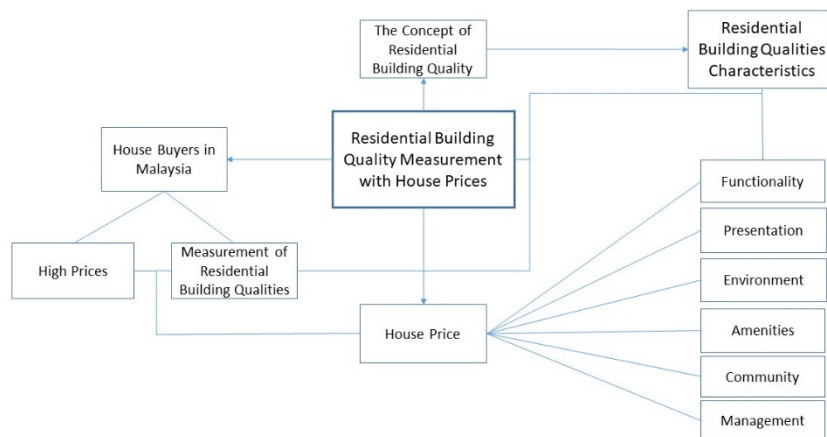


Figure 1: Theoretical Framework of Residential Building Quality Measurement with House Prices

METHODOLOGY

Observation Form

As for the case study included in the sampling of the research, fifty units of observation forms were laid out for the measurement of residential building qualities. Elements that include the characteristics of functionality, presentation, environment, amenities, community, and management. The next step of the survey conducted by the researcher aims to measure the relationship that affects houses prices in Klang. As objective one has been achieved from the review of literature, elements from the first objective to measure the quality level of the characteristics were included. The observation was conducted on the selected fifty houses in ten residential areas in the district of Klang using convenience sampling. The researcher personally conducted the observation form survey to reduce errors that may occur with using research assistants. The data obtained by the researcher's survey also must be low in error in allowing the measurement of the residential building quality. The subsequent data analysis will then be measured with the house prices that were obtained from NAPIC, and the relationship will be measured through the Regression Analysis.

Regression Analysis

For this research analysis, this section will show the analysis relating to both variables independent and dependent that will be carried out by regression analysis. To complete the regression analysis, steps on homoscedasticity, normality, linearity, and outlier's identification must be fulfilled, thus allowing regression analysis to be carried out. The empirical data collected then were analysed using the SPSS 22.0 statistics software and help to identify the residential building characteristic's quality relationship with prices. Table 1 explains the framework of the research being conducted, and Tables 2 to 7 will show the analysis values of the regression together with the findings generated from it.

Table 1: Research Method and Sampling

Stage of Research	Research Objective	Research Methods & Types of Data	Selection of Sample
Stage 1	1. To identify residential building quality characteristics	Quantitative Data Instrument: • Observation Forms Respondents: • One observation per house Sample: Convenience Sampling • Ten households per residential area • Total 50 households involved	Sampling of Houses 1. Bandar Bukit Raja (DS) 2. Taman Klang Utama (SS) 3. Aman Perdana (DS) 4. Bandar Bukit Tinggi (DS) 5. Bandar Botanic (DS) 6. Taman Sentosa (SS) 7. Taman Berkeley (SS) 8. Bandar Puteri (DS) 9. Taman Sri Andalas (DS) 10. Taman Bayu Perdana (DS)

		<ul style="list-style-type: none"> • Double (DS) and Single Storey (SS) Terrace Houses 	
Stage 2	2. To measure the residential building quality characteristics effect on houses prices.	Significant Findings: Instrument: <ul style="list-style-type: none"> • Regression Analysis • SPPS Software Version 22 	1. Functionality 2. Presentation, 3. Environment 4. Amenities, 5. Community, 6. Management, 7. House Prices

FINDINGS AND DISCUSSION

Table 2: Regression Analysis of Functionality and Prices

Regression Analysis between Functionality and Prices						
	Double Storey Houses			Single Storey Houses		
	B	t	Sig.	B	t	Sig.
Functionality	0.177	1.128	0.029	0.153	1.152	0.021
<i>R</i> ²	0.016			0.018		
<i>F</i>	27.63**			25.67**		
<i>Sig.</i>	0.029			0.021		

Note: Significant at 0.01 (**) levels

Table 2 shows the summary statistics using regression regarding Functionality and house price. The regression results show that the F-Values for Double and Single Storey House models to be statistically significant at 0.01 level. The regression models explain only 1.6% (double-storey houses) and 1.8% (single storey houses) variations in the house prices. The coefficient of the Functionality Variable is positive for the Double Storey Houses (0.177) but the t-value at 1.128 is not statistically significant at 0.05 level. Therefore, Functionality is not a significant factor affecting Double Storey House prices.

For the Single Storey House model, the coefficient of the Functionality Variable is positive (0.153) but the t-value at 1.152 is not statistically significant at 0.05 level. Therefore, Functionality is not a significant factor affecting Single Storey House prices.

The result shows that the relationship between functionality and prices is not significant. Functionality, therefore, was not an important element in the observation of the research. The aspect of the functionality of houses was expected to fulfil quality houses but not as a priority. The functionality quality level of residential building quality only contributed a small amount of increase of house price.

Table 3: Regression Analysis of Presentation and Prices

Regression Analysis between Presentation and Prices						
	Double Storey Houses			Single Storey Houses		
	B	t	Sig.	B	t	Sig.
Presentation	0.118	1.022	0.323	0.131	1.121	0.292
<i>R</i> ²	0.007			0.008		
<i>F</i>	12.57**			10.76**		
<i>Sig.</i>	0.323			0.292		

Note: Significant at 0.01 (**) level

Table 3 shows the summary statistics using regression regarding Presentation and house price. The regression results show that the F-Values for Double and Single Storey House models to be statistically significant at 0.01 level. The regression models explain only 0.7% (double-storey houses) and 0.8% (single storey houses) variations in the house prices. The coefficient of the Presentation Variable is positive for the Double Storey Houses (0.118) but the t-value at 1.022 is not statistically significant at 0.05 level. Therefore, Presentation is not a significant factor affecting Double Storey House prices.

For the Single Storey House model, the coefficient of the Presentation Variable is positive (0.131) but the t-value at 1.121 is not statistically significant at 0.05 level. Therefore, Presentation is not a significant factor affecting Single Storey House prices.

From the result, the aspect of presentation does not have any significant effect on house prices. It can be concluded that buyers did not pay much attention aspect of the presentation of the houses. As in new houses, house buyers have to rely on the information given on the houses by the developers rather than the actual house itself as there is no physical completion. For second-hand houses, perceived observation and own inspection of the houses were only needed for the information of buyers and does not have much effect on prices.

Table 4: Regression Analysis of Environment and Prices

Regression Analysis between Environment and Prices						
	Double Storey Houses			Single Storey Houses		
	B	t	Sig.	B	t	Sig.
Environment	0.485	3.584**	0.000	0.435	3.415**	0.000
<i>R</i> ²	0.154			0.142		
<i>F</i>	51.23**			47.88**		
<i>Sig.</i>	0.000			0.000		

Note: Significant at 0.01 (**) levels

Table 4 shows the summary statistics by using regression regarding Environment and house price. The regression result shows that the F-value for Double and Single Storey House models of 51.23 and 47.88 are statistically significant at 0.01 level. The regression model explains 15.4% (double-storey houses) and 14.2% (single storey houses) of the variation in the dependent variable. The coefficient of the Environment Variable is positive for the Double Storey Houses (0.485) and statistically significant at 0.01 level. Therefore, the coefficient is significantly different from zero at 0.01 level indicating Environment to be a significant factor affecting Double Storey House prices. A 1 per cent change in the value of the Environment will cause an increase of 0.485 per cent in Double Storey House prices.

For the Single Storey House model, the coefficient of the Environment Variable is positive (0.435) and statistically significant at 0.01 level. Therefore, the coefficient is significantly different from zero at 0.01 level indicating Environment is a significant factor affecting Single Storey House prices. A 1 per cent change in the value of the Environment will cause an increase of 0.435 per cent in Single Storey House prices.

The analysis shows that there is a significant relationship between the two elements. Buyers in a way can be understood by the researcher to purchase a home in a holistic manner encompassing larger areas of the development. An emphasis on the environment shows that house buyers value their surrounding areas and look for a higher quality of planned residential developments.

Table 5: Regression Analysis of Amenities and Prices

Regression Analysis between Amenities and Prices						
	Double Storey Houses			Single Storey Houses		
	B	t	Sig.	B	t	Sig.
Amenities	0.291	2.877**	0.001	0.277	2.983*	0.000
					*	
<i>R</i> ²	0.077			0.073		
<i>F</i>	30.23**			32.72*		
					*	
<i>Sig.</i>	0.001			0.000		

Note: Significant at 0.01 (**) levels

Table 5 shows the summary statistics using regression regarding Amenities and house price. The regression result shows that the F-value for Double and Single Storey House models of 30.23 and 32.72 are statistically significant at 0.01 level. The regression model explains 7.7% (double-storey houses) and 7.3% (single storey houses) of the variation in the dependent variable. The coefficient of the Amenities Variable is positive for the Double Storey Houses (0.291) and statistically significant at 0.01 level. Therefore, the coefficient is significantly different from zero at 0.01 level indicating Amenities is a significant factor affecting Double Storey House prices. A 1 per cent change in the value of Amenities will cause an increase of 0.291 per cent in Double Storey House prices. For the Single Storey House model, the coefficient of the Amenities Variable is positive (0.277) and statistically significant at 0.01 level. Therefore, the coefficient is significantly different from zero at 0.01 level indicating Amenities is a significant factor affecting Single Storey House prices. A 1 per cent change in the value of Amenities will cause an increase of 0.277 per cent in Single Storey House prices.

The analysis shows that there is a significant relationship between the two elements. The provisions given in a residential area development will contribute to higher house prices and also higher quality of houses.

Table 6: Regression Analysis of Community and Prices

Regression Analysis between Community and Prices						
	Double Storey Houses			Single Storey Houses		
	B	t	Sig.	B	t	Sig.
Community	0.177	1.258	0.001	0.184	1.387	0.001
R ²	0.016			0.013		
F	20.55**			21.85**		
Sig.	0.001			0.001		

Note: Significant at 0.01 (**) levels

Table 6 shows the summary statistics using regression regarding Community and house price. The regression results show that the F-Values for Double and Single Storey House models are statistically significant at 0.01 level. The regression models explain only 1.6% (double-storey houses) and 1.3% (single storey houses) variations in the house prices. The coefficient of the Community Variable is positive for the Double Storey Houses (0.177) but the t-value at 1.258 is not statistically significant at 0.05 level. Therefore, Community is not a significant factor affecting Double Storey House prices.

For the Single Storey House model, the coefficient of the Community Variable is positive (0.184) but the t-value at 1.387 is not statistically significant

at 0.05 level. Therefore, Community is not a significant factor affecting Single Storey House prices.

From the analysis, it was found out that the two elements do not have any significant relationship with one another. The findings shows that the social aspect is not an important quality factor that can influence the price of houses.

Table 7: Regression Analysis of Management and Prices

Regression Analysis between Management and Prices						
	Double Storey Houses			Single Storey Houses		
	B	t	Sig.	B	t	Sig.
Management	0.452	2.873**	0.000	0.409	2.325*	0.000
<i>R</i> ²	0.118			0.134		
<i>F</i>	34.75**			37.93**		
<i>Sig.</i>	0.000			0.000		

Note: Significant at 0.05 (*) and 0.01 (**) levels

Table 7 shows the summary statistics using regression of house prices on Management. The regression result shows that the F-value for Double and Single Storey House models of 34.75 and 37.93 are statistically significant at 0.01 level. The regression model explains 11.8% (double-storey houses) and 13.4% (single storey houses) of the variation in the dependent variable. The coefficient of the Management Variable is positive for the Double Storey Houses (0.452) and statistically significant at 0.01 level. Therefore, the coefficient is significantly different from zero at 0.01 level indicating Management is a significant factor affecting Double Storey House prices. A 1 per cent change in the value of Management will cause an increase of 0.452 per cent in Double Storey House prices.

For the Single Storey House model, the coefficient of the Management Variable is positive (0.409) and statistically significant at 0.05 level. Therefore, the coefficient is significantly different from zero at 0.05 level indicating Management is a significant factor affecting Single Storey House prices. A 1 per cent change in the value of Management will cause an increase of 0.409 per cent in Single Storey House prices.

The last analysis shows a significant relationship between the two elements. Although management was usually associated with strata buildings, landed residential units also shows that house buyers appreciate the availability of security, safety, and well-maintained developments in their area. This thus affects the house prices significantly.

CONCLUSION

Based on the findings generated from this research, there are some elements that were deemed as insignificant that can affect the house prices that were functionality, presentation, and community. Whereas the significant elements were the environment, amenities, and management. This shows that with proper empirical research conducted, the relationship between residential building qualities with their prices can be determined, thus helping the stakeholders. House buyers can therefore generally expect much better in terms of the quality level of their houses with the prices that they have paid.

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FIRST-TIME HOMEBUYERS' INTERESTS IN USING PROPERTY CROWDFUNDING AS AN ALTERNATIVE FINANCING OPTION

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Abstract

Property crowdfunding as an alternative financing option for first-time homebuyers was introduced by the Malaysian government during the presentation of the National Budget 2019. This platform was the first of its kind, and targeted fundraisers who were first-time homebuyers, i.e., those allowed to raise financial support for their home purchase via the platform. As the mechanism of the Malaysian property crowdfunding platform is new to homebuyers, this study aims to explore homebuyers' interests to use property crowdfunding platform as an alternative financing option for the purchase of their first home. First-time homebuyers' opinions were collected through face-to-face interviews, and content analysis was performed to analyse the obtained qualitative data. Key themes were identified and organised into three sections: (i) knowledge of the property crowdfunding; (ii) factors that motivated the use of the property crowdfunding and (iii) barriers that hindered the use of the property crowdfunding. These findings are expected to contribute toward the adoption of the property crowdfunding in Malaysia.

Keywords: property crowdfunding, first-time homebuyer, affordable housing, homeownership

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INTRODUCTION

As an alternative financial scheme, crowdfunding has received increasing attention worldwide. The concept of crowdfunding has been adopted as an alternative financing option for new ventures, as well as cultural and social projects (Mollick, 2014). In general, crowdfunding is a micro-finance concept (Mollick, 2014) based on the fundraising strategy which collects an individual's small amount of capital from across a large group of people (Ordanini *et al.*, 2011; Sigar, 2012). It connects the investees (project or idea owners) with potential supporters for the purpose of turning start-up ideas into reality (Ramsey, 2012). Thus, it involves three main participants which are the fund seekers (project or idea owners), investors, and the platform operators.

In terms of the business models, there are four types of crowdfunding platforms, namely donation-based, reward-based, equity-based and loan-based (Massolution, 2015). In general, the donation-based platform is used by non-profit organisations for charity purposes, while the reward-based platform is offered to the crowd funders as a token of appreciation in recognition of their business ideas. In contrast, the equity-based and loan-based platforms are investment oriented, in the sense that they fund providers who are looking toward for a return from their investments. Similarly, in the real estate domain, property crowdfunding is a fundraising process, whereby developers and project owners raise an aggregated small amount of capital from a large group of individual investors via the internet platform (Maarbani, 2015). The business model of property crowdfunding platform is either equity-based, or loan-based. It allows the investor and property developer (the project owners) to achieve a higher interest by eliminating the involvement of intermediaries and transaction costs (Miller, 2015). Although the crowdfunding concept has been widely adopted, studies on the application of this concept in the real estate domain has remained scarce (Lowies, Viljoen and McGreal, 2017). The application of the crowdfunding concept in the real estate industry is worth being investigated, as both the risk and the growth opportunity needed to be clarified (Cohen, 2016).

The importance of crowdfunding as an alternative financial platform has been recognised in Malaysia for some time now. In fact, Malaysia is the first country within the Asia-Pacific Region to legislate an equity-based and peer-to-peer lending crowdfunding platform (Mokhtarrudin, Masrurah, and Muhamad, 2017). According to the Asian Institute of Finance (2017), there was a total of RM15.8 million funds which were raised using equity-based platforms to support 24 projects, and the amount of funds were expected to increase to RM343.4 million by 2021. On the other hand, peer-to-peer crowdfunding platforms are expected to secure RM1513.7 million in funding by 2021. Recently, the application of crowdfunding had been further embraced by the Malaysian government to support homeownership. As stated in the Malaysian 2019 national budget, property crowdfunding had been introduced by the Malaysian

government as an alternative financing option for first time homebuyers (Ministry of Finance, 2018). It is recognised that by promoting an innovative home financing product will certainly offer benefits in term of promoting homeownership in Malaysia (Mohd Yusof *et al.*, 2019), as it provides an alternative pathway that increases the possibilities for those who need access to financial assistance (Yusof *et al.*, 2019), as well as addressing the mismatch between the existing financial system criteria and the homebuyer's profile (Kamal *et al.*, 2018). It is worth mentioning that difficulties in obtaining housing loans have contributed to the failure of homeownership, especially those in low- and medium-income groups (Hing and Singaravelloo, 2018; Osman *et al.*, 2020).

Unlike traditional property crowdfunding platforms which are predominantly used to raise funds for property development projects, the recently announced Malaysian property crowdfunding platform is meant to address housing affordability issues, and facilitate homeownership among first time homebuyers. Accordingly, under the Malaysia property crowdfunding mechanism, first time homebuyers can secure a property by paying 20% of the property selling price, as the remaining 80% will be funded by potential investors who are keen to fund the property in exchange for the potential appreciation in the future property value. Recently, the 20% deposit had been allowed to be reduced to 10% by the Securities Commission of Malaysia. By doing so, the financial burden of owning a house had been reduced, thus, making homeownership an affordable option for homebuyers.

In recognising the potential of property crowdfunding platform as an alternative financing option, studies have disclosed the associated advantages and disadvantages (Vogel and Moll, 2014) as well as the risks and potential growth associated with the property crowdfunding platform (Cohen, 2016), which highlighted the concerns over information asymmetry pertaining to the investment decision via property crowdfunding (Ahlers *et al.*, 2015). It also investigated the influence of the characteristics of property, financial and crowdfunding platform characteristics on the return of the property platform (Schweizer and Zhou, 2016), which identified investors as the key driving factor for change (O'Roarty *et al.*, 2016), and profiled the investor's risk perceptions (Lowies *et al.*, 2017). Nonetheless, these studies have been focused on the investment perspective whereby policy implication is now focused on promoting investment decision-making using property crowdfunding platforms. Studies on another domain, which is the user's perspective has remained scarce, and is worth being investigated as the key to the success of the property crowdfunding platform, which does not solely depend on the investor's interest to invest, but, also on the intention of the users (fundraisers) to adopt the platform as an alternative financing option for them.

Furthermore, the Malaysian property crowdfunding is novel compared to that of the traditional property crowdfunding platforms, in such a way that fundraisers are the homebuyers, instead of developers and project owners. This makes the Malaysian property crowdfunding platform the first of its kind in the world, whereby, it serves as a platform for homebuyers to seek financial capital to purchase their homes. Following this, the motive of using the property crowdfunding platform is very much different, as developers and project owners (in the traditional property crowdfunding platform mechanism) intend to seek funds to support their development projects for businesses and investment purposes, while, homeowners (in the case of the Malaysian property crowdfunding platform) intend to secure financial support for personal homeownership purposes. In addition to that, the investment based crowdfunding platform (such as the property crowdfunding platform in this study) is unique and different from other forms of crowdfunding platforms, due to the differences in term of its incentives and compensation (Hervé *et al.*, 2017). This uniqueness further points to the fact that the adoption of crowdfunding platforms can be case specific, whereby the user's motive for a crowdfunding platform can be distinguished and differ from other crowdfunding platforms. In other words, the Malaysian homebuyer's intentions to use property crowdfunding platforms can differ from that of users from other countries and regions, which use different forms of crowdfunding platforms to facilitate homeownership. On top of that, property crowdfunding is regarded as a potentially disruptive innovation which may disrupt the traditional real estate finance market (Montgomery, Squires and Syed, 2018). Thus, understanding the homebuyer's intentions to use property crowdfunding as an alternative financing vehicle can contribute toward the preparation of the industry for facing the adoption challenges of this disruptive innovation. In short, this study not only contributes toward the scarcity of literature on property crowdfunding, but also prepares the Malaysian real estate industry and financial industry for addressing the challenges pertaining to property crowdfunding adoption, by-providing an in-depth understanding of the Malaysian homebuyer's intentions to use the property crowdfunding platform as an alternative financing option to secure their homeownership.

RESEARCH METHOD

For the purpose of this study, the FundMyHome platform is referred to. This platform is Malaysia's first and only property crowdfunding platform that serves to support homeownership. The FundMyHome platform is a privately operated property crowdfunding platform of which the operating mechanism is regulated by the Securities Commission of Malaysia. At present, this platform has more than 7,000 registered users, with about 20 successful applicants who are currently using this property crowdfunding platform as an alternative financing scheme for supporting their homeownership (Idris, 2019). Applicants who successfully

obtained the required financial support needed to only pay 20% of the house's price. The applicants are not be tied down to instalment repayments for a period of five years. After five years, the applicants will be given two options, which are (i) retain their ownership, or (ii) sell the property. For the first option, the applicants are required to look for their own financial support to pay the 80% house price in the platform, in order to secure their homeownership. For the second option, applicants are required to bear costs involved in selling the property, and can enjoy their portion of the gain from selling the property only after paying back the associated costs of the property to the crowdfunding platform.

This study is exploratory in nature, given the fact that utilising property crowdfunding in supporting homeownership is a novel application. This study employed a qualitative interview to probe the respondent's understanding and perceptions about property crowdfunding as an alternative financing option for homebuyers. Using qualitative interviews in this study is expected to provide new information and insights on the adoption of the property crowdfunding platform, and will contribute to our knowledge pertaining to the topic.

A total of thirty-two (32) first-time homebuyers (coded with R1 to R32) were identified during their visit to a local property fair and exhibition centre in Kuala Lumpur. In order to ensure that the interviewees were qualified for our study, the respondents were screened with three questions, (i) if they owned any property; (ii) their income range and (iii) if they had the intention to purchase a property over the next 5 years. The rationale of the first screening question was to ensure the recruited respondents were first-time homebuyers. Subsequently, the second question aimed to ensure that the targeted respondents were users of the property crowdfunding based on their income levels, and lastly, the third question implied if the respondents were rigorously looking for financial options for their homeownership over the 5 year period.

The interviews were recorded and transcribed. The thematic content analysis was used to identify, analyse, organise, describe, and report themes derived from the transcripts (Braun & Clarke, 2006). The codes and themes had been derived independently by two researchers, with line-by-line coding of the interview transcripts. A rigorous discussion was conducted amongst the researchers for reaching to an affirmative agreement on the identified codes and themes.

FINDINGS

In total, 46.9% of the respondents were male. The majority of them ranged between 24 to 30 (46.9%) years of age, and the remaining were above the age of 30. Furthermore, 87.5% had a household size of 5 or less. The majority of our respondent's profile were young and with a low household size. This was not surprising, as our targeted respondents were first-time homebuyers who were just

establishing their family, and looking forward to owning property. In terms of income level, almost 84.4% of our respondents earned less than or equivalent to RM5,000 and the remaining earned between RM5,001 - RM10,000.

In terms of house ownership, none of the interviewees owned any property at the time of the interview. A total of 62.5% of the interviewees stayed with their family members, and 31.3% were renting a house, and the remaining 6.3% are room tenants. The majority of the interviewees (68.8%) were seeking to purchase the house for their own dwelling, meanwhile that 25.0% were looking for an investment opportunity. The remaining 6.3% were seeking property for personal dwelling or as an investment. Almost 53.1% of the interviewees were willing to jointly own their property with their family members and spouse, while, 46.9% had a strong intention to become sole proprietors.

The following sub-sections are presented according to the findings of this study. The findings have been arranged accordingly to correlate to the identified themes, into three sub-sections, (i) prior knowledge of property crowdfunding, (ii) factors which stimulate a homebuyer's interest to use property crowdfunding, and (iii) barriers which hinder homebuyers from using property crowdfunding.

Knowledge on Property Crowdfunding Platform

In general, 66% of the respondents (n=21) acknowledged that they were not aware of the term "property crowdfunding". Interestingly, 67% of the respondents had heard about the FundMyHome platform. Furthermore, those who responded with awareness about property crowdfunding seemed to associate property crowdfunding with the FundMyHome platform. They tended to highlight the mechanism of FundMyHome while explaining their interpretation of property crowdfunding to the researchers. For instance, as noted by R10 "*....it means that they are people who invest in our property with a small pool of funds.....so that we can own the house by paying only 20%. The anonymous investors will fund the remaining 80%*". None of the interviewees defined the term from its original operating mechanism and definition. This implied that the public may have misconceptions about property crowdfunding, as the FundMyHome platform actually operates on the basics of property crowdfunding. A plausible explanation is that the public awareness on property crowdfunding is low. The awareness of property crowdfunding is due to the introduction of the FundMyHome platform.

Despite their awareness about property crowdfunding, we were particularly interested in how the homebuyers perceived the FundMyHome platform. Despite the operating mechanism of the platform, interviewees tended to link the platform with government efforts in promoting affordable housing. The statement "*supported by government*", "*financial support from government*", "*government to reduce financial burdens*" and "*a loan provided by government to homebuyers*" were frequently mentioned by the interviewees. The tendency of

interviewees to associate the FundMyHome platform with the government can be attributed to the fact that the property crowdfunding had been highlighted in the government's Budget plan 2019. Additionally, the FundMyHome platform was officially launched by the Prime Minister (Tan, 2018), and was supported by the government by providing aid to first-time homebuyers to use the platform for homeownership purposes (Idris, 2019). Thus, it is not surprising that our respondents tended to perceive the platform as a government initiative and strategy to support homeownership among first-time homebuyers.

Factors which contribute to the use of the platform

Only 21.9% (n=7) of interviewees acknowledged that they were considering using property crowdfunding as an alternative financing option for supporting their homeownership. The Government's role in property crowdfunding is one of the motivators which stimulate the homebuyer's interest to use property crowdfunding. As highlighted by one of the interviewees, "...*the government supports this scheme...the risk can be lowered, and I think is worth to try...*" (R31). Also, "...*Guaranteed by the government and there must be a fund supported by the government for helping the homebuyers to purchase the property after 5 years...*" (R28). This indicated that the government's involvement in property crowdfunding will further enhance the public's confidence in property crowdfunding, and stimulate the homebuyer's interest to use property crowdfunding as an alternative financing option.

Additionally, the advantage of delaying the monthly instalment period is another attractive point for property crowdfunding. Interviewees tended to perceive that the delay in paying the monthly instalment will likely reduce their financial burden and prompt them to opt for this option to own their home over the next 5 years. For instance, as revealed by one interviewee, "...*buyers do not need to worry about the monthly instalments, at least for the first five years...*"(R10).

Nonetheless, property crowdfunding has been perceived as a replacement financial scheme to that of the traditional housing loan offered by banks. As mentioned by R29, "...*If I cannot get a loan from the bank, I may consider it.*" This was supported by other interviewees, who considered property crowdfunding as a replacement financial scheme for those who cannot meet bank requirements (R31). As an alternative financial option, the public tended to perceive it as a replacement financial scheme, or serve as the last option as mentioned by R32, "...*I will put this as the last option...*"

Barriers that hinder the usage of the platform

On the other hand, interviewees who were concerned about the trustworthiness of the platform could prevent them from using property crowdfunding as an alternative financing option. For instance, as noted by R31, "...*I would not use it.*"

I do not really trust the platform...". It is also argued that the platform only "benefits the investors and developers" (R13) and "...it seems to be speculative as it will contribute to price escalation..." (R30). Along with this argument, the interviewees highlighted the importance of a clear agreement in safeguarding those using property crowdfunding to fund their homeownership. As stated by the respondent, "...there needs to be a clear agreement that both parties (the homeowner and the platform owners) will not only benefit but also share the potential risks associated with the mechanism of the platform..." (R27)

The uncertainty and risks associated with the platform is another barrier that hinders the usage of property crowdfunding in supporting homeownership. Although homebuyers may enjoy a five (5) year period of time without commitments toward the housing loan, however, homebuyers were still concerned about what would happen to them after five years. As noted by R26, *"...I am not certain if I am able to save enough money for the balance or get another institution to provide a financial scheme for supporting me to pay for the ownership after five years..."*. In other words, homebuyers who opted for the current property crowdfunding faced the risk of losing their homeownership. This will definitely offset the benefits of using property crowdfunding. As mentioned by R32, *"Many uncertainties. I don't believe we can own a home for free. The after five years scenario can be worse, as we may lose our house if we cannot get the loan to support our purchase. What is the point of the five years' timeframe, when you have the risk of losing the ownership after five years"* Alongside with this concern, the term *"insecure"*, *"not guaranteed"*, *"losing"*, *"actual cost maybe higher"*, and *"jeopardise the interest of homebuyers"* were mentioned by the interviewees.

The third theme that emerged from the barriers that hindered the usage of property crowdfunding was related to the housing product offered by the platform. At present, the FundMyHome users have limited choices in term of housing products, of which they are limited in terms of choices listed on the platform. This further discourages interested and committed first-time homebuyers from using the platform, as they are unable to refer to the current platform for funding their preferred housing product, which is not listed on the platform. As mentioned by R29, *"...we need to subject to the product listed on the platform, and there are limitations in terms of the product itself, especially at my preferred location"*. Thus, it is not only the limited product availability but, the location for the housing product which is also a concern for the interviewees.

CONCLUSION

This study aimed to explore first-time homebuyer's interest to use property crowdfunding as an alternative financing option. A series of interviews had been conducted to probe first-time homebuyer's knowledge and understanding of property crowdfunding. Our finding indicated that the public had limited

knowledge of property crowdfunding. They had a better understanding of the financing mechanism of the platform, whereby 20% was paid by the homebuyers, and 80% was supported by the platform itself. They had a perceived misunderstanding on the government's role in the operating of the property crowdfunding platform in Malaysia. Essentially, the public will likely opt for property crowdfunding if it is supported by the government, as it may potentially reduce the associated financial burden, which is the last financial option after traditional housing loans offered by banks. On the other hand, homebuyers had trust issues, uncertainties, and a high-risk avoidance factor, as well as highlighted limited housing products provided by the property crowdfunding financing scheme.

The results suggested that an additional educational campaign is required, essentially, the concept of crowdfunding, and how it can be utilised and incorporated in our daily activities, rather than employed as an alternative financial solution for business activities. Moreover, although the platform is supported by the government, nonetheless, the misunderstanding on the government's role needs to be clarified. In terms of the platform's mechanism, policy makers and platform operators need to focus on lowering the uncertainty and risks associated with the platform's operation. Initiatives such as a better risk-sharing mechanisms between the investors and homebuyers, and the deposit guarantee scheme that protects homebuyers from financial risks can contribute toward lowering the uncertainty and risks faced by the homebuyers. To address the limited choice of products, the variety of products need to be diversified, and should not be limited to those listed on the platform.

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ASSESSING THE STRATA HOUSING ATTRIBUTES FOR ELDERLY TO AGE IN PLACE IN KLANG VALLEY

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Abstract

As the elderly population is burgeoning globally, the number of elderlies in Malaysia has also increased tremendously. Malaysia is expected to become an aging nation by 2030. The elderly in Malaysia prefer to age in place. At the same time, the trend of residing in landed property has shifted to strata housing due to several factors. Therefore, the purpose of this study is to assess the strata housing attributes for the elderly to age in place in Klang Valley. The list of housing attributes is divided into three categories: housing features, housing environment and technology. These attributive patterns emerge from various sources of literature reviews. Eight experts were identified and selected to validate the content based on their background as well as their area of specialization.

Keywords: Aging, Elderly, Strata Housing, Aging in Place, Housing Attributes

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INTRODUCTION

The aging population is burgeoning globally, including in Malaysia. Malaysia is predicted to become an aging nation by the year 2030. The elderly population increases are due to factors such as low birth rate, low fertility rate, low mortality rate and increased life expectancy. However, as an elderly, they experienced impairments such as primary functional impairment, chronic disease, diminishing social network, and lower level of physical activities (Peek et al., 2014; Wilby & Cathy Chambless, 2012).

However, previous research discovered that most elderly prefer to age in place regardless of their impairments. Aging in place is defined as the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, and ability level (Lum et al., 2016). They prefer to age in place to maintain control and autonomy in their lives to ensure their wellbeing and quality of life (Coleman & Kearns, 2015). It is also revealed that the elderly tend to choose a smaller house namely strata housing such as apartments, townhouses, and condominiums (Guillory & Moschis, 2008; Judd et al., 2012; Vasara, 2015). Thus, the elderly require an innovative housing design for them to age in place safely and comfortably (Thompson, 2013).

In Malaysia, the increasing population and limited land offered have forced high-rise buildings to become a lifestyle (Che Ani et al., 2010). However, the homes and communities in Malaysia are not designed to meet people's needs as they grow older. Moreover, according to the mid-term review of the 11th Malaysia Plan, one of the challenges of the increasing number of elderlies is the lack of collaboration between agencies in implementing the universal design for building and public facilities. Consequently, it has reduced the efforts to provide a user-friendly physical environment, especially for the elderly (Ministry of Economic Affairs, 2018). On top of that, under Strategy 4 of the 11th Malaysia Plan, various measures need to be considered to enhance the elderly living environment.

Initiatives such as age-friendly community, lifelong learning and retirement village concept will be promoted as the independent living lifestyle. The mid-term review also urged the private sector to embrace the creation of a lively community, housing and local areas. It is also imperative that the location is near public amenities and transit terminals. Environment-friendly facilities such as parks and recreation spaces need to be provided (Ministry of Economic Affairs, 2018). Many previous local scholars have studied the housing attributes for the elderly to age in place in landed properties (Tobi et al., 2017; Zainab Ismail et al., 2012), but there are limited studies on housing attributes for the elderly to age in place in strata housing (Sitinur Athirah et al., 2016; Wai & Wei, 2016). In addition, Tan & Lee (2018) claimed that the housing needs and preferences of the

elderly are lacking in Malaysia. Thus, this study will assess the attributes of strata housing needed by the elderly to age in place in Klang Valley.

RESEARCH BACKGROUND

The Aging Population

The aging population has increased tremendously worldwide. Most of the developed countries have categorized 65-year-olds as elderly (Rosilawati & Pettit, 2016). Meanwhile, in most of the developing countries, including Malaysia, 60 years old are grouped as elderly (Siti Uzairah et al., 2018). In Malaysia, Jariah, Husna, Aizan, & Ibrahim (2012) identified that the Ministry of Women, Family, and Community Development of Malaysia affirmed that someone who is above 60 years of age could be considered elderly. This follows the guideline by the United Nations World Assembly on Ageing 1982 in Vienna. According to the Malaysian Department of Statistics, there were about 2.7 million senior citizens in 2014, forming 8.9% out of the 30.3 million Malaysian population. Hence, Malaysia is expected to become an aging nation by the year 2030.

Yüksel, Kırkkanat, Yılmaz, & Sevim (2016) specified that the characteristics of the elderly could be divided into psychological and physiological aspects. The psychological aspect is indicated by the state of emotion of the elderly. The positive emotions are when the elderly feel satisfied with their lives and the negative emotions are when they feel unsatisfied with their lives, feeling isolated and alienated (Pavalache-Ille, 2015). On the other hand, the physiological aspect is related to physical illness (Abdul Manaf et al., 2016). Frailty among the elderly is evident in the increase of weakness and slowness that usually leads to a decline in daily activities, causing fatal accidents (Yuki et al., 2016). In addition, Gonawala et al. (2013) mentioned that the elderly also endanger themselves on the road caused by their decreasing vision, lack of hearing ability, increased cognitive impairment, and confusion.

As the global population is aging, societies around the world are struggling with the issues and problems related to providing care for the aging population in their homes. Lipman, Lubell, & Salomon (2012) found increased demands for home modification to enable the elderly to age in place. In addition, Mohd, Senadjki, & Mansor (2017) highlighted that number of elderly living alone across 43 countries, including Malaysia, is increasing to the extent that almost a quarter of them live by themselves. Furthermore, most elderly wish to age in place in a strata housing (Ainoriza et al., 2016). The trend to prefer living in a strata housing is due to factors such as land scarcity, high price for landed property, facilities in strata housing and many other factors (Ainoriza et al., 2017; Shuid, 2004; Siti Rashidah Hanum et al., 2016). Therefore, this study will assess the strata housing attributes to cater to the elderly needs to age in place using the

content validation method which will be explained in the next section.

METHODOLOGY

In order to answer the research questions and attain the research objective, which is to identify the strata housing attributes that fulfil the elderly needs to age in place, various housing attributes were identified from various literature reviews and validations of experts. Content Validation has been conducted to validate the attributes that emerged from the review of various literature. Rossiter (2010) stated that selecting at least three experts are advisable in conducting content validity via interviews. In this research, 8 experts were chosen to validate the content based on their areas of specialization, as indicated in Table 1.

Table 1: Experts Involved in Content Validation

No of Experts	Category of Expert	Area of Specialization
2	NGO	Aging society
2	Academician	Research related to elderly
2	Government agency	Jabatan Kebajikan Masyarakat
2	Developer	Sustainable development

The content obtained from the literature review was divided into three sections. Section A comprises the housing features, including the entrance, hallway, living room, toilet, bedroom, kitchen and balcony. Meanwhile, Section B consists of the housing environment; the housing environment for the elderly is based on accessibility, safety, security, other services, and facilities. The final category is Section C which is concerned with technology - an exploration of the participant's knowledge and opinions regarding the usage of mobile devices, telecommunication link such as fibre optic, Wi-Fi, intercom, television and clocking.

RESULT

Table 2 illustrates the content features that had been validated by the experts, including non-government organizations, academics, developers, and government authorities. The attributes were discovered from various reviews of literature, comprising the entrance, hallway, living room, toilet, bedroom kitchen, and balcony. They also validated the housing environment features, namely accessibility, safety, security, and other services, including the lift, open space or green park, car park, multi-language signboards, and multipurpose hall. On top of that, the experts also validated technological features such as individual mobile

devices, i.e., smartphone or tablet and telecommunication links, i.e. fibre optic, Wi-Fi, internet, intercom, television, and clocking.

Table 2: Content Analysis

Housing Attributes		
Housing features	House Type	High-rise
Housing features	Entrance	<ul style="list-style-type: none"> ● Bench ● Sliding door ● Lightweight door with doorknob height is not more than 1.2m ● Door equipped with thumb print scanner ● Wide opening (900m-1.2m)
	Hallway	<ul style="list-style-type: none"> ● Equipped with grab bar ● Sufficient lighting ● Barrier free
	Living room	<ul style="list-style-type: none"> ● Size (minimum 2.5m) ● Separate living room and dining area ● Sufficient lighting ● Sufficient ventilation ● Electrical socket (800mm-1.1m from the floor level, waist level, and visible) ● Anti-skid flooring ● Bright colour ● Living room facing swimming pool, garden, park, road, or different unit
	Toilet	<ul style="list-style-type: none"> ● Has handrails/toilet grab bar ● Has alarm/emergency button ● Has anti-skid flooring ● Has flat entrance with tactile waning indicator ● Has wide doorways (minimum width is 1200mm)/sliding door ● Has water tap/shower head with sensor ● Large in size (minimum width is 2400mm, minimum length is 2000mm) ● Squat toilet ● Seated water closet ● Attached to bedroom ● Has mirror ● Regularly maintained and cleaned ● Split toilet and bathroom

	Bedroom	<ul style="list-style-type: none"> ● Has adequate lighting fittings ● Has access to natural daylight ● Ample in size (minimum 1000mm x 2000mm) ● Has electrical socket (800mm-1000mm from the floor level, waist level and visible) ● Equipped with alarm/emergency button ● Has intercom connected to security guard house
	Kitchen	<ul style="list-style-type: none"> ● Is wide (sufficient space for walking aids and for wheelchair access, between 1800mm-2000mm) ● Kitchen with compartment/partition (closed/hidden kitchen) ● Equipped with manual equipment (using gas) ● Equipped with electrical appliances (induction cooker, electric kettle, rice cooker, et cetera) ● Has anti-skid floor finishes ● Has gas leaking sensor ● Has smoke detector ● Has fire extinguisher and fire protector
	Balcony	<ul style="list-style-type: none"> ● Large in size, equipped with handrails, has a good view facing swimming pool, garden/park, road, or different unit
Housing environment	Location or distance	<ul style="list-style-type: none"> ● Near to friends and family ● Close to amenities (groceries, wet market, supermarket) ● Close to recreational parks / centre ● Close to public transportation (train station, bus station) ● Close to medical centre (pharmacies, clinic, hospital) ● Close to banks/ATM/saloon ● Close to dining (restaurants, canteen) ● Close to worship place (surau/masjid, temple, church)
	Safety, security and other services	<ul style="list-style-type: none"> ● Has thumb print door access ● Has safe crosswalks/pedestrian cross ● Has speed bump ● Has street lighting ● Has cleaning service/maid service ● Has garbage chute service ● Gated/guarded ● 24-hour neighbourhood surveillance
	Lift	<ul style="list-style-type: none"> ● Large in size (minimum size is 1100mm x 1400mm, 630kg) ● Has sufficient ventilation ● Close to lobby ● Has chairs at the lobby ● Has handrail on the three sides (1000mm from the floor level) ● Has mirror located opposite of the lift door

		<ul style="list-style-type: none"> ● The highest button is not higher than 1400mm
	Open space or green parks	<ul style="list-style-type: none"> ● Has gardening space ● Has activity space ● Has benches and tables ● Has reflexology track ● Has community society ● Has ramp with tactile warning indicator ● Has walking path ● Has basic exercise equipment
	Car park	<ul style="list-style-type: none"> ● Elevated car park ● Ground covered car park ● Ample size of car park (minimum width is 3600mm, minimum length is 5400mm and minimum transfer array is 1200mm) ● Direction signage for designated parking and other facilities
	Others	<ul style="list-style-type: none"> ● There are multi-language signboards consists of information, symbol, and direction ● Multipurpose hall
Technology		<ul style="list-style-type: none"> ● Individual mobile devices like smartphone and tablet
		<ul style="list-style-type: none"> ● Telecommunication link (fibre optic/Wi-Fi/internet/intercom) ● Television ● Clocking

Source: Developed for research

DISCUSSION

Based on the results, an unobstructed door with a width of a minimum of 850mm; 900mm or more is recommended in MS1184:2014 (Zaid et al., 2019). Mei-yung (2017) highlighted that sliding doors are convenient to the elderly and encourage independence among the elderly. Next is the attributes of the hallway. Rieh (2018) mentioned that the presence of grab bars inside a house is crucial to assist the elderly gain mobility and, at the same time ensure their safety. Mei-yung Leung et al. (2019) further added that a grab bar enables the elderly to be more independent and mobile in accomplishing their daily activities. Based on Lee & Yoo (2020) research, it is found that the wide size of a hallway will provide convenience to the elderly. According to Russell et al. (2019), good lighting is another important feature, as poor lighting can cause a fall and other accidents among the elderly in their houses.

Moving on to the living room attributes, Mei-yung (2017), mentioned that building orientation is important to provide natural lighting and good

ventilation, which will increase the quality of life of the elderly. According to Rieh (2018), the living room is one of the important attributes for the elderly as they spend most of their time watching TV, reading and doing activities associated with their hobbies. Moreover, Chen, Zhu, & Xiong (2018) highlighted that lighting provides a pleasant mood, increases alertness, and enables the elderly to stay vigilant. In addition, Datta (2019) found that good ventilation in a room or space is very important in determining a good quality of life for the elderly. Mei-yung (2017) further added that good ventilation would ensure the elderly's health by maintaining the elderly's body temperature. Mei-yung Leung, Yu, & Chow (2016) also mentioned that a moderate height of electrical sockets enables the elderly to be more independent.

Akbar, Ramadhani, & Putri (2018)'s research findings revealed that a smoke detector is an assistive technology that can detect the presence of fire. A heat detector in the kitchen provides additional protection against the risk of fires, and it is exposed to fire when the temperature hit 62°C (Palumbo et al., 2014). It is important for the elderly's security and provides appropriate warning during emergency situation as well as to avoid fire accidents and death (Akbar et al., 2018; Feng et al., 2018). Feng et al. (2018), in their research, highlighted that anti-skid flooring will prevent falling and accidents among the elderly.

Anti-skid flooring in a toilet is important for the elderly to protect them from accidents and falling (Afifi et al., 2015; Clemson et al., 2019). In addition, according to Abdel Salam & Shams El-din (2019), a grab bar in the toilet or bathroom will enable the elderly to move around. Abdel Salam & Shams El-din (2019) further added that the emergency button in the bathroom should be waterproof and color contrasted, to increase the safety of the elderly. Katunský & Brausch (2018) asserted that tactile features are essential to increase visual and sensory cognition among the elderly. According to (Carr et al., 2013), sliding doors will provide accessibility for the elderly to enter a space and reduce the need for them to open a heavy door. Opening a heavy door can cause negative feelings among the elderly as they have very limited energy (M. Y. Leung et al., 2017). Moreover, the sliding door will also enable the elderly with a wheelchair to access the toilet or bathroom (van Hoof & Boerenfijn, 2018).

According to Abdel Salam & Shams El-din (2019), water faucets with sensors in the bathroom can assist the elderly who find it is difficult to turn the manual faucet, and at the same time, they will reduce water usage. Based on Afifi et al. (2015), a seated water closet will enable the elderly to stand with the support of the installed grab bar in the toilet. Mirror located next to the washbasin also promotes comfort and safety to the elderly (Paiva et al., 2015). According to Feng et al. (2018), even flooring is also fundamental for the elderly to avoid impediments, while cleanliness is also important to prevent contagious and skin

diseases. Mei-yung (2017) highlighted that the use of contrasting colors in a building could reduce confusion among the elderly.

According to Gardner (2011), a balcony is very important for the elderly to feel connected to their neighbour. Al-Shaqi, Mourshed, & Rezgui (2016); Gardner (2011); Verma (2019) mentioned that businesses and services such as banks, groceries store, restaurants and others are important for the elderly who wish to age in place as those businesses and services enable the elderly to maintain their social network.

On the other hand, Lehmann, Syrdal, Dautenhahn, Gelderblom, & Bedaf (2013); Weeks & LeBlanc (2010) highlighted the importance of a safe and secured neighbourhood. Day, Boarnet, Alfonzo, & Forsyth (2006); Haselwandter et al. (2015) stated that safety aspects include safety from crimes, the provision of street lighting, neighbourhood surveillance, and protection from traffic like safe crosswalks, bike lanes, and sidewalks. Gated and guarded communities and the availability of 24-hour surveillance cameras are important for the elderly to prevent snatch thefts, house break-ins, and rampant. Having a few street lightings in the surrounding area to assist the elderly in walking and giving a comfortable view at night is imperative

According to Loukaitou-Sideris, Wachs, & Pinski (2019), proper lighting is an attribute to increase road safety for the elderly. Speed bumps are important to slow down the approaching vehicles (Loukaitou-Sideris & Wachs, 2018). Pedestrian lanes are believed to reduce the risk of accidents and, at the same time, increase safety (Verma, 2018). According to Nadine (2019), a garbage chute will ease the elderly in managing waste from their house. Farzana & Tanmoy (2019) added that maid service is important for the elderly to help them manage their basic necessities while aging in place.

Lift is essential in strata housing. Based on the results, a mirror in a lift is an attribute. The function of a mirror in the lift is to assist the elderly who are in a wheelchair to observe any obstacles behind them when they are unable to turn around and move backwards (Department of Standards Malaysia, 2014). Mei Yung Leung & Liang (2019), in their research, stated that a lift is important for the elderly to connect with their external environment when living in high-rise buildings. They further added that the lift should be elderly sensitive by providing benches for resting. Moreover, according to Yuen (2019), a grab bar is important in a lift to assist the elderly to age in place.

Open space is important for the elderly to encourage social interaction and, at the same time, ensure successful aging (Yung et al., 2016). Moreover, according to Yung et al. (2016), WHO (2007) has identified 11 elements to revitalize open spaces for the elderly, which include green spaces, walkways, outdoor seating, pavements, roads, traffic, cycle paths, safety, services, buildings and public toilets. According to Arnberger et al. (2017) and Paiva et al. (2015),

benches in the garden and outside space are important for elderly as resting points along the route. Darmawati (2019) asserted that open space or green space will be able to reduce the elderly's stress level, hence attractive open space or green space is necessary to increase the elderly's interaction. In addition, activities suitable for the elderly are considered social therapy for them (Darmawati, 2019). Besides, green space will be able to reduce the temperature by providing shading for outside activities (Arnberger et al., 2017). Loukaitou-Sideris, Levy-Storms, Chen, & Brozen (2016), further added, parks will increase the social interaction among the elderly. Social and recreational activities are said to improve the elderly's health (Mei-yung, 2017).

On the other hand, proper signage can assist the elderly to be independent (Mei-yung, 2017). Wei, Kiang, & Chye (2017) highlighted that a multipurpose hall is a critical attribute for aging in place in order to encourage and provide shared space for common use. Mei-yung (2017) further added that facilities that can cater to multipurpose activities are essential in improving the elderly's quality of life.

In addition, technologies must also be anticipated in designing a house for the elderly to help them overcome their weaknesses (Wright et al., 2014). According to Nordin et al. (2017), most elderly who live in an apartment usually engage in recreational activities such as watching television or listening to the radio. Hence, those attributes are important. At the same time, those attributes provide a valuable link to the outside world and society. At the same time, television will enable the elderly to live independently, remain active and stay healthy (Peek et al., 2016). Smartphones allow the elderly to have social interaction and social engagement to increase their quality of life (Wang et al., 2019). In addition, in their research, Joe et al. (2018) mentioned that the elderly could use their phones for health and wellness interventions, including management of diabetes, symptom management, and fall detection. According to Casado-Muñoz, Lezcano, & Rodríguez-Conde, (2015); Tatnall & Lepa (2003), telecommunication or internet is important for the elderly to enable them to communicate with their family and friends through email, to access information, to perform e-commerce activities such as paying bills, purchase of goods and services and electronic banking.

SUMMARY

From the theoretical perspective, the implications of this study are manifolds. First, the findings contribute to the growing body of knowledge in housing that enables the elderly to age in place in Malaysia. The suggested attributes for all the strata housing will enable the elderly to age in place gracefully, with less risk of hazards and accidents. The discovered housing attributes can be developed as a guideline for the elderly in Malaysia to age in place in strata housing. Moreover,

it will contribute towards the formulation and monitoring of more effective policies to promote aging in place.

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AN ANALYSIS ON THE EFFICIENCY OF GREEN ROOF IN MANAGING URBAN STORMWATER RUNOFF

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Abstract

Modernization has created new impervious urban landscape contributed to major catastrophe. Urban drainage system incapable to convey the excess rainwater resulting in flash flood due to heavy rainfall. The combination of green roof on building have tremendously proved to control stormwater efficiently. This study is conducted to review the efficiency of intensive and extensive green roof in reducing urban storm water runoff. This study identifies characteristic of green roof that contributes to lessening urban storm water runoff. Data was collected based on rigorous literature reviews and analyzed using meta-analysis. Overall, findings revealed intensive green roof performed better in reducing storm water runoff compared to extensive green roof. Green roof performance increases as the depth of substrate increased. Origanum and Sedum plants are both highly effective for intensive and extensive green roofs. The performance of green roof reduces as degree of roof slope increased.

Keywords: Flash flood, urban, green infrastructure, green roof, storm water

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INTRODUCTION

New urban landscape surface of densely walled with tall buildings were the effect from changes in economic development, population growth and mitigation from rural to urban areas. This situation may serve as evidence of a mismatch between land supply and brisk population growth in urban areas. Thus, new non-porous or impervious surface has been created in urban landscape. Past research found that conventional roofs consist of 40% to 50% of impervious area (Dunnett and Kingsbury, 2004). Countries that received large amount of rainfall every year viewed this new urban landscape as a catastrophic problem.

A non-porous surface creates elevated storm water runoff volumes and flow rates and engulf the existing centralized drainage systems. Storm water runoff created when rain falls on impervious surface and cannot be absorbed into the ground. It makes stream impairment in urban areas which cause by high volumes of water that rapidly transferred to local streams, lakes, wetlands, and rivers which trigger flood phenomena. Report from 2012 till 2016 from Department of Irrigation and Drainage Malaysia reported the major causes of flash flood in the urban area are due to several contributing factors including non-stop heavy rainfall, changes in land uses, and low water infiltration capacity. The impervious surface has changed the hydrological response of natural catchment areas which causes more frequent flooding episodes in the urban region.

Floods are natural disasters that have been affecting human lives ever since the beginning of time. Floods has been recorded among 50% from all natural disasters that cause deaths around the world (Du et. al., 2010). Tropical climate countries such as Malaysia also suffers this natural disaster which paralyse communities and cause destructions (Elias et. al., 2013). Malaysia has experienced several events of flash floods in the urban area including in Johor Bahru city centre and Kuala Lumpur city centre in 2007 and 2016 respectively. Flash floods were produced when the existing drainage systems does not able to withstand the excess rainwater from an intense burst of rainfall which often cause from thunderstorms.

Hence, there is an urgency to introduced mitigation measures in managing rainwater runoff as response to these disastrous events. Numerous countries have implemented green infrastructure in urban landscape as this solution is designed innovatively to restore environment and ecological damage. Trees and scrubs are found to be vital in avoiding flood disaster as the roots are naturally function as sponge to soak water that falls on the ground (Nagase & Dunnett, 2012; Razzaghmanesh et. al., 2014).

Scarcity of urban greenery and plantation may be due to the limited vacant land in urban areas. However, green initiatives such as green roof become one of the promising solutions to this issue (Bakar et. al., 2021). The green roof idea was constructed and created to encourage the development of numerous

types of vegetation on the top of buildings and thus deliver aesthetical, environmental and economic benefits (Vijayaraghavan & Raja, 2015). Besides, green roof is able to provide annual electricity energy savings by RM139 for residential buildings (Azis et. al., 2019).

Green roofs have been gradually implemented as part of urban stormwater management plans in urban areas. According to Razzaghmanesh and Beecham (2014), the appropriate designed of green roofs can function as storm water source control devices. Henceforth, this study is conducted to review the efficiency of green roof in managing storm water runoff in the urban area. This is conducted through determining the physical characteristics of extensive and intensive green roof that contributes in reducing storm water runoff. The data were collected from literature reviews and analysed using meta-analysis.

GREEN ROOF CONCEPT

Green roofs are comprised of five components which are water proofing membrane, anti-root sheet, a drainage layer, a filter layer, growth substrate (soil), and vegetation on the top of the structure. Waterproofing sheet is the individual anti-root sheet and placed as a base. The function is to cover the roof by redirecting water to the drainage ducts. Anti-root sheets are placed to avoid harm to the roof waterproofing layers. The drainage layer acts to prevent extreme water stagnation in the substrate that could be harmful to the vegetation. Filter is positioned on top of the layer to prevent parts of the substrate from forming sludge.

Besides, substrate is the layer that strengthens the vegetation and comprises the roots and nutrient materials. The upper layer of the green roof structure is the vegetation or plantation. This layer consists of resistant and aesthetically pleasing vegetation. The most planted varieties on green roofs are succulent's plants such as Sedum. Succulents' plants are best for endurance in green roof systems due to its characteristics of shallow root system and conservative water use strategy (VanWoert et al., 2005; Getter and Rowe, 2009).

Extensive green roof

Extensive green roofs typically have thin media and drought tolerant vegetation (Berndtsson, 2010; Getter et. al., 2006). Substrate depth of extensive green roof is constructed less than 150mm and can be installed on sloped roofs as high as 45 degrees (Renato and Sara, 2016; DeNardo et al., 2005; Mentens et al., 2006; Moran et al., 2003). This type of green roof does not require a complicated construction process (Sajedeh et al., 2015). These roofs are sown with smaller plants such as sedum species which able to provide full coverage of the vegetated roof.

Intensive green roof

An intensive green roof is a roof assigned with a substrate layer with a depth of more than 150 mm and have thicker substrates which may include trees, shrubs, and grasses (Sajedah et al., 2015; Kosareo & Ries, 2007; Mentens et al., 2007; Carter and Fowler, 2008; Getter and Rowe, 2006). Normally, this type of intensive green roof is set up when the on slope that is less than 10 degree as it can support multiple type of plant but need extra structural reinforcement (Mentens et al., 2003; Sajedah et al., 2015).

Table 1: Comparison of extensive and intensive green roof characteristic

Green roof characteristic		Type of green roof	
		Extensive	Intensive
Physical	Thickness of growing media	Less than 150mm	More than 150mm
	Type of vegetation	Combination of large plant and small plants e.g.: tress and shrub	Small plant e.g.: sedum, mosses, grass
	Roof slope	Up to 45 degree	Less than 10 degree
	Weight	Lightweight	Heavyweight
Management	Accessibility to roof top	Inaccessible	Accessible for recreational activities
	Cost	low	high
	Construction	Moderately easy	Technically complex
	Maintenance	Simple	complicated

HYDROLOGICAL PROCESS OF SLOWING STORM WATER RUNOFF BY GREEN ROOF

A green roof manages storm water runoff by reducing and prolonging the peak of water runoff process. Rainfall from asphalt and gravel rooftops produce 62% to 91% runoff (Voyde et al., 2010; Razzaghmanesh & Beecham, 2014). Green roof will detain certain water volume. Retained water will then either evaporate or be transpired by plants which dries out the substrate and regenerates retention capacity before the next rainfall event (Berretta et al., 2014; Poë et al., 2015). Figure 2 below explains the hydrological process of green roof.

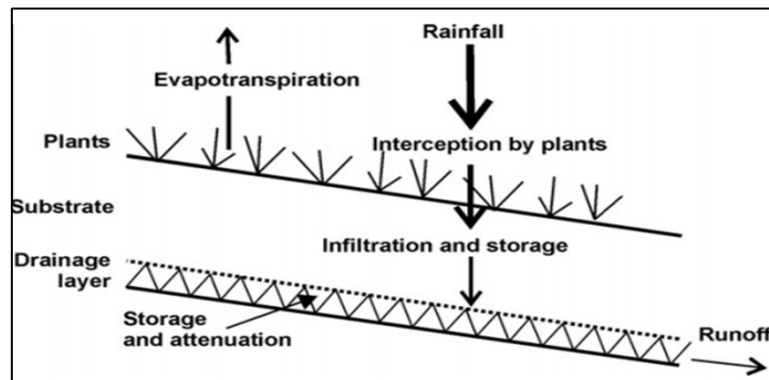


Figure 2: Green roof hydrological process
Source: Virginia et al. (2012)

EFFICIENCY OF GREEN ROOF IN REDUCING URBAN STORMWATER RUNOFF

There are two factors that control green roof water retention capacity and runoff volume which are green roof characteristics and weather conditions (Berndtsson, 2010). In general, green roof capable to lessen storm water runoff roughly 20% to 90% varying on type of green roof. The essential green roof characteristics that contributed to reducing storm water runoff are substrates depth, type of vegetation, and roof slope (Liu et al., 2019; Renato & Sara, 2016; Sajedeh et al., 2015; VanWoert et al., 2005; Getter et al., 2007). This study focuses on intensive and extensive green roof characteristics that influence water retention thus reduce storm water runoff accordingly.

EXTENSIVE GREEN ROOF

Substrate's depth

Numerous of studies have been conducted regarding the performance of substrate depth for water runoff retention purposes. A latest green roof study was conducted by Liu et al. (2019) at Gansu province, China. The experiment was conducted on extensive green roof with 150mm of substrate depth. The finding indicated that substrate depth contributes to 26.2% of rainwater retention. Razzaghmanesh and Beecham (2015) has constructed a scale model of extensive green roof at Adelaide, University of South Australia. The findings proved that at 100mm of substrate depth, green roof able to reduce 66% to 81% of storm water runoff. Overall, substrate depth between 5cm and 15cm can effectively reduce water runoff at approximately 23% - 81%. This indicated that deeper substrate depth provide higher storm water reduction.

Type of vegetation

Extensive green roof normally sown with smaller plants to provide comprehensive coverage of the vegetated roof (Berndsston, 2010). There are various types of vegetation for extensive green roof including sedum, vegetable, mosses, and centipede grass. Overall, these plantations able to provide 30% to 89% reduction of storm water runoff. According to a study by Whittinghill et al. (2015), the most effective type of plant for extensive green roof is Sedum plant.

Roof slope

Roof slopes affect the effectiveness of green roof in lessening storm water runoff. According to Getter et al. (2007), extensive green roof slope at 25 degrees able to retain water at 75%. Meanwhile at 2 degree of roof slope, it able to produce larger water retention at 85%. Overall, elevated degree of roof slope can decrease green roof performance in reducing storm water runoff.

INTENSIVE GREEN ROOF

Substrate's depth

Intensive green roof with deep substrate capable to deliver 60% of water retention (Viola et al., 2017). Simulation research on intensive green roof by Renato and Sara (2016) shows that intensive green roof able to reduce storm water runoff at 29%, 33%, 40%, and 54% at 200mm, 400mm, 800mm, and 1600mm of substrate depth, respectively. Mentens et al. (2006) has proved in his study that intensive green roof with 155mm substrate depth contributes to 65% to 85% of water retention performance. Overall, substrate depth between 155mm and 1600mm can effectively reduce water runoff at approximately 29% - 92%. This result has proved that the deeper the substrate, the higher the water retention performance.

Type of vegetation

Size and structure of plants significantly influenced the amount of water runoff. Plant species with taller height, larger diameter, and larger shoot and root were more effective in reducing water runoff than plant species with shorter height, smaller diameter, and smaller shoot and root biomass (Nagasea and Dunnett, 2012). It was found that Origanum (tall plant) able to reduce higher storm water runoff than sedum (short plant). Origanum and sedum plant are able to reduce storm water runoff at 79% and 76% respectively.

Roof slope

Roof slopes influence the effectiveness of intensive green roof. According to VanWoert et al. (2005), intensive green roof slope at 6.5 degree can retain 66% water runoff while at 2 degrees, it retains water at 87%. Overall, higher degree of roof slope reduces the performance of intensive green roof in reducing storm

water runoff. The summary of extensive and intensive green roof performance is tabulated in Table 1 below.

Table 1: Extensive and Intensive green roof performance in storm water runoff reduction

Green roof Attributes	Percentages of storm water runoff reduction (%)		Authors
	Intensive	Extensive	
Substrate depth	29% (200mm) 33% (400mm) 40% (800mm) 54%(1600mm)	26% (50mm) 27% (100mm)	Renato and Sara (2016)
	65% - 85% (155mm)	27% – 81% (100mm)	Mentens et al. (2006)
	85% - 92% (300mm)	66% - 81% (100mm)	Razzaghamanesh and Beecham (2015)
	85%	60%	Sajedeh et al., (2015)
	65.7% (170mm)	-	Speak et al. (2013)
	60%	53%	Viola et al. (2017)
	-	45% - 60% (150mm)	DeNardo et al.(2005);Mentens et al. (2006); Moran et al.(2003)
Type of vegetation	77% (sedum) 79% (origanum)	70% (sedum) 71% (origanum)	Konstantinos et al.(2017)
	-	66% (sedum)	Rowe et al. (2003)
	-	47.4% (centipedegrass)	Shuai et al. (2019)
	-	89% (sedum) 35% - 88% (Vegetable)	Leigh et al.(2015)
Roof slope	87% (2 degree) 65.9% (6.5 degree)	-	VanWoert et al. (2005)
	-	85.2% (2 degree) 75.3% (25 degree)	Getter et al. (2007)
	-	28% (2 degree) 25.8% (12 degree)	Wen et al. (2019)

COMPARISON BETWEEN INTENSIVE AND EXTENSIVE GREEN ROOF PERFORMANCE FOR STORM WATER RUNOFF REDUCTION

Figure 3 and Figure 4 illustrate the performance of intensive and extensive green roof in reducing storm water runoff. Both figures have proved there are positive relationship between performance of green roof in reducing storm water runoff

and depth of substrate. Overall, intensive green roof provides higher percentages of storm water runoff at 54% compared to extensive green roof at 45%.

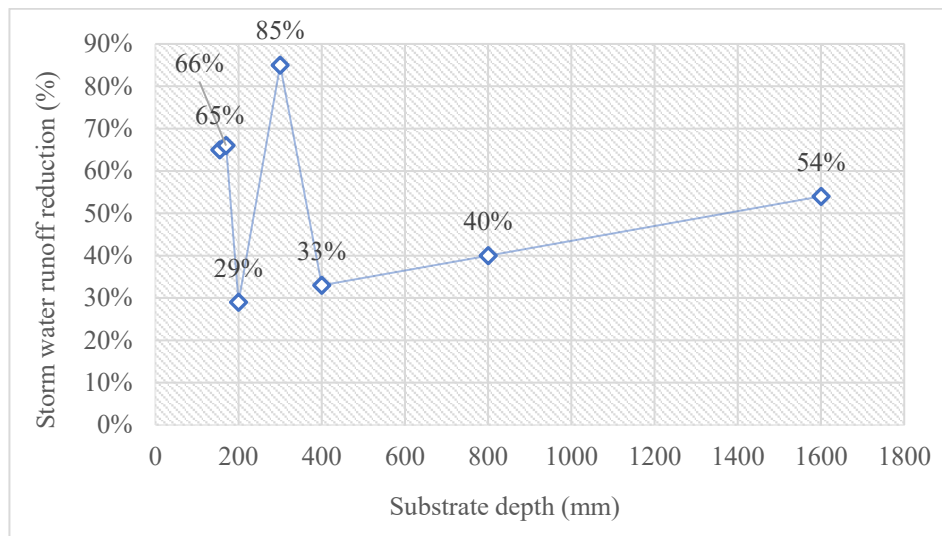


Figure 3: Performance of Intensive green roof based on substrate depth

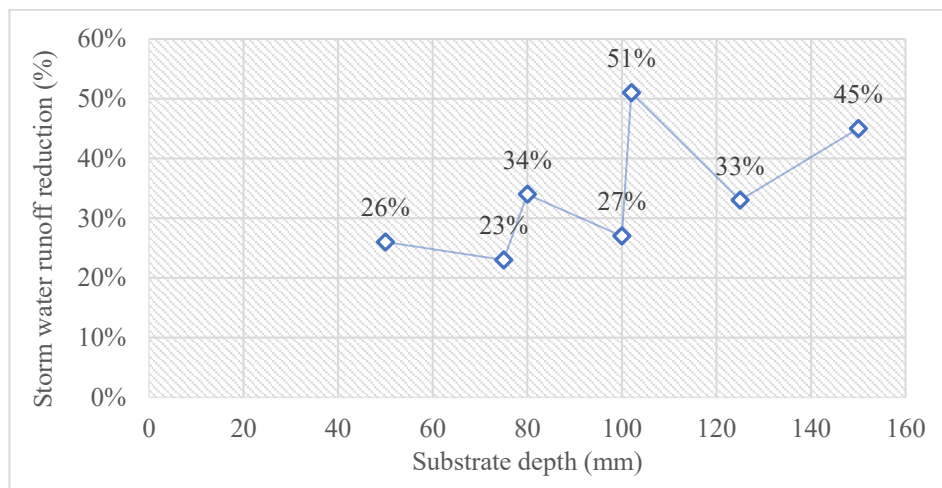


Figure 4: Performance of Extensive green roof based on substrate depth

Meanwhile, Figure 5 and Figure 6 illustrate the performance of both green roof based on type of vegetation. The result shows that for intensive green roof, Origanum plant provides slightly better storm water runoff reduction at 79% compared to Sedum at 76%. This highlighted that tall plant is more effective to

be used for intensive green roof. The result is also similar for extensive green roof where origanum and sedum provides highest storm water reduction at 71% and 66% respectively. This indicated that origanum plant and sedum plant are the best efficient type of vegetation for intensive and extensive green roof for storm water reduction purposes. Specifically, origanum plant and sedum plant are the most effective under intensive green roof structure than extensive green roof structure.

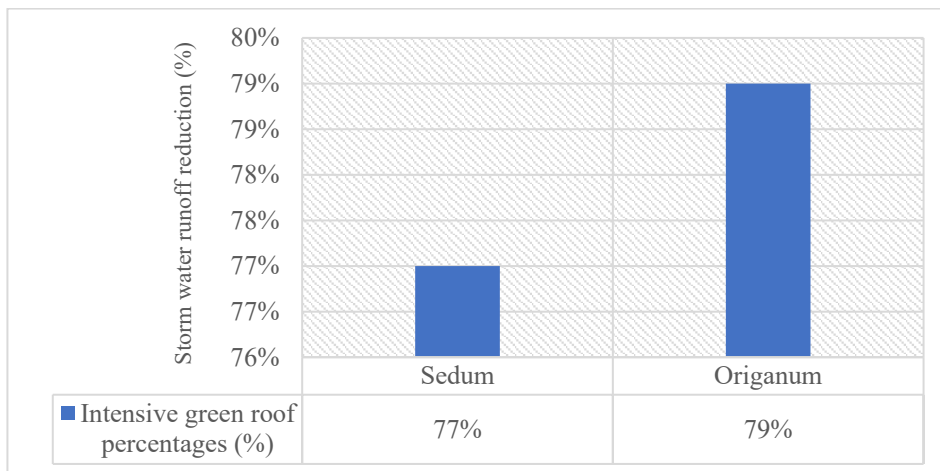


Figure 5: Performance of Intensive green roof based on type of vegetation

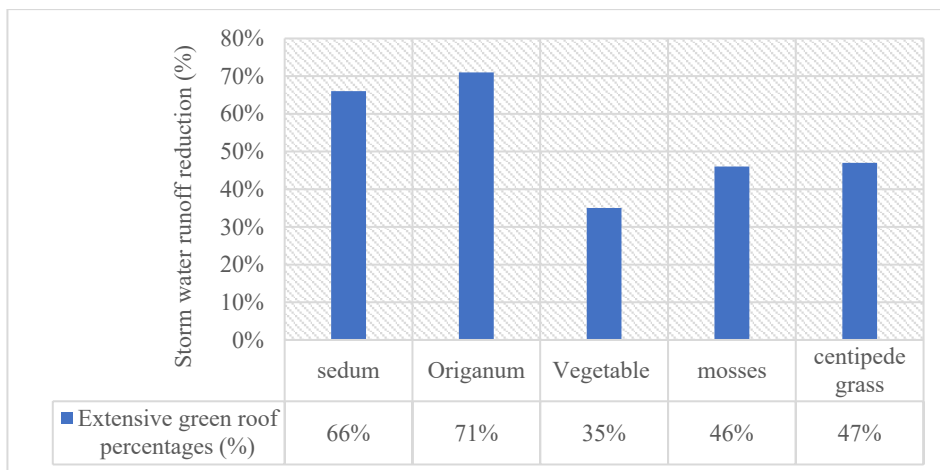


Figure 6: Performance of Extensive green roof based on type of vegetation

Figure 7 illustrates the performance of intensive and extensive green roof according to the degree of roof slope. The result indicated that higher degree of roof slope reduces the performance of green roof in reducing storm water runoff.

For intensive and extensive green roof, roof slope at 2 degree provides higher storm water runoff reduction at 87% and 85% compared to roof slope at 6.5 degree and 25 degrees. Higher roof slope reduces the performance of intensive and extensive green roof. Overall, to achieve highest performance of intensive and extensive green roof, the degree of roof slope must be reduced to minimum degree.

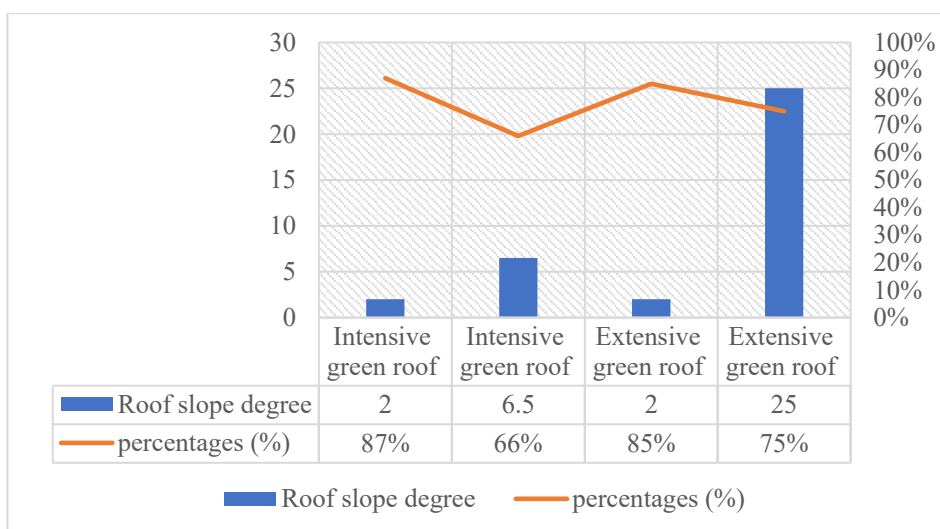


Figure 7: Performance of Intensive and Extensive green roof based on roof slope

CONCLUSIONS

To conclude, green roof is an effective and environmentally friendly strategies to manage flash flood in urban area though reducing volume of storm water runoff. Generally, intensive green roof performed better in reducing storm water runoff than extensive green roof. There are several attributes of green roof that influences the performance in reducing storm water runoff including substrate depth, type of vegetation, and degree of roof slope. The performance of green roof has positive relationship with depth of substrate. Deeper substrates increase the percentages of storm water runoff reduction. Meanwhile, the performance of green roof has negative relationship with degree of roof slope. Higher degree of roof slope decreases the performance of green roof in reducing storm water runoff. This study is significant mechanism to strategies for urban flash flood control by the government and other relevant parties.

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FACTORS CAUSING FAILURE IN COMPLETING REASSESSMENT WORK AMONG APPOINTED VALUATION FIRMS

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Abstract

Property tax is a main source of local authority and contributes to nation's development. Local Government Act 1976 (Act 171) has authorized local authority as the responsible party in levying property tax. Based on pilot study, there is an urgency in conducting property tax reassessment due to the lack of manpower in valuation department. Besides, it was found that the outsource solution by appointing private valuation firm also failed to complete the reassessment within dateline. Hence, this study is conducted to scrutinize the most significant factors that cause failure in completing reassessment work among private valuation firm appointed by local authority. Questionnaires were distributed among local authority within Iskandar region to rank the most important factors that cause the failure. The results shows that workload increase, and time constraint is the most prominent factors that cause failure in completing the reassessment work. This paper is significant for local authority in handling the problem regarding reassessment work among appointed valuation firm.

Keywords: Local authority, tax reassessment, valuation firm, failure

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INTRODUCTION

The IAAO (2013) defines property tax assessment as property valuation officially for the taxation purposes. Property tax assessment value is defined as the market value of property on the date based on tone of the list which could derive from the basis of annual value or improved value (Ibrahim, 2009). Property tax assessment can also be referred to as tax collected by local authorities to cover expenses for services and development (Ariffian and Hasmah, 2014). The property tax assessment that was collected from the taxpayer and has become the major source of income for local authorities (Pawi et al., 2011). According to Local Government Act 1976 (Act 171), property tax reassessment must be conducted once every five years and valuation list must be prepared before conducting reassessment work. Valuation list is a complete record that consist of information related to the holding such as the location of the property, district, file number, lot number, house number, name of the owner, owner address, basis of property tax assessment (annual value or improved value) and date of valuation list. The valuation list is important to local authority as before it is gazette, it must be advertised in two local newspaper and at least one of it is in national language based on Local Government Act 1976 (Act 171). The purpose of the advertisement is to ensure owner aware on the tax rate that are imposed on their holding property. During the reassessment work, thousands of properties need to be inspected and assessed by the local authority. However, property tax reassessment work must be completed within 5 years to avoid issues in collecting tax. Private valuation firm are then appointed to conduct the reassessment work under local authority observations. However, several issues arise regarding reassessment work in preparing valuation list which are limited space provided, lack of manpower and expertise (Ariffian and Hasmah, 2014). Therefore, this study is conducted to determine the cause of failure in completing reassessment work among appointed valuation firm.

PROPERTY TAX

Tax revenue is used to finance government expenditure for providing services to public in defense, healthcare, education, law and internal or external effects on the market (Ariffian and Hasmah, 2014). Taxation can be one of ways to reallocate income for national growth and offset social benefits with production costs. Every tax system has certain characteristics or criteria in order for it be imposed efficiently.

The Great Recession during late 2000s and early 2010s certainly affected the national economy and funds. Authority funds are affected in terms of income and spending, monetary and spending, budgeting and public worker benefits and recompense (Chernick, Langley and Reschovsky, 2011; Conant, 2010; Levine and Scorsone, 2011). According to Alm, Buschman and Sjoquist

(2011) and Lutz, Molloy and Shan (2011), Great Recession causes the local authority to depend on the assessment.

Property Tax Assessment

The purpose of enacting property tax is to accommodate local authority expenses such as cost to manage drainage maintenance, roads, public utilities, management, and other expenses. Tax assessment is considered to be the largest contributor to local authorities fund to manage public finances and resources for urban management and border development administration (Pawi et. al., 2011; Lim et. al., 2017). Factors that determine property tax are type of holding usage, land size, building size, type of construction materials and other influential factors and is evaluated based on the market value.

There are four types of property that are subjected to assessment tax which are building residential, commercial buildings, industrial buildings, agricultural land including vacant land or undeveloped land. The amount of assessment tax is based on the percentage rate on the value added which is determined by the Valuation and Property Management Department (JPPH). Property tax reassessment are performed every five years to update valuation list of holding property. The purpose of reassessment is to marks any changes on the building such as renovation or extension upon the land which will affect the market value of holding property.

Basis of Property Tax Assessment

The basis of assessment is important as it is fundamentally used in taxation process. Section 2 of Local Government Act 1976 states that there are two basis in determining property tax assessment which are annual value and improved value. Improved value is used as the basis in tax assessment in Johor and Melaka state while annual value is used in the remaining states in Malaysia.

Annual Value

The annual value can be defined as a reasonable amount of gross rental value of a holding without any implication of forced, restrictions or control over the rent (Jaafar & Ismail, 2017). Annual value is the estimated gross annual rent that is available or expected from year to year through such holding where the holding owner shall pay expenses for repairs, insurance, maintenance, and public taxes.

Improved Value

Improved value is used as the basis of tax assessment in state of Johor. Section 2 of Act 171 defines improved value as: 'The price that an owner willing, and not obliged to sell might reasonably expect to obtain from a willing purchaser with whom he was bargaining, for sale and purchase of the holding.' In accordance with the provisions under section 130 of Act 171, assessment tax may be levied

on the improved value of such property, but this principle is less practiced in Malaysia. Section 130 (3) of the Act has provided the rate of property tax assessment based on improved value which are 5 percent as a general rate, 1 percent as drainage rate, and 1 percent as removal and cleaning rate (Michaely, Vila & Wang, 1996).

OUTSOURCING VALUATION WORK

In recent years, authority has often looked to outsourcing and contracting out as means of addressing talent shortfalls and driving efficiencies. Such measures have encountered resistance from unions, which represent over half of all public sector workers. As a result, local authority has opted to involves the adoption of insourcing. Agencies are now focused on defining which functions are better performed by authority and which are better performed by insourced contracted talent.

However, insourcing is no better than outsourcing in the impending employment crisis. Insourcing depends on recruitment of for-hire external expertise and relies on a management model which directly involve authority as much as outsourcing does.

PILOT STUDY

A pilot study has been conducted to verify major issues faces by local authority in conducting reassessment work. The pilot study has been conducted within several local authority including Iskandar Malaysia Region which are Iskandar Puteri City Council, Johor Bahru City Council, Pasir Gudang Municipal Council, Kulai Municipal Council and Pontian District Council. The result of pilot study showed that there is an urgency in conducting the reassessment work which is lack of manpower in local authority valuation department.

To address this issue, local authorities have privatized the reassessment work to the private valuation firm. According to the pilot study, there is an issue in appointing private valuation firm which is failing to fulfil reassessment work within given period of time. If private valuation firm failed to carry out their responsibilities in reassessment work, it will cause a problem to the local authority in collecting assessment tax from owner of the holding property. Table 1 and 2 shows the issues faced by local authority and valuation firm in completing property tax reassessment.

Table 1: Issues in Local Authority

No.	Issues in local authority
1	Lack of manpower
2	Lack of expertise
3	Limited building spaces
4	Time constraint

5	Lack of an efficient data
6	Monetary saving
7	Political issue

Table 2: Issues among appointed valuation firm

No.	Issues among appointed valuation firm
1	Slow resolution times
2	Slow response time
3	Giving rise to quality problem
4	Time constraint
5	Loss of control featured a dominant reason
6	Fail to resolve conflict and any dispute
7	Fail to achieve objective (completing work)

FACTORS THAT CAUSE FAILURE IN COMPLETING REASSESSMENT WORK AMONG APPOINTED VALUATION FIRM

Factors cause failing in reassessment work are identified from content analysis in literature studies. Past research has investigated the impediment factors in property tax revaluation found that there are four impediments factors which are lack of knowledge, lack of workforce, cost constraints, and time constraints in property tax revaluation (Atilola et. al., 2019; Abd Rahman et. al., 2021). These factors are used in forming questionnaires to determine the rank for failure factor. The findings from literature review are tabulated in Table 3.

Table 3: Failing Factor in Reassessment Work

Finding	Author
Lack of top management	Abdullah et. al. (2012), Mamat et. al. (2012)
Lack of training and education	Mohsen (2012), Abdullah et. al. (2012),
Difficulty in allocation of personnel responsibilities	Mzni (2011), Abdullah et. al. (2012),
Lack of cooperation among internal departments	Amirtash et al., (2012)
Resistance to change	Osman et. al. (2014)
Lack of leadership	Bente (2014)
Lack of qualified personnel	Bujang & Zarin (2014), Abdullah et. al. (2012)
Lack of human resources	Bujang & Zarin (2014), Dock (2009)

Lack of involvement, cooperation and commitment from employees	Harvey Brown (1999) and Roth (1997)
Lack of motivation	Magne Jorgensen (2014),
Workload increase	Amar & Mohd. Zain (2002), Chirantan Basu (2005)
Time constraint	Chirantan Basu (2005)
Difficulty in preparing documentation (inspection)	Amar & Mohd. Zain (2002), Chirantan Basu (2005)
Lack of related information	Bénézech et al., (2001), Abdullah et. al. (2012)
Improper control of documents and data	Allen & Chandrashekar (2000), Hartshorne (2015)
Building spaces	Bujang & Zarin (2014), Abdullah et. al. (2012)
Lack of efficient data system	Bénézech et al., (2001), Abdullah et. al. (2012)
Data system interruption	Marc J. S. et, al. (2015), Gill (2013)
Financial	Gill (2013), Grimshaw et al. (2015), Diaz-Mora & Triguero-Cano, (2012)
Communication	Sonfield (2014), Sutter & Kieser (2015)

DISCUSSION AND ANALYSIS

55 questionnaires have been distributed to appointed valuation firm within Iskandar Malaysia Region. The questionnaires are divided into to sections which are section A and section B. Section A consists of respondents' profile including gender, job position and years of experience. Meanwhile, in section B consists of consist six categories of factors that cause failure in completing tax reassessment which are time, resources, human factor, financial, and communications. The questionnaires were distributed among registered valuer, valuer, trainee, and contract staff which have experience in handling tax reassessment work from local authority. Majority of the respondents have 2-10 years of experience in property tax assessment.

Table 4 shows the mean value for each failure factor in reassessment work arrange according to the six categories. The results shows that workload increase in time category has the highest mean value by 3.40. Besides, time category has a higher average mean value compared to other categories. Factor that received lowest mean value is lack of qualified personnel and lack of involvement, cooperation, and commitment from employees with 2.55, each.

Table 4: Failure Factor in Reassessment Work

Category	Factors	Mean
Time	Workload increase	3.40
	Time constraint	3.33
	Difficulty in preparing documentations (inspection)	3.05
Resources	Limited building spaces to put all files	3.09
	Lack of related information	3.04
	Data system interruption	2.93
	Lack of an efficient data system	2.85
	Improper control of documents and data	2.73
Human Factor	Lack of human resources	2.95
	Lack of motivation	2.89
	Lack of leadership	2.62
	Lack of qualified personnel	2.55
	Lack of involvement, cooperation, and commitment from employees	2.55
Financial	Lack of financial	2.67
Management	Resistance to change	2.85
	Lack of cooperation among internal departments	2.75
	Lack of top management and commitment	2.56
	Difficulty in allocation of personnel responsibilities and authority	2.56
	Lack of training and education	2.47
Communication	Lack of communication	2.64

Table 5: Average Mean Value based on Category of Failure Factors in Reassessment Work

Category	Average Mean Value	Rank
Time	3.26	1
Resources	2.93	2
Human Factor	2.71	3
Financial	2.67	4
Management	2.64	5
Communication	2.64	6

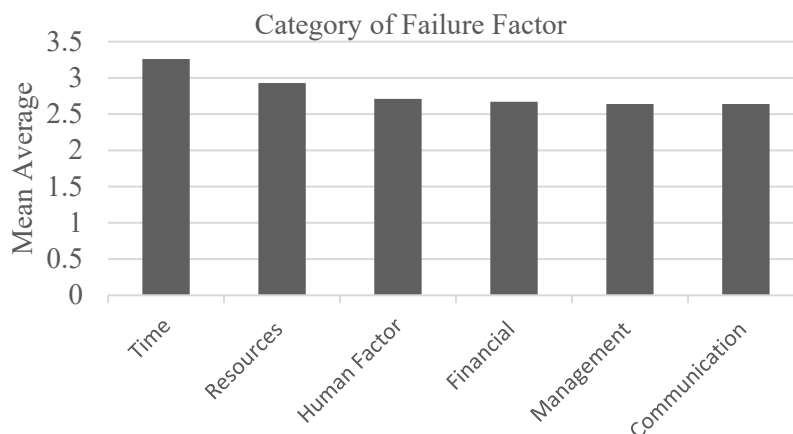


Figure 1: Average Mean Value based on Category of Failure Factors in Reassessment Work

Table 5 and Figure 1 illustrates the average mean value based on category of failure factors in reassessment work. The category of failure factors is ranked based on the average mean value. Based on the charts, time category has the highest average mean value and considered the most prominent category of failure factors in completing property tax reassessment work.

Table 6: Mean Value Rank Failure Factor in Reassessment Work

Index Scale	Index Range	Factors	Mean	Rank
Strongly Agree	3.27 - 3.46	Workload increase	3.40	1
		Time constraint	3.33	2
Agree	3.07 - 3.26	Limited building spaces to put all files	3.09	3
Neutral	2.87 - 3.06	Difficulty in preparing documentations (inspection)	3.05	4
		Lack of related information	3.04	5
		Lack of human resources	2.95	6
		Data system interruption	2.93	7
Disagree	2.67 - 2.86	Lack of an efficient data system	2.89	8
		Resistance to change	2.85	9
		Lack of motivation	2.85	10
		Improper control of documents and data	2.75	11
		Lack of cooperation among internal departments	2.73	12

		Lack of financial	2.67	13
Strongly Disagree	2.47 - 2.66	Lack of communication	2.64	14
		Difficulty in allocation of personnel responsibilities and authority	2.62	15
		Lack of leadership	2.56	16
		Lack of qualified personnel	2.56	17
		Lack of involvement, cooperation and commitment from employees	2.55	18
		Lack of top management and commitment	2.55	19
		Lack of training and education	2.47	20

Table 6 describes the summary of the final findings of this study. The respondents strongly agree that workload increase, and time constraints is the most prominent factors that cause failure in completing property tax reassessment with mean value of 3.40 and 3.33, respectively. Besides, the respondents also agree that limitation in building spaces to put all files contributes to failing to complete the reassessment work. Moreover, factors such as difficulty in preparing documentations (inspection), lack of related information, lack of human resources, and data system interruption has no effect on completing the reassessment work. However, the respondents mostly disagree that the remaining factors cause failure in completing property tax reassessment with mean value ranged from 2.47 to 2.89.

CONCLUSION

To conclude, time factor is rank 1 as the failure factor in tax reassessment work faced by the appointed valuation firm. Time factor, specifically workload increase, and time constraints are the major issues faced by the appointed valuer to complete the tax assessment work. Tax assessment is important to local authority because they are responsible to ensure the facilities and services were provided to the public and satisfied their needed under local authority jurisdiction. Hence, the reassessment work must be carried out to ensure the facilities and services provided in the best standard. Working environment must be enhance because to make sure the result of the work is in the best result. Thus, the failure factor in reassessment work will be decrease and prevent.

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HOUSING PREFERENCES: AN ANALYSIS OF MALAYSIAN YOUTHS

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Abstract

Housing preferences among Malaysian youths are an important issue because the housing unit prices nowadays are often unaffordable. Malaysian youths confront various challenges nowadays, including marriage, relocating away from home upon graduation, and finding new work opportunities. Youths have developed into the primary section of the housing market who are constantly faced with housing options and decisions. Besides, youths have different preferences for housing characteristics throughout their particular stage of life, which will significantly impact their future lives. Data was gathered from a survey questionnaire answered by 174 Shah Alam youths aged from 18 to 35. This research focuses on identifying the preferred types of houses chosen by youths, involving features such as location, housing price and type of house to live in. The results also showed that the highest-ranked preferred factors were the financial factors, followed by the neighbourhood, location, and design factors.

Keywords: Housing preference, youth

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INTRODUCTION

Vision 2020 envisions a fully developed Malaysian society in all aspects, not only economically but also socially, justly and politically stable. Malaysian should enjoy a best quality of life, social wellbeing and spiritual values.

The younger generation has a hard time purchasing a property. House purchasers are discovering that acquiring their ideal house has become significantly more complicated. Unfortunately, the costs of potential properties tend to be above their budget. Young adults seem unable to buy a decent, adequate, and livable property that does not force them to take out a large bank loan or relocate to a remote and unexciting housing development that requires lengthy daily travels.

Wu (2010) indicated that because youths are undergoing a tough time of life, such as leaving the family house for employment prospects and marriage, they are likely to have different housing preferences. As a result, youths frequently consider the environmental factors and services available in a particular locality while acquiring a home. According to a study by Gateshead Council on April 2009 survey determined that young people's housing needs and ambitions, the critical need of young people in terms of housing is for additional housing alternatives since many young people feel constrained by their present housing options.

Many researchers have endeavoured to clarify homebuyers' preferences based on demographic and socio-economic characteristics. Based on classic research conducted by Rossi and Weber (1980), housing choices might vary by age, household capacity, income, and present housing situation.

Most studies on housing preferences are generally concerned with demographic and socio-economic factors, such as different age groups and family size (Berko, 2000). According to Al-Momani and Box (2000), the preference factors are lifestyle, values and family patterns. Other factors are education, age, family income and the nature of a buyer's employment organisation (Wang and Li, 2006).

RESEARCH BACKGROUND

Youths, especially those living in metropolitan regions such as the Klang Valley, are presently facing real challenges in purchasing a home as the cost of housing continues to grow at an alarming rate. Youths can be considered the most active population in terms of migration. According to Hoek J. (2016), young adults represent the cohort or age group between 18 and 35 years old. People in this age range can translate from their parents home to become independent and start to build an individual household of their own. According to Heath (2008), youths frequently take a 'live for today' approach toward financial planning, whereas saving is viewed as an 'adult' behaviour. Youth have the lower-than-average financial knowledge and limited access to financial services. Leaving the family

home frequently results in an increased awareness of one's financial responsibilities.

High housing costs have meant youths prefer to choose rental units rather than purchasing a house. Youth are more likely than other age groups to experience homelessness and rent housing. Additionally, the majority of people acquire their first house in their late 20s or early 30s (Hong, 2011). This situation shows that many youths, in particular, are unlikely to own or purchase a house. For example, a survey conducted by Malaysian government workers Zaimah et al. (2012) on 250 youths under 40 discovered that only 40% of respondents owned their homes. Another study reported that the housing problem in Malaysia is more related to accessibility issues for the low-income group (Junaidi et al., 2012), including youths. This scenario because of the low supply of low-cost or affordable housing, as well as the low-income level among locals.

According to the Star (2014), fifty (50) percent of Malaysia's population was forty (40) years old or younger. Thus, based on this scenario, half of Malaysia's population is expected to be youths who are disadvantaged in the housing market.

Housing is a basic human need that maintains people's quality of life. Additionally, a house is a safe place that reflects cultural perceptions and occurrences. It is a cultural unit of space that encompasses actions that occur and vary in their significance and use as fundamental rituals (Al-Homoud, 2009). Thus, housing should not have been built or given just for the purpose of providing shelter but also to accommodate people's preferences and other requirements. Considering the housing issues and scenarios, this study aimed to identify youth housing preferences and develop suggestions based on the research findings.

LITERATURE REVIEW

Housing preferences are distinguished into two related terms, which are housing expectation and housing aspiration. Housing aspiration refers to a future-oriented desire for housing or standards, whereas expectation refers to a realistic evaluation of future housing circumstances (Thanaraju et al., 2019).

The importance of investigating the relationship between housing preferences and personal characteristics is due to the consequent ability to identify variations in housing preferences between different population groups (Shi, 2000). If it is established that different segments of the population have distinct housing preferences, this will have a substantial impact on housing design and research. For example, it is believed that older people like to live in areas near open space but not too close to shopping centres. Thus, a housing designer should consider this when building flats or buildings for senior citizens.

Housing affordability for the young generation has deteriorated to precarious circumstances (Nor Suzylah Sohaimi, 2017). A household's housing

choice or decision can be influenced by a variety of socio-demographic factors (Kömürlü, 2013). To instance, household composition is a critical factor to consider when determining housing choices. The size of households results in varying housing demands, which results in distinct housing preferences. Meanwhile, both single-family homes and suburban locations are favourably associated with family size. Secondly, age is an essential factor to consider when determining the composition of households, since as individuals go through their lives, they may require a variety of living environments. Furthermore, marital status probably has an effect on housing preferences.

Housing Preferences

Housing preferences can be classified into two broad modelling approaches (Harold W. Elder, 1991). The first one is revealed models based on household observational data and actual housing decisions in the proper market. Meanwhile, stated models are predicated on the premise that observed choices would be mirrored in the effect of preferences, market circumstances, and housing availability (Karsten, Lia. 2007). Social-demographic descriptors do not only influence house preferences, but equally important are buyers' intentions and their financial situations (Lim Poh Im, 2018). When no one choice offers a clear benefit, housing preference indecision may lead to deferral. For a long time, researchers have noted that there is no apparent distinction between preference and choice; thus, they are frequently entwined. Ameera (2019) highlighted that decision is frequently motivated by personal preferences.

Also, researchers have emphasised that because the choice is a mirror of preferences, individuals may deduce their preferences just by witnessing their own choices. According to a recent survey, about 60% of Lagos residents were renters. Because most of the existing housing was provided by private landlords, most of them had to pay rent that was 50-70 percent of their monthly income (Olugbenga Taiwo, Yusoff, and Aziz 2018).

The majority of research that examine consumer housing choices employ the hedonic pricing framework, which is predicated on the concept of housing characteristics or house purchase considerations (Opoku & Abdul-Muhmin 2010). The relevance of housing variables in housing research is emphasised further by their inclusion in discrete choice models of housing, as well as by the numerous empirical studies examining their relative importance in consumers' housing decisions across a variety of national settings. Numerous studies have indicated that various unique housing characteristics and home purchasing variables impact people's housing choices (Ling, 2016).

These range from intrinsic housing attributes such as cost and size, to extrinsic attributes such as exterior design and exterior space, to the neighbourhood and other locational factors such as pollution (Chin, 2016). There has been considerable discussion concerning the relative relevance of internal and

extrinsic factors in house selection. It finds that residential location decisions are influenced by factors such as neighbourhood and school quality, as well as perceived neighbourhood safety (Salleh, 2015).

Similarly, Levine (1998) discovered that commute time is a significant predictor of the residential location at the regional level. Providing affordable homes near work concentrations can affect low- to moderate-income and single-worker households' residential location preferences. On the contrary, Kauko (2006) discovered that customers prioritise housing functioning and spaciousness above location, whereas Giuliano and Small (1993) claimed that other variables influence location selections more than commute expenses.

Factor Affecting Housing Preferences

Phan (2012) highlighted the five factors that affect the house purchasing decision, which are the financial status, location, neighbourhood, exterior design and interior design, as shown in Table 1.

Table 1: Factors Affecting Housing Preferences

Factors	Attributes
Location	Presence of shops nearby
	Availability of retail centres nearby
	Presence of public infrastructure nearby
	Presence of schools nearby
	Distance travelled to work
Neighbourhood	Safety neighbourhood
	Level of pollution
	Presence of guarded and gated security
	Green environment
	Cleanliness of surroundings
Financial status	Housing price
	Mortgage loan
	Payment terms
	Income level
Interior design and space	Size of the building
	Number of floors
	Building layout design
	Number of bedrooms and bathrooms
	Type and quality of finishing
Exterior design	Building orientation
	Size of garden

These factors and attributes were adopted in order to conduct the questionnaire survey in this study.

RESEARCH METHOD

Scope of research

This study focuses on the parameters of the preferences of Malaysian youths, covering the aspects of financial status, location, neighbourhood and design. The housing preferences of the youth generation of different socio-economic backgrounds, such as age, employment and income, were analysed. Youth is best viewed as a transitional stage between childhood dependency and adult independence. Youth is a more flexible category than other set age groupings. However, age is the most straightforward way to describe this group, particularly in terms of education and work, because the term ‘youth’ frequently refers to someone between the ages of leaving compulsory education and obtaining their first job (Nations, 2008).

Case Study

The target respondents were youths staying in Shah Alam, Selangor, and aged between 18 and 35. This research aims to determine the housing preference factors for youths who stay in Shah Alam, which is the capital city of Selangor.

Questionnaire survey and sampling of respondents

The questionnaire survey was carried out to identify the housing preferences of respondents in the study area. The questions in the questionnaire covered the following aspects:

- a) Socio-economic background (e.g., gender, income, education, employment and homeownership).
- b) Housing preferences (e.g., location, financial status, neighbourhood and design).

The information was collected by randomly distributing questionnaires to youths in Shah Alam and 174 respondents participated. The respondents were chosen using a simple random sampling technique. The probability that a population sample would be selected was the same for the different housing areas in Seksyen 7, Shah Alam.

The samples covered both male and female residents who had various socio-economic backgrounds and were within the 18 to 35 age group.

Table 2: Background of Respondents

Variables	Percentage (%)
Gender	
Male	44%
Female	56%

Age	
18-21years old	7%
22-24 years old	31%
25-28 years old	39%
29-31 years old	10%
32-35 years old	13%
Race	
Malays	64%
Chinese	17%
Indian	19%
Marital Status	
Single	59%
Married	38%
Divorced/Widowed	3%
Number of Children	
No Child	67%
One Child	14%
Two Children	9%
Three Children and above	10%
Household Income	
RM999 and below	48%
RM1000-RM2999	37%
RM3000-RM7999	9%
RM8000 and above	6%
Current Homeownership	
Owner	11%
Renting	63%
Family home/shared	26%
Length of Stay	
1-5 years	48%
6-10 years	32%
11-15 years	10%
16-20 years	7%
>20 years	3%
Employment	
Self-employed	27%
Unemployed	6%
Employed	41%
Housewife/Unpaid work	6%
Student	20%

Education background	
SPM and below	7%
STPM/Certificate	6%
Diploma	31%
Degree	44%
Master's	8%
Phd	4%

Table 2 shows that about 50% of the respondents were aged between 22 and 28. The majority of the respondents also represented lower-income groups, with forty-eight (48%) per cent earning below RM999 and thirty-seven (37%) per cent earning between RM1000 and RM2999. The demographic details also show that only eleven (11%) per cent of them owned a home, while sixty-three (63%) per cent were renting houses and the rest stayed with family members.

METHOD OF ANALYSIS

The data were analysed using the frequency and cross-tabulation tests provided in the Statistical Package for Social Science (SPSS) software. The analysis's objective was to identify the housing preferences of Malaysian youths living in the study area. The data were analysed to investigate the relationship between the housing choices of the research area's youthful generation and their income level and present housing situation.

THE RESULTS AND FINDINGS

Table 3: Housing Preferences among Malaysian Youths

Variables	Percentage (%)
Housing Location	
Urban	72.6%
Suburban	14.23%
Rural	13.17%
Housing Type	
Landed	60.92%
High-Rise Building	39.08%
Preferred House to Live	
Terrace	21.78%
Semi-Detached	10.31%
Bungalow	17.20%
Apartment	17.20%
Flat	4.84%
Condominium	17.20%
Others	11.47%

Housing Price	
RM42,000-RM100,000	38.82%
RM100,000-RM200,000	34.94%
RM200,001-RM250,000	19.99%
RM250,001-RM500,000	4.97%
RM500,001-RM1,000,000	1.28%

Table 3 shows the housing preferences of the respondents. In terms of the housing location, the majority of respondents, about seventy-six (72.6%) per cent, preferred housing in urban areas. Landed properties were preferred by about sixty (60.9%) per cent of the respondents. The houses the respondents preferred to live in were terraced houses, represented by about twenty-one (21.78%) per cent, followed by bungalows, apartments and condominiums, each being preferred by about seventeen (17.20%) per cent of the respondents. Results also indicated that a massive majority of the respondents preferred housing prices below RM200,000, with the preference for the range of RM42,000 to RM100,000 being the choice of about thirty-eight (38.82%) per cent, and the range from RM100,000 to RM200,000 being the choice of about thirty-four (34.94%).

Table 4: Factors Affecting Housing Preferences

Factors	ITEM	MEAN	TOTAL MEAN SCORE	RANK
Financial factor	Payment terms	3.6494	3.5830	1
	Income level	3.6494		
	Housing price	3.5862		
	Mortgage loan	3.4770		
Neighbourhood factor	Cleanliness of surroundings	3.6667	3.5460	2
	Presence of guarded and gated security	3.5575		
	Green environment	3.5345		
	Safety neighbourhood	3.4943		
	Level of pollution	3.4770		
Location factor	Availability of retail centres nearby	3.6092	3.5195	3
	Presence of public infrastructure nearby	3.5345		
	Distance travelled to work	3.5115		
	Presence of shops nearby	3.5057		
	Presence of schools nearby	3.4368		

Interior design and space	Number of bedrooms and bathrooms	3.5517	3.3961	4
	Size of the building	3.4943		
	Building layout design	3.4253		
	Type and quality of finishing	3.3736		
	Number of floors	3.1954		
Exterior design	Size of garden	3.4425	3.3231	5
	Building orientation	3.1839		

According to Table 4, the factor that most affected housing preferences, as ranked by the respondents, was the financial factor, with an average mean of 3.5830. The results were followed by the neighbourhood factor (3.5460), location factor (3.5195) and interior design factor (3.3961). The factor that least affected housing preferences was the exterior design factor, with an average mean of 3.3231.

CONCLUSIONS AND RECOMMENDATION

In conclusion, this study has found that most of the youth who participated as respondents were low-income earners and were renting housing units because they could not afford to own homes. Their preferences show their favour for landed properties, preferably the terraced house type, as well as their need for houses which could be priced below RM200,000 and located within urban areas. The results also highlight that the factor that most affected the youths' housing preferences was the financial factor. The ongoing rise in housing prices was seen as a concern by respondents. Indeed, the majority of property prices might be far greater than the median. Malaysia's housing property is usually viewed as expensive by Malaysian youths due to the disproportionate increase in housing prices relative to income. Corresponding efforts should be made to increase household income, which may be a more sustainable method to close the gap between housing prices and the income of Malaysian youths. As a result, government housing agencies should carry out studies to understand Malaysian youths' housing preferences to strategies for future housing development. It is recommended to focus on the actual demand for housing in order to ensure a steady supply of affordable housing which caters to the needs of the lower- and middle-income population segments. This strategy would ideally prevent a homeless generation from emerging and prevent our youths from drowning in debt, which would result in many social problems.

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REVEALING THE INVESTMENT VALUE OF PENANG HERITAGE PROPERTIES

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Abstract

Heritage buildings are a representation of historic features and the Malaysian culture. The intangible value of a heritage property comprises aesthetic quality, spiritual aspects, social functions, and its own uniqueness. Therefore, heritage properties have been seen to be moving away from traditional alternative investments, which are not covered by conventional real estate schemes. Additionally, the characteristics of heritage properties are expected to be seen as ‘art’, and they offer a highly beneficial diversification strategy with a relatively low correlation towards traditional assets classes. The Penang (Island) Heritage Property Price Index (PPHPPI) is estimated to be using a hedonic regression method. Based on the index, the heritage property records the highest quarterly returns and risk among the conventional assets considered in this study.

Keywords: Heritage property, investment, price index, diversification

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INTRODUCTION

Real property is viewed as a conservative investment asset because it is more resilient to short term volatility in economic conditions. Based on past studies, property investment had been used to hedge against the inflation of a particular country. The property types included residential (Li and Ge, 2008; Lee, 2014), commercial (Limmack and Ward, 1988; Newell, 1996; Fraser, Leishman and Tarbert, 2002; Leung, 2010) and industrial (Tarbert, 1996). Therefore, most of the investors preferred to invest in such properties in order to diversify the risk of investment. Tan and Ting (2004) found that Malaysia had allocated about 50%-65% of the available capital for investing in residential property. According to the National Property Information Centre (NAPIC) (2019), the total value of property transactions were worth RM 68.30 billion in the first half of 2019. The large amount of transaction value showed the significance of the property sector towards Malaysia's economy. Additionally, the three folds increase of pre-war properties prices in Georgetown, Penang, has gained the attention of the practitioners since its recognition as a UNESCO World Heritage in 2008 (The Edge 2017).

RESEARCH BACKGROUND

In year 2008, UNESCO World Heritage had recognised Georgetown as one of the heritage cities in Malaysia. In order to manage the heritage buildings effectively, the local government had subsequently divided the heritage area into core zone and buffer zone. Besides, the landlords who intended to restore the condition of the heritage buildings in these zones, they are required to obtain the approval from the local authorities (Heritage Department of the Penang Island City Council). Jasme *et.al* (2014) stated that the guidelines in preserving the pre-war properties included forecourt, roof, external, and internal parts of the building. According to Lum (2018) and Rahman (2018), some of the landlords of these heritage properties transformed the old buildings into much more valuable properties. For instance, cafés, boutique hotels, restaurants, and others. There are only 4,665 units of heritage buildings in the core zone and buffer zones, with a size of 109.38 hectares and 150.04 hectares respectively, in Penang (Jasme *et.al.*,2014). Hence, the property value of heritage buildings have been rising faster than unprotected or undefined buildings, due to the limited supply of heritage buildings (Gilderbloom *et.al.*,2009).

The conventional property investment in terms of risk and returns have been widely discussed in previous studies. However, the heritage properties have been given less attention in the developing investment portfolio. For example, there are some studies which explored the factors which influenced the price of these heritage properties (Shipley, 2000; Ashworth, 2002; Kouwenberg and Zwinkels, 2014; Lazrak *et al.*, 2014). Some research was conducted on the conservation of heritage properties in order to protect its value (Billington, 2004;

Samadi and Yunus, 2012; Tokede, Udawatta and Luther, 2018). The conservation of heritage properties is necessary because these buildings can produce aesthetic and spiritual value which cannot be found in the conventional properties such as terrace houses, apartments, etc (Cores, Assets and Development, 2012; Halim and Tambi, 2021). Moreover, Shipley (2000) claimed that the heritage properties were able to outperform the general market trend in terms of sales rate and value, especially during the economic downturns. This result was also supported by Mat Zin *et.al* (2018), from which there was evidence of an increasing trend in the price per square foot for the heritage shophouses in the long run. Hence, this study hypothesised that the heritage buildings shared the characteristics of art, from which the heritage property was embedded as an intangible value. Therefore, the correlation between heritage property and traditional asset classes were expected to be low.

Furthermore, it is important to construct a price index for measuring the performance of the Penang heritage properties, but the construction of such heritage property price indexes is indeed complicated due to the heterogeneous characteristics of these properties in terms of location and land size. The property price index should be effectively captured in the price change based on the supply and demand forces, rather than the quality change in each transacted period (Rosen, 1974). The quality change of the transacted properties must be controlled in order to avoid the price index from being overstated or understated in the price change across every period. Lazrak *et al* (2014) adopted the spatial autoregressive model to investigate the impact of cultural heritage on the value of the real estate in the cities. Both structural and spatial characteristics of the property were used to construct the model. The study found that the structural characteristics (e.g. number of rooms, floor space, and capacity) and spatial characteristics (e.g. population density, percentage ethnic, and proportion of water areas) had a significant impact on the property's value. According to the study, it is crucial to identify significant variables in the hedonic price index model in order to avoid the model being mis specified, or overfitted.

According to NAPIC (2019), there are several published indices for the housing sector, such as terraced, high-rise, detached, and semi-detached. Ting *et.al* (2007) conducted a study on the real estate returns using the published indices, and they found that the property market in Malaysia is relatively homogeneous. The diversification effect in the portfolio is not established across property type and geographical region. In terms of commercial properties, Callender *et.al* (2007) claimed that the risk reduction in the commercial property investment can be realised with a portfolio of 30-50 properties. Furthermore, previous studies on the commercial property market in the United Kingdom showed that the log returns and standard deviations of the transaction-based rental series were estimated to be 15.60 percent and 35.64 percent, respectively (Patel and Sing, 2000). Brown & Matysiak (1995) stressed that there was a correlation

between a reliable property index, and the performance measurement. In other words, a reliable price index is needed to yield precise measurements on the risk and return of such a property. The study indicated that the price index is an effective indicator in terms of making strategic decisions. However, the investigation on the investment performance of such heritage properties were not possible without the presence of heritage property price indexes.

The computation of risk and return for every asset is crucial in developing an investment portfolio. The risk of an investment asset can be measured based on its variance or standard deviation. Elton & Gruber (1997) pointed out that the Markowitz Modern Portfolio Theory had considered the trade-off between the mean and variance of the assets. The theory aimed to maximise the expected return, and minimise the variance of the portfolio through the formulation of an efficient frontier. Thereafter, it was adopted to improve conventional investment portfolio that consists of shares, real estate security, bonds, cash, commodity, real estate and etc. (Ghazali *et.al.*, 2015; Hiang Liow & Adair, 2009; Jin, Grissom, & Ziobrowski, 2007; Lee, 2007). Furthermore, a few studies found that artwork could be included for reducing the risk in an investment portfolio. It was mainly contributed by low correlation on return between artwork and financial assets. (Worthington and Higgs, 2004; Campbell, 2009). Therefore, it would be interesting to assess the aesthetic value of heritage properties from the aspect of investment. (de la Torre, 2013). Apart from that, the conservation of a historic core can also distinguish the city from competing locations (both national and international), in order to attract investment and talented people.

RESEARCH METHODOLOGY

This study listed 1084 transacted Georgetown pre-war properties from 2009Q1 until 2018Q4 (10 years or 40 quarters) for constructing a Penang (Island) Heritage Property Price Index (PPHPPI). It was used to evaluate the performance of the heritage property market in Penang's Georgetown over the past 10 years. The raw transaction data underwent data cleaning before the construction of a price index. It is important to ensure that the transacted value qualified within the definition of market value, and that the non-arm's length transactions were removed from the price index basket. In addition, this study only included the pre-war properties that held a freehold status, because the transaction volume of the leasehold properties were very low and not significant. Besides, the transacted value was based on the individual share of the property. The land size, location, and transacted months were collected from the raw transaction data, correlated (positive or negative) with the heritage property prices based on the statistical results.

The Hedonic Regression Method (HRM) is a fundamental approach in developing a price index model for heritage properties, as it is useful in

overcoming the quality change of the properties across the period. Moreover, this technique had been widely used in determining the contribution of different characteristics on house price, wage levels, and environmental quality (Palmquist *et.al.*, 2001). The approach can be further extended to a Hedonic Time-Dummy Regression Method (HTDRM) for computing the Heritage Property Price Index Model (HPPIM) (Haan and Diewert, 2013). The price index is computed by the estimated pooled time dummy regression equation. The negative or positive value of the time dummy parameter indicates the effect of “time” on the logarithm of the price. The value of the price index is estimated from the model by exponentiating the time dummy coefficient. It provides a quality adjusted price change between the base period 0, and each comparison period, t. HTDRM can then be integrated within the Spatial Longitudinal Hedonic Model (SLHM) for capturing the variability of the property price due its location (Clapp, 2004). The heritage property price index model to be adopted in this study is illustrated as follows:

$$\ln SP_{it} = QUARTER_{it}\gamma + \ln LAND_{it}\beta + \gamma_1 lat_{it} + \gamma_2 lon_{it} + \gamma_3 lat_{it}^2 + \gamma_4 lon_{it}^2 + \gamma_5 latlon_{it} + \varepsilon_{it}$$

The dependent variable in this model is the transacted price in the logarithmic form ($\ln SP$), and follows the independent variables such as the time parameter ($QUARTER$), land area of the transacted property in the logarithmic form ($\ln LAND$), and the polynomial expansion of the locational variables ($lat=latitude$ and $lon=longitude$). The price index of each quarter is obtained by exponentiating the coefficient of the time parameter.

The investment performance among several asset classes such as REITs, Stocks (KLCI), the Penang (Island) Terrace House Price Index (PPTHPI), Penang High Rise Unit Price Index (PPHRPI) and Penang (Island) Heritage Property Price Index (PPHPPI) were investigated in this study. The comparison study comprised of the expected risk and return of the respective assets. Additionally, the quality of the investment asset was examined by using the Sharpe ratio. The high value of the Sharpe ratio was preferred in the selection of the investment asset. The Sharpe ratio (S_p) was derived from the division of the portfolio's expected return (\bar{R}_p) in terms of the excess of risk-free rate (\bar{R}_f) by its expected standard deviation (σ_p) . It can be represented through the formula below (Best *et.al.*, 2007).

$$S_p = \frac{\bar{R}_p - \bar{R}_f}{\sigma_p}$$

The expected return of every asset was calculated based on its average quarterly return over the 10-year price change. The standard deviation or risk of the quarterly return for 5 different assets in this study were estimated. The average

quarterly yield for the Malaysian government’s bond over 10 years is the risk-free asset which was used for computing the Sharpe ratio.

DATA ANALYSIS

Two types of analysis were conducted. The first type of analysis was to analyse and determine a suitable hedonic price index model for the Penang heritage property in order to ascertain the price trend starting from 2009Q1-2018Q4. The second type of analysis was to investigate the investment quality among the assets, which had been highlighted in this study. The Sharpe ratio was adopted for assessing the investment quality of each asset.

The Penang (Island) Heritage Property Price Index (PPHPPI) was constructed through the hedonic regression model, and it was estimated using the least square method. There were 39 hedonic price index models created for capturing the price change across 40 quarters, and it started from 2009-2018. The base period for the index was 2009Q1. The statistical result of the hedonic price index model is illustrated as follows:

Table 1: Statistical Result of Hedonic Price Index Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.891906	0.299035	29.73533	0.0000
lnLAND	0.795586	0.056579	14.06153	0.0000
lat	-346997.0	239524.7	-1.448690	0.1522
lon	-540067.1	196737.0	-2.745122	0.0078
lat2	637.5783	2774.168	0.229827	0.8189
lon2	2599.911	970.0003	2.680320	0.0093
latlon	3389.920	2142.520	1.582211	0.1185
QUARTER	0.145827	0.086634	1.683252	0.0971
R-squared	0.787632			
Adjusted R-squared	0.764761			
F-statistic	34.43890			
Prob(F-statistic)	0.000000			

Note: C = intercept, Dependent variable: property price in logarithm form (lnp), Independent variables: Land area in logarithm form (lnLAND), Coordinates in polynomial form (X, Y, X², Y², XY), Time dummy variable (QUARTER).

According to the output above, the price index model was acceptable because 76.5% of the variability (adjusted R square=0.765) for the heritage properties prices were explainable using the independent variables. This was supported by Wilhelmsson (2009), who had constructed 5 hedonic price index models with the value of an adjusted R square, which ranged from 0.7263-0.7785. Hülögü

et.al.(2016) also adopted a hedonic price model for estimating a Laspeyres-type of price index, giving an adjusted R square value of 0.641. In addition, the land size of the the heritage property was significant with a positive impact on the property’s price. In other words, heritage properties with larger land size appeared to be more expensive. Buyers were willing to spend more to buy properties with bigger land size. The location of the heritage properties also had a significant relationship towards the property price, as indicated by the p-value of less than 0.05. For example, both variables Y and Y2 recorded a significant level of 1 percent. The price index can be obtained by exponentiating the coefficient of the time dummy variable. The results showed that the price of the heritage properties in 2009Q2 were transacted at 15.63% higher than the previous quarter. Therefore, the hedonic price index model in this research was reliable and replicable for estimating the Penang (Island) Heritage Property Price Index for the future.

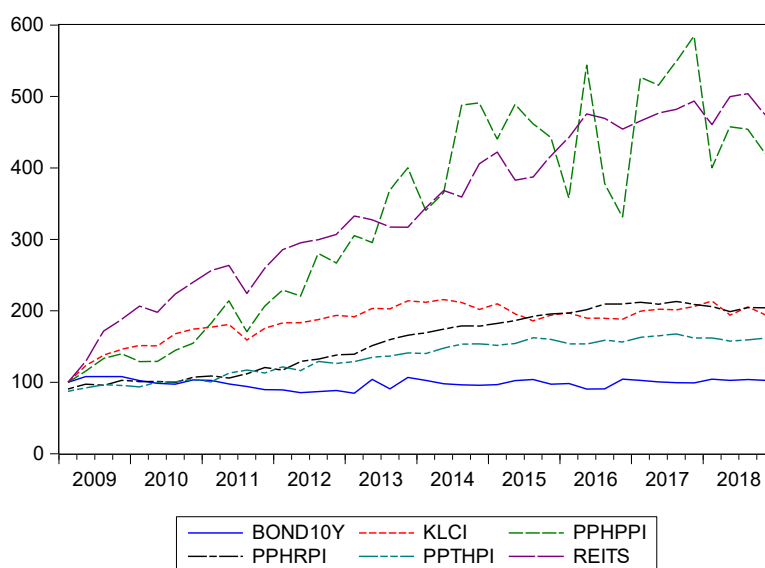


Figure 1: Quarterly Price Index of Investment Assets

Figure 1 depicts the price index of investment assets, including the Malaysian Government Bond (BOND10Y), Kuala Lumpur Composite Index (KLCI), Penang (Island) Heritage Property Price Index (PPHPPI), Penang (Island) Terrace House Price Index (PPTHPI), Penang (Island) High Rise Unit Price Index (PPHRPI) and the Malaysian Real Estate Investment Trust (REITS). Based on the graph above, REITS and PPHPI dominated other assets in terms of capital appreciation over the past 10 years. After the Global Financial Crisis, the stock performance which is represented by the KLCI, recovered at a moderate speed,

and the same scenario took place for the PPHRPI and PPTHPI. The momentum of the increasing trend in the PPHRPI was greater than the PPTHPI after year 2012. In Penang (Island), the investment return (percentage form) of high-rise units were much better than terraced houses.

Table 2: Quarterly Risk and Return of the Asset Classes

Asset Class	Return	Risk	Sharpe Ratio
<i>REITS</i>	4.43%	8.86%	0.39
<i>PPHRPI</i>	2.16%	3.43%	0.34
<i>PPHPPI</i>	5.35%	18.62%	0.24
<i>PPTHPI</i>	1.66%	3.89%	0.18
<i>KLCI</i>	1.89%	6.12%	0.15
<i>BOND 10Y</i>	0.975%	-	-

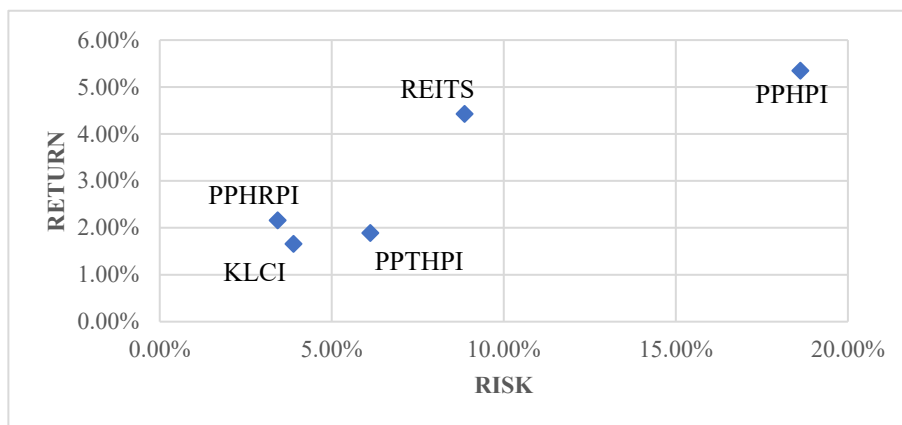


Figure 2: Quarterly Risk and Return of Investment Assets

Table 2 shows the risk and return for 5 types of investment assets. The Penang (Island) Terrace House Price Index (PPTHPI) recorded an average quarterly return of 1.66%, which gave the lowest returns to the property investor. In contrast to the Penang (Island) Heritage Properties (PPHPPI), they had the highest quarterly average return of 5.35% among all of the assets. However, the risk of investing in the heritage properties appeared to be higher than other assets, especially the conventional properties such as the Terrace House and High-Rise Units. Furthermore, REITS had a better investment quality as indicated by the Sharpe ratio of 0.39. It provided the optimal risk and return trade-off among the assets. Although PPHPPI obtained the highest average quarterly return over the

past 10 years, the price change of the heritage properties were extremely volatile, and resulted in a Sharpe ratio of 0.24.

CONCLUSION

In conclusion, this study constructed a hedonic price index model that is able to capture the price trend of Penang (Island) Heritage Properties. The model is acceptable in predicting the price index of heritage properties, as indicated by the adjusted R square of 0.765. The result is supported by results from previous studies. The average quarterly return of the Penang heritage properties dominated other conventional investment assets, such as stocks, REITS, terrace houses, and high-rise units. However, the investment of heritage properties must be exercised with much more caution, as it is much riskier than other conventional assets.

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ALTERNATIVE NUMERAIRES FOR MEASURING WELFARE CHANGES: REVIEW OF EMPIRICAL ENVIRONMENTAL VALUATION STUDIES

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Abstract

This study examines numeraire or an account unit that measures household welfare changes. Although money metric usually determines budget constraint, textbook explanations of the alternative metrics are limited. Therefore, the study aimed to fill the existing gap by systematically and qualitatively analysing previously published articles on environmental valuation in developing countries. The results showed the existence of alternative numeraires in working time, commodities, and financing. The alternative metrics are useful in the valuation of environmental goods and services in developing countries, especially those involving poor respondents and underdeveloped monetary transactions. The non-monetary payments reduce zero bids due to the inability of subsistence people to pay in cash and help the poor express their true environmental values.

Keywords: numeraire, welfare change, willingness to work, willingness to pay

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INTRODUCTION

Economic valuation of environmental goods and services is important in the policy context when environmental change has economic impact (Söderqvist & Soutukorva, 2009). Recently, there is a rise of governments' interests to economic value of environmental goods and services in order to measure state wealth (e.g. Solikin et al., 2019). In the case of Indonesia, Ministry of Finance keens to value natural resources in order to put the values in the environmental balance sheet in particular and for optimal fiscal policy in general. In the valuation process, a researcher should make decision on the valuation approach, since different approach has its specific strengths, weaknesses, and challenges. One of challenges in the use of contingent valuation method (CVM), an approach capable of estimating nonmarket values (Sunoto et al., 2020), is to choose appropriate valuation yardstick or numeraire. The yardstick is usually measured in monetary, while other measures are increasingly popular among researchers.

RESEARCH BACKGROUND

Standard introduction to economics and microeconomics textbooks describes price and quantity in vertical and horizontal axes when depicting demand and supply graphs. However, it least discusses the need to use alternatives other than monetary to analyze demand and supply. There are discussions on numeraire in the intermediate microeconomics textbook, such as Varian (2010). The numeraire measures other prices or income and helps avoid redundancy. Varian (2010) also illustrated the Robinson Crusoe's economic concept that uses a coconut as a numeraire to measure wage rate. In general, it is essential to find alternative numeraires to measure environmental goods and services in an empirical study. The failure to include such alternative measures may induce bias in the estimated valuation values in developing countries.

LITERATURE REVIEW

The welfare impact of a proposed program or project could be illustrated in indifference curve changes. Theoretically, the distance among indifference curves illustrates the welfare, utility enhancement, or impairment measured in money or alternative numeraires.

Money Metric

The money metric is usually used to denote underlying utility changes because they are unobservable. Money is an appropriate welfare measure because it is widely used by people to relate their preferences or utility changes. People buy packages of goods and services using money in the transactions. Additionally, money easily aggregates and is readily retransformed to goods and services as sources of utilities (Ahlheim et al., 2010).

Arguments for Alternative Numeraires

Researchers do not need to confine matching welfare change with monetary measures (Carson and Louviere, 2011) for various reasons. First, the respondents are poor so using monetary payment will limit the monetary payment (willingness to pay, WTP) they offer (Nath et al., 2017). Since poor people in developing countries (Whittington, 2010) have a limited budget, they elicit zero or near zero WTPs when asked about money, though they value environmental goods and services. In Lower Kinabatangan, Sabah, almost half of the respondents are unwilling to pay for various reasons, with 7% stating they did not spare income to pay (Latip et al., 2013).

Second, using non-monetary payment (willingness to work, WTW) instead of WTP increases participation rate or decreases the zero bids. The planned program may need local participation, which could be achieved by creating an unpaid working day (Arbiol et al., 2013; Casiwan-Launio et al., 2011; Schiappacasse et al., 2013). In this regard, further inquiry of valid zero bids due to inability to pay showed that most respondents were willing to pay through non-monetary transactions (Brouwer et al., 2008).

Third, the market in the region is not well developed, as shown by barter transactions or partial subsidies (Saizan et al., 2019). There are pervasive in-kind payments for community activities (Diafas et al., 2017). This is in line with Gorkhali (2009) that stated the Nepal remote area is characterized by low ability to pay, a barter economy, less cash in the market, and typical labor as a community's input to a project; making non-monetary contributions appealing. However, the imperfect market economy may produce a downward bias on implementing the WTP. Fourth, the mean WTW is more stable than WTP (Jiang, 2018; Pondorfer & Rehdanz, 2018). Fifth, WTP may yield a lower estimate due to institutional distrust in corruption-prone countries (Kassahun et al., 2020).

Disagreement exists in using non-monetary contributions because, as a numeraire, the labour is not easily convertible to utility (Ahlheim et al., 2010). The numeraire must have four characteristics: (1) to fulfil theoretical requirements, it must be strictly monotonically increasing in individual utility, (2) to satisfy the psychological criterion of relating the numeraire with utility, it must be extensively used in everyday life, (3) it must be easily aggregated across people, and (4) it must be easily converted to money (Ahlheim et al., 2010). However, Vondolia et al. (2014) argue that the choice of numeraire does not responsible for the results; rather respondents' acquaintance with the numeraires that matters. If respondents are familiar with the numeraires then the results should be indifferent between money and other measures. Additionally, eliciting cash WTP could be biased when the existing arrangement does not contain money expenditures (Abramson et al., 2011).

RESEARCH METHOD

This study answers the research question using a literature review from the internet, comprising articles that cite and appear in reference lists of non-monetary vehicles as numeraire (van Houtven et al., 2017). It only reviews the valuation of environmental goods and services. Additionally, articles written in languages other than English, Bahasa Indonesia, and Malay are excluded due to the language barrier.

Five topics are specifically sought after in the literature, including: (1) whether the literature includes theoretical exposition; (2) the majority of payment vehicles used in the studies; (3) determinants of WTW; (4) how to translate non-monetary to monetary values; and (5) whether the non-monetary value significantly differs from the monetary valuation. To compute mean WTW in hours per month, this article assumes 8 hours per day, 30 days per month, four weeks per month, and 365 days per year.

RESULTS AND DISCUSSION

Theoretical Exposition

Most of the reviewed literature did not offer theoretical discussion but focused on empirical estimation (Das and Mahanta, 2013; Girma and Beyene, 2012). Jiang (2018), Saizan, et al. (2019) only discussed why the willingness to contribute (WTC) or WTW is more suitable than WTP. Similarly, Ishiguro (2019) did not discuss the theory but directed interested readers towards the public goods model, proving that people could substitute money and time in producing public goods.

Arbiol et al. (2013) follows Eom and Larson (2006), which used compensating surplus measures of WTP, though modified to incorporate time budget. The indirect utility function (V) could be represented as:

$$V(M - WTC^L, Z, q^1) = V(M, Z, q^0) \dots\dots\dots (1),$$

where M is time budget, WTC^L is the willingness to contribute labor, Z is the vector of socioeconomic variables, q^0 is the condition before the intervention, and q^1 is the condition after the program. Therefore, WTC^L represents WTW for environmental improvements ($q^1 - q^0$). The model could be further made empirical by considering the formats used to elicit WTP or WTW. Susilo et al. (2017) also used this framework to value mangrove restoration in Mahakam Delta, Indonesia.

Alternatively, the standard individual preference function (Haab & McConnell, 2002) states that respondents gain utilities from the bundle of private and public goods. To measure WTW, WTP is substituted with WTW and budget constraint with time constraint (Arbiol et al., 2013; Gibson et al., 2016; Navrud & Vondolia, 2020; Solikin, 2017).

Alternative Payment Vehicles

Many authors empirically used non-monetary payments, the most popular choice being labor time or WTW (Abramson et al., 2011; Alam, 2013; Arbiol et al., 2013; Casiwan-Launio, Shinbo & Morooka, 2011; Das & Mahanta, 2013; Gibson et al., 2016; Girma & Beyene, 2012; Gorkhali, 2009; Hung, Loomis & Thinh, 2007; Ishigu, 2019; Ninan & Sathyapalan, 2005; Notaro & Paletto, 2011; Saizan et al., 2019; Saxena, Bisht, & Singh, 2008; Schiappacasse et al., 2013; Solikin, 2017; Tilahun et al., 2015; Vasquez, 2014; & Vondolia et al., 2014). In contrast, the less popular alternatives include commodity or harvest, such as rice (Navrud & Vondolia, 2020), providing meals (Diafas et al., 2017), borrowing (Abramson et al., 2011), and income tax and reduction of government subsidy for groceries (Hassan et al., 2018).

Several studies used voluntary working to predict WTP time, WTW, or WTC. For instance, Hung, Loomis, and Thinh (2007) used unpaid work from 0 to 30 days per year to value a forest fire prevention program in Vietnam. Furthermore, Saxena, Bisht, and Singh (2008) used WTW and WTP to low-income groups in three villages in India to value gazelle habitat. Similarly, Abramson et al. (2011) used WTP, WTW, and borrowing or interest-free loans to potable water programs in Zambia. The results showed that WTW is the highest, WTP is the lowest, while borrowing lies between labor and cash amounts. Schiappacasse et al. (2013) used money and time variables to value a forest restoration project in Chile. Similarly, Alam (2013) used the money and time variables to value the restoration of a river ecosystem in Bangladesh. In contrast, Arbiol et al. (2013) used labor as a numeraire to value leptospirosis prevention in Metro Manila, Philippines. Solikin (2017) used the money and unpaid working days variables to value Indonesia's deforestation and forest degradation avoidance. Similarly, Vasquez (2014) used money and labor to value improved water services in Guatemala. Moreover, Navrud and Vondolia (2020) used money, labor time, and harvest contributions to value flood risk prevention in Ghana.

Critics state that the elicited WTW depends on the tasks offered to the respondents. Specifically, the measure of contribution in labor may not be appropriate for all programs (Rai and Scarborough, 2015). According to the critics, the tasks asked in WTW studies should be designed to suit the valuation project. For instance, voluntary work could comprise tree planting, forest management, or the number of days refraining from logging (Ishiguro, 2019). Voluntary work could also encompass environmental clean-ups and health advocacy activities (Saizan et al., 2019), labor-meal, or providing meals for workers participating in the village development program (Diafas et al., 2017). People could also voluntarily plant seedlings, monitor their growth, and protect mangrove areas (Susilo et al., 2017).

Determinants of WTW and Other Numeraires

Several socioeconomic variables are usually included in the regression models, such as gender, age, education, household size, income, and occupation. Table 1 shows the information on the significance and the direction between independent and dependent variables.

In most cases, in addition to socioeconomic variables, other specific variables pertinent to the research are also included. They include landholding size (Das & Mahanta, 2013; Girma & Beyene, 2012; Schiappacasse et al., 2013), village-type (Das & Mahanta, 2013), house type (Jiang, 2018), ethnicity (Girma & Beyene, 2012), length of stay (Girma & Beyene, 2012; O'Garra, 2009; Solikin, 2017) and type of forest use (Ishiguro, 2019). As a result, the WTP and WTW determinants could be different (Solikin, 2017) or similar (Dai et al., 2017).

Several conclusions could be inferred from Table 1. First, males are willing to contribute labor because they are associated with fieldwork. Second, age negatively affects WTW since older people may not be fit for the hard work program. Third, education negatively affects WTW, as seen when respondents with better education have better jobs, making them reluctant to work in the fields or forests. Fourth, the effect of income on WTW is inconclusive, as seen in the reluctance to work in the field for negative effects and increased volunteering related to nature for positive effects. Fifth, household size positively affects WTW by increasing potential labor in fieldwork.

Table 1. Determinants of WTW for Selected Articles

Variable	Significant	Insignificant
Gender (male=1)	+ Casiwan-Launio et al. (2011); Dai et al. (2017); Das & Mahanta (2013); Ishiguro (2019); O'Garra (2009)	Arbiol et al. (2013); Solikin (2017); Susilo et al. (2017)
Age	- Casiwan-Launio et al. (2011); Das & Mahanta (2013); Ishiguro (2019); Schiappacasse et al. (2013)	Arbiol et al. (2013); Girma & Beyene (2012); O'Garra (2009); Solikin (2017); Susilo et al. (2017)
Literacy/ Education	- Dai et al. (2017); Das & Mahanta (2013); Ishiguro (2019)	Girma & Beyene (2012); O'Garra (2009); Susilo et al. (2017)
Household size	+ Ishiguro (2019); O'Garra (2009); - Susilo et al. (2017)	Das & Mahanta (2013); Girma & Beyene (2012)
Income	- Ishiguro (2019), Susilo et al. (2017); + Casiwan-Launio et al. (2011); Schiappacasse et al. (2013)	Arbiol et al. (2013); O'Garra (2009)
Occupation	Ishiguro (2019)	Dai et al. (2017); Das & Mahanta (2013); Susilo et al. (2017); O'Garra (2009)
Knowledge/ participation/ attitude	Arbiol et al. (2013); Casiwan-Launio et al. (2011); Dai et al. (2017); Girma & Beyene (2012); O'Garra (2009); Schiappacasse et al. (2013); Solikin (2017); Susilo et al. (2017)	Source: author compilation

Translation to Monetary Value

The WTW should be converted to monetary to be compared with WTP. When translating WTW to monetary, it is compulsory to consider the working or leisure time and the rate at which value is assigned to the time. When the WTP-labour is assumed to be traded-off with working time, converting person-days to monetary value involves multiplying the mean or median workday by the daily income (Tilahun et al., 2015), official minimum wage (Saxena, Bisht, & Singh, 2008; Susilo et al., 2017; Vondolia et al., 2014), market wage (Arbiol et al., 2013; Vondolia et al., 2014), or respondents' expected wage (Susilo et al., 2017). Furthermore, estimating the total WTP from households' WTW involves multiplying the daily or minimum wage or other rates by the mean WTW. The result is extrapolated to the number of households in the research area and adjusted with the percentage of respondents willing to contribute.

When the time contribution is assumed to come from leisure time, one-third of the wage is implemented (Arbiol et al., 2013; Casiwan-Launio et al., 2011; O'Garra, 2009; Saizan et al., 2019; Saxena, Bisht, & Singh, 2008). In this case, the wage rate represents the working contribution trade-off, while one-third of the wage represents the leisure contribution trade-off. Similarly, Schiappacasse et al. (2013) allocated different values of time to respondents that could take the working time voluntarily (using wage rate) and respondents that could not choose freely (using one-third of the wage rate).

Instead of using income or official wage, Gibson et al. (2016) and Solikin (2017) used wage rates from job vacancies in the villages because an official minimum wage for formal employment is substantially lower. However, this is not always the case. For instance, Abramson et al. (2011) found that official minimum wages were 4 to 12 times higher than local wage rates for unskilled labor in Zambia. Recent study by Hagedoorn et al. (2020) suggest of using individual conversion to accommodate heterogeneity in value of time. They argue that using generic wage rate may yield downward bias of the WTP.

Sum of Money vs. Nonmonetary

Previous literature found that WTW is significantly greater than WTP. The reason for a bigger WTP value may be due to low time value or hypothetical bias (Eom and Larson, 2006). Casiwan-Launio et al. (2011) and Gibson et al. (2016) suggested two reasons for the discrepancies. First, a missing or incomplete labor market lowers opportunity costs of time, as previously mentioned by Eom and Larson (2006). For instance, transportation is very difficult in the Philippines in the rainy season, hampering workers' mobility to get jobs outside the area. Second, sacrifice of potential income (as in case of WTW) is psychologically less painful compared to surrendering hard earned income (as in case of WTP). The second reason is reinforced by the social norms where labour contribution to community program indicates being a good village resident. However, as

previously mentioned, the difference between WTW and WTP diminishes when respondents are familiar with the non-monetary payment (Vondolia et al., 2014). For instance, Diafas et al. (2017) found no significant difference between WTP and WTW in Kenya due to respondents' familiarity with both payment vehicles. Similarly, Gibson et al. (2016) found the same result due to the functioning labor market in the villages surrounding Cambodia's capital city.

Several studies showed higher WTW than WTP, including Gorkhali (2009), which found that WTW was 2.6 to 4.8 times higher than WTP for quality improvement of a hydropower project in Nepal. The discrepancy is more considerable in the most remote areas, where the WTW is 9.4 times higher compared to WTP. Furthermore, Saxena, Bisht, and Singh (2008) showed that the WTW value was more than four times WTP in India. Schiappacasse et al. (2013) found that WTW was almost seven times greater than the WTP in reforestation in Chile. According to Solikin (2017), villagers in Berau District, Indonesia elicited WTW 8.5 times higher than WTP in valuing deforestation and forest degradation avoidance. Similarly, Casiwan-Launio et al. (2011) showed that the WTW is 3 or 8 times greater than the WTP in a marine reserve in the Philippines.

Exceptions for this general trend include Vondolia et al. (2014), which found that mean WTP is 2.32 higher than mean WTW. This is possible when WTW is converted to WTP using the minimum wage. Additionally, Navrud and Vondolia (2020) found that the probability of farmers purchasing flood risk insurance is higher when premium as monetary and harvest rather than as labor. O'Garra (2009) also found higher WTP compared to WTC labor in Fiji probably due to outlier data.

The percentage of respondents that answered "yes" to participate in non-monetary contribution implies the suitability of the non-monetary measures. Regarding this, Dai et al. (2017) found that 73.57% of respondents were willing to contribute labor, while 55.65% were willing to contribute financially. Moreover, Ishiguro (2019) showed percentages of respondents willing to participate in voluntary works in several villages in Cambodia. The study showed that 78% of respondents were willing to participate in forest preservation two days per year, 44% in forest management one day every two years, and 57% refraining from logging three days each month. Furthermore, Nath et al. (2017) showed that 85% of respondents in Kuala Selangor, Malaysia are willing to contribute non-monetary through an awareness program, (82%) tree planting, 75% patrolling, and fire protection, and 74% community-based forest management. Ahlheim et al. (2010) valued a landslide protection program in Vietnam and found that more than 85% of respondents stated their WTW and WTP.

Recalculating mean WTW based on hours per month found that they range from 3.83 (Navrud & Vondolia, 2019) to 31.40 (Dai et al., 2017). Saizan et

al. (2019) found that respondents are willing to pay an average of 6.68 hours per month for leptospirosis prevention in Malaysia. Moreover, Das and Mahanta (2013) found that respondents living in forest villages were willing to contribute 12 to 16 hours for biodiversity conservation in Assam, India. According to Solikin (2017), the mean number of days a respondent is willing to contribute to the program is 13.50 hours. Saxena, Bisht, and Singh (2008) valued the habitat function of planted forests in India and found that the WTW average is 11.18 hours. Furthermore, Arbiol et al. (2013) found that the WTW average was 10.66 hours per month in valuing leptospirosis prevention projects in Manila, The Philippines. The results show that mean WTW varies with study location, goods and services in questions, and the study design. Therefore, further research should carefully design the study to suit the proposed program.

CONCLUSION

In the valuation of environmental goods and services, especially when using the contingent valuation method, the use of monetary or nonmonetary measures determines the estimate of welfare change. When majority of local people are very poor, the money market is underdeveloped, barter is prevalent, contribution in kind is a social norm, and then using money to value WTP is inappropriate. An alternative to monetary payment is voluntary working (WTW) or contributing commodity.

This study reviewed the use of non-monetary contribution, resulting in five conclusions. First, most WTW studies do not expose theoretical foundations. Most studies use standard individual preference theory amended using time constraint and bundles of public rather than budget constraint and all private goods, respectively. Second, the most popular alternative measure is voluntary working that suits the program evaluated, while the less common alternatives are a commodity, providing a meal, or credit. Third, WTW determinants include age, income, gender, household size, education, knowledge or attitude, and variables suitable to the project designs evaluated. Fourth, in translating the WTW to WTP, researchers usually use wage rate for trade-off between contribution-working or one-third of the wage rate if assumed that trade-off is between contribution-leisure. Recent study, however, calls for conversion rate which accommodate individual heterogeneity. Fifth, the WTW is generally larger than WTP due to low leisure time value in the villages or remote areas, as indicated by limited job opportunities or difficult transportation.

Future studies should examine the theoretical basis for using WTW. In addition, future empirical research on environmental valuation should seriously consider using WTW in addition to standard WTP. Determinants of WTW included in the empirical studies should also consider different nature of WTW and WTP.

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TECHNICAL, SCALE AND MANAGERIAL EFFICIENCIES IN MALAYSIAN REITS: A NON-PARAMETRIC APPROACH

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Abstract

The paper examined technical, managerial and scale efficiencies scores of Malaysian Real Estate Investment Trust (M-REITs). A non-parametric approach of VRS-DEA examined the input and output variables to determine REIT efficiency. We examined their determinants using GLS regression in the second stage. On average, the M-REIT industry has faced technical inefficiency, that involves scale and managerial inefficiencies. This paper presents new estimates through discussion on return as REIT output. The empirical results indicate Islamic REITs exhibited higher efficiency scores than their counterparts. The results from GLS regression analysis suggest that efficient REITs are smaller in size with higher concentration in property sector and geographical area. Having examined these values, there is still some catching-up for the inefficient REITs in the sample to be more competitive to stay relevant in the global market.

Keywords: Technical, Scale; Efficiency; Malaysian REITs

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INTRODUCTION

Real estate investment trusts (REITs) are unit trust scheme which predominantly invest or propose to invest in income-generating real estate (Securities Commission Malaysia, 2019). The REIT market is now spread to 33 countries, with nearly US\$ 2 trillion market capitalisation (EPRA, 2019). The market capitalisation of Malaysian REITs was approximately US\$7.32 billion, contributing 1.8% to the Asia Pacific REIT market (EPRA, 2019). If confidence in the REIT industry is shaken, both local and global investors may leave the industry as well as the country, increasing the vulnerability of the real estate industry. To maximise profits, REIT investors must consider the operational efficiency of the REIT in which they invest. Furthermore, more efficient REITs can provide average stock gains of up to 3.88 percent greater than REITs that do not practise effective efficiency (Beracha et al., 2019). REITs with an effective strategy are often able to maintain higher-quality operating performance, lower risk, and higher cross-sectional stock returns (Beracha et al., 2018).

From managerial perspective, efficiency improvement could be the focus of REIT managers as inefficiency could likely lead to agency problems and the corporate resources wastage. Therefore, it is important for the managers to provide insights to ensure the dynamic performance to stay competitive in the global market. Building on past research on REIT operating efficiencies and recognising the growth in the industry over the past decade, we examine REIT efficiencies performance over the period of 2007 to 2015 in Malaysia.

LITERATURE REVIEW

Previous literature in the REIT industry focus on capital structure, diversification benefits and corporate strategies (see for example Anderson, Benefield, & Hurst, 2015; Bauer, Eichholtz, & Kok, 2010; Brockman, French, & Tamm, 2014; Newell & Marzuki, 2016). However, limited studies explore the issue related to technical and scale efficiencies (see Table 1) particularly in the Malaysian emerging market. Chuweni and Eves (2017) reviewed measurement for REIT efficiency, particularly for Malaysian Islamic REITs. Table 1 summarises the matrix for input and output variables in REIT efficiency.

Table 1: Matrix input and output variables

Source: Authors' compilation

Author(s)/ Year of publication	Chuweni et al., (2019)	Chuweni & Eves, (2019)	Yilmaz et al., (2019)	Chuweni et al., (2018)	Jreisat, (2018)	Isik & Topuz, (2017)	Ahmed & Mohamad, (2017)	, Topuz & Isik, (2009)	Anderson et al., (2002)	Frequency
Subject	Malaysian REITs	Malaysian REITs	Turkish REITs	Malaysian REITs	Australian REITs	US REITs	Singapore REITs	US REITs	US REITs	
Measures	TFPCH THPCH TECCH EFFCH PTECH SECH	TE PTE SE	TE, PTE SE	TFPCH THPCH TECCH EFFCH PTECH SECH	TFPCH THPCH TECCH EFFCH PTECH SECH	CE AE TE PTE SE	TFPCH THPCH TECCH EFFCH PTECH SECH	TFPCH THPCH TECCH EFFCH PTECH SECH	TE PTE SE	
Output (y)										
Total assets/ property assets	√	√		√	√	√	√	√	√	8
Loan properties						√		√		2
Other asset						√		√		2
Net Asset Value			√				√			2
Net profit			√							1
Market Cap			√							1
Total revenue							√			1
Enterprise value					√					1
Input (x)										
Interest expense/ cost of borrowing	√	√		√	√	√	√	√	√	8
Property operating expense	√	√		√	√	√	√	√	√	8
Admin expense	√	√	√	√	√				√	6
Mgmt. expense	√	√		√	√		√		√	6
Total loan			√							1
Equity			√							1
Total inventory			√							1

METHODOLOGY

Following previous work on REIT efficiency and productivity (see Table 1), the following input vector variables are used, namely interest expense, property operating expense, and administrative and management expense. However, as highlighted in Table 1, we propose return of investment as the management focus, measured by distribution and revenue as the output vector variables. Factors of sustainable returns could be used as better measure for possible focal area in achieving better market performance, rather than the conventional method of measuring using capital appreciation or asset value.

We utilised the data envelopment analysis (DEA) to examine technical, managerial and scale efficiencies of Malaysian REITs from 2007 to 2015. DEA allows the investigation of changes in efficiency results and measure whether the reasons for such changes could either be in the form of improvement in scales (scale efficiency) or in managerial practice (pure technical efficiency). The linear programming allows the measurement of each REIT relative to the frontier. We use the Variable Return to Scale-DEA input-oriented model which decomposes technical efficiency (TE) into pure technical efficiency (PTE) and scale efficiency (SE). The VRS-DEA model proposed by Banker, Charnes, & Cooper, (1984) relaxes the CRS assumption by Charnes, Cooper, & Rhodes (1978):

$$\theta^{PTE} = \text{Min } \theta - \varepsilon \left(\sum_{i=1}^m S_i^- + \sum_{r=1}^s S_r^+ \right)$$

Subject to

$$\sum_{j=1}^n \lambda_j x_{ij} + S_i^- = \theta x_{i0}; (i = 1, 2, \dots, m);$$

$$\sum_{j=1}^n \lambda_j y_{rj} + S_r^- = y_{r0}; (r = 1, 2, \dots, s);$$

$$\sum_j^n \lambda_j = 1;$$

$$\lambda_j \geq 0; S_i^- \geq 0; S_r^- \geq 0$$

Whereby λ_j are non-negative scalars such that $\sum_j^n \lambda_j = 1$, x_{i0} is the i th input, y_{r0} is the r th output, S_i^- and S_r^- represent input and output slacks, respectively. We investigate the sources of their degree of efficiency by focusing on the relation between efficiency estimates and key characteristics of REITs, suggesting useful information for managerial decisions. Following Isik and Hassan (2003) and Topuz et al., (2005), generalised least square (GLS) regression was employed in the second stage analysis. The estimated efficiency is regressed with a set of factors of

variables (key characteristics of REITs). GLS method could address the statistical issues, such as heteroscedasticity.

Table 2: Definitions of the variables

Variables	Definition of the variables
<i>Dependant variables:</i>	
TE	Technical efficiency
PTE	Pure technical efficiency
SE	Scale efficiency
<i>Independent variables:</i>	
Leverage	Total loan divided by total asset
Board size	The number of board directors
Board diversity	Dummy, equals one if more than one female directors in the board, 0 otherwise.
Capital risk	Total equity divided by total asset
Property and geographic index	Following (Anderson et al., 2002; Topuz et al., 2005), we calculate the Herfindahl-Hirschman Index to measure the property-type and geographic concentration effect on REIT efficiency, assuming N property types and M regions: $D_i^{prop} = \sum_{i=1}^N P_i^2, i= 1, \dots, N;$ $D_i^{geo} = \sum_{j=1}^M R_j^2, j= 1, \dots, M;$ Where P_i is the asset proportion invested in property i , R_j is the asset proportion in region j . The higher the index value indicate low diversification or high concentration (Anderson et al., 2002; Topuz et al., 2005).
REIT Size	Total asset value
Islamic REIT	Dummy, equals one if for Islamic REITs, 0 otherwise.

RESULTS AND DISCUSSION

Efficiency estimates of REIT industry

Figure 1 illustrates the mean scores of REIT efficiency between 2007 and 2015. There is a trend of the annual means for each type of REIT over time, from as low as 0.7071 in 2008 to the highest score of 0.9090 in 2007. As the result suggests, there is a downward (upward) trend in the technical efficiency (inefficiency) in REIT industry in the 2007-2009 and 2010 – 2015 periods, which is reflective of the impact of global financial crisis. Similar to our result, Islamic REITs exhibit persistent superior performance than conventional REIT for overall technical efficiency (Chuwani et al., 2017). We can see that the effect of global financial crisis is less evident for Islamic REIT, suggesting interesting question on how Islamic REITs behave better than their conventional counterpart.

The average means for TE, PTE, and SE of the REIT industry are 0.7982, 0.8811 and 0.9068 respectively: these scores imply that managerial inefficiency is the key component of inefficiency in REIT industry which is determined by resource management rather than operational management. The 79.82% indicates input waste of 20.18%, implying that REIT could reduce their input usage significantly if they operate on the efficient frontier.

The preceding discussion indicates the significant return to scale of Malaysian REIT for 2007 to 2015. The three possibilities include (1) constant return to scale or scale efficient, (2) increasing return to scale (economies of scale) and (3) decreasing return to scale (diseconomies of scale). The result in Figure 2 indicates that REIT experienced decreasing return to scale, with an average of 41.73% followed by 40.29% of constant return to scale. On the other hand, the percentage of REITs with increasing return to scale varies over the period: the percentages fell from 36.36% to 9.09% in 2009, rose to 15.38% and 40% in 2010-2011 and then fell again to 6.25% in 2012. One possible reason is that the vast majority of REITs were scale inefficient with either REITs experiencing diseconomies or economies of scale. Our results accord well with the findings from the US REITs (Topuz et al., 2005) since majority of them experienced decreasing return to scale (Topuz et al., 2005).

Determinants of REIT efficiency

Table 3 reports the results based on GLS regression to enhance the statistical efficiency of our estimate and heteroscedasticity was also taken into consideration. Our results show a positive relation and significant at 1 percent level for TE and PTE scores, suggesting that Malaysian Islamic REITs exhibit higher efficiency than their counterpart. This indicates that, despite their additional Sharia requirements and limitation in the investment universe, Islamic REITs provide consistent better performance (Chuweni et al., 2017) particularly in efficient resource allocation and scale of operation.

The proxy of leverage, loans/Total Asset, show negative relationship (statistically significant at 10 percent level) with technical efficiency, implying that the more efficient REIT, *ceteris paribus*, they use less leverage compared to their counterpart. Excessive debt could limit the management to take up rewarding prospects which could contribute to inefficiency in management (Topuz et al., 2005).

Our empirical evidence indicates that board size and board diversity are not statistically significant for technical efficiency. However, board size is significant at 10 percent level for PTE while board diversity is significant at 5 percent level for SE. This shows that higher number of board directors contribute to higher efficiency in managerial decisions. In the matter of board diversity and efficiency, having female directors in the composition of board could lead to greater efficiency. High index value indicates low diversification or higher concentration for property sector and geographical area. Our results for both indexes show positive relationship, and

they are statistically significant at 1 percent level for technical efficiency, implying that higher concentration in sector and location could enhance REIT efficiency.

The literature suggest that REIT size and efficiency are correlated. Our findings in Table 3 fail to attain this. Similar to the findings of Topuz et al., (2005), REIT size seems to display significantly negative relationship with REIT efficiency, implying smaller size REITs are more efficient. This finding corroborates earlier findings of return to scale when majority REITs are operating at diseconomies of scale.

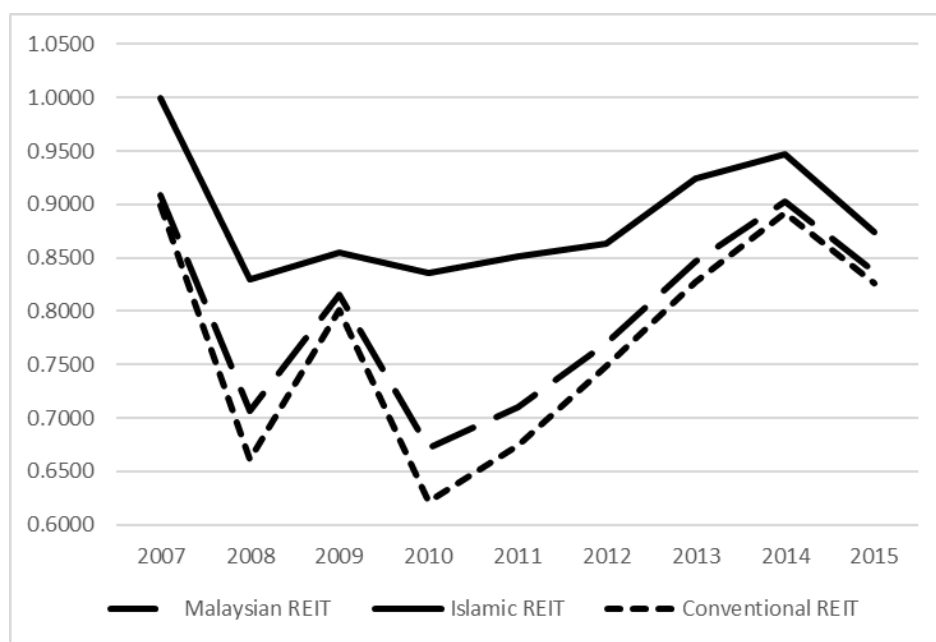


Figure 1: Technical efficiency scores

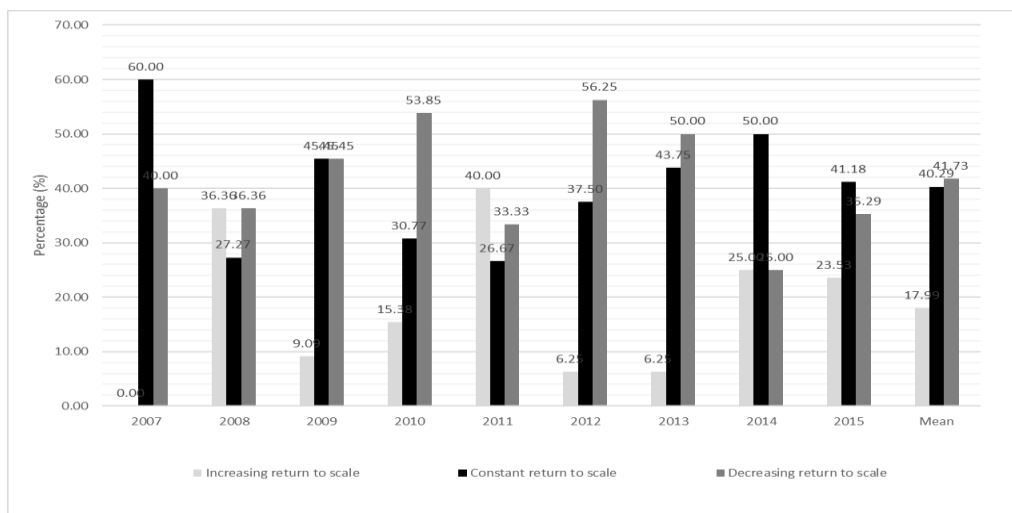


Figure 2: Return to scale in Malaysian REITs

Table 3: Multivariate GLS regression Analysis of REIT efficiency

Variable	Technical efficiency	Pure Technical Efficiency	Scale Efficiency
Constant	0.4452 (0.2864)	0.6319*** (0.1721)	0.9301*** (0.1949)
<i>Determinant Variables</i>			
Loan/Total Asset	-0.4868* (0.2894)	-0.2532 (0.1698)	-0.1161 (0.1876)
Board size	0.0055 (0.0095)	0.0104* (0.0062)	-0.0053 (0.0061)
Board diversity	0.0496 (0.0322)	0.0149 (0.0240)	0.0470** (0.0204)
Capital risk	-0.0610 (0.2633)	0.0643 (0.1408)	-0.0664 (0.1781)
Property index	0.3130*** (0.0654)	0.0630 (0.0487)	0.0907** (0.0452)
Geographic index	0.2568***	0.2086***	0.0306

	(0.0698)	(0.0545)	(0.0635)
Size	-0.0000***	-0.0000***	-9.09e-06
	(6.22e-06)	(5.61e-06)	(6.43e-06)
Islamic REIT	0.2601***	0.1868***	0.0542
	(0.0402)	(0.0283)	(0.0385)

Notes: The multivariate GLS regression coefficient with standard errors in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

CONCLUSION

We examined performance for Malaysian REITs in terms of technical, managerial and scale efficiencies using non-parametric approach of DEA in the first stage and GLS regression in the second stage. Our DEA results indicate that on average, Malaysian REIT suffer inefficiency, which comprises of scale and managerial inefficiencies. The average TE, PTE and SE scores of Malaysian REIT industry are 0.7982, 0.8811 and 0.9068 respectively, over the period of 2007 to 2015. The majority of Malaysian REITs suffered from diseconomies of scale and could have improved their performance by downsizing their portfolio or asset. We found a positive relationship between Shariah compliance and technical efficiency, implying that efficient REITs are Islamic REITs compared to their peers. Furthermore, our results also show that technically more efficient REITs are those that are smaller in size with higher concentration in property sector and geographical area.

Further analysis on productivity, technical change, or technological progress/regression by employing the Malmquist Total Factor Productivity Index. Moreover, the scope of this study could be expanded to other changes in allocative or cost efficiency over time to achieve more robust results. Despite these limitations, our study is expected to contribute significantly to the existing knowledge of the operating performance of the REIT industry in the emerging market of Malaysia. The study has also provided empirical evidence in improving managerial decision for investors and portfolio managers particularly in achieving and maintaining optimal utilization of resources capacities, optimise resource allocation as well as operation scale in the REIT industry. In addition, this study could also facilitate future directions for long-term competitiveness of Islamic REIT operations.

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VALUATION OF MARKET RENTAL VALUE OF A PLANNED DORMITORY USING HEDONIC PRICING METHOD: A CASE STUDY OF POLYTECHNIQUE OF STATE FINANCE STAN, INDONESIA

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Abstract

This study determines the attributes that affect the market rental value of dormitories using the Hedonic Pricing Model. The proportional stratified random sampling technique was used to obtain data from 1,292 PKN STAN students in levels 1 to 3, which was analyzed using the SPSS statistical application. Based on the calculation, the dormitory value varies between IDR11,719,521 (RM3,424.82) to IDR15,482,242 (RM4524,41). The determinants that have a significant positive effect on dormitory value are bathroom location, average remittances per month, earnings per month, room size, gender, and origin, while the type of residence attribute has a negative correlation effect. The results of this study will be beneficial inputs for the PKN STAN in determining the market rental value, the quality of buildings and facilities are in accordance with the market preference.

Keywords: Market Rental Valuation, Hedonic Pricing Model, Willingness to Pay

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INTRODUCTION

Polytechnic of State Finance STAN (PKN STAN) is a state campus under the Ministry of Finance, Indonesia. Graduates of this higher institution are directly recruited as government officials for the Ministry of Finance and state institutions in Indonesia. PKN STAN is among the favourite campuses in Indonesia, attracting more than 100,000 applicants every year with approximately 2,000 freshmen. The campus offers free tuition, while students bear accommodations and meals.

However, this polytechnic plan to build dormitories to improve discipline, safety, esprit de corps, and monitor students' activities in and around its surroundings. The planned dormitories are intended for students, and the occupants are required to pay rent. According to analysts, the planned dormitory would likely decrease the prices of rental houses or rooms in areas near the PKN STAN campus. The additional rooms supply will undoubtedly lead to an increase in empty rooms, thereby mandating the owners to reduce rental prices to attract new tenants. Therefore, this research also aims to analyze the new equilibrium of rental price.

This policy is likely to affect land asset utilization for PKN STAN to become more productive. It creates an avenue for the polytechnic to generate revenue as a public service agency (*Badan Layanan Umum*) which legally has the right to levy fees on its services. Students varying financial abilities need to be taken into account when setting the rental price. This study also aims to estimate rental prices based on students' preferences by revealing their preference for available facilities and services provided. Furthermore, this study applied the hedonic price model (HPM), which has been widely implemented to appraise the effect of respondents' willingness to pay in accordance with residential property value.

LITERATURE REVIEW

According to Palmquist (1984) utility of a property is determined by its physical and external attributes. The HPM is suitable for this study due to its effect on the characteristics on the value of a property. The valuation approach is applied to dormitory property planned in the PKN STAN from 2020 to 2022.

HPM is a valuation model used to estimate someone's preferences in paying for the value of goods and services through its attributes. According to Orford (2000), this strategy has been used extensively in the property industry to evaluate peoples' preferences. Hanley, Shogren, & White (1997) defined it as an economic valuation model based on respondents' preferences to pay for goods or services in accordance with the attributes of the property.

Furthermore, Ready, Berger, and Blomquist (1997) stated that HPM can be implemented to calculate the value of agricultural land. Preliminary studies implement it to evaluate the monetary impact of environmental damage, such as air pollution, sedimentation, and landfills (Hite et al., 2001). In addition, Brendt (1990) used HPM to estimate prices in the car and computer industries.

Therefore, information regarding the willingness to pay in accordance with HPM analysis is beneficial to stakeholders in the government and private sectors. This evaluation model also provides valuable information on the value of specific goods and services and informs policymakers.

The hedonic price model is one of the methods suitable for valuing and replacing special goods that do not have market values. HPM is commonly used in valuing property (Bolt et al., 2005). It assumes that physical property is an attribute that reflects community preferences for property and is used as a reference in determining its value.

The physical attributes of the hostel include location, room area, elevator, study table, bed, wardrobe, and wifi. This is in addition to the property externalities such as distance from campus. The frequent use of statistical analysis and multiple regression models makes it possible to isolate the effects of the features considered to be assessed.

METHODOLOGY

Theoretically, property value is determined by its attributes which people then consume to fulfill its demand. Therefore, studies need to be carried out to construct regression functions with dependent variables, such as dormitory rental price and the independent variables. According to Cró and Martins (2017), several attributes affect dormitory prices, such as staff, facilities, atmosphere, cleanliness, location, and security. However, Santos (2016), Tsai, and Pan (2014) state that attributes such as location, daylighting, facilities, service quality, and security are the dominant factors affecting dormitory prices.

The rental price of an apartment is determined by its physical and environmental attributes (Anselin, 1988; Dubin, 1992). The mathematical expression is shown in equation (1).

$$R = f(P, E) \dots\dots\dots (1)$$

where R, P, and E denotes dormitory rent, physical conditions, and environmental attributes.

Kong, Yin, and Nakagoshi (2007) and Bolt et al. (2005) reported that choosing attributes that affect property value is imperative because they are used in the multiple regression as independent variables. In addition to physical facilities and environmental attributes, this research also included some socioeconomic variables to capture the effect of socioeconomic status on willingness to pay (Mohit & Mustafa, 2010). Therefore, the attributes and socioeconomic variables include:

1. Physical attributes, such as type of current room (house, room, or apartment), room size, location of shower/toilet (inside or shared), electricity bill, kitchen, and parlor.
2. External attributes, such as distance or time-traveled to the campus, transportation type, and food provider. We do not include open space

(Asmawi et al., 2018) as an external attributes since we assume that the open space is not relevant for majority of students.

3. Socioeconomic attributes, such as income (from family or own revenue), department, semester, age, place of origin, gender, family member, and parents' professions.

The empirical model of multiple linear regressions is shown in equation (2):

$$Y_i = \beta + \beta_1TYPE_i + \beta_2ELEC_i + \beta_3SHARED_i + \beta_4KITCHEN_i + \beta_5SIZE_i + \beta_6BATH_i + \beta_7REMIT_i + \beta_8INCOME_i + \beta_9DEPT_i + \beta_{10}SEM_i + \beta_{11}AGE_i + \beta_{12}ORI_i + \beta_{13}GENDER_i + \beta_{14}FAM_i + \beta_{15}JOB_i + \beta_{16}DIST_i + \varepsilon_i \dots\dots\dots (2)$$

where Y_i = Dormitory value, β = intercept, $\beta_{1...n}$ = coefficient correlation, TYPE = type of place, ELEC = electricity cost, SHARED = shared space, KITCHEN = shared kitchen, SIZE = room size, BATH = the location of the bathroom, REMIT = Average remittances per month, INCOME = own income, DEPT = Departmen, SEM = semester, AGE = age, ORI = origin, GENDER = gender, FAM = family number, JOB = profession parents, DIST = distance to campus.

The sample in this study was Campus PKN STAN students of all department levels, namely Accounting, Tax, Customs and Excise, and Financial Management. The sampling technique used was stratified random sampling by randomly select sample based on attendance numbers list. The data will be analyzed using the ordinary least square (OLS) method by a stepwise selection of variables. This method is the same as the research conducted by Majid et al. (2018).

FINDING AND DISCUSSION

Descriptive Statistics

The sample population consists of 10,756 students grouped into 287 per class at all levels. Out of the 1289 respondents, 1236 (95.9%) agreed and strongly agreed with the construction of dormitories in the campus area. Meanwhile, 912 (70.7%) were aware of the planned construction of the dormitories. 1,064 (82.5%) lived with a distance of 0-500 meters and 167 (12.9%) at 501-1500 meters. The remaining 58 (4.5%) lived at a distance of 1.5-11 km. Therefore, it can be concluded that the current significant number of students mostly live around the campus. It is logical that our models do not include transportation choice, albeit previous literatures found it significant predictors of rents (Suhaimi et al., 2021).

Table 1: Composition of Respondents Based on Gender, Level and Department

No	Department	Male				Female			
		I*	III	V	VII	I	III	V	VII
1.	Accounting	151	127	76	0	90	186	70	0

2. Tax	80	53	29	0	28	79	21	0
3. Customs and Excises	1	13	28	0	0	0	3	0
4. Financial management	52	45	10	0	41	82	24	0
Total	284	238	143	0	159	347	118	0
Grand total	1289							

* Level/semester

The composition of respondents by gender, level, and department is shown in Table 1. Based on gender, the number of respondents consists of 665 (51.6%) male and 624 (48.4%) female students. In terms of origin, 893 (69.3%) of the respondents come from Java, Bali, and Nusa Tenggara, while 335 (26%), 29 (2.3%), 29 (2.3%), and 3 (0.2%) are from Sumatra, Kalimantan, Sulawesi, and Papua, respectively. Furthermore, there are 700 (54.3%), 290 (22.4%), 45 (3.5%), and 254 (19.7%) Department of Accounting, Department of Tax, Department of Customs and Excise, and Department of Financial Management.

Regression Analysis

Parameter Estimation

Parameter estimation in this regression uses the ordinary least square (OLS) method by a stepwise selection of variables. It is a combination of forward and backward methods, with the first variable consisting of the highest and significant correlation with the dependent variable. The second incoming variable with the highest value is still a significant and partial correlation. Furthermore, after certain variables enter the model, others are evaluated to eliminate those that are not significant (Draper & Smith, 1998).

From 7 possible models, the 7th model can explain the effect of variables used up to 7 variables. Therefore, model 7 will be used. As shown in Table 1, bathroom location, average monthly remittances, own earnings per month, room size, type of residence (others), gender (male), and place of origin (Kalimantan island), are all significant at 5%.

Table 2: Coefficients

	Model	B	Std. Err.	t	Sig.	Tol	VIF
1	(Constant)	9909483	307905	32.184	.000		
	Bathroom location	3460185	446147	7.756	.000	1.000	1.000
2	(Constant)	8189247	484983	16.886	.000		
	Bathroom location	3240819	439284	7.378	.000	.988	1.012
	Average remittances (month)	1.402	.310	4.527	.000	.988	1.012
3	(Constant)	6768582	593756	11.400	.000		
	Bathroom location	3316224	432331	7.671	.000	.986	1.014
	Average remittances (month)	1.933	.332	5.823	.000	.831	1.203

	Earnings per month	.931	.232	4.016	.000	.835	1.197
4	(Constant)	5054363	801417	6.307	.000		
	Bathroom location	2961641	442595	6.692	.000	.922	1.085
	Average remittances (month)	1.805	.331	5.453	.000	.819	1.222
	Earnings per month	.815	.233	3.503	.001	.814	1.228
	Room size	220628	70109	3.147	.002	.909	1.100
5	(Constant)	4910736	797510	6.158	.000		
	Bathroom location	2816514	442735	6.362	.000	.908	1.101
	Average remittances (month)	1.822	.329	5.541	.000	.818	1.222
	Earnings per month	.827	.231	3.579	.000	.814	1.229
	Room size	245199	70205	3.493	.001	.893	1.119
	Type of residence (others)	-6094337	2258613	-2.698	.007	.973	1.028
6	(Constant)	4293484	818644	5.245	.000		
	Bathroom location	2561503	447627	5.722	.000	.874	1.145
	Average remittances (month)	1.852	.326	5.678	.000	.817	1.223
	Earnings per month	.860	.229	3.749	.000	.812	1.232
	Room size	259623	69787	3.720	.000	.889	1.125
	Type of residence (others)	-6692091	2248877	-2.976	.003	.965	1.036
	Gender (Male)	1260031	432426	2.914	.004	.953	1.049
7	(Constant)	4254244	814508	5.223	.000		
	Bathroom location	2487704	446361	5.573	.000	.869	1.150
	Average remittances (month)	1.800	.325	5.534	.000	.814	1.229
	Earnings per month	.833	.228	3.646	.000	.810	1.235
	Room size	267198	69493	3.845	.000	.887	1.127
	Type of residence (others)	-6662045	2237091	-2.978	.003	.965	1.036
	Gender (Male)	1275017	430199	2.964	.003	.953	1.049
	Origin (Kalimantan)	3052249	1287452	2.371	.018	.989	1.011

Model Evaluation

Model evaluation consists of testing 4 (four) assumptions namely normality, non-multicollinearity, non-heteroscedasticity, non-autocorrelation. As shown in Table 3, all regression assumptions are met.

Table 3: Gaus-Markov Assumption

No.	Assumptions	Technical testing	Test Tools	Conclusion
1	Normality	PP-Plot	PP plots meet diagonal normality line	Fulfilled
2	Non-Multicollinearity	VIF	VIF value is lower than 10	Fulfilled
3	Non-Heteroscedasticity	scatter/plot diagram between	the distribution of plots shows a random pattern	Fulfilled

		residuals (e_i) and estimated values (Y_i)		
4	Non-Autocorrelation	Durbin- Watson	DW value of 2,074 is close to 2	Fulfilled

Interpretation Model

a. Simultaneous Significance Test (F Test)

Table 4: Anova^a

Model	Sum of Squares	df	Mean Square	F	Sig.
7 Regression	2695794528394240	7	385113504056320	20.118	.000 ^b
Residual	8326987638648644	435	19142500318733		
Total	11022782167042884	442			

H_0 : The independent variable does not have a simultaneous influence on the dependent variable.

H_1 : The independent variable influences the dependent variable simultaneously.

F Test – reject H_0 because prob < 5%, it can be concluded that the independent variable has a simultaneous influence on the dependent variable.

b. Partial significance test (t-Test)

A partial test is used to determine the independent variable that influences the dependent. This test result is shown in the table above.

H_0 : the independent variable does not influence the dependent variable

H_1 : the independent variable influences the dependent variable

The results are determined from the prob of each variable in the model above.

c. The Goodness of Fit (R^2)

Based on the adjustment R^2 value of 0.232 from Model 7 in the Summary table during the autotest, it is concluded that the independent variable in the model is used to explain 23.2% of the variation of the dependent variable. Meanwhile, the remaining is explained by other variables not included in the model.

Analysis Result

The regression results of the dormitory value are as follows:

$$\text{Dormitory value} = 4,254,243 + 2,487,704 (\text{Bathroom location}) + 1.800 (\text{Average Remittances per Month}) + 0.833 (\text{Earnings per Month}) + 267,197 (\text{Room Size}) - 6,662,045 (\text{Type of Residence, others}) + 1,275,016 (\text{Gender, Male}) + 3,052,248 (\text{Origin, Kalimantan}) \dots \dots \dots (3)$$

The bathroom location has a positive effect on the dormitory value, assuming it is located inside the room. The difference in value is IDR2,487,704 larger than when it is located outside the room. This is because when the bathroom is located inside the room, it increases the comfort and privacy of its residents. Average remittance per month also has a positive effect on the dormitory value. For

instance, an increase in the monthly transfer by IDR1,000,000 tend to affect the dormitory value to IDR1,800,000. This is because people with a higher average remittance per month have a more significant ability to pay dormitory rent, which increases the value. The earnings per month factor also have a positive effect on the dormitory value.

For instance, an increase in its monthly value by IDR1,000,000 leads to a rise in the dormitory value to IDR833,000. This is because those from families with higher income are more willing to pay rent with greater value. The model also indicates that room size affects the dormitory value, with an increase of IDR267,197 for every 1 m². This is because the wider the room, the more functionality its uses. When the type of residence is in the form of owned or rented house, it does affect the dormitory value. However, supposing it is in other types, it reduces the dormitory value by IDR6,662,045. Gender also has a positive effect on it, with male affecting its value by IDR1,275,016 compared to females. The origin of students from Kalimantan also positively affects the dormitory value by IDR3,052,248 as opposed to those from Sumatra, Java and Bali, Sulawesi, and Papua. Table 5 shows the dormitory value from variations 1 to 4.

Table 5: Dormitory Value

Attribute type	Variation 1	Variation 2	Variation 3	Variation 4
Bathroom location	in the room	in the room	outside the room	outside the room
Average remittances per month	IDR1,000,000	IDR1,000,000	IDR1,000,000	IDR1,000,000
Earnings per month	IDR250,000	IDR250,000	IDR250,000	IDR250,000
Room size	9 m ²	9 m ²	9 m ²	9 m ²
Type of residence	Rent a house	Rent a house	Rent a room	Rent a room
Gender	Male	Female	Male	Female
Origin	Java	Java	Java	Java
Dormitory value	IDR15,482,242	IDR14,207,225	IDR12,994,538	IDR11,719,521

Source: Calculation

CONCLUSION

In conclusion, the variables that have a significant positive effect on dormitory value are bathroom location, average remittances per month, earnings per month, room size, gender, and origin, while the type of residence attribute has a negative correlation effect. Based on the simulation results, the highest simulation value is IDR15,482,242 (RM4524,41), with the bathroom located in the room, average remittances per month of IDR1,000,000, earnings per month of IDR250,000, room size of 9 m², type of residence of rent a house, male, and Java origin.

Meanwhile, the lowest simulation value is IDR11,719,521 (RM3,424.82), with the bathroom located outside the room, average remittances per month IDR1,000,000, earnings per month of IDR250,000, room size of 9 m², type of residence of rent a house, female, and of Java origin.

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DETERMINATION OF FINANCIAL FEASIBILITY OF INDONESIA'S NEW CAPITAL ROAD CONSTRUCTION PROJECT USING SCENARIO ANALYSIS

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Abstract

The plan to relocate the Indonesian capital from Jakarta to East Kalimantan Province in 2024 requires a significant amount of 442 trillion Rupiah to construct various new capital infrastructure such as roads for transportation. This study aims to analyze the funding scheme for new capital road construction projects in Indonesia using two alternative financing, namely the National Budget and Public-Private Partnership (PPP). This study used quantitative methods with a scenario analysis approach to determine the best funding scheme based on regional economic growth and financial viability. This study did not consider the project management factors during the construction period and the quality factors of the roads built during the concession period. The results showed that road construction projects in the new capital city can be implemented using two financing schemes. The National Budget financing scheme will increase the percentage of the budget deficit to GDP in the first five years of development. The financing scheme through PPP can help the government overcome the budget deficit but requires the resilience of the government's budget during the project concession period.

Keywords: infrastructure, scenario analysis, financing, new capital

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INTRODUCTION

The government has been planning to relocate the Indonesian national capital from Jakarta to some other state even before it gained independence. Based on data compiled by Kompas Research and Development (2019), Bandung in West Java, Palangkaraya in Central Kalimantan, and Jonggol were being considered during the Dutch East Indies era, and Presidents Soeharto and Soekarno's times in office. Finally, President Jokowi established the Kutai Kertanegara and North Penajam Paser Regencies, East Kalimantan Province, as Indonesia's new capital.

The Ministry of National Development Planning has reported that an estimated cost of IDR 466 trillion is needed to construct new capital. This is expected to lead to an increase in APBN spending in the next few years. Given the limited fiscal space, an alternative financing procedure, namely a partnership scheme between the government and business entities or SOEs' assignment, was adopted for this construction, thereby enabling APBN spending to be allocated to other public sectors.

One factor that determines the readiness to develop the new capital is road construction. Its provision is important because it is regarded as a basic infrastructure that connects various economic aspects, including access both in and out of the capital. Moreover, the planned capital Kutai Kertanegara and Pasir Penajam Districts lack adequate road infrastructure. Although the Ministry of PPN intends to execute its construction using the Public-Private Partnership scheme, besides it is important to review the financing feasibility of capital roads.

The PPP is implemented supposing the road construction has economic and financial feasibility, thereby providing added value to the companies to get their investment returns. Therefore, this study ensures that the government's choice of the PPP scheme is realistic compared to other alternative financing initiatives, such as SOE special assignments and bilateral loans from international institutions.

However, this study aims to determine the feasibility of road construction using an economically sustainable financing scheme that benefits the government and reduces fiscal risks in the long run. This led to the adoption of a funding initiative that meets the 3 aforementioned criteria. Before calculating the financing feasibility, a scenario analysis approach was adopted to determine the road requirements based on the estimated number of existing and migratory populations. Meanwhile, the government has yet to formalize the design and technical drawings related to the construction of these roads.

RESEARCH METHODOLOGY

This study uses quantitative methods to analyze the determination of financing schemes for developing the new capital city of Indonesia. Furthermore, inference statistics were used to calculate the average and standard deviations of road requirements. Some data that serve as independent variables include population,

area size, and Gross Regional Domestic Product (GRDP) in the Kutai Kertanegara and Penajam Pasir Utara districts were used to determine the estimated length of the road. The results showed that the estimated length of road and the yield data of Rupiah denominated government securities are used as independent variables to determine the estimated project based on several scenarios.

According to Kishita et al. (2016), the scenario analysis is a method used to predict the possible occurrence of a situation and its consequences, assuming that the phenomenon or a trend is continued in the future. The scenario analysis is carried out through 4 stages. The first is estimating the road construction requirements based on Minimum Service Standards using the following variables, population, and GDRP per area. The second stage is to estimate the average population parameters according to a small sample size to ascertain the road construction project costs. Third, extrapolate Government Bonds (SBN) Yield Curve in Rupiah Denominations as Discount Rate, and trend compilation using scatter-plots and logarithmic natural (ln) to estimate the interest rates for 50 years as an input in the NPV calculation.

The fourth stage involves analyzing the scenarios to determine the changes in independent variables, determined by a set of values. Based on this, the independent variables are projects and a range of estimated values determined by an inferential statistical approach. Conversely, the dependent variable is a primary balance and the ratio of deficits to GDP. Income expenditure is the control variable in accordance with *ceteris paribus*. However, the addition of the project value results in capital expenditure.

LITERATURE REVIEW

Sumardjoko (2019) stated that the provision of infrastructure creates connectivity and trade. Based on the managerial status of the authority, there are national, provincial, district, city, and village roads. National roads are described as arterial collectors in the primary road network system that strategically connects provincial capitals, national and toll lanes. Provincial roads are collectors in the primary road network system that strategically connects provincial, and district, or city lanes. City roads are a secondary road network system connecting service centers, parcels, and settlements within the city. Village roads are also categorized as public lanes that connect the area or settlements within the community and environmental roads.

However, technical inefficiency has a greater deviation in the efficient frontier compared to the ineffective scale (Chuweni, 2019). In road construction, technical requirements include the speed of the plan, width, capacity, driveways, intersections of complementary buildings, equipment, usage according to their functions, and the ability to meet the security, safety, and environmental needs. To guarantee all these, Government Regulation No. 25 of 2000 stipulated a

minimum service standard, which is developed from 3 basic desires of road users. This includes good road conditions, non-congested lanes, and durability. Based on the Decree of Ministry for Public Works and Human Settlements Number 14 of 2010, several aspects of the service sector that need to be met in constructing this infrastructure are accessibility, mobility, and safety measures.

The accessibility aspect is described as the availability of roads connecting the district or city activity centers. Its parameter is the ratio of the total road length to the population density. The higher the accessibility indexes, the better availability of interconnecting roads. The magnitude of the Minimum Service Standards accessibility index parameters is shown in Table 1.

Table 1: Accessibility Index Values

Category	Population density (per km ²)	GRDP per capita (billion)	Accessibility Index Values	Mobility Index Values
Very high	> 5.000	> 10	> 5,00	> 5,00
High	> 1.000	> 5	> 1,50	> 2,50
Moderate	> 500	> 2	> 0,50	> 1,00
Low	> 100	> 1	> 0,15	> 0,50
Very Low	<= 100	<= 1	> 0,05	> 0,20

Source: Minister for Public Works and Human Settlements

The mobility aspect is the quality of road services, measured by the ease per individual community to travel to a certain destination. This aspect is calculated using the proportion of available road length and the population with the magnitude of the minimum service standard parameter based on the Gross Regional Domestic Revenue per capita. Furthermore, the safety aspect is the availability of roads that ensures users drive safely, including the addition of equipment such as traffic signs, etc.

The calculated project feasibility is an essential factor that determines the success of road construction, and this starts with the preparation of cash flow projections. According to Titman et al. (2018), this procedure involves 4 steps. First, measure the project's operating cash flow, obtained by calculating operating income, project, tax, and depreciation expenses. The net profit realized after the tax payment is referred to as Net Operating Profit After Taxes (NOPAT). The second is identifying the additional net operating working capital needed. The third is identifying the capital expenditure, while the fourth involves reducing net cash flow per year (free cash flow / FCF). This is realized by adding the net operating working capital and capital expenditure.

In carrying out a feasibility assessment, it is necessary to consider the overall costs incurred and the return on investment period. The annuity method is an alternative approach for calculating these costs. According to Titman et al. (2018), an annuity is a series of payments with similar nominal for a certain number of years. The model is an implication of two financial management principles. First, money with similar nominal has a time value which means that

its current worth tends to be enormous compared to the future. Second, cash flow is a source of value. In addition, Titman et al. (2018) stated that it is the amount of money obtained from a business operating within the same period. This led to the generation of two models, namely ordinary and maturity annuities. The usual one involves the making of payments at the end of the period (n). The annuity due is the ability to make payments (PMT) at the beginning of the period (n) with an interest rate (i). The present values (PV) of an ordinary annuity and its due are shown in Equations 1.1 and 1.2, respectively.

$$PV = PMT \left(\frac{1 - \frac{1}{(1+i)^n}}{i} \right) \quad (1.1)$$

$$PV = PMT \left(\frac{1 - \frac{1}{(1+i)^n}}{i} \right) (1 + i) \quad (1.2)$$

Recognizing the cash flow risks in project implementation and evaluation method, namely the net present value (NPV), is developed to map these issues and returns, which are helpful in the decision-making process. The NPV method guides project innovation by indicating potential financial value (Žižlavský, 2014). Conversely, it is adopted during optimal decision-making (Arya, 1998).

Titman (2018) stated that the discount factor is used to calculate the NPV between expenditure and income. In addition, it is also obtained using the social opportunity cost of the capital. Meanwhile, assuming it is related to the cash flow projection method, the NPV is the amount of net cash flow throughout the project duration that has been discounted to produce the present value. The intended cash flow includes estimated investment, operating, maintenance costs, and benefits from the planned project.

The basic NPV formula is shown in Equation 1.3, where CF_0 is the initial cash outlay, usually represented by a negative number, CF_1 through CF_n represents cash flow expectations for periods 1 through n. It is important to note that these cash flow expectations are either positive (inflows) or negative (outflows), k is the desired rate of return or discount rate used to calculate the present or expected value of future cash flows, and n is the cash flow period for the project being evaluated.

$$NPV = CF_0 + \frac{CF_1}{(1+k)^1} + \dots + \frac{CF_n}{(1+k)^n} \quad (1.3)$$

NPV reflects three principles: first, money has a time value. Second, the higher the rate of return, the higher the risks encountered, and third, cash flow is a source of value. In addition, to the NPV analysis, several aspects need attention. First, the estimated cash has to be based on a tax basis. Second, cash outflow need not be included in the element of interest, supposing the project is funded with a loan. These interest costs are the required rate of return for the project appraisal. However, assuming the interest payments are calculated based

on project cash outflow, double results are obtained. This is because as part of borrowing costs, it is recorded as cash outflows for funding activities.

RESULT AND DISCUSSION

Calculation of Estimated Road Construction Needs

The estimated road construction needs must be optimized using asset performance measurement, thereby enabling efficient public planning involving several alternative cost requirements (Puspitarini, 2019). The expectant numbers of residents in Penajam Paser Utara and Kutai Kartanegara Districts by 2024 are 2,559,746, with a population density of 84 people per square kilometre. The projection referred to considers the geometric average population growth of 0.95% and 2.48% in North Penajam Paser and Kutai Kartanegara Districts, respectively, yearly from 2011 to 2018. However, this population growth was not caused by the migration of government employees and their families to the capital city. Therefore, an estimated increase of 175.62% has been predicted to occur from 2018 to 2024.

A weighted average was used according to the population to obtain a single GRDP per capita value for the two districts. The combined per capita GRDP in 2024 is projected to be Rp247.05 million. In the same year, the per capita GRDP of North Penajam Paser and Kutai Kartanegara Districts are projected at Rp74.42 million and Rp279.74 million, respectively. This calculation is based on the assumption that the economy is constantly growing at an average rate of 5%.

According to the Minimum Service Standards, road length is calculated based on the accessibility index. Furthermore, with a population density of 84 people per square kilometre, the minimum accessibility index referred to in the Decree of the Minister of Settlement and Regional Infrastructure Number 534 / KPTS / M / 2001 is 0.05. Based on the calculation that considered the length of the existing clean road and the total area of the two regencies, which were realized as 2,061.88 km and 30,596 square km, respectively, an accessibility index of 0.07 was obtained. Therefore, it was discovered that the accessibility index realization was higher than the Minimum Service Standards. In conclusion, the net length of the existing roads met the Minimum Service Standards.

Furthermore, the length of the road is calculated based on the mobility index. Considering the projected GDP per capita 2024 in two districts and minimum mobility index of 5, The net length of existing roads and the value per thousand population are 2,061.88 km and 2,559,746, respectively. The mobility index of 0.81 is obtained which still below the Minimum Service Standards. Therefore, to meet the specified standard, the required road length is 12,798.73 km.

In accordance with the 2 approaches, assuming a one-way lane is 11 meters wide compared to the minimum primary arterial road width stipulated in

government regulation No. 34 of 2006, as 12,798.73 km, the resulting area of the project is 281.57 square km. or 0.92%. Conclusively, the length of the road is acceptable considering that the percentage of its area is less than 5%.

Development of Project Value Scenarios

Scenario development needs to shift from the traditional approach, namely the project feasibility study, to a new method that adheres to the sustainable development principles (Shen, 2010). The value of needs per kilometre is calculated using an inferential statistical approach, considering projects executed close to the new capital. The data processing results carried out on 5 samples of road development projects on Kalimantan Island obtained an average value of IDR7.64 billion with a standard sample deviation of IDR 2.47 billion. Furthermore, the average population interval estimation method was used to obtain the t distribution as illustrated in Equation 1.4, with a free degree of 4 and an error value of 5%, including an average interval of project values per km of IDR4.57 billion and IDR10.71 billion.

$$p\left(\bar{X} - t_{(0,025,4)} \frac{s}{\sqrt{n}} < \mu_x < \bar{X} + t_{(0,025,4)} \frac{s}{\sqrt{n}}\right) = 1 - 0,05 \quad (1.4)$$

$$p\left(\text{Rp}7,64 \text{ m} - 2,776 \frac{\text{Rp}2,47 \text{ m}}{\sqrt{5}} < \mu_x < \text{Rp}7,64 \text{ m} + 2,776 \frac{\text{Rp}2,47 \text{ m}}{\sqrt{5}}\right) = 0,95$$

$$p(\text{Rp}4,57 \text{ m} < \mu_x < \text{Rp}10,71 \text{ m}) = 0,95$$

From this formula, the road construction needs in the new capital are calculated by multiplying the length of the required road (12,798.73 km) and the estimated range of project values. The results obtained led to the generation of three funding scenarios for the construction projects are shown in table 3.

Table 3: Value Scenarios of Road Development Projects

Scenario	The length of the road (km)	Unit per km (IDR billion)	Project value (IDR billion)
Low	10.736,85	4,57	49.073,41
Moderate	10.736,85	7,64	82.049,71
High	10.736,85	10,71	115.026,01

The next step is preparing cash flow projections in accordance with several assumptions. First, the road construction duration is 5 years with a utilization period of 50 years as stipulated in Government Regulation Number 27 of 2014 concerning Management of State Property. Second, the discount rate used is the yield of government securities denominated in Rupiah with a tenure of 50 years. However, assuming the data is not found, an extrapolation method is applied using the logarithmic function based on natural numbers (ln). Annual maintenance costs are 5% of the project value.

Depreciation expense is calculated using the straight-line method with no residual value and useful life of 50 years. The assumption used to calculate the capital expenditure increase is based on the analysis that the project tends to be carried out for 5 years with an annual completion rate of 20% of the road length target. The final assumption is that it is not a commercial road, therefore, users are not charged any form of tariff or fees.

Financial feasibility models are calculated based on inputs and indicators (Kurniawan, 2015). In accordance with the assumptions and scenarios, the calculated cash flow projections are shown in table 4 for the low, moderate, and high project value scenarios. The results show that all scenarios have a negative cash flow.

Table 4: Project Cash Flow Projects with Scenarios in billion (rupiah)

	Low		Moderate		High	
	<5 years	5-54 years	<5 years	5-54 years	<5 years	5-54 years
Cash inflow						
Revenue		0		0		0
Cash Outflow						
Maintenance		(2.453,67)		(4.102,49)		(5.751,30)
Depreciation		(981,47)		(1.640,99)		(2.300,52)
Net Operating Profit		(3.435,14)		(5.743,48)		(8.051,82)
Tax		-		-		-
NOPAT		(3.435,14)		(5.743,48)		(8.051,82)
(+) Depreciation		981,47		1.640,99		2.300,52
Operating CF		(2.453,67)		(4.102,49)		(5.751,30)
Increase in Capex	(9.814,68)		(16.409,94)		(23.005,20)	
FCF	(9.814,68)	(2.453,67)	(16.409,94)	(4.102,49)	(23.005,20)	(5.751,30)

The second assumption proves that a discount rate of 8.339% was realized using the yield curve extrapolation, thereby making it possible for the Net Present Value (NPV) for all project value scenarios to be calculated. The results show that all scenarios have negative NPV with IDR57.96 trillion, IDR96.90 trillion, and IDR135.85 trillion in the low, moderate, and high categories. The results indicate that the road construction project was not financially feasible.

Financing Scheme for Indonesia's New Capital Road Project

The government adopted 3 schemes in financing the new capital road construction projects. These include APBN capital expenditure, the assignment of State-Owned Enterprises (SOE), and Public-Private Partnerships (PPP). The SOE assignment scheme was implemented because it was in accordance with the specified criteria (Ansari, 2017) and considering the fact that the project's scenarios cash flow has

negative NPV values. Investment risk is bound to occur, assuming the government continues to assign SOE because it reduces the company's equity.

The PPP scheme with the availability of payment facilities was also applied. The government and the private sector tend to share the risk associated with this scheme. One of its advantages is that the private sector receives payments from the government during concession yearly. In addition, payment is made once the road construction complies with the output and service performance indicators specified in the agreement. This scheme reduces the contraction of short-term financing in the budget. However, financing schemes through state government spending tend to be implemented considering that roads are free public usage. In accordance with the construction of new capital roads, the financial losses are covered by the citizens' tax receipt. Based on the 3 financing schemes, the availability payment and state government spending serve as alternatives.

According to the theory of the monetary time value, a payment trajectory based on assumption is formulated in the context of implementing the PPP scheme. First, the road concession period, asides from the construction duration, are 50 years. Second, the discount rate used is the estimated interest rate of Rupiah denominated SBN with tenure of 50 years based on the yield curve extrapolation result of 8.339%. In addition, it was also reported that the annual maintenance costs carried out by the Implementing Business Entity is 5% of the project value and is constant. Therefore, the costs incurred by the government are shown in table 6.

Table 6: Government Payments in PPP Scheme For 50 Years in Rp billion

Scenario	Payment of Project	Maintenance Cost	Total
Low	(4.195,42)	(2.453,67)	(6.649,09)
Moderate	(7.014,66)	(4.102,49)	(11.117,15)
High	(9.833,90)	(5.751,30)	(15.585,20)

It is a trade-off when considering alternative road construction financing schemes using government budgets or private company budgets. If the government considers project financing using the government budget (APBN), the need for capital expenditure budget for the first five years of project development will be high. This is a dilemma when there are other budgetary needs such as additional health spending. However, there are advantage using this scenario where the allocation of road maintenance spending during the concession period is not significant.

The alternative financing schemes using PPP have advantages because of the project risks that are shared by the government and the private sector (Ke, 2010). Private companies will finance the road construction project for 5 years with their budget. Furthermore, after the construction project is completed, the government will pay the development costs incurred and the profits. This payment period is called the concession period. Sometimes during the concession period, the

government gives permission to private companies to collect revenue from those who use the road as part of the company's profits.

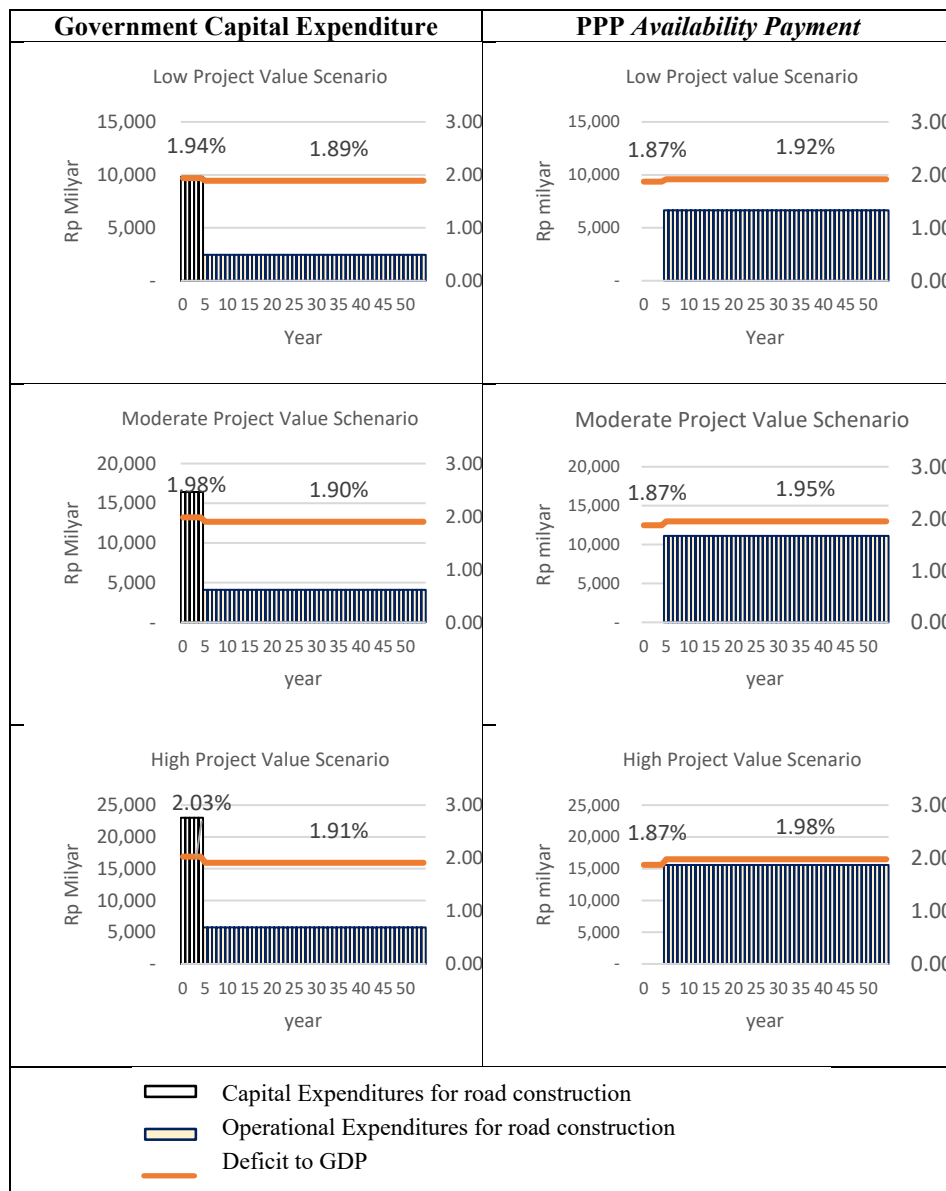


Figure 1: Simulation Results of the Impact of Using a Financing Scheme against the State Budget Deficit in the Long Term

CONCLUSION

Road construction as a form of connectivity from one place to another is one of the challenges facing the development of new capital. The use of scenario analysis shows that the needs of the project are not financially feasible therefore, the government has to adopt the APBN capital expenditure funding scheme and PPP availability payment. However, the use of these methods encouraged the government to provide a working budget for the next 50 years. The APBN capital expenditure financing method is preferred to the PPP scheme, because it has less impact on the budget allocated to finance road construction projects during the first 5 years. Furthermore, the use of the PPP scheme is associated with numerous risks. However, within 6 to 50 years, the government needs to provide a budget allocation to pay for the return on investment of the business entity. The second financing schemes are risky, the government needs to consider the best that does not have a negative impact on the government budget. Finally, the results of this study do not consider the project management factors during the construction period and the quality factors of the roads built during the concession period. We assume the project management and road quality using these two scenarios are the same.

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THE LEGAL REQUIREMENTS OF APPROPRIATE HERITAGE PROPERTY VALUATION METHOD

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Abstract

Heritage property value is an important economic indicator to a country. Thus, it is imperative that the value is derived from an accurate and reliable method of valuation. However, in Malaysia, there are no specific standards that can be referred to for conducting an assessment for heritage property valuation. Thus, this paper fills the gap by reviewing five provisions of the Malaysian laws and four provisions of the international laws that are related to heritage property valuation. Thematic analysis of the documents is undertaken by using five keywords that relate to heritage property valuation, namely: definition, factors, method, procedure and type of values. Out of nine legal documents analysed, Valuation of Specialised Public Service Assets has the most information needed as a guidance for heritage property valuation.

Keywords: heritage property, valuation, law of property, Malaysian laws, international laws

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INTRODUCTION

Heritage is increasingly defined as an economic development tool. However, in order to conclusively gauge heritage-related economic impacts, measurements, tools and methodologies must be accordingly implemented and evaluated. This paper conducts a thematic analysis on the legal documents that are related to heritage property valuation in the effort to determine the procedure in conducting an assessment for heritage buildings.

HERITAGE PROPERTY VALUATION

Heritage property can be classified into two types of uses, i.e., for public use and for private use. Interest in the valuation of heritage property has increased among researchers, particularly in determining the best methods to value heritage properties. Yet, the valuation of heritage property has been met with many challenges over the time. The valuation of heritage property differs from the valuation of other kinds of assets or property because heritage property is not traded actively in the market. The uniqueness of heritage property makes it difficult to be valued using the existing conventional methods. The theory, methods, and practice of economic valuation are well established especially in valuing Grade-I heritage property. However, no studies have attempted to identify the most appropriate approach for valuing heritage property, especially for Grade-II heritage property (for example, pre-war shop-houses and pre-war housing buildings). Some of the difficulties in valuing heritage property have already been discussed in the literature through various perspectives, and the following critical issues have been identified: i) the complexity of the term is a fundamental part of why heritage property becomes difficult to be assessed. First, one needs to understand the classification of heritage property and types of values; ii) heritage property value cannot be expressed only with statistics because the heritage value is also influenced by other variables (non-use value), including intrinsic value; iii) the current methods for assessing the impact and outcomes of heritage property value are increasingly being questioned, both in terms of methodologies and the results have illuminated our understanding. If the methodology of measurement is not accurate, the results would be inconclusive; and iv) the limited availability of data might not facilitate us in understanding the valuable aspects of heritage value.

A previous study by Junainah et al. (2015) revealed that, the valuers use a conventional method for heritage property valuation where comparison approach is the main choice due to market conditions. Moreover, based on the findings, most of the valuers admitted that they did not have enough knowledge about valuation of heritage property. The valuers claimed that the comparison approach is the best approach compared to the conventional methods, but there are weaknesses that need to be dealt with in applying this approach. The main weakness of this approach is the unavailability of comparison data. So, it could

be said that it is very important to establish an appropriate method for heritage property valuation in order to produce reliable and accurate value of assessment. The unavailability of a specific guidance for heritage property valuation is the motivation for this paper.

RESEARCH METHODOLOGY

This paper adopts a qualitative document study and analysis. A document study approach is an analysis of any written material which contains information of the phenomenon being studied (Henning et al., 2004). The documents which were studied in this paper are five provisions of the Malaysian Laws and four provisions of the International laws that are related to heritage property valuation. Textual data presented in provisions of the Malaysian and International laws were analysed using thematic analysis. Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data (Braun & Clarke, 2006). Thematic analysis of the legal documents is undertaken based on five keywords, which are, definition, factors, method, procedure and type of values.

LAWS RELATED TO HERITAGE PROPERTY

This section reviews the related statutes for heritage property valuation by looking into five keywords on heritage property valuation: definition of heritage property, factors affecting the heritage property values, methods of valuation, procedure taken for conducting valuation processes, and type of values that exist in a heritage property. The discussion is based on the following Malaysian laws: National Heritage Act 2005 (Act 645), Local Government Act 1976 (Act 171), Town and Country Planning 1976 (Act 172), Malaysian Valuation Standard 2019 (6th Edition), and MPSAS 17-Property, Plant and Equipment. The following international laws were also referred to: International Valuation Standard, Valuation of Specialised Public Service Assets, Accounting Standards Board – Heritage Assets (GRAP 103), and IPSAS 17-Property Plant and Equipment.

Malaysian Laws

National Heritage Act 2005 (Act 645)

The legislation related to building conservation was introduced with the inauguration of Antiquities Act 168, 1976, which was later replaced by the National Heritage Act, 2005 (NHA 2005). NHA is empowered by the National Heritage Department (NHD) under the Ministry of Cultural, Arts, and Heritage. This act focuses more towards building conservation. According to five keywords that have been assigned, it appears that only one important keyword is found in the NHA 2005, which is the definition of heritage property. The definition provided by NHA 2005 is diverse, which facilitates the understanding of the meaning of heritage property. Referring to NHA 2005 Part I – Preliminary 2(1), the listed definitions indicate significance definition towards Grade-II heritage

property. The Grade-II heritage properties are considered ‘heritage property’ even though they are not registered in official registrar as long as the buildings have significant historical or cultural value. They are regarded as having “cultural heritage” because they represent the same meaning for heritage property and are classified under tangible cultural heritage.

Local Government Act 1976 (Act 171)

Local Government Act 1976 (Act 171) is a Malaysian law enacted to revise and consolidate the laws relating to local government and shall apply only to Peninsular Malaysia. This act has 16 parts and is divided into 166 sections that cover a variety of matters related to the functions and role of local government. In the Local Government Act 1976, there are provisions that discuss heritage property. Section 101 (1) (c) (iv) denotes further empowerment to local authorities to maintain or contribute to the maintenance of historical buildings or sites and acquire any land, with or without buildings. This is done for the purpose of or in connection with the establishment of such public parks, gardens, esplanades, recreation grounds, playing fields, children’s playgrounds, open spaces, holiday sites, swimming pool, stadia, aquaria, gymnasia and community centres, or for the purpose of or in connection with the maintenance of historical buildings or sites. The purpose of Local Government Act 1976 is more towards the power given to local authorities inducting the maintenance on heritage property. However, no specific discussion on heritage property valuation is available.

Town and Country Planning 1976 (Act 172)

Local authorities are responsible for managing, controlling, and monitoring Town and Country Planning 1976 (Act 172). Following are the lists of the provisions contained in the Town and Country Planning Act relating to heritage property in obtaining planning permission.

The layout plans under paragraph 21A(1)(f) shall show the proposed development and in particular— Section 21B (1) (b) where the development is in respect of a building with special architecture or historical interest, particularly to identify the building including its use and condition, and its special character, appearance, make and feature and measures for its protection, preservation and enhancement;

- a) 22 (5) (j) where the development involves any addition or alteration to an existing building with special architecture or historical interest, with the conditions to ensure that the facade and other external characters of the building are retained;
- b) Section 22 (5) (k) where the development involves the re-erection of a building with special architecture or historical interest or the demolition thereof and the erection of a new building in its place, with the conditions

to ensure that the facade and other external character of the demolished building is retained.

- c) Section 58 (2) (f) the protection of ancient monuments and lands and buildings of historical or architectural interest;

For valuation purposes, these conditions will affect the value of heritage property; often they may decrease the value of the property. The conditions are as follows:

- a) The heritage property cannot be demolished and rebuilt with a new modern building; the owner of the building needs to maintain the façade of the building.
- b) Any addition or alteration made to the heritage building must obtain approval from the local authorities.
- c) Overall, heritage properties are protected by law.

Malaysian Valuation Standards 2019 (6th Edition)

Malaysian Valuation Standards 2019 (6th Edition) (MVS) are the latest valuation standards that come with 19 standards and 2 introductory chapters. The introductory chapter commences with the definitions of terms and words used in the standards. The second introductory chapter is on the general concepts and principles normally used in the valuation profession. The review focuses on the standards related to heritage property valuation. However, the findings show that the MVS does not come with specific standards regarding heritage property valuation.

MPSAS 17 – Property, Plant, and Equipment

The objective of the MPSAS 17 – Property, Plant and Equipment is to prescribe the accounting treatment for property, plant and equipment so that users of financial statements can discern information about an entity's investment and the changes in such investment. There are specific contents for heritage assets in MPSAS 17 starting from Paragraph 9 until 12. MPSAS 17 provides the meaning of heritage assets in Paragraph 10. Paragraph 10 states that some assets are described as heritage assets because of their cultural, environmental, or historical significance.

In MPSAS 17, there is a specific section that discusses heritage property but the discussions are more on the preparation of financial statements. Nevertheless, the information provided can be adopted in the valuation of heritage property, for example, the factor affecting the value of heritage property and determination of market value, among others.

International Laws

International Valuation Standards

The IVS 230 Annexe – Historic Property was removed from IVS 2017. The reason is the Board did not consider that there were sufficient unique requirements or considerations when valuing historic (real) property that warrant the inclusion of this annexe in the standards. It also provides only guidance, which under current IVSC protocols should be included in a TIP. The guidance provided is similar to that in the TIP on Specialised Public Sector Assets 2012. Another reason for the removal of this annexe is due, to the fact that it may be issued as a standalone paper providing information and guidance on some of the valuation criteria to be considered.

In addition, there have been recent changes after we completed the analysis where the International Valuation Standards Council has issued an updated version of the suite of International Valuation Standards titled IVS 2020 which took effect on 31st January 2020; the 2020 edition of IVS would be replacing IVS 2017.

Valuation of Specialised Public Service Assets

Up to now, based on a review of what? in Malaysian laws, there are no specific guidelines or standards for heritage property valuation. They need to refer to several guidelines in order to conduct the assessments on heritage property. It is interesting that in Valuation of Specialised Public Service Assets there is one section for interests in undertaking valuation for historic real properties. The section is under Asset Standards – Annexe - Historic Property. It contains Annexes A1 until A17. The Annexe gives additional guidance on matters that require consideration when valuations are undertaken for heritage assets. First, the definition on heritage property where some people may use different terms to refer to heritage property. Annexe A2 defines historic property as a real property that is publicly recognised or officially designated by a government body as having cultural or historic importance because of its association with a historic event or period, with an architectural style or with a nation's heritage. The characteristics common to historic property include the following; its historic, architectural and/or cultural importance, the statutory or legal protection to which it may be subjected, restraints and limitations placed upon its use, alteration and disposal and, a frequent obligation in some jurisdictions that it be made accessible to the public.

Annexe A3 explains that the historic property is a broad term, encompassing property types. For example; certain properties are restored to their original condition and some are only partially restored, i.e building façade; it also includes properties which are partially adapted to current standards, i.e interior space and properties that have been extensively modernised

Annexe A4 – A6 explains on the need to protect heritage property. It also provides the definition of cultural heritage and cultural property by UNESCO Glossary of World Heritage. Lastly it also states that not all heritage properties are necessarily recorded in registers. Certain properties having cultural and historic importance also qualify as heritage property.

Annexe A7-A11 specifies the factors that affect heritage property values. The valuation of heritage property requires consideration of a variety of factors that are associated with the importance of these properties, including the legal and statutory protections to which they are subjected, the various restraints upon their use, alteration and disposal and possible financial grants, tax rate or tax exemptions to the owners of such properties in some jurisdictions.

When undertaking a valuation of a heritage property, the following matters should be considered depending upon the nature of the heritage property and the purpose of the valuation:

- a) Restrictive covenants that apply to the land regardless of the owner,
- b) Preservation easements that prohibit certain physical changes, usually based on the condition of the property at the time the easement was acquired or immediately after proposed restoration of the property,
- c) Conservation easements that limit the future use of a property so as to protect open space, natural features or wildlife habitat.

The valuation of heritage property involves special considerations dealing with the:

- a) Nature of old approaches
- b) The current efficiency and performance of the property in terms of modern equivalent assets
- c) The appropriateness of the methods used to repair, restore, refurbish or rehabilitate the properties, and
- d) Character and extent of legal and statutory protection

Annexe A12-17 states the valuation approaches that can be applied in valuation of heritage property. The methods are market approach, income approach, and cost approach. The conformity of those approaches depends on the nature of the heritage property. In applying market approach, the first important requirement that should be considered is availability of market evidence. If the market evidence is available, then the market approach can be applied. The market evidence should be similar with the subject property. Other criteria for selection of comparable properties include architectural style, property size, specific cultural or historic associations of the subject property, and similarity in locations with regards to zoning, permissible use, legal protection and concentration of historic properties. The adjustment may have to be made to the comparable sale with regard to their differences in factors affecting the values. Heritage properties fully utilised for commercial purposes may be valued by means of the income approach. When applying the cost approach for heritage

property, consideration is given to whether the features of the heritage building would be of intrinsic value.

Accounting Standards Board – Heritage Assets (GRAP 103)

Accounting Standards Board – Heritage Property (GRAP 103) is set out in Paragraphs .01 to .98. The objective of this standard is to prescribe the accounting treatment for heritage assets and related disclosure requirements.

Paragraph .04 defines the terms used in the standard what?, and one of the terms is related to heritage assets. The standard defines heritage assets as an asset that has a cultural, environmental, historical, natural, scientific, technological or artistic significance and are held indefinitely for the benefit of present and future generations.

Paragraph .06, there are several characteristics often displayed by heritage assets. Some of the characteristics may affect the value of this asset. either they increase or increase the values. The characteristics are as follows:

- a) Heritage property value may increase over time even though their physical condition deteriorates (increase the value)
- b) Heritage property value are protected, kept unencumbered, cared for and preserved (decrease the value)
- c) The value in cultural, environmental, educational and historical terms is unlikely to be fully reflected in monetary terms (use value and non-use value)

In this standard, Paragraph .13 states that the heritage assets can be recognised as an “heritage asset if:

- a) The future economic benefits or service potential associated with the asset will flow to the entity, and
- b) The cost or fair value of the asset can be measured reliably

With reference to the above underlined sentence “the cost or fair value of the asset can be measured reliably” is parallel with the aim of this study in identifying the appropriate approach for heritage property valuation in ensuring its reliability, validity of the values.

Paragraph .35 to 0.45 discusses on determining fair value. The standard defines fair value to be the same with the market value. The value of a heritage asset is the price at which the heritage asset could be exchanged between knowledgeable, willing parties in an arm’s length transaction. The willing buyer and the willing seller are reasonably informed about the nature and characteristics of the heritage asset, its actual and potential uses, and market conditions at the date of the revaluation.

In Paragraph 0.43, we can find that this standard recognises a valuer as a person who is qualified to undertake the valuation exercise for heritage assets. The values of heritage property can be obtained from the active market and it is the best evidence for fair value. However, there is a situation where the evidence

is not available and the valuation profession may use any valuation technique to determine fair value. For man-made heritage structures such as monuments, the fair values are usually determined by using a replacement cost approach.

There is one section discussing the inability to determine fair value reliably. The discussion starts from Paragraphs .55 until .58. There is a presumption that fair value can be measured reliably for heritage assets if the market evidence is available. However, the presumption can be rebutted when market evidence (heritage property prices) is not available. Besides, the alternative method to estimate the fair value of heritage property is seen as clearly unreliable.

IPSAS 17-Property, Plant and Equipment

IPSAS 17-Property, Plant and Equipment was developed by the International Public Sector Accounting Standards Boards to converge public sector accounting standards with private sectors standards.

Under Heritage Assets Standard in Paragraph 9, some assets are described as “heritage assets” because of their cultural, environmental or historical significance. Examples of heritage assets include historical buildings and monuments, archaeological sites, conservation areas and nature reserves, and works of art.

The standard also states that it is important to determine the fair value based on recent market evidence. The discussion is similar with Accounting Standards Board-Heritage Asset (GRAP 103) where market evidence is used to determine the fair value, and the valuation process is undertaken by a person with a relevant professional qualification. Under Paragraph 47, if no market evidence is available to determine the market value in active market for heritage property, the fair value of heritage property may be established by reference to other similar properties (similarity in terms of characteristics, circumstances and location). However, this is difficult to find.

RESULTS OF ANALYSIS

Table 1 summarises the review on the related laws on heritage property valuation. In Malaysia, there are no specific standards that can be referred to for conducting an assessment for heritage property valuation. A valuer needs to refer to several standards as follows:

- a) Malaysian Valuation Standard 2019 (6th edition) is very important for the valuation profession. MVS describes the procedure for conducting real estate appraisal including methods of valuation, factors affecting the value, several important concepts such as market value, highest and best use, and others. MVS is very important in the valuation process because it will affect the accuracy of value estimation. However, MVS provides general

descriptions of property valuation. No specific explanation is available for the interest in undertaking an assessment for heritage property.

- b) National Heritage Act 2005 (Act 645) focuses more on heritage property conservation and preservation. NHA 2005 provides the definition and the classification of heritage property.
- c) MPSAS 17-Property, Plant and Equipment. So far in Malaysia, this standard is most related to heritage property valuation. However, the purpose of the standard is for preparation of financial statements. MPSAS 17 provides the information on the definition of heritage property and the historical factors affecting the heritage property value, either increasing or decreasing the value.
- d) Town and Country Planning Act 1976 (Act 172) - Restriction on heritage property. For each development, approval must be obtained from the local authority and must comply with the listed conditions provided in Town and Country Planning Act. For example, for any addition, alteration or re-erection of heritage building, the owner must ensure that the building façade is retained.
- e) Local Government Act 1976 (Act 171). It enlists the power given to the local authority regarding the heritage property matters related to maintenance works.

At International level, the review suggests that the practice of heritage property valuation is more guided compared to Malaysia. This is based on the existence of several legal provisions as follows:

- a) *Valuation of Specialised Public Service Assets*. This provision provides a section for heritage property known as Annexe - Historic Real Property. It provides detailed information for conducting heritage property valuation including the definition of heritage property, factors that affect the value, the valuation methods, procedures and types of value comprising in heritage property.
- b) *Accounting Standards Board-Heritage Assets (GRAP 103)*. This provision is specifically for financial statement preparation but we can still use this standard for heritage property valuation. There is one section that emphasises the determination of market value for heritage property. It is important to take note that this requires the market value of heritage property to be determined based on market evidence, but question arises as to what will happen if the market evidence is not available. The GRAP 103 states that there is no clear method to be used if the market evidence is not available, which leads to the need to identify an appropriate approach that considers the thin market issue.
- c) *IPSAS17-Property, Plant and Equipment*. The explanation is similar to GRAP 103.

Table 1: Review on the Laws that are Related to Heritage Property Valuation

Malaysian Laws	Keywords for heritage property valuation				
	Definition	Factors	Method	Procedure	Type of Values
1. National Heritage Act 2005 (Act 645)	/				
2. Local Government Act 1976 (Act 171)		/			
3. Town and Country Planning 1976 (Act 172)		/			
4. Malaysian Valuation Standard 2015 (5 th Edition)					
5. MPSAS 17-Property, Plant and Equipment	/	/		/	/
International Laws	Keywords for heritage property valuation				
	Definition	Factors	Method	Procedure	Type of Values
1. International Valuation Standards 2011					
2. Valuation of Specialised Public Service Assets	/	/	/	/	/
3. Accounting Standards Board – Heritage Assets (GRAP 103)	/	/	/		/
4. IPSAS 17-Property, Plant and Equipment	/		/		

Notes:

MPSAS 17 and GRAP 103 provide detailed explanations about heritage property. These can be applied for valuation purposes however the explanation is more on financial reporting.

VSPSA provides an explanation on heritage property valuation.

CONCLUSION

This paper has highlighted the unavailability of specific guidance for heritage property valuation in Malaysia. This has been the motivation for the attempt to gather and analyse the legal documents that are available to the public. Eight documents were identified. A thematic analysis based on five keywords of heritage property valuation has been undertaken. Out of 8 legal documents analysed, VSPSA has the most information needed as a guidance for heritage property valuation. Further concerted efforts can focus on developing a specific guidance for heritage property valuation in Malaysia.

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DETERMINANTS OF PUBLIC ASSET VALUE FOR LAND PROPERTY: A STUDY IN THE CITY OF TANGERANG, INDONESIA

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Abstract

Public lands take a huge portion of the government balance sheet in many countries, necessitating the need to reevaluate public assets for accurate financial reports, informed decisions, and optimized performance in strategic asset management. This study aimed to determine how the land area, location, shape, road width, and distance to the CBD affect the value of public land. A quantitative method with multiple regression was used to analyze primary data collected from the Public Asset Revaluation Report in the City of Tangerang from 2017 to 2018. The subject was made of 62 plots of public land chosen through population sampling. The results showed that land area and distance to the CBD significantly and negatively affected the public property value, while the road width had a positive effect. However, the location and shape of the public land did not affect its value.

Keywords: Strategic Asset Management, public property fair value, City of Tangerang, public asset revaluation

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INTRODUCTION

Land property has similar characteristics to buildings, such as being immovable, long-lasting, scarce, and dependant on other production factors (Whipple, 1995). In general, land property continues to appreciate in value because it has fixed supply and rising demand. The Indonesian Minister of Finance, also acts as a public asset manager, controlling the Central Government's land property. This authority is then delegated to the Directorate General of State Asset Management (DGSAM). From 2017 to 2018, DGSAM held an Asset Revaluation Program for public assets, including land, building, roads, and dams, to establish their true value.

The government used a market data approach during the valuation process. In this case, the property being valued is compared with similar recent sales in the area. DGSAM provided public valuers with the Appraisal Guidelines for compliance with the valuation requirements and consistency. The guideline primarily focused on the object under relation. Potential factors that could affect the property value were selected, analyzed, and made necessary adjustments to account for the difference when estimating market value. According to previous studies, road width and distance from the property to the Central Business District (CBD) affect land value (Bintang et al., 2017; Aulia (2005); Olawande (2011); Sutarmin (2012); Mariada et al. 2014). However, the Appraisal Guidelines did not include them as adjustment factors in valuing the public land property. Most previous studies examined private land property while ignoring public assets, hence there is a need to examine factors affecting the public land property. This study focused on Tangerang, Province of Banten in Indonesia. The findings were expected to provide information to the government for revising The Appraisal Guidelines policies.

Apart from the introduction, this paper has additional 5 Sections. Section 1 presents a literature review, covering a discussion on land property determinants and develops a framework. The methodology is described in Section 2. Section 3 presents data analysis and results, while 4 and 5 present the paper conclusion and the limitation of the study

LITERATURE REVIEW

Previous Research

Various studies have examined land and real estate property valuation, each proposing different valuation methods, determinants, and object's location. However, they all agree that location is one factor that affects land value. Some studies define location as distance to CBD while others use it in general. Eckert (1990) indicated that land property value is affected by the area of the land, front width, its position on the road, and shape. Another study with a specific definition of location reported that the distance and accessibility to the CBD via private or public transportation affects property value (Hromada, 2018). Hasan et al. (2019)

also defined the location variable as the distance to residential neighborhoods and employment centers. This is in line with another study conducted in Shanghai, China (Chena et al., 2008), which showed that housing prices were impacted by their distance to CBD and the availability of mass transportation (subway). The further away the house is from the CBD, the lower its price. Easy access to the subway was found to increase housing value sharply. A similar result was also recorded in the city of Semarang by Rakhmatulloh et al. (2019), which concluded that land prices were significantly affected by the proximity and the ease of access to the city center of Semarang. Studies in Greater Jakarta show that proximity to CBD affects property value.

A study conducted in Bekasi, Indonesia, to establish the relationship between land value and distance to the CBD in urban structure in Bekasi (Yowaldi, 2012) demonstrated that the distance to the CBD affects land value in the area. Though Yowaldi's study primarily focused on one part of Greater Jakarta (Bekasi), a different study by Andrayani examined all parts of Greater Jakarta (Andrayani et al., 2014) and found that population density and the distance to the CBD area in Jakarta have impacted land value. Bintang et al. (2017) claimed that the ability of the surrounding community also affects property value since an increase in the surrounding community's purchasing power will lead to an increase in property value around it. This study also indicated a higher demand for a property close to the CBD and has wide road access. A study by Sutarmin (2012) agrees with these findings, indicating that location positively influences property values.

Though these studies give a different definition of location, they agree that it affects land value. Nevertheless, the above studies were focused on private land and private real estate property. No research has focused on factors affecting the public land property, despite the Appraisal Guidelines stating that public land value is affected by land area, location, and shape. This study aimed to determine if two other factors (distance to CBD and road width) in the previous studies affect the value of the public land property.

Framework

The framework of the study is discussed below in Figure I.

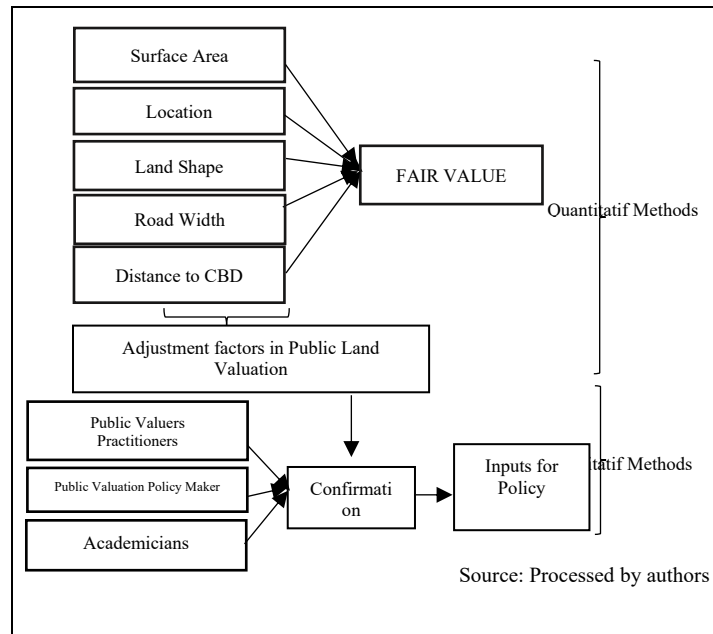


Figure 1. Framework

Research Background

Tangerang is located west of Jakarta, the capital city of Indonesia. It is the largest city in Banten Province but falls behind Jakarta and Bekasi in Greater Jakarta. Tangerang is considered densely populated with 1,771,092 people by 2019. This means that for every square kilometer, there were 10,763 people, making it one of the densest cities in Indonesia (the official website of Tangerang City Government, 2020). Tangerang city is strategically located as it serves as the west entrance to Java Island from Sumatra Island. Apart from its strategic location, Tangerang also boosts several labor-intensive industries and a freeway, improving its dynamic and growth. Additionally, the Soekarno-Hatta international airport adds to the exclusive value of the city, making it a capital city. Tangerang also has many public assets, including buildings, offices, jails, sports centers, schools, hospitals, and airports. These public properties fall under respective line ministries under the coordination of the Indonesia Central Government. Indonesian public land properties are also managed by DGSAM as authorized by the Minister of Finance, considered the Public Asset Manager.

Angotti (1993) alluded that a metropolitan city has ease of mobility as their unique characteristic that could influence property value. Winarso (2006) divided mobility into three categories: job mobility, housing mobility, and travel mobility. Tangerang city has all three forms of mobility; therefore, it qualifies as a metropolitan city.

METHODOLOGY

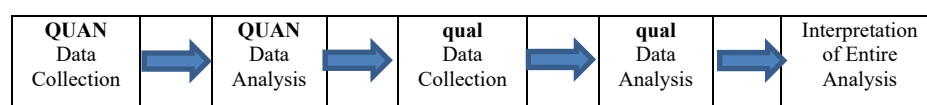
This study combines qualitative and quantitative methods for a better understanding. The *Sequential Explanatory Strategy* was used to attain a perfect mix, where quantitative data are collected and analyzed first, followed by the collection and analysis of qualitative data in a second phase to build the results of the initial quantitative method (Morse in Cresswell, 2008). The initial quantitative analysis results inform the secondary qualitative data collection, meaning that the two forms of data are separated but connected.

Both secondary and primary sources of data were used. The secondary data was obtained from the 62 documents on Valuation Reports and paperwork from the Revaluation Program held in 2017-2018 in Tangerang. Data concerning land size, location, and shape were collected from paperwork. Additional information on land properties' value and location were also acquired from the Valuation Reports. Other secondary sources, such as a copy of land certificates, provided data on land property. The data on road width and distance to the CBD were obtained through direct measurements in the field. Another primary source of data included interviews performed on a triangular basis.

Hypothesis

This study's hypothesis is tested through quantitative methods by data verification in the field. Hypotheses constructed in this research are as follows:

- H 1: Public Land Property Surface Area effect on the value of the land property per square meter;
- H 2: Public Land Property Location effect on the value of the land property per square meter;
- H 3: The shape of the ground effect on the value of the land property per square meter;
- H 4: Distance ground to CBD effect on the value of the land property per square meter;
- H 5: Road Width around the parcel of land effect on the value of the land property per square meter.



Research Model

Semilog Model with multiple linear regression analysis is used in this study. The model measures the absolute changes of the dependent variable (Y) over the relative changes of independent variables (X1, X2, X3, etc.).

Based on the review literature and research beforehand, this study uses the following variables:

NTNH= Public Land Property Value per m2 (in units of currency rupiah)

LUAS= Size of Land (in units of square meters)
 LOKS= Location (discrete data)
 BTNH= Land Shape (discrete data)
 JCBD= Distance to the CBD (in units of meters)
 LBJL= Width of the Road (in meters)

The model constructed is as follows:

$$NTNH = \beta_0 + \beta_1 \ln LUAS + \beta_2 \ln LOKS + \beta_3 \ln BTNH + \beta_4 \ln JCBD + \beta_5 \ln LBJL + e$$

The definitions of variables above are:

- a) Public Land Property Value (NTNH) is the fair value per the Public Valuers based on the market value of surrounding properties (measured in units of rupiah currency per square meter).
- b) Size of Land Property (LUAS) is the area of the object being valued (measured in square meters).
- c) Location (LOKS) is the location where the public land property is, with value score (1) indicating that the location is good, value score (2) location is moderate, and value score (3) poor location.
- d) Land Shape (BTNH) in the form of land property, with value score (1) signifying land is square, value score (2) showing trapezoidal or parallelogram shape, and value (3) is given to any other shape.
- e) Distance to the CBD (JCBD) is the distance taken from the land property location to the nearby CBD, measured in meters.
- f) The width of the Road (LBJL) is the width of roads that accesses the land property, measured in meters.

DATA ANALYSIS AND RESULTS

Quantitative Analysis

The vertical offices of DGSAM in Tangerang (KPKNL Tangerang I and II) conducted Public Asset Revaluation from 2017 to 2018 on 62 public land properties in an area covering 11,683.76 square meters, and the result of all variables are depicted in the table below.

Table 1. Description of Statistical Data

	NTNH	LARGE	LOKS	BTNH	JCBD	LBJL
N	62	62	62	62	62	62
The mean	8777700.97	11683.76	1,161	1,565	2970.19	7.58
Median	7274645.50	1244.50	1,000	1,000	2579.50	6:00
Std. Deviation	4761976.73	61373.03	.3708	.8223	2238.34	3.59
Minimum	2874400.00	112	1.0	1.0	300.0	3.0
Maximum	18288064.00	479717	2.0	3.0	10611.0	20.0

Regression Analysis

The data used in this study has met the BLUE criteria (Best, Linear, Unbiased, and Estimator). Tests done include normality test, multicollinearity test, autocorrelation test, and heteroscedasticity test. The data is further processed through the regression analysis, as exhibited in Table 2 below.

Table 2. Regression Analysis Results

Model	Unstandardized Coefficients		Std. Coeff.	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	33739228,233	7363081,836		4,582	,000
LUAS	-642950.257	371290,900	-.215	-1,732	,089
LNLOKS	-2164799,859	2241292,983	-.117	-.966	,338
LnBNTNH	-1412843.705	1105524,995	-.138	-1.278	,207
LnJCBD	-3112286,362	684696,783	-.515	-5,545	,000
LnLBJL	2283345,943	1167489,510	.218	1956	,055

Source: Adapted from document Reports Results Assessment

Based on Table II equation obtained from the regression are as follows:

$$\text{NTNH} = -642,950.26 \text{ LnLUAS} - 2,164,799.86 \text{ LnLOKS} - 1,412,843.71 \text{ LnBNTNH} - 3,112,286.36 \text{ LnJCBD} + 2,283,3345.94 \text{ LnLBJL} + 33,739,228.23$$

The result of this study indicates that the five variable independents; LUAS, LOKS, BNTN, JCBD, and LJBL, simultaneously contributed to a 45.8% change in Land Property Value (dependent variable), with external factors contributing to the remaining 54.2%. The external factors include documents of land ownership, zoning, land elevation, and macroeconomic factors. The model can also be interpreted as follows:

- a) The hypothesis that LUAS harms the value of public land property in Tangerang is accepted, meaning that a 1% increase of land area reduces the land value by Rp.6,429.50. This is because a 1% increase in land property area will reduce the society's purchasing power by Rp.6,429.50. Increasing land supply in the market will make it difficult for landowners to sell, thus reducing their prices.
- b) The hypothesis that the Location of Public Land Property (LOKS) impacts land property value in Tangerang is rejected since almost all public land properties are located in strategic locations. Additionally, these properties have good access and facilities; thus, LOKS variable does not significantly affect the value of the public land property.
- c) The hypothesis that Land Shape (BNTN) affects the value of public land property in Tangerang is rejected because almost all public land properties in the area are in good shape (squares or rectangles), meaning that the BNTN variable does not affect land value.

- d) The hypothesis that the distance of the public land property to the CBD (JCBD) negatively affects the value of public land property in Tangerang is accepted. The study established that a 1% increase in distance of the ground to the CBD reduces its value by Rp31.122,86.
- e) The hypothesis that the Width of the Road to the property positively affects the value of public land property in Tangerang is accepted, meaning that a 1% increase in the road width adds to the land value by Rp22.833,45.

Qualitative Analysis

A list of main interview questions was generated during qualitative analysis before respondents were interviewed. The use of open-ended questions to Policy Makers on public, Government Valuers, Practitioners' valuation, and academicians resulted in better outcomes. The questionnaires were based on issues from the public land property revaluation program from 2017 to 2018, including the methods used in the valuation and adjustment factors. Respondents' opinions on Distance to CBD, road width, and the urgency of revising the Guideline to accommodate these two variables were also asked. The questions can be developed according to the answers from the sources.

a. Valuation Method used during Revaluation of Public Land Property

Valuers were given the freedom to choose the valuation method, market prices, costs, and revenues method. They all chose the market price method as the best method in the valuating of public land property. Using the market price approach, valuers carried out a field survey to determine the surrounding land, obtain comparative data, create adjustment factors, weigh each related factor, and develop a fair value opinion of the property being valued.

Table 3. Valuations Method Applied in Revaluation of Public Land Property
Source: Results of interview sources

Interviewees	Results
Government Valuer Practitioners	Market price method
Policy Makers (DGSAM)	Market price method
Academicians	Market price method

b. Adjustment Factors Used in Valuation.

This study shows that each respondent has different opinions and reasons regarding different adjustment factors and the weights placed on the valuation. Government Valuers Practitioners argue that emphasis should be laid on legal, financial, maximization, and physical condition aspects as adjustment factors. In contrast, Policy Makers (DGSAM) reason that valuers should consider all factors in the Guidelines, including location, type, area, shape, size, contour, elevation, public facilities, zoning, permits, legal documents, and other related

factors. Academicians also have a different view, arguing that relevant adjustments factors are demand, utility, scarcity, transferability, accessibility, and zoning. Moreover, they also indicated through their response that private sectors will consider additional adjustment factors, such as frontage (front width). The three categories of respondents agree that zoning and accessibility to the property are adjustment factors that affect property value.

Table 4. Adjustment Factors Used in Valuation

Interviewees	Results
Government Valuer Practitioners	Legal Documents, Size, Contour, Elevation, Location, Accessibility, Zoning
Policy Makers (DGSAM)	Legal Documents, Size, Contour, Elevation, Location, Zoning,
Academicians	Demand, Utility, Scarcity, Transferability, Accessibility and Zoning.

Source: Results of interview sources

c. *Distance to CBD and Road Width as Adjustment Factors.*

All the respondents agreed that valuers should know what qualifies a place as a CBD. The academicians suggest that CBD is a place where people interact and do business; however, several centers of interaction and business may not necessarily be a CBD. Road width is its ability to accommodate vehicles, making the object of valuation easy to access. The respondent agreed that these two factors affect property land value; nevertheless, it is up to valuers to determine if they will consider them as adjustment factors. The following Table 5 summarize the interview result regarding Distance to CBD and Road Width as adjustment factors:

Table 5. Effect of Distance Soil into CBD And Lebar Road Against Opinion Value

Interviewees	Results
Government Valuer Practitioners	Have an effect by considering surrounding conditions
Policy Makers (DGSAM)	Have an effect by considering surrounding conditions
Academicians	Have an effect by considering surrounding conditions

Source: Results of interview sources

d. *The urgency of revising the Appraisal Guideline to accommodate the Distance to CBD and Road Width as Adjustment Factors.*

Government Valuer Practitioners state that each valuation object and region is unique and can contribute to different weights on the adjustment factor. However, the respondent from Policy Makers (DGSAM) indicates no urgency in revising the Guideline because of different regional characteristics. They

argue that public valuers have the freedom to choose which adjustment factors impact the property being valued. However, it is better if they explore those given in the Appraisal Guidelines. The academicians' reason that revising the Guidelines would limit the valuers, making the valuation process more rigid. They argued that valuers should undertake market research in the property's region to determine influencing factors. The general response from all respondents confirmed that the government doesn't need to revise the Guidelines, suggesting market research as a tool valuers can use in determining what qualifies as an adjustment factor. Moreover, DGSAM has agreed to maximize the use of *Geotagging* to equip public valuers in performing market research to connect to the latest database regarding the conditions of the object.

Table 6. The Urgency of Revising the Appraisal Guideline to Accommodate the Distance to CBD and Road Width as Adjustment Factors

Interviewees	Results
Government Valuer Practitioners	No need, because each region has its own uniqueness
Policy Makers (DGSAM)	No need, it hasn't become an urgency yet
Academicians	No need, because it will restrict the valuers

Source: Results of interview sources

CONCLUSION

This study shows that public land property value in Tangerang is 45.8% affected by five independent variables, including the size, location, shape, distance to the CBD, and the width of the road. However, the Appraisal Guidelines do not include two adjustment factors considered in this study: the distance to the CBD and the width of the road. Furthermore, qualitative analysis shows that these two factors influence land value with all respondents consenting to the claim. Nevertheless, some respondents reasoned that revising government guidelines is not a priority as they could limit the valuation process. Therefore, valuers should use market research to determine which determinant factors affect the property undervaluation. The use of *Geotagging* will help all public valuers access the latest data for market research.

THE LIMITATION OF THE STUDY AND FURTHER RESEARCH

This study's focus is limited to identifying the distance to the CBD and the width of the road as additional variables that should be considered in valuing public land property, with Tangerang as an area of study. The result from this study is generalized, thus subject to limitations, such as the uniqueness of various valuation objects in each region. Therefore, there is a need for additional research

covering various parts of Indonesia for more insight for policymakers, public valuers, and academicians.

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ISSUES AND OBSTACLES IN THE DEVELOPMENT OF MALAY RESERVE LAND

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Abstract

Malay Reserve Land (MRL) is an heirloom belonging to the Malays to be protected, preserved, and developed in line with the aspirations of sustainable development. However, it has been found that land under the Malay Reserve Land (MRL) category is still lagging in the development stream although it has the potential to be developed in tandem with other Non-Malay Reserve Land. This research paper aims to establish the issues and obstacles in developing the Malay Reserve Land eventually to formulate a strategy for development of the land in future. Focus Group Discussions (FGDs) were held involving experts from various backgrounds namely academics, government officers, industry players and non-governmental organizations (NGOs). Issues and the respective obstacles mainly elicited from the FGDs are in the areas of data, information and research, legislation, development, and financial.

Keywords: Development, Malay Reserve Land (MRL), Focus Group Discussions (FGDs)

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INTRODUCTION

In Malaysia, it can be seen that the demand for land is increasing from time to time for development purposes. There have been regular occurrences in the past whereby decision for land development was initiated by the government especially if it is recognised that development of certain land not necessarily idle or under-developed, is essential in fulfilling certain urban planning policies of the government (Nik Jaafar, 2009). However, it has been found that land under the Malay Reserve Land (MRL) category is still lagging in the development stream although it has the potential to be developed in tandem with other non-Malay land (Ali, 1999).

The MRL has begun since its enactment of the Malay Reservation Enactment in 1913. MRL is a very valuable heritage of the Malays. It is one example of a category of land ownership reserved for the Malays only. The efforts of the government in helping to develop the MRL should be praised, but it is dependent on the potential and condition of a Malay reserve land such as size, location, and may have overlapping claims on the land (Abdul Aziz, 2017). The development of MRL can improve rural livelihoods, living environment and narrows the life quality gaps between those living in urban and rural areas (Abdul Rashid et al., 2021).

In order to achieve the high potential of Malay Reserve Land (MRL) for development, strategic development is very important to guide the development and efficiently fulfil the objectives of the government, developers and land owners. However, some strategic development provisions tend to be static and fail to consider the consequences of the changing economic demand for development (Sivam, 2002).

According to Odongo and Datche (2015), strategic development if well implemented in the organisation is effective towards growth and can be instrumental in helping it to remain profitable, attain a competitive edge (Olusanya and Oluwasanya, 2014) and face challenges in a highly competitive and rapidly changing business environment (Al-Turki, 2011). The implementation of strategic development is thus crucial to unlock the potential for development of MRL.

Nevertheless, integral to the strategic development of the MRL is the identification of the issues and obstacles in developing the land. This will help the developers to enhance the opportunities in developing the MRL with the valuable information serving as a benchmark to strategise the development planning and eventually to produce a holistic and comprehensive strategic development framework.

This research paper thus aims to establish the issues and obstacles in developing the MRL with a view to formulate a strategy for development of the land in future.

LITERATURE REVIEW

A number of issues and obstacles in developing the MRL highlighted by previous work are as follows:

Availability of Data and Information

Lack of data and information on the successful developments on MRL is one of the issues that have prolonged the ignorance and led to negative mind-set of the society about the status of MRL (Md. Ariffin, 2015).

There are data and information pertinent to MRL that have not been recorded, updated, and reported by relevant authorities or parties for the benefits of the society especially for Malays and Bumiputera. If the data and information are made available and statistically analysed by a dedicated party, it can help others to plan for a strategic and sustainable development of the MRL (Ali, 2008).

Legal Matters

The legal obstacles in the development of MRL, can be inferred from previous researchers who argued that the restriction by legislation under Article 89 of the Federal Constitution involving the sale, mortgage, transfer, leasing and other transactions from Malays to non-Malays are issues that affect the potential of developing MRL (Shamsuddin, 2001).

Hussin and Abdul Rashid (2014) stated that although the provisions of the law relating to MRL prevent the sale, lease, mortgage, transfer or any other business on the land to non-Malays, the Ruler in Council is empowered to give possession of state land including in Malay Reservation to any agency or company as required.

The MRL status which mainly in certain areas are predominantly in agricultural land use category may hinder its development. The small size of the land and the low market price caused the landlord to have low negotiation power to determine the landlord's interest in the land. In addition, any forms of development that will be held on MRL can only be sold or transacted only among the Malays. Thus, the market will be limited to the Malays only. This has led to the real estate market being limited and consequently the prices offered low (Abdullah and Omar, 2012). These are issues that need to be addressed and taken into account in order to develop strategically the MRL.

Land Values and Development

The value of MRL is directly linked to the potential land development activity in view of accessibility, provision of infrastructures and potential demand and its marketability (Omar and Raji, 2015). Land owners also need to act creatively in ensuring MRL does not back down and can increase the economic position of the Bumiputera through strategic development of the land development (Samsudin

et al., 2021). The developer must have the edge when deciding to go ahead with the development proposal in lieu of the underlying constraints on the MRL.

In addition, the normal consideration by developers of “choosing the right location, building the right property types, for the right buyers and at the right price” still applies in the case of development on MRL (Md. Ariffin, 2015).

The issue of perceived MRL value has the potential for generating optimistic value (Omar, 2017) causing the MRL to decline slightly in terms of development (Abdul Aziz, 2017). Notwithstanding the constraints in value, MRL has good potential for development when it comes to location, land, size, and availability to generate the marketability of land in the future (Omar and Raji, 2015).

Land Ownership Structure

The issue of overlapping ownership of MRL is an obstacle that has long been a challenge in its development. According to Omar (2015), when the land is owned by more than one owner, the potential of developing the land is low.

Previous studies have found that overlapping ownership is one of the factors that inhibits MRL development. Much of this form of shareholding comes from land inheritance mechanisms. According to Siwar (1976), theoretically this status of ownership is a form of land fragmentation that affects the efficiency of land use in the long run. The studies by Hanif et al. (2015) and Maidin (2013) found that the development of MRL was hindered as a result of shared ownership status and legal restrictions on land dealings. This is not only happening in rural areas but it is more alarming for MRL in urban areas (Md Ariffin, 2013).

Most MRL overlapping ownership situations occur as a result of the process of inheritance or land alienation. Jusoh et al. (2013) found that the process of dividing the land had led to the fragmentation of individual land lots making them no longer economical to be developed. Land ownership status is an important factor in land development efforts (Md. Ariffin, 2013). This is because the sole ownership of land will facilitate its development activities (Omar, 2015). In situations where land ownership overlaps, it requires more than one decision maker (Md. Ariffin, 2015). Often misunderstandings and lack of co-operations among co-owners will hinder any development activities to be undertaken.

Finance

Issues related to the problem of obtaining finance from banks and financial institutions often undermine efforts to develop the MRL especially in multiple ownership situations. Most MRL owners stated that they failed to develop their land for example into housing due to failure to obtain loans from banks and financial institutions (Md. Ariffin, 2015). This is because the multiple ownership status makes it difficult to get an agreement on the project to be implemented and there is no guarantee of the validity of the agreement being created. As a financial

institution, the financiers often avoid giving the loan due to the risk of unsecured loan repayment (Termizi and Ismail, 2018).

There are also MRL owners in certain areas who are able to obtain financing from financial institutions but the low value of the land has led to smaller loans being approved. The amount of the loan could not cover the cost of developing the land and as a result the proposed project could not continue. This has led to an adverse impact on the landlord where the loan cannot be settled and the development project being abandoned (Termizi and Ismail, 2018).

Financial obstacles also exist where the cost of redevelopment of such properties on MRL which are sometimes small and oddly shaped is often higher than the cost of equivalently-sized properties outside the urban core. The lending practices also contribute to the difficulties in obtaining funding for redevelopment. This financial barrier impacts the economics of decision-making that hinder redevelopment of particularly vacant and abandoned lands in the urban areas (Hanif et al, 2015).

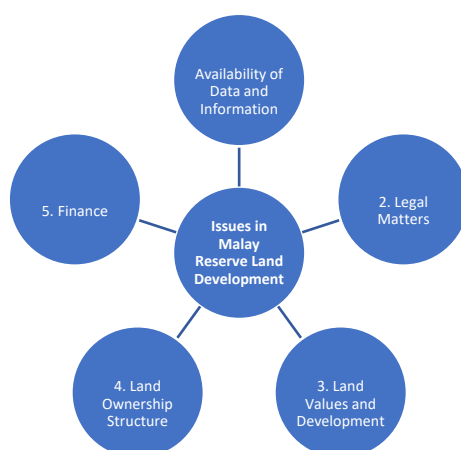


Figure 1: Obstacles Arises in Malay Reserve Land Development

Source: Researcher, 2020

Figure 1 summarises the main headings of obstacles in developing the MRL from the literature review.

METHODOLOGY

The research commenced with secondary data collection from the literature review, which led to an in-depth understanding of the issues associated with the obstacles in the development of MRL in Malaysia. Focus Group Discussions (FGDs) were conducted involving experts in the field of MRL in Malaysia to identify real issues and obstacles based on the expert opinions and experiences of

the experts. A non-probabilistic purposive sampling technique was used to identify the prospective respondents for this research (Samsudin et.al, 2021).

Thirty (30) experts were selected for the FGDs comprising academics, government officers, industry players, and members from the Non-Governmental Organizations (NGOs). Their roles were to provide expert inputs on the issues and challenges faced in developing the Malay Reserve Land in Malaysia (refer Table 1). The experts were divided into different groups comprising of four (4) categories of areas of investigation namely research and information, legislation, development and financial aspects. The FGDs were managed and handled by moderators to ensure the discussions do not deviate from the context given. The broad components of the methodology are depicted in Figure 2. Content analysis on the FGDs was conducted to elicit key points that are used as variables and findings in this research.

Table 1: Respondents Involved in Focus Group Discussion

Background Respondent	Number of Respondent
Academician [Lecturer]	8
Government Officers [Land Office]	10
Industry Player [Banking Sector]	2
Industry Player [Lawyer Firm]	2
Industry Player [Bumiputera Developer]	4
NGO's [Majlis Perundingan Melayu]	4

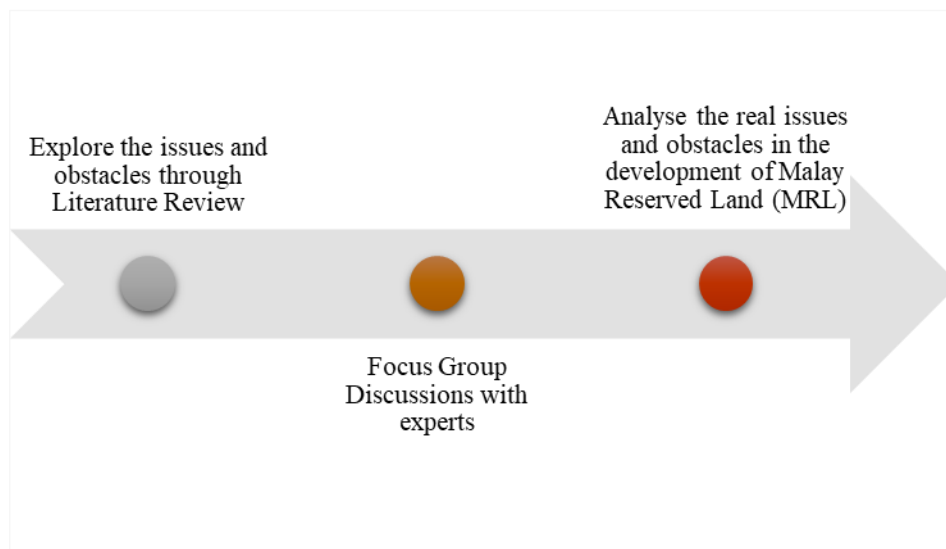


Figure 2: Research Methodology Process

FINDINGS FROM THE FOCUS GROUP DISCUSSIONS (FGDs)

The Focus Group Discussions (FGDs) have further elaborated the issues related to the four (4) categories of obstacles namely data, information and research, legislation, development and financial. The main salient findings from the discussions are as follows:

Data, Information and Research

Lack of structured data, information and crucial research on MRL is something that needs to be addressed in the future. Therefore, the responsible parties need to update the data and information making them more transparent, especially on the total land area of MRL. With a more accurate and comprehensive data and information, research can then be undertaken to gauge the strategic potentials of developing the land in various parts of the country. Furthermore, concerted efforts can then be conducted to formulate strategies to ensure that fifty percent (50%) ownership of the Malays on land is achieved and sustained. Relevant strategies can also be put in place to ensure that the acquired MRL for development purposes are replaced with the same size and market value. It was highlighted in the discussions that organisations for example the land office that have better data and information database, have managed to implement land replacement immediately after the acquisition of the land to prevent the decline of MRL ownership and development.

Legislation

Issues related to the development of MRL are focused on the legislative barriers such as restrictions in land dealing, collateral, and multi-level ownerships. It was emphasised in the discussions that the government should review some aspects of the existing legislation related to land ownership and consider putting a limit on the ownership of each plot of land to facilitate enhancement of value and development of the land. Efforts towards reconciling the differences of the different enactments in different states should be seriously considered with a view to form a consolidated legislation to add value to the MRL.

Provisions related to ownership of land to the Malays should be preserved and efforts to replace the land that were acquired for development purposes should always be the main spirit of any statutory regulations and Malay Reserve Land Enactments.

Development

It was highlighted in the discussions that the potential marketability and development of MRL should be in tandem with the non-Malay reserve land. The development of MRL should be seen as an effort to provide sustainable economic development for the Bumiputera emphasising on the inclusivity of the

development in tandem with the Bumiputera Agenda, efforts to optimize the value and use of the MRL as one of the primary mechanisms to strengthen Bumiputeras' involvement in real estate and their participation in the economy.

It was highlighted that despite the MRL having great potential for future development, its development has been left behind from the current development. The MRL has always been and continues to be an important aspect to the Malaysian land development. It was highlighted that the land value for MRL is less than four times the value of non-Malay Reserve Land. Currently, most of MRL is either left idle or underutilised. Compared with its neighbours, MRL is considered as lagging behind its neighbours' economic development although it has the potential to be developed.

The FGDs have stressed that the MRL which is located far inland, has also led to challenges in developing them in terms of their suitability and risks. A strategic land development framework for MRL is thus crucial to strategically plan and develop the land with proper study and analysis of their development potential in different strategic locations. It was also reemphasised that the MRL has development constraints and restrictions, therefore developers need strategic development plan in developing MRL to create the highest and best use in future development. Typically, quite a substantial proportion of MRL are located further inland. This is because most of the vast and fertile land has been owned by plantation and livestock operators since the colonial times. Therefore, it is not surprising that MRL located in the rural areas are less attractive to developers to develop whereas for areas close to the major urban locations such as the city centre have better potentials to be acquired by the government through the Land Acquisition Act, 1960.

The marketability of the MRL, restriction of MRL possession, MRL replacement, lack of maintenance and multiple ownerships which have contributed to the difficulty in developing MRL were also discussed in-depth.

The small size of the land and the low market value caused the landlord to have low negotiation power to determine the landlord's interest in the land. In addition, any form of development that will be held on MRL can only be sold or transacted only among the Malays only. Thus, the market will be limited leading to lower market value.

Financial

One of the issues that has arisen is that there is no holistic financial model to facilitate the real estate development process for MRL in Malaysia.

Most property owners and developers found government initiatives or cooperative bodies helpful in providing a start-up fund for them to develop the MRL comprehensively. Nevertheless, in some situations support from the commercial banks are not always forthcoming due to restrictions of ownership and consequently affecting the marketability of the land.

In summary, the findings from the study are illustrated in Table 2.

Table 2: Outputs from Focus Group Discussions (FGDs)

Malay Reserve Land (MRL)	Obstacles	Issues
	Data, Information and Research	<ul style="list-style-type: none"> • Actual size of individual plots of MRL • Rightful replacement of MRL based on size and value • Enhancement of value of MRL
Legislation	<ul style="list-style-type: none"> • Lack of uniformity of the Enactments between different states • Enforcement of MRL on replacement by law • Statutory control and limitation 	
Development	<ul style="list-style-type: none"> • Development is not competitive • Suitable location • Undervalue of MRL 	
Financial	<ul style="list-style-type: none"> • No holistic financial model • No initial fund for the development • No support from financial institutions 	

Table 2 shows the overall results of the FGDs that can provide useful insights into the formulation of some strategy to resolve the issues and obstacles in developing the MRL. Eventually, they can be integral in the formulation of a strategy for development of the MRL in the future.

CONCLUSION

In conclusion, this study has explored holistically and collectively the main issues and obstacles in developing MRL from the perspective of the previous work as well as the views of experts and stakeholders in the MRL. There are four (4) main issues and obstacles in the development of MRL in Malaysia, namely the lack of data and information, development issues, legal aspects and also financial aspects that need to be holistically and comprehensively considered in the strategic development of the land. The findings are useful as a basis in the formulation of a strategic development plan of the MRL in tandem with other non-Malay Reserve Land. This research will be able to contribute to strengthen the Twelfth Malaysia Plan (RMK-12) to ensure a more inclusive and meaningful development of MRL within the overall context of national development, in line with the formation of a prosperous society.

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THE IMPORTANCE OF SUSTAINABILITY IMPLEMENTATION FOR BUSINESS CORPORATIONS

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Abstract

Sustainability is the current trend adopted by major business corporations in Malaysia. Abundant evidence reveals corporations are now recognizing that aligning business operation with sustainable ways adds more value. Previous literature shows sustainability has become a strategic imperative for all businesses. Apart from that, having a sustainable building in their asset portfolio contributes towards achieving the management strategic corporate goals. Therefore, this research aims to discuss what are the corporate goals or corporate expectations from going green. In conjunction with that, secondary data collection was thoroughly reviewed from previous studies. Then, primary data consolidates via questionnaire distribution on 117 persons directly involved in green management. The data then analyzed via relative importance index (RII) to identify the importance level for expected corporate goals. Derivation of deeper conceptual findings uses the sustainable triple bottom line theory as a guide. The result indicates four major goals of corporations including the environment, maximization of economic value, and minimization of economic and social costs. This research provides ample evidence for further research in green management.

Keywords: Corporate Goals; Corporate Sustainability; Triple Bottom Line

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INTRODUCTION

The corporate movement towards sustainable buildings in efforts to implement sustainable practice successfully, also simultaneously contribute to the success of business operations. Sustainable involvement is considered as a new strategic planning approach which is employed worldwide (Rasoolimanesh et al., 2011). Abundant evidence reveals corporations are now recognizing that aligning business operations with sustainable ways adds more value. Corporations believe that owning sustainable buildings in the asset portfolio contributes to achieving the management strategic corporate goals. This research aims to discuss on the corporate goals or corporate expectations from sustainable adoption.

LITERATURE REVIEW

The main key for sustainable practice is to minimize environmental impact and costs while maximizing occupant comfort and satisfaction. The need for enhancing corporate and organizational image are also motivators for management to go green (Fauzi et al., 2021; Rock et al., 2019). Hopkins et al. (2017) acknowledge and divide the various benefits of sustainability into three perspectives. These categories are to improve environmental performance, social performance, and economic performance through revenue increase and cost reduction. These are in line with the corporate sustainability concept that integrates the environment, the economic, and the social aspects of triple-bottom line to meet the needs of a firm's direct and indirect stakeholders (Isaksson, 2019; Masalskyte, Andelin, Sarasoja, & Ventovuori, 2014; Olawumi & Chan, 2019). The following explains many more expectations from going sustainable according to three major perspectives of sustainability namely environmental, economic and social.

Environment Perspective

A sustainable environment seeks to improve human welfare by protecting the sources of raw materials used for human needs and mitigating harm to humans (Ajayi, Oyedele, & Jamiu, 2019; Ilhan & Banu Yobas, 2019; Razali, 2018; Zaid & Zainon, 2019). The environment perspective or also known as the ecological dimension is mostly illustrated as global warming prevention. Støre-Valen & Buser (2019) concurrently find that the environment perspective aims to focus on environmental sustainability particularly on lowering energy consumption and reducing the carbon footprint. The findings echo Shurrab et al. (2019) where environmental sustainability is beneficial in terms of improved air quality, higher water quality, and reductions in energy and water consumption. Consistent with Ohueri, Enegbuma, & Kenley (2018); and Shaikh et al. (2019), among the shared benefits include minimizing adverse environmental effects, obliteration of the risks of environmental disasters, contribution towards the development of natural resources, reduction in the use of non-renewable materials, water, emissions,

wastes, and pollutants. Conclusively, all the benefits discerned from previous research relate to sustainable performance as per Lu & Taylor (2018) on the environmental concerns normally related to the aims to achieve sustainability performance.

Economic Perspective

In purely economic view, economics is defined as a target concept covering performance targets, financial targets, and success targets (Glatte, 2012). These parallels findings by Masalskyte, Andelin, Sarasoja, & Ventovuori (2014) that corporations' aims in green buildings include financial benefits, added value for the customers, brand value, transparency, and trust. Hopkins et al. (2017; and Robert (2010) reiterate that sustainability is able to increase revenue and reduce cost. Cass (2018); Lamprinidi & Ringland (2006); Mansfield (2009) also find that competent sustainable practices reduce cost. When relating to sustainable or green CRE, corporations will experience significant economic impact towards the market such as higher rent and lower vacancy rates. Subsequently, they enjoy higher market price reflecting good long-term business opportunities (Rogerson, 2014). The veritable conclusion is that demand is increasing (Chang & Devine, 2019; Collins, Junghans, & Haugen, 2018; Hui, Yu, & Tse, 2016; Shurrab et al., 2019). This is the scenario in Malaysia where the average green office rental value is higher compared to non-green office buildings (Muniandy & Kasim, 2019). Razali (2018) adds that the sustainable building provides positive incentives to the firms in the form of attractive rentals and high-profile tenants. Ganda (2018) discovers that sustainable buildings generate increased financial gains of up to 3.15 per cent and enjoying 0.76/m² higher rent compared to common buildings. Oyewole & Markson Opeyemi (2018) agree and further discover increasing demand for sustainable offices in the market day by day. Rameezdeen et al., (2019) concur that private buildings with green certification have positive impact on investor decisions due to market demand and the opportunity for branding. Not only that, Reichardt, Fuerst, Rottke, & Zietz (2012) postulate that sustainable real estate contributes to positive economic performance. They also exhibit higher returns on assets than their fewer green counterparts that far outweigh the costs.

In addition, Bangwal & Tiwari (2018; Newsham et al. (2018) report that sustainable buildings tend to have higher resale values and better market values. Further, portfolio greenness was found to be positively related to operating performance by Reichardt et al. (2012). Additionally, sustainable CRE delivers value for marketing and branding purposes, innovations and creativity improvements (Jylhä, Remøy, & Arkesteijn, 2019). This is a good sign for the corporation. Prior research suggests that sustainable buildings improve productivity (Christensen, Baldwin, & Ellis (2012); Cass (2018); Dwaikat & Ali, 2018; Jylhä et al. (2019). Meanwhile Hui et al. (2016) mention the benefits of

efficient building includes improving business image. Ledashcheva (2019); Reichardt et al. (2012); Zaid & Zainon (2019) agree that the business gains and improves its reputation and image through sustainable building. In concurrence, Eichholtz et al. (2018) state that green commitment improves corporate reputation and reflects more attractive employers than otherwise comparable firms. If leasing green office space leads to a superior corporate reputation, this may enable firms to attract investors more easily and at better market rates (Eichholtz et al., 2018). Rameezdeen et al. (2019) discover tenants realize that some sustainability features of the buildings are more cogent to their productivity and hence are willing to pay more for these attributes. The overall life cycle of the economic performance reflects optimization (Ohueri et al., 2018) like increases in share prices (Ganda, 2018), and many more.

Recently, Fauzi et al. (2021) find several benefits of sustainable practices associated with economics. These are minimizing costs, which include reduced management, operational, renovation, and replacement costs. Cost minimization is conceptually similar to cost effectiveness. Cost effectiveness generally represents reasonable value for the money paid. In conjunction with that, Lu & Taylor (2018) post that sustainable buildings establish cost effectiveness for investment, construction, and operation costs. Oyewole & Markson Opeyemi (2018) concur that the growing interest in green buildings is due to its potential benefits in operating cost reduction, energy use reduction, and savings in waste management costs. Meanwhile, Dwaikat & Ali (2018); Ohueri et al. (2018); Shurrab et al. (2019); Zaid & Zainon (2019) address that being sustainable reduces operation and maintenance costs.

Social Perspective

The next concern are social benefits. These are more concerned on the social performance (Hopkins et al., 2017) and impacts on the organization including labour practices, human rights and society (Ghazali, 2015). Masalskyte, Andelin, Sarasoja, & Ventovuori (2014) recount that the social dimension of a sustainable building includes a healthy and comfortable working environment, employee engagement to sustainability-related activities, promotion of employee satisfaction, and working efficiency. Other than that, most research reveals that sustainable buildings manifest social benefits through improved safety and health (Lu & Taylor, 2018) that directly enhance the quality of life (Ajayi et al., 2019) and promotes a healthy life (Zhang, Kang, & Jin, 2018). Eichholtz & Kok (2018) and Rogerson (2014) experience reduced number of employee sick leave days and reduced staff turnover. Tenants report that employee skill intensity relates positively to corporate use of green office space. Eichholtz et al. (2018) also record one of the common social benefit aims by corporations is occupants' healthy living. It has also been established that green buildings help in providing important benefits to human health (Oyewole & Markson Opeyemi, 2018). These

findings echo Zaid & Zainon (2019) results that sustainable buildings contribute to occupant absenteeism minimization. Gou & Ma (2019) and Shurrab et al. (2019) share the same thing that is community benefits that encompass health enhancement, quality of life and wellbeing improvements, and occupant comfort. Taylor (2013) also indicates occupant comfort and health are benefits of sustainability.

Collins et al. (2019) view the benefit of sustainability in a different way that is it promotes a sense of sustainable community. This is actually the root for successful implementation of sustainable concern in the community. According to Shaikh et al. (2019), sustainability contributes to increased awareness for harmonization and also human health. Not only that, the role of sustainable buildings is crucial to encourage technological innovation in society (Lu & Taylor, 2018). In relation to the community, generally corporations embed corporate social responsibility initiatives to ensure the community is able to gain benefits from corporate sustainability. Ajayi et al. (2019) recap that sustainable initiatives aim to support communities.

METHODOLOGY

The analysis of data uses the descriptive analysis method in order to compare the level of agreement and the level of importance of each element from the most important to the least important. The descriptive analysis method used is relative important index analysis (RII). RII analysis allows identifying most of the important criteria based on the participants' replies. It is an appropriate tool to prioritize indicators rated on Likert-type scales (Mohd Adnan, Aman, Razali, & Daud, 2017; Rooshdia, Majid, Sahamir, & Ismail, 2018). This research adopted five (5) point likert scales for the questionnaire instruments that start from strongly disagree, disagree, neutral, agree and strongly agree. According to Akadiri (2011) in (Rooshdia et al., 2018), five important levels are transformed from importance values. They commence with high (H) ($0.8 \leq RI \leq 1$), high medium (H-M) ($0.6 \leq RI \leq 0.8$), medium (M) ($0.4 \leq RI \leq 0.6$), medium-low (M-L) ($0.2 \leq RI \leq 0.4$) and low (L) ($0 \leq RI \leq 0.2$). The highest ranking refers to the highest RI value. Waidyasekara & Silva (2016) also mention a low RII indicates that the factor is less applicable and less relevant, whereas a high index indicates higher applicability, agreement and relevance. The distribution of feedback involves 117 respondents that directly involved in the sustainable management of corporate companies certified with green building index certification in Peninsular Malaysia. There are 39 building chosen whereby three respondents are selected from each of the buildings. Then, 100 responses are accepted for the final analysis. The total 100 data used in the study meets the required sample suggestion by Raosoft (90 sample) and G Power (98 sample).

RESULTS AND DISCUSSION

There are four main elements of the results. These are 1) environment, 2) social 3) economic (maximizing value) and 4) economic (minimizing cost).

Table 1: Corporations' Sustainability Goals

Sustainability Goal	RII	Rank	Importance Level
Environment	0.881	1	High
Economic (Maximizing Value)	0.876	2	High
Social	0.815	3	High
Economic (Minimizing Cost)	0.808	4	High

Table 1 explains an overall ranking and important levels of sustainability goals. In line with the results, environmental sustainability goal ranks first (RII=0.881), economic sustainability goal (maximizing value) ranks second (RII=0.876), social sustainability goal ranks third (RII = 0.815), and economic sustainability goal (minimizing cost) was ranked the last (RII = 0.808). This revealed that the main objective of the corporations involved in sustainability is to preserve the environment as found in Rameezdeen et al. (2019), while at the same time improving their economic sustainability and contributing to social sustainability.

Table 2: Environmental Sustainability Goals

Environment	Mean	RII	Rank	Importance Level
ENV_HAZARDOUS	4.49	0.898	1	High
ENV_NATURAL_SOURCE	4.39	0.878	2	High
ENV_SUSTAINABILITY	4.38	0.876	3	High
ENV_INNOVATION	4.35	0.870	4	High

Table 2 shows that reducing hazardous gas emissions and pollution ranks first (RII=0.898) while protecting, preserving, minimizing, and effective use of natural resources ranks second (RII=0.878). These precede promoting sustainability in the environment and attitude which ranks third (RII = 0.876). The least sustainability goal ranking fourth is encouraging innovation to preserve and promote the sustainable environment (RII = 0.870). It is evident that the corporations' main goal in environmental sustainability is to reduce pollution that contributes to the environmental problems leading to environmental deterioration. This is line with aim of most companies involved in sustainability as to reduce the co2 emission (Razali & Hamid, 2018) and adverse impact on the environment (Shaikh et al., 2019). Further the the aim of sustainability involvement includes of contributing to the development of the natural resources (Shaikh et al., 2019). Then, Follows by environment accountability demand (Rameezdeen et al., 2019).

Table 3: Social Sustainability Goals

Social	Mean	RII	Rank	Importance Level
SOC_HEALTH	4.320	0.864	1	High
SOC_SATISFACTION	4.240	0.848	2	High
SOC_LIFE_QUALITY	4.120	0.824	3	High
SOC_SKILL	4.050	0.810	4	High
SOC_SAFETY	4.010	0.802	5	High
SOC_TURNOVER	3.720	0.744	6	High-Med

Table 3 illustrates the ranking of the elements involved in social sustainability goals of corporations. It is apparent from the results that improved health condition of the occupants (RII = 0.864), fulfil the satisfaction of employees, occupants and customer (RII = 0.848), and improved life quality of the employees, occupants, clients and the community (RII = 0.824), are the three top rated elements. The three least rated elements by the persons directly managing the green buildings are promote employees' and occupants' professional development and skills (RII = 0.810), increased safety in the building towards occupants, employees and customers (RII = 0.802), and reduced staff turnover among the employees (RII = 0.744). It is clear that health, satisfaction and improved life quality are the main aims for social sustainability by corporations. This is in line with the current trend of employers and employees that paying more attention to the quality of life. Employers also invest in workplace health and employee satisfaction at the workplace to reduce stress. Most research has revealed that sustainable buildings provide a social benefit towards health and safety (Lu & Taylor, 2018), which directly enhances quality of life (Ajayi et al., 2019). Further, satisfaction also the main concern involving with sustainable building concept (Ghazali, 2015; Hopkins et al., 2017; Lamprinidi & Ringland, 2006).

Table 4: Economic Sustainability Goals (Maximizing Value)

Economic Maximizing Value	Mean	RII	Rank	Importance Level
ECO_IMAGE	4.720	0.944	1	High
ECO_MARKETING	4.520	0.904	2	High
ECO_RENTAL	4.490	0.898	3	High
ECO_VALUE	4.440	0.888	4	High
ECO_OCCUPANCY	4.280	0.856	6	High
ECO_SERVICE	4.280	0.856	6	High
ECO_PRODUCTIVITY	4.190	0.838	7	High
ECO_PROFIT	4.160	0.832	8	High

ECO_GOOD_GOVERNANCE	3.950	0.790	9	High-Med
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Table 4 displays two elements that record RII values of more than 0.9. These are the element increased image and reputation (RII=0.944), and the element marketing strategies (RII=0.904). Six elements record RII exceeding 0.8 and rank from 3 to 8 respectively. These elements comprise increased rental value and attract tenants to rent (RII=0.898), increased value of the business operations and increased building value (RII=0.888), enhanced occupancy rate (RII=0.856), and improved service quality provided (RII=0.856). The ranking descends further with the elements increased productivity of the whole business operation (RII=0.838), and enriched profits of the business (RII=0.832). Good governance is ranks last (RII=0.790) where the importance level is high-medium. Consistent with what mentioned by Eichholtz and Kok (2018) the commitment with sustainability able to improved corporate reputation and business image (Ledashcheva, 2019; Reichardt et al., 2012; Zaid & Zainon, 2019). Further, sustainability also cause the companies to become more attractive to employees than other compareble companies (Zaid & Zainon, 2019). Rogerson (2014) mentioned corporation will experience significant economic impacts towards the overall market. Moreover, Chang & Devine (2019); Collins et al. (2018); Lu & Taylor (2018); Newsham et al. (2018); Shurrab et al. (2019) the sustainability contribute to higher sale price, higher rental, increased asset value and higher market value.

Table 5: Economic Sustainability Goals (Minimizing Value)

Economic Minimizing Value	Mean	RII	Rank	Importance Level
ECO_OPERATIONAL_COST	4.28	0.856	1	H
ECO_MANAGEMENT_COST	4.11	0.822	2	H
ECO_REPLACEMENT	3.98	0.796	3	H-M
ECO_RENOVATION	3.78	0.756	4	H-M

Table 5 shows reduced operational and maintenance costs at first ranking (RII=0.856), reduced management and disposal costs rank second (RII=0.822), reduced replacement cost ranks third (RII = 0.876), and reduced construction and renovation costs at the last ranking (RII = 0.870). This paper discovers that in terms of economic sustainability goals, corporations are mainly motivated by maximizing values as compared to reducing costs. This is because Malaysia is still at a very early stage of green building concept development. As such, developers and owners import various products, materials, fittings and equipment involving substantial initial capitals. Subsequently, the factor of minimizing cost in terms of payback period could not be realized in the short term period. In contrast, corporations are most concerned about minimizing operational cost and

management cost. In line with Tjenggoro & Khusnul Prasetyo (2018) that mentioned lower operating costs is one of the top reasons some countries triggering future green building activities.

CONCLUSION

There are many benefits of implementing sustainability in business corporations. They include environmental benefits; economic benefits that are manifest in two perspectives of maximizing value and minimizing cost, and the last are social benefits. From these four benefits, environmental benefits are the most influential concern for corporations to go green. This indicates benchmark for the country to focus more on green initiatives. However, the economic concern still strongly relates to the corporation as the economic maximizing value ranks as the next important benefit followed by social concerns and economic minimizing cost. Corporations perceive sustainability as significant in economic development particularly in maximizing the value and optimizing the utilization of limited resources. The maximization of value helps the management to provide and deliver the management objectives without comprising on the social and environmental aspects. By addressing the importance of sustainability implementation, this study establishes the need for the stakeholders and policy makers to promote environmental practices while contributing to the economic and social development cores of business operations.

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ENHANCING THE ACCURACY OF MALAYSIAN HOUSE PRICE FORECASTING: A COMPARATIVE ANALYSIS ON THE FORECASTING PERFORMANCE BETWEEN THE HEDONIC PRICE MODEL AND ARTIFICIAL NEURAL NETWORK MODEL

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Abstract

The Hedonic Price Model (HPM), a prominent model used in real estate appraisal and economics, has been argued to be marred with nonlinearity, multicollinearity and heteroscedasticity problems that affect the accuracy of price predictions. An alternative method called Artificial Neural Network Model (ANN) was identified as capable of addressing the shortcomings of HPM and produces superior predictive performance. Hence, this study aims to evaluate the forecasting performance between HPM and ANN using Malaysian housing transaction data from the period between 2009 to 2018, sourced from the Valuation and Property Service Department, Johor Bahru. The models' performance was evaluated and compared based on their statistical and predictive performance. Results showed that ANN outperformed HPM in both statistical and predictive performance. This study benefits the expansion of academic and practical knowledge in enhancing the accuracy of house price forecasting.

Keywords: Property forecasting, property valuation, predictive accuracy, hedonic price model, artificial neural network

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INTRODUCTION

The era of the fourth industrial revolution (IR 4.0) saw the explosion of new technologies such as Artificial Intelligence (AI), biotechnology, collaborative robots, internet of things, nanotechnology, quantum computing and 5G telecoms. All industries, including the real estate industry, are increasingly investing in advanced analytical tools to remain competitive and responsive to fast growing market demands. For instance, the application of AI in property valuation is crucial to cope with the fast changing and high demand for property valuation services (Yalpir, 2014; Sa'at and Adi Maimun, 2019b). Although AI has been explored since the 1990s, the adoption rate was slow. At present, the Hedonic Pricing Model (HPM) still dominates both literature and applications due to its flexibility and straightforwardness in estimation. Nonetheless, the nonlinearity, multicollinearity and heteroscedasticity problems (Kilpatrick, 2011; Antipov & Pokryshevskaya, 2012; Rahman et al., 2018) that plagued HPM may cause biased estimates and specification errors that may reduce prediction accuracy (Adi Maimun, 2011). Inaccurate predictions will negatively affect the decisions of policy-makers, valuers and developers. Thus, an improved property forecasting model is vital to enhance the efficiency and accuracy of forecasting.

An AI model, known as Artificial Neural Network Model (ANN), was able to address the shortcomings of HPM (Tabales et al., 2013). Like humans, the ANN has self-learning ability, permits analysis on a large dataset, identifies relationships between variables, and predicts a future trend (Mohd Radzi et al., 2012). Despite the advantages and good forecasting performance, ANN received less attention than HPM (Mooya, 2015; Abidoye & Chan, 2016; 2017), including its use in Malaysia. In response to the Malaysia Government's vision towards IR 4.0 through "Industry 4WRD: NATIONAL POLICY ON INDUSTRY 4.0" and to improve the accuracy of house price forecasting, this paper aims to evaluate the forecasting performance between HPM and ANN in the Malaysian context. This paper offers two benefits. Firstly, it expands academic knowledge on AI-based property forecasting. Secondly, it guides researchers, valuers and investors on AI for property valuation, index and investment.

This paper is structured as follows. An overview of the literature on house price forecasting models is provided, followed by an elaboration on the theoretical framework of HPM and ANN. Based on previous studies findings, it is hypothesised that ANN will outperform HPM in both statistical and predictive performance. The following section explains and justifies the methodology used in this study, followed by a discussion of findings.

THE HPM THEORETICAL BACKGROUND

Theoretically, HPM is executed through regression analysis (Selim, 2009). It is assumed that consumers are willing to purchase a commodity that consists of a

bundle of property attributes to fulfil their needs and satisfaction (Limsonbunchai et al., 2004). Property attributes can be classified into locational, structural, and neighbourhood attributes and may impact property prices, either positively or negatively depending on the situation (Suhaimi et al. 2021; Zihannudin et al. 2021). Location attributes represent the geographic location of the property and access to the city centre and facilities, structural attributes represent the physical characteristics and conditions of the property while neighbourhood attributes represent the socioeconomic, local authority services, externalities and facilities of the neighbourhood where the property is located.

The following equation illustrates the house price function.

$$P = f(L, S, N) \tag{Eq. 1}$$

Where P represents house prices, L represents locational attributes, S represents structural attributes, and N represents neighbourhood attributes.

Meanwhile, equation 2 below defines the general equation for HPM:

$$Y_{it} = \beta_0 + \beta_1(X_1m_1) + \beta_2(X_2m_2) + \beta_3(X_3m_3) + \beta_4(X_{nmm}) + \varepsilon_i \tag{Eq. 2}$$

Where; Y_{it} = Forecasted House Price; m = Price of house i at time period t ; X = Property attributes; β = Regression coefficient; ε_i = Error term

Despite the flexibility and simplicity of HPM, Selim (2009) argued that the HPM performance gradually decreases due to its instability in producing price coefficients. HPM is ineffective at capturing nonlinearity and is exposed to multicollinearity and heteroscedasticity problems that lead to inaccurate estimations (Limsonbunchai et al., 2004; Kilpatrick, 2011; Antipov & Pokryshevskaya, 2012). The drawbacks of HPM also led to the application of ANN to enhance forecasting accuracy.

THE HPM THEORETICAL BACKGROUND

The ANN, which originated from McCulloch and Pitts (1943), is a computing system inspired by biological neurons that mimicked the human brain's learning process (Pagourtzi et al., 2007). In ANN, nodes represent the brain's neurons and are connected through input, hidden, and output node layers. There are four stages involved in ANN modelling, namely Input criteria (Phase 1), Data processing (Phase 2), ANN modelling (Phase 3) and Model evaluation (Phase 4) (Sa'at & Adi Maimun, 2019a;b). The general equation for ANN is:

$$X_{jj} = \text{Total } W_{ij}Y_i; O_j = f(X_j) \tag{Eq. 3}$$

Where: X_j is the net input to artificial neuron (j), Y_i is the value of input signal from artificial neuron (i), W_{ij} is the weight from an artificial neuron, (i) to artificial neuron (j). n is the number of input signals to artificial neuron (i), O_j is the output signal from artificial neuron (j), $f(X_j)$ is the transfer function of artificial neuron (j). Figure 1 below visualizes the neural net topology.

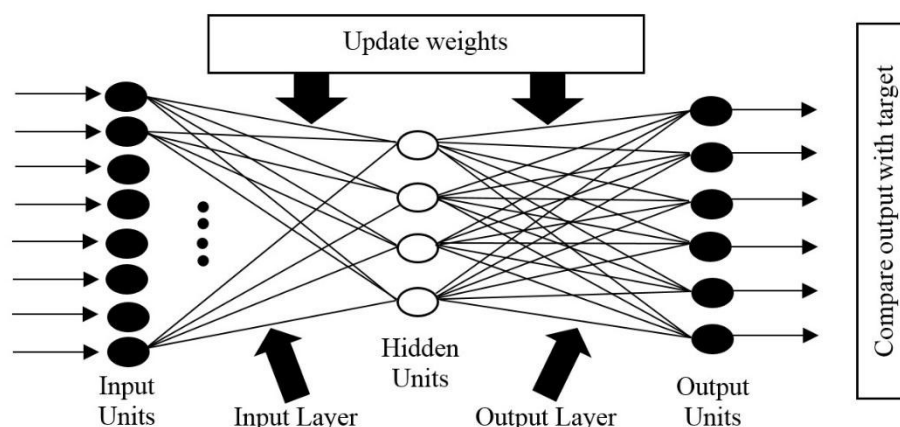


Figure 1: Neural Net Topology

The input layer, consisting of independent variables, is processed in the hidden layer(s) before being transferred to the output layer, represented as the dependent variable(s). At least one input layer, several hidden layers (s), and one output layer are required to operate ANN. The network topology is specified through a series of trials and errors to ensure no over-parameterisation and an excessive number of neurons. The back-propagation method is the most commonly used in the ANN learning algorithm. It minimises the discrepancies between actual value and forecasted value by adjusting the network's weights and biases.

PREVIOUS STUDIES ON HOUSE PRICE FORECASTING

An overview of the literature reveals that only two studies are based in Malaysia (Table 1). Most studies included locational, structural and neighbourhood attributes as independent variables due to the significant impact on house prices (De and Vupru, 2017). These variables may include main floor area, distance to facilities/amenities/city, elevator, building exteriors, garden, number of bedrooms/floors/households, population size, and type of garage/house. ANN was highlighted to be the best forecasting model based on the high R^2 value compared to HPM model. Different software or tools are used to develop ANN, including NeuroShell2, Matlab and Visual Gene Developer.

Table 1: Summary of House Price Forecasting Literature

No	Author (Year)	Study Area	Variables	Model	Software	R ²
1	Lin & Mohan (2011)	USA	Sale price, living/land area, age of building, no. of bedrooms/bath rooms/fireplace, external building styles, location	HPM, ANN	NIL	NIL
2	Mohd Radzi et al. (2012)	Malaysia	House price index, employment/interest rate, population, household income	ANN	NeuroShel 12	0.9932
3	McCluskey et al. (2013)	Ireland	Sale price, property size, garage/property/class/glazing type, no. of storey's/bedrooms, age of building, property type, travel to work time, location	HPM, ANN, SAR, GWR	NIL	HPM: 0.788 ANN: 0.823 SAR: 0.887 GWR: 0.879
4	Morano & Tajani (2013)	Italy	Sale price, floor level, panoramic view, life expectancy, heating type	HPM, ANN	NIL	HPM: 0.972 ANN: 0.999
5	Chiarazzo et al. (2014)	Italy	Asking price, property size, no. of bedrooms/bathrooms, improvement, lift, property/construction type, location, garden, beach, garage, travel time, public transport, neighbourhood, pollution, zone, population	ANN	NIL	0.83
6	Ghorbani & Afgheh (2017)	Iran	Sale price, floor/land area, age of building, no. of rooms, building façade, lift, indoor decoration, cooling system, balcony, location, street width	HPM, ANN	Eviews 6, Neurosolution5	HPM: 0.88 ANN: 0.98
7	Kitapci et al. (2017)	Turkey	Sale price, floor size, no. of rooms/bathrooms, no. of floor, parking, age of building, lift, heating/property/floor type location, insulation, kitchen cabinet	ANN	Matlab	NIL
8	Abidoye & Chan (2019)	Nigeria	Price index, population, real gross domestic product, domestic export/import, household size/income/stock, interest/inflation/unemployment rate	SVM, ANN, ARIMA	Eviews 9.5 R	SVM: 0.94 ANN: 0.92 ARIMA: 0.73
9	Rahman et al. (2018)	Malaysia	Sale price, land area, main floor area, location, transaction year	ANN	Visual Gene Developer	NIL

RESEARCH METHODOLOGY

Over 4,000 sale observations between 2009 and 2018 in Johor Bahru were sourced from the Valuation and Property Services Department Johor Bahru. The dataset included a wealth of attributes influential to house prices such as location, land area, main floor area, type of lot and type of tenure. To ensure no outliers, several observations were removed from the dataset based on the following rule of thumb: (1) invalid number of land lots, (2) redundant data, (3) no land area, (4) sales

transaction below RM80,000.00, (5) sales transaction above RM800,000.00 and (6) incomplete or confusing information. The finalised set of data for analysis contained 3,732 observations.

A total of 21 variables, including ten years of sales transaction data, four different mukims, two types of tenure, three types of lot, land area, and main floor area were used as inputs. A feed-forward structure with only one and two hidden layer(s) was tested based on its Root Mean Square Error (RMSE) value. Contrary to previous studies, this study used RMSE rather than R² to evaluate the model's predictive performance because it better reflects its performance in generalising the dataset. Higher estimation accuracy relates to lower RMSE value. Meanwhile, the Back Propagation Algorithm is used to train the Neural Network. IBM SPSS is applied to execute both HPM and ANN. Figure 2 illustrates the ANN designed model for this study.

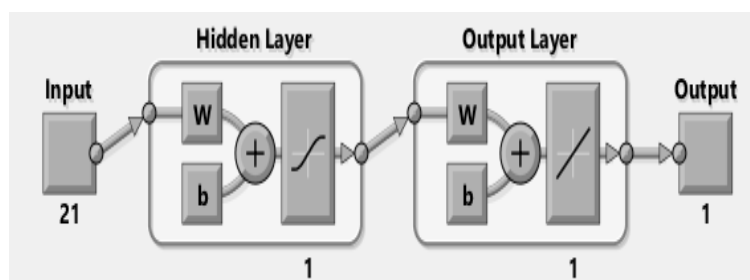


Figure 2: ANN Designed Model

Datasets were divided into three sets, namely the training set (60%), testing set (30%) and validation set (10%). The number of hidden neurons were identified randomly by performing a series of trial and error process. Hidden neurons were gradually increased for each training and testing process to minimise the error between actual and forecasted prices. The number of cycles for processing datasets depended on the epochs (stopped once it reached the local minimum). ANN is designed to undergo two phases. The first phase is training an ANN where the model would learn by itself to find the unknown implicit function in forecasting house prices.

Housing data from years 2009 to 2017 were used to find the unknown function.

$$Y = mx + c \quad (\text{Eq. 4})$$

Where: Y = forecasted house prices, m = gradient, x = property attributes (inputs), and c = biases.

After the unknown implicit function is determined, the simulation phase occurs. This is the phase where the implicit function is used to forecast house prices

using the finalised dataset. In the simulation phase, only the 2018 year dataset is used. The forecasted values produced by ANN and HPM are compared.

RESULTS AND DISCUSSION

The ANN learning and momentum rates were performed through simultaneous trial and error processes. This training process involved 32 sets of data that varied in partition and activation function (hidden and output layers). The training algorithm used for the trial and error processes is Levenberg-Marquardt (trainmlm). The predictive performance of each set is evaluated through RMSE. The dataset with the lowest RMSE value indicates the highest prediction accuracy. Table 2 illustrates dataset number 4 with a data partitioning ratio 60:30:10, and sigmoid for activation function in hidden and output layers produced the lowest RMSE value. This indicated that the configuration for set number 4 produced the best predictive performance. Hence, set number 4 was selected to compare with RMSE value produced by HPM.

Table 2: Ranking for Testing 32 Datasets with Varying Activation Function and Different Number of Hidden Layer

Set	No of Hidden Layer	Data Partitioning	Activation Function in Hidden Layer	Activation Function in Output Layer	MSE	RMSE	Rank
1	1	70:15:15	Sigmoid	Sigmoid	0.0013	0.0361	5
2	1	70:20:10	Sigmoid	Sigmoid	0.0013	0.0361	6
3	1	60:20:20	Sigmoid	Sigmoid	0.0013	0.0361	7
4	1	60:30:10	Sigmoid	Sigmoid	0.0020	0.0047	1
5	1	70:15:15	Hyperbolic-Tangent	Hyperbolic-Tangent	0.0042	0.0648	19
6	1	70:20:10	Hyperbolic-Tangent	Hyperbolic-Tangent	0.0053	0.0728	23
7	1	60:20:20	Hyperbolic-Tangent	Hyperbolic-Tangent	0.0054	0.0735	24
8	1	60:30:10	Hyperbolic-Tangent	Hyperbolic-Tangent	0.0083	0.0911	31
9	2	70:15:15	Sigmoid	Sigmoid	0.0010	0.0316	2
10	2	70:20:10	Sigmoid	Sigmoid	0.0015	0.0387	13
11	2	60:20:20	Sigmoid	Sigmoid	0.0013	0.0361	8
12	2	60:30:10	Sigmoid	Sigmoid	0.0022	0.0469	16
13	2	70:15:15	Hyperbolic-Tangent	Hyperbolic-Tangent	0.0036	0.0600	17
14	2	70:20:10	Hyperbolic-Tangent	Hyperbolic-Tangent	0.0056	0.0748	25
15	2	60:20:20	Hyperbolic-Tangent	Hyperbolic-Tangent	0.0058	0.0762	28
16	2	60:30:10	Hyperbolic-Tangent	Hyperbolic-Tangent	0.0085	0.0922	32
17	1	70:15:15	Hyperbolic-Tangent	Sigmoid	0.0010	0.0316	3
18	1	70:20:10	Hyperbolic-Tangent	Sigmoid	0.0014	0.0374	12
19	1	60:20:20	Hyperbolic-Tangent	Sigmoid	0.0013	0.0361	9

20	1	60:30:10	Hyperbolic-Tangent	Sigmoid	0.0021	0.0458	15
21	1	70:15:15	Sigmoid	Hyperbolic-Tangent	0.0043	0.0656	20
22	1	70:20:10	Sigmoid	Hyperbolic-Tangent	0.0058	0.0762	27
23	1	60:20:20	Sigmoid	Hyperbolic-Tangent	0.0053	0.0728	23
24	1	60:30:10	Sigmoid	Hyperbolic-Tangent	0.0078	0.0883	29
25	2	70:15:15	Hyperbolic-Tangent	Sigmoid	0.0012	0.0346	4
26	2	70:20:10	Hyperbolic-Tangent	Sigmoid	0.0013	0.0361	10
27	2	60:20:20	Hyperbolic-Tangent	Sigmoid	0.0013	0.0361	11
28	2	60:30:10	Hyperbolic-Tangent	Sigmoid	0.0020	0.0447	14
29	2	70:15:15	Sigmoid	Hyperbolic-Tangent	0.0038	0.0616	18
30	2	70:20:10	Sigmoid	Hyperbolic-Tangent	0.0046	0.0678	21
31	2	60:20:20	Sigmoid	Hyperbolic-Tangent	0.0060	0.0775	28
32	2	60:30:10	Sigmoid	Hyperbolic-Tangent	0.0081	0.0900	30

Table 3 tabulates the statistical performance for HPM and ANN based on their MSE and RMSE values. ANN produced lower MSE (0.0020) and RMSE (0.0047) compared to HPM. This means ANN produced a more accurate prediction closer to the actual house prices than HPM.

Table 3: Statistical Performance of HPM and ANN

Forecasting Model	MSE	RMSE
HPM	0.0024	0.0490
ANN	0.0020	0.0047

At the simulation phase, an analysis was performed on ten latest transactions in 2018 to identify the best model that predicts the closest to the real market (Table 4). Overall, ANN outperformed HPM as it produced values closer to the actual price, reflected in lower error values. Nonetheless, specific prediction values deviated more than 10% from the actual value.

Table 4: Predictive Performance of HPM and ANN for 2018 House Prices

Actual Price (RM)	HPM			ANN		
	Forecasted Price (RM)	Error (RM)	Error (%)	Forecasted Price (RM)	Error (RM)	Error (%)
655000	480448	-174552	26.65	498549	-156451	23.89
550000	619236	69236	-12.59	638182	88182	-16.03
708000	551493	-156507	22.11	587877	-120123	16.97
518000	512399	-5601	1.08	514311	-3689	0.71
500000	639971	139971	-27.99	645406	145406	-29.08
600000	534735	-65265	10.88	572759	-27241	4.54
480000	499150	19150	-3.99	528329	48329	-10.07

642000	615268	-26732	4.16	636276	-5724	0.89
550000	516811	-33189	6.03	549103	-897	0.16
560000	508934	-51066	9.12	511145	-48855	8.72

A total of 364 sales transactions in 2018 were utilised to visualise the discrepancies between the actual value and predicted value (HPM and ANN) (Figure 3). The closer the forecasted house price trend line with the actual sale price, the more accurate the forecasting model predicts house prices. Figure 3 depicts that the ANN line trend (indicated by grey line) is closer to the actual sale price trend than the HPM model's price trend. This proved that ANN produced a more accurate estimation compared to the traditional forecasting model, which is HPM.

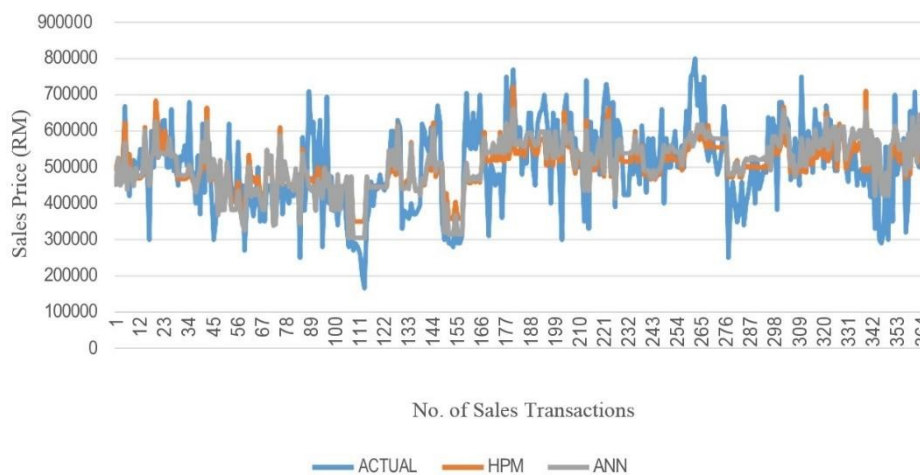


Figure 3: House Price Trend for Sales Transaction in 2018

CONCLUSION

This paper evaluated the forecasting performance of HPM and ANN using house sales data. Overall, neural network algorithm set 4 with only one hidden layer - using Sigmoid as the activation function for hidden and output layers is the most appropriate algorithm for forecasting Malaysian house prices. As hypothesised, ANN outperformed HPM in forecasting performance as measured through lower RMSE. This supported the findings of McCluskey et al. (2013), Ghorbani and Afgheh (2017) and Abidoye and Chan (2018). Nonetheless, several ANN error values are more than 10%, which might be caused by the omission of other price-influential variables in the model. This study expanded existing knowledge by shedding light on the forecasting performance between HPM and ANN. Academics and practitioners can use the study findings to choose the best model and technique to forecast house prices. Although good forecasting performance was observed for ANN, it is suggested that

future studies consider additional variables to improve forecasting accuracy. Future research may also explore other AI models such as autoregression, autoregressive integrated moving average, fuzzy logic, support vector machine and spatial-temporal models to uncover the potential of AI in forecasting house prices in specific and real estate as a whole.

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A PROPOSAL FOR AFFORDABLE WAQF HOUSING PROJECTS IN MALAYSIA: PUBLIC PERCEPTION OF HOUSE CHARACTERISTICS

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Abstract

Housing affordability is important to ensure houses are affordable to everyone across all income categories, whether they are in the low-income, middle-income (M40), or high-income group. Building housing projects on waqf land will help increase the supply of affordable houses, especially targeted at the M40 group, while also addressing the shortage of affordable housing for the M40 cohort. This study analyses public perceptions of house characteristics and relate these factors to affordable housing prices. The independent variables are location, infrastructure, facilities, size, design and quality. By applying a quantitative research design, the study aims to understand the relationship between various demanded housing characteristics vis-à-vis the price of the house. A sample of 261 usable responses was analysed using the Structural Equation Modelling (SEM). The results show that house size is not statistically significant in influencing the housing price, while location, infrastructure and design of the house are positively significant factors. These findings are expected to provide important inputs to the relevant authorities on factors that are critical in influencing the prices of housing projects built on waqf land in Malaysia.

Keywords: Housing Affordability, Housing Price, Middle Income Group (M40), Waqf

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INTRODUCTION

In Malaysia, efforts have been made by policymakers to understand and manage affordable housing issues. This effort has led to several initiatives focusing on providing affordable houses or financial resources to low-income households who by nature, are incapacitated to house themselves. However, the gap left unfilled by these initiatives is middle-income households (M40) who neither qualify for social housing nor are capable of affording houses provided by private sector suppliers (Baqutaya et al., 2016; Khazanah Research Institute, 2015). The issue of a shortage of affordable housing requires immediate attention since most of the conventional methods used in the property market lack the capacity to supply affordable housing. While several houses are unsold, a sizeable number of middle-income households are still looking for reasonably priced and affordable houses to buy. The use of waqf land on which the affordable houses will be constructed would help reduce the construction costs substantially. This will lead to more reasonable pricing of the houses.

RESEARCH BACKGROUND

The Malaysian government has acknowledged that housing is a basic human need and one of the important components in the urban economy (Suhaida, Norngainy, Noraini, Adi Irfan, & Tahir, 2010). While Malaysia has made immense contributions towards providing affordable housing, especially to low-income households, affordable housing providers are faced with serious resistance over their products because they are generally unaffordable for middle-income households. Consequently, the housing contribution to the quality of life in urban areas is deteriorating since housing providers cannot produce houses at prices that middle-income households would be able to afford (Hong, 2013; Ernawati, Kong Seng & Nor A'ini, 2020). However, it should be noted that house prices in Malaysia are deeply dependent on location, with some states having more affordable housing. For example, Melaka with median multiple of 3.0 times compared to others; the house prices in other states, such as Kuala Lumpur (5.4 times) and Pulau Pinang (5.2 times) are strictly unaffordable (Khazanah Research Institute, 2015). Location has influence towards housing affordability (M. Azren, Hazlina, Jamalunlaili & Yusfida Ayu, 2018). Data in the Annual Property Market Report 2016 and 2020 by the National Property Information Centre (NAPIC) reveals that a considerable amount of completed and under construction residential units are currently not demanded by Malaysian households.

Table 1 indicates more than 14,000 completed residential units are unsold as of the third quarter of 2016 and in Table 2, the amount increases further in fourth quarter of 2020. From Table 1, 4,646 completed residential units are priced below RM250,000, 4,120 units are priced between RM250,001-RM500,000, and 5,427 units are priced above RM500,001. In addition, 14,792 units of house under residential were overhang in 2016 and in 2020 it increases

to 29565 units. Surprisingly, an estimated one million Malaysian households in the RM2,500 to RM10,000 monthly income group do not own a house as of 2016¹.

Table 1: Launched and Unsold Residential Properties

House Category	Units Launched	Units Unsold	Value (RM Mill)
Below RM250,000	23,849	4,646	624.7
RM250,001-RM500,000	13,730	4,120	1,512.1
Above RM500,001	25,233	5,427	6,130.7
Total	62,812	14,193	8,267.4

Source: *The Edge Markets (2017) and NAPIC (2016)*

Table 2: Residential Overhang Properties in 2020

House Category	Units Unsold
Below RM100,000	1,209
RM100,001-RM300,000	7,549
RM300,001-RM500,000	7,116
RM500,001-RM700,000	6,607
Total	22,481

Source: *NAPIC (2020)*

Based on the data reported in Tables 1 and 2, we can deduce that most low and middle-income households do not own a house because they cannot afford to purchase the house due to the price being beyond their reach. The house prices according to NAPIC (2020) still seriously unaffordable therefore the quantities of unsold housing units remain huge. This is consistent with the study by Liu and Ong (2021). Although there are a significant number of unsold houses, a considerable number of middle-income households are still looking for reasonably priced and affordable houses to buy. Bank Negara Malaysia² reported that Malaysian middle-income households with the household income brackets of RM6,000 to RM7,999 are in need of houses priced less than RM408,300. The price of RM408,300 is considered the affordability threshold. There is suggestion that proposed selling price should be monitor by the Government (Ernawati, et al., 2020)

In short, the houses available in the market currently are unaffordable to middle-income groups, and with their current level of income, they may not be

¹ Cindy Yeap (2017), state of the nation: unsold units reflect mismatch in supply and demand for affordable housing, retrieved from <http://www.theedgemarkets.com/my/article/state-nation-unsold-units-reflect-mismatch-supply-and-demand-affordable-housing>

² Cheah S. Ling, Stefanie Almeida, Muhamad Shukri and Lim Le Sze, (2017) Imbalances in the Property Market. Bank Negara Malaysia.

able to secure a home loan or financing from financial institutions to finance the purchase of a house. This issue requires immediate attention from the government, government bodies or relevant authorities to find solutions or mechanisms to provide more affordable homes for this cohort. This study proposes using waqf as an alternative financing mechanism to provide affordable houses to middle-income (M40) households. Due to the global financial crisis, land mitigation, and global environmental issues, the country faces design innovation and policy evolution (Lim, 2016 and Malaysia Productivity Corporation, 2010). Thus, the Malaysian government has adopted a creative design approach and various incentives to increase the number of affordable houses.

In the Muslim world, many humanitarian projects are operated by waqf institutions. Among their large scale waqf projects is building houses for the needy. In the context of Malaysia, building housing projects on waqf land will help increase the supply of affordable houses, especially targeted at the middle-income (M40) group, thus addressing the issue of shortages of affordable houses for the M40. In Malaysia, the prospects and demand from the public to rent the waqf houses are high due to affordable rental rates. In view of this, the best option by State Islamic Religious Councils (SIRCs) in managing their waqf land is to develop affordable houses so that the waqf land is productively developed as well as getting lump sum rental income. Currently, these initiatives are actively undertaken by SIRCs in Kedah and Pulau Pinang (UDA Holdings Berhad, 2019).

RESEARCH METHODOLOGY

By applying a quantitative research design, the study aims to understand the relationship between various housing demanded characteristics with the price of the house. The definition of population in this study are middle-income Muslim households in Malaysia. Due to limitations in gaining feedback from Sabah and Sarawak, the study only focuses on middle-income Muslim groups in Peninsular Malaysia. A sample of 261 usable responses was collected using the purposive sampling method. The sample size between 200 to 300 respondents was appropriate and fair according to the scale suggested by Comrey and Lee (1992) and cited by Tabachnick & Fidell (1996). A set of questionnaires with four parts was designed to collect various responses from the respondents. The first part addresses the demographic profiles of respondents. The second part targets the public knowledge of affordable housing projects built on waqf land in Malaysia. Among the aims in part three of the questionnaire is to understand the relationship between various housing characteristics vis-à-vis the price of the house. The last part of the questionnaire covers the public perception of several aspects of the proposed waqf financing model. This paper only reports part of the findings from part three. The independent variables that reflect housing characteristics are location, infrastructure, facilities/amenities, size, design, and quality, while price

is the dependent variable. The data were analysed with the Structural Equation Modelling (SEM) using Analysis of Moment Structure (AMOS) software.

ANALYSIS

This analysis was performed to determine the relationships between independent variables such as location, infrastructure, facilities/amenities, size, design, and quality with price for the housing project. The response from statements reflecting the demanded housing characteristics was measured using a five-point Likert scale where respondents indicated their disagreement or agreement on each given statement. The results of Composite Reliability (CR) reflect the validity of the samples used in this study. The cutting point of CR value must be greater than 0.6. Based on Table 3, all variables have CR values greater than 0.6. The assessment of sample fitness, measured by the Kaiser-Meyer-Olkin (KMO) test, is adequate at 0.853.

Table 3: Reliability Statistics

Number	Variable	Number of item	Composite reliability
1	Location	4	0.797
2	Infrastructure	4	0.825
3	Facilities/Amenities	4	0.761
4	Size	5	0.762
5	Design	4	0.738
6	Quality	4	0.726
7	Price	4	0.768

Source: Authors

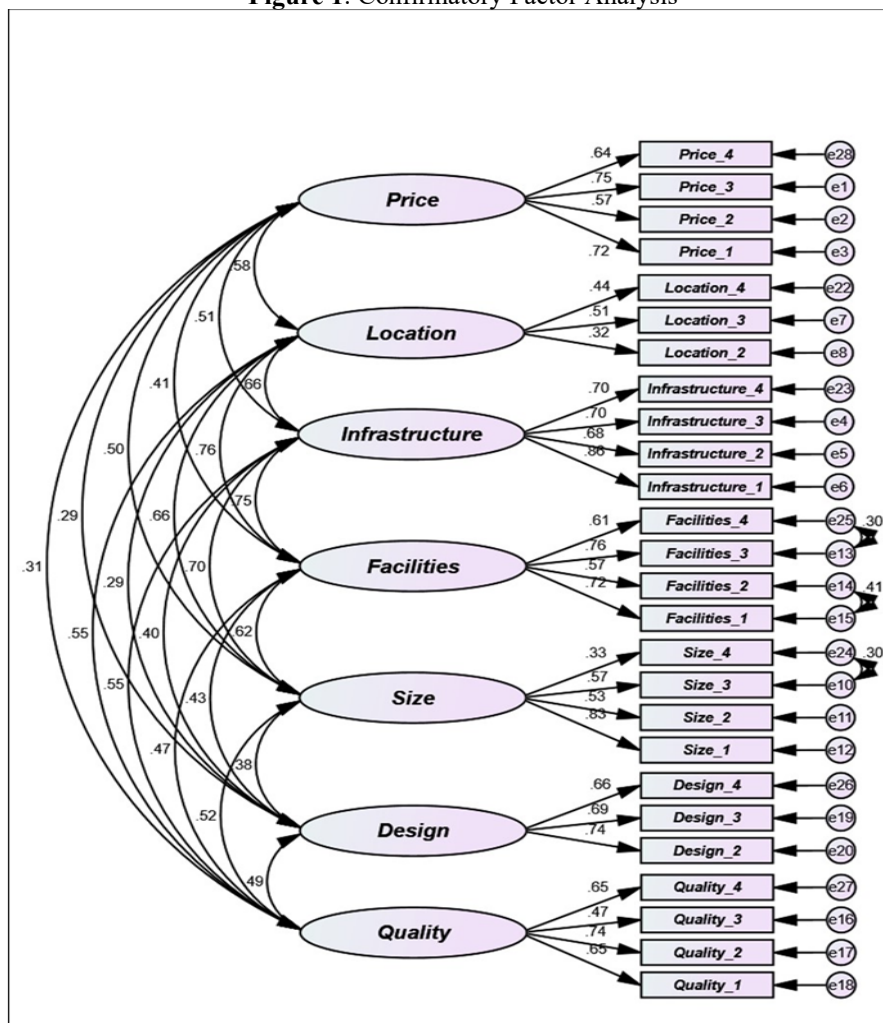
Table 4: KMO and Bartlett's Test

Kaiser- Meyer-Olkin Measure of sampling adequacy		. 853
Bartlett's Test of Sphericity	Approx Chi-square	2540.980
	df	351
	Sig	.000

Source: Authors

The results of Bartlett test of Sphericity ($X_2 = 2540.980$, p -value = 0.000) suggest a correlation between variable exist, as described in Table 4. Confirmatory Factor Analysis (CFA) was performed to assess and develop the measurement model (Figure 1) in order to specify how well the measured variables, come together to represent latent variables (i.e., constructs). All the seven latent variables generated during the Exploratory Factor Analysis are retained after CFA. However, few of the observed (items) were eliminated during the analysis.

Figure 1: Confirmatory Factor Analysis



Source: Authors

The model met the model fit criteria. The results of minimum discrepancy per degree of freedom (CMIN/DF), Comparative Fit Index (CFI), Standardised Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA) and the chi-square value (PClose) are reported in Table 5. The interpretation for model fit criteria based on Hu, L-t., and Bentler, P. M. (1999) and Gaskin, J. & Lim, J. (2016) shows that the model in this analysis met the model fit criteria.

Table 5: Regression Weights

Measure	Estimate	Threshold	Interpretation
CMIN	495.041	--	--
DF	275	--	--
CMIN/DF	1.800	Between 1 and 3	Excellent
CFI	0.900	>0.95	Acceptable
SRMR	0.058	<0.08	Excellent
RMSEA	0.055	<0.06	Excellent
PClose	0.124	>0.05	Excellent

Source: Hu, L-t., and Bentler, P. M. (1999) and Gaskin, J. & Lim, J. (2016)

SEM analysis was performed to determine the relationships between independent variables (location, infrastructure, facilities/amenities, size, design, and quality) and dependent variable (price for housing project). As presented in Figure 2 and Table 6 below, three variables were found to be positively and significantly contribute to the price of housing. The variables are, location, infrastructure and design. The results are location ($\beta = 1.970$, $p < 0.05$), infrastructure ($\beta = .484$, $p < 0.05$), and design ($\beta = .434$, $p < 0.05$). With these results, we conclude that a house buyer prefers a house that is close to college, school and workplace and agreed to compensate it with a slightly higher price. Therefore, respondents regarded location as an important house characteristic. The results show that house buyers agreed to pay more if the housing projects have a proper road infrastructure plan, have adequate water supply, have facilities for the disabled, and without electricity supply interruptions.

Interestingly, design is also an important house characteristic to house buyers who agree to pay more for a good design. Among the designs are houses built as disabled-friendly, the positioning of the rooms that considers the position of Qiblat, etc. From the results, house characteristics such as location, infrastructure and design are very important factors to house buyers who will consider paying more to have such characteristics.

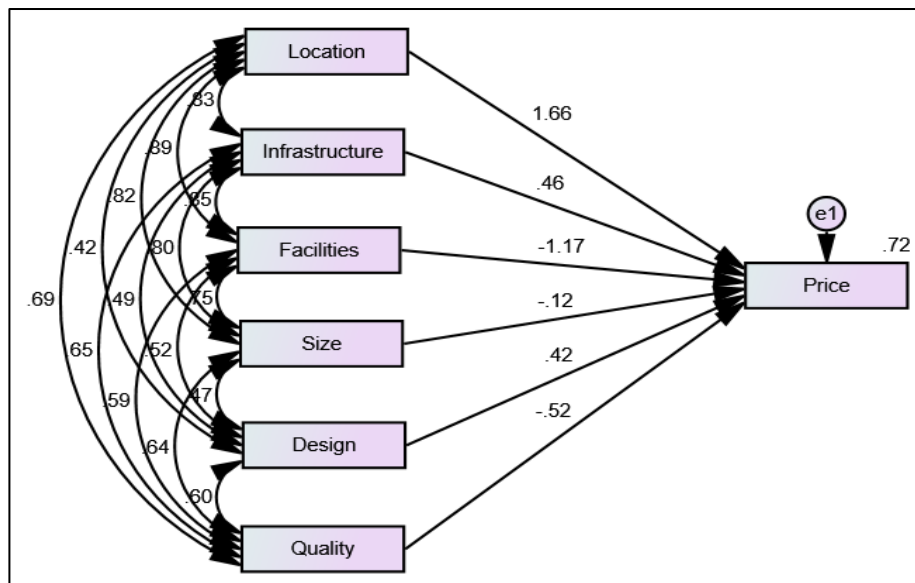


Figure 2: Structural Model
Source: Authors

From the results, we found that facilities and quality are negatively significant, where facilities, ($\beta = -1.323$, $p < 0.05$) and quality ($\beta = -.626$, $p < 0.05$). The result reflects that house buyers are particular about the house facilities. They are also concerned with the price the developer will charge. The result shows that house buyers prefer housing projects with many facilities at affordable prices. Quality of the house is also an important characteristic for house buyers and is associated with price. The result shows that house buyers want a quality house at an affordable price. However, size ($\beta = -.150$, $p > 0.05$), is negatively and insignificantly related to the price of houses. This means the house size is not statistically significant in influencing the housing price. Based on these findings, the study supported five hypotheses and rejected one hypothesis where we conclude that location, infrastructure, design, facilities, and quality are significantly related to the price for housing, while size does not influence the housing price. Therefore, the hypothesis concerning size was rejected.

Table 6: Regression Weights

	Estimate	S.E.	C.R.	P
Price <--- Location	1.970	.114	17.209	***
Price <--- Infrastructure	.484	.077	6.279	***
Price <--- Facilities	-1.323	.102	-12.915	***
Price <--- Size	-.150	.081	-1.854	.064
Price <--- Design	.434	.048	9.053	***
Price <--- Quality	-.626	.065	-9.561	***

Source: Authors

CONCLUSION

The results show that house size is not statistically significant in influencing the housing price, while location, infrastructure and design of the house are very important factors. These findings are expected to provide important inputs to the relevant authorities on factors that are critical in influencing the prices of affordable housing projects built on waqf land in Malaysia. Therefore, in setting the price for affordable waqf housing in Malaysia and increasing the demand for such a housing project, waqf institutions must emphasise the house characteristics demanded by house buyers.

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AN INTEGRATED APPROACH BASED ON ARTIFICIAL INTELLIGENCE USING ANFIS AND ANN FOR MULTIPLE CRITERIA REAL ESTATE PRICE PREDICTION

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Abstract

A relatively high level of precision is required in real estate valuation for investment purposes. Such estimates of value which is carried out by real estate professionals are relied upon by the end-users of such financial information having paid a certain fee for consultation hence leaving little room for errors. However, valuation reports are often criticised for their inability to be replicated by two or more valuers. Hence, stirring to a keen interest within the academic cycle leading to the need for exploring avenues to improve the price prediction ability of the professional valuer. This study, therefore, focuses on overcoming these challenges by introducing an integrated approach that combines ANFIS with ANN termed ANFIS-AN, thereby having a reiteration in terms of ANN application to fortify price predictability. Using 255 property data alongside 12 variables, the ANFIS-AN model was adopted and its outcome was compared with that of ANN. Finally, the results were subjected to 3 different error testing models using the same training and learning benchmarks. The proposed model's RMSE gave 1.413169, while that of ANN showed 9.942206. Similarly, using MAPE, ANN recorded 0.256438 while ANFIS-AN had 0.208324. Hence, ANFIS-AN's performance is laudable, thus a better tool over ANN.

Keywords: *AI, ANFIS, ANN, ANFIS-AN, price prediction, Real Estate, Valuation*

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INTRODUCTION

Valuation of real estate is regularly required for distinctive investment purposes that could encompass valuation for mortgage lenders who require landed properties as collateral for securing advanced loans. Other uses of valuation reports include, premiums for insurance, rents and sales/purchase among others. Consequently, the need for accurate and dependable valuation figures, due to the fact a misguided investment valuation may have a devastating impact on investors who could require such financial valuation figures. In this line, many researchers have affirmed inconsistencies in many executed valuations as these figures, in most cases, do not represent market price (Abidoye & Chan, 2017c; Ogunba & Iroham, 2011). Such inconsistencies may arise as a result of negligence and biasness in the valuers' judgement (Mohammad et al., 2018) leading to dwindling of the valuers' image including liability for negligence (Atilola et al., 2019)

Therefore, there is the need to enhance the price prediction accuracy of real estate valuations considering the enormous capital tied in such investments, hence the application of Artificial Intelligent (AI) techniques in property valuation (Chaphalkar & Sandbhor, 2013). Even though some specialists in the field may argue in opposition to the adoption of non-traditional valuation models, claiming that it cannot effectively substitute the conservative traditional techniques. Nevertheless, while this study is not calling for a total replacement of the traditional technique with AI, there is the need for having a complementary technique that would serve as a benchmark for the traditional technique. Hence, Mora-esperanza (2004) pronounced that the AI model best serves as an assisting tool to the valuers.

This study proposes the ANFIS-AN model which combines the ANN and ANFIS models, wherein the output arising from the ANFIS model becomes the ANN's input (figure 1.1). Thus, the projective ability of ANFIS-AN in real estate valuation was tested through a sizeable collection of experiments carried out with results indicating better performance by the proposed model over the baseline technique.

This article is organised into five steps. The first two-part deal with a background and a review of relevant literature. The next part is dedicated to the experimental setup for the study, while the fourth part presents the results and performance analysis of the advanced ANFIS-AN model. The final part concludes the findings of the study alongside recommending areas for further research.

RELATED RESEARCHES

AI is seen as a method that is used by real estate operators in assessing market values through automatically capturing data having a causal relationship between value determinants and prices (Morano et al., 2003).

Popular amongst these AI techniques is the ANN technique modelled after the human neurological structure of the brain. ANN application in the realm of real estate valuation started in the '90s (Chan & Abidoye, 2019).

Another related technique is the Fuzzy Neural network (FNN) which Kumari et al. (2013) describe as a hybrid neuro-fuzzy technique that combines the fuzzy structures' human-like reasoning alongside the learning and connection potential of the ANN to form a married model. Hence, FNN, in its architecture, forms a hybrid learning algorithm that adopts the IF-THEN rule capable of dealing with qualitative and quantitative information (İsen & Boran, 2018). It is particularly useful as it replaces the crisp figures of the ANN where knowledge is stored in weight with MF found in FL technique which minimises the subjectivity tendencies of the valuers (Król et al., 2016). FNN is a useful resource in complex decisions due to its fast and accurate learning abilities alongside its good calibration and generalisation capacity (Yakubu & Ziggah, 2017). This technique is sometimes referred to as the Neuro-Fuzzy System (NFS) or Adaptive Neuro-Fuzzy Inference System (ANFIS).

Among researchers that adopted AI techniques in real estate valuation includes those that applied only ANN in prediction (Abidoye & Chan, 2017b; Rahman et al., 2019). Others compared the prediction ability of ANN with other techniques (Alexandridis et al., 2019; Cechin et al., 2000; Zurada et al., 2011). Others adopted fuzzy logic-FL (Gonzalez & Formoso, 2006; Król et al., 2016; Pagourtzi et al., 2006) among others. On the other hand, are those that adopted a hybrid of ANN and FL to form ANFIS (Azadeh et al., 2014; Liu et al., 2006; Ustundag et al., 2011).

AI techniques are reported to have performed better, most especially in heterogeneous data sets (Zurada et al., 2011). Hence, some researchers reported that the performance of ANN is better than other methods (Abidoye et al., 2019; McCluskey et al., 2013; Mimis et al., 2013). While, in comparing hybrid techniques to other models, it is affirmed that hybrid systems are better (Guan et al., 2008; Liu et al., 2006; Yacim & Boshoff, 2020).

EXPERIMENTAL SETUP

This study adopts secondary class data from an online data bank '1torgo'² where 506 real estate transaction data sets were retrieved relating to real estate values in Boston. 49.7% of the data were screened out; hence, 255 data were randomly

² <https://www.dcc.fc.up.pt/~ltorgo/Regression/housing.html>

selected. Adopting secondary data for statistical analysis using ANN is not unusual in literature, an example is the adoption of datasets from propertyGuru websites (Ke & Wang, 2016); ingantlan³ (Kutasi & Badics, 2016); and sahibiden⁴ (Kitapci et al., 2017). Others include Kaggle (Phan, 2019); stats⁵ (Piao et al., 2019), while Hu et al. (2019) retrieved and adopted datasets from five foremost Chinese real estate secondary data sources⁶.

The adopted dataset 255 was fed into the proposed model, which is divided into two distinctive parts to include the ANN and ANFIS. The first stage of the prediction process was to train the dataset in the ANFIS model, the second stage was the adoption of the resultant output from the ANFIS model as the input datasets for the ANN model. This is demonstrated in figure 1.1 below;

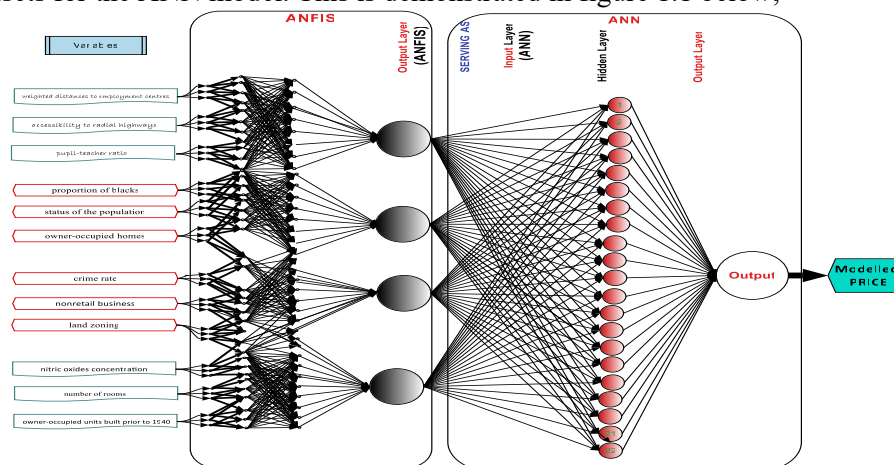


Figure 1.1 ANFIS-AN architecture (the proposed model)

Phase 1: The FNN model

To achieve higher overall performance and attainment of a good generalisation potential, this study embraces the Gaussian MF. In specifying Membership Function (MF) parameters as it relates to fuzzy sets, the Bell and Gaussian types of MF remain the most adopted in literature as they have a non-zero point advantage with a robust smoothness alongside concise code. The Gaussian function is favoured in real estate application towards price determination (Liang et al., 2018).

³ www.ingantlan.com

⁴ www.sahibinden.com

⁵ <http://www.stats.dl.gov.cn>

⁶ <http://sz.ganji.com/fang1/>, <http://zu.anjuke.com/>, <http://sz.lianjia.com/zufang/>, <http://sz58.com/chuzu/>, and <http://www.sofang.com/esfrent/area/>,

Initially, 3 MF was adopted, this was changed to 4 resulting in improved network performance, hence the MF was further adjusted to 5. Conversely, the network training confronted a critical delay when the MF changed into raised beyond 5, suggesting that it may cause a decline while raised further as cautioned by Guan et al. (2014) who acknowledged that continued surge in the MF might not necessarily further enhance the performance in the network.

In addition, other parameters were equally adjusted which includes the error goal and the epochs, which serves as a signal towards stopping the network. The network is programmed to end the training process, automatically, whenever either of these parameters is reached.

Twelve real estate price determinants serve as the input variables. The adopted number is justified as Mora-esperan (2004) whose study confirms that while the amount of input variables determines the number of input layers in a NN, nonetheless between 10 to 50 variables is considered adequate when constructing a NN for use in property valuation.

Table 1.1:Summary of adopted parameters

Parameter	Value	Parameter	Value
No. of fuzzy rules	125	Nonlinear parameters	30
No. of training data pairs	255	Linear parameters	500
No. of nodes	286	Total number of parameters	530
Membership Function	5	Epochs	10

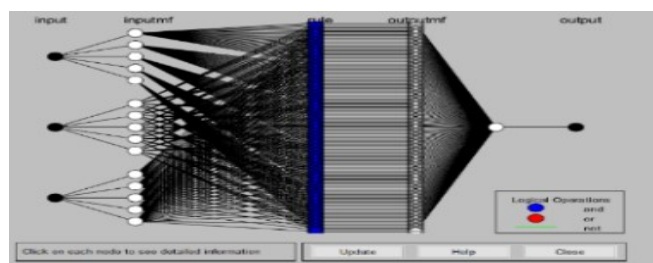


Figure 1.2The ANFIS network architecture (for a single group of 3 variables)

Source: Data Analysis using Matlab R2019a

Phase II:Input layers and Multi-Layer Perceptron (MLP)

The screened 255 datasets were grouped into three sets namely 179 (training); 38 (testing); and 38 (validation) hence in ratio 70:15:15 in line with Chiarazzo et al. (2014). Even though, Chan & Abidoye (2019) opined that the sharing of training cum testing ratio is at the discretion of the researcher, however, the study noted that a lesser portion is adequate for testing of the models.

Matlab R2019a was adopted in the training and testing procedure. This allows for flexibility of the network design and architecture; training benchmarks

and simulation in design (Peterson & Flanagan-III, 2009). Matlab R2019a also allows for a better and more efficient performing MLP (Al-Akhras & Saadeh, 2010). MathWorks (2004) further uphold that the rule in the MLP perceptron learning is within the supervised learning classification.

Determination of the number of hidden layers and neurons

This study adopts a single hidden layered network. Lin & Mohan (2011) recommend the adoption of a single hidden layer when modelling using MLP as a solitary hidden layer is sufficient in modelling a NN towards realizing accurate complex non-linear function. Hence, a single hidden layer node is considered adequate in a NN design for most practical problems (MathWorks, 2004).

However, in determining the number of neurons, otherwise term nodes, in a NN hidden layer, researchers including Limsombunchai (2004), Lin & Mohan (2011) opine that experimentation, using trial and error, pending when a satisfactory result is achieved is recommended. Contrarily, Ge & Runeson (2004) and Kitapci et al. (2017) stressed that determining the number of hidden neurons is crucial as it affects the convergence ability of the network, as insufficient hidden nodes disallow the feeding of the full specifics of the pattern involved in the NN leading to inability to converge. On the other hand, too many hidden layers often result to delay in the network and/or overtraining cum overfitting.

The above observations by different researchers affirm that caution needs to be taken in determining the number of neurons/nodes in a network's hidden layer. Thus, rather than the subjective random trial by error propounded by some researchers, Lam et al. (2008) and Abidoye et al. (2017) respectively explore the use of formula in their study as shown below;

1. $N_h = \frac{1}{2} (\text{Inputs} + \text{Outputs}) + \sqrt{\text{Number of patterns in the training file}}$ eqn.2

2. $N_h = \frac{N_{in} + N_{out}}{2} + \sqrt{N_s}$ eqn.3

N_h implies the number of neurons adaptable in a hidden layer. N_{in} signifies the input while N_{out} indicates the output layer and N_s indicates the training samples.

Therefore, this study adopt MLP using the supervised learning rule. Hence, different NN topologies were applied, with adjustments, to the hidden neurons during the network's learning process ranging from 16-22 neurons while seeking the most appropriate network. However, more concentration was centred on having neurons within the group 20-24 because when the parameters were applied to the formula, N_h indicated 22.9687. Nevertheless, when subjected to several trials, the study's best-performing architecture contains 22 hidden neurons resulting in an architecture of 12:22:1. The results of these trials are given in tables 1.2 and 1.3 below.

Table 1.2: Trained MSE results for both ANN and ANFIS-AN

Number of nodes		ANFIS-AN	ANN
16		2.91	5.07
19		3.25	1.74e-6
22	Retraining	1 st	7.76e-7
		2 nd	6.38e-8
		3 rd	3.53e-11
		4 th	2.49e-9
		5 th	2.81e-8

Table 1.3: Tested MSE results for both ANN and ANFIS-AN

Number of nodes		ANFIS-AN	ANN
16		32.20	1482.72
19		12.94	314.26
22	Retesting	1 st	519.51
		2 nd	781.86
		3 rd	663.31
		4 th	1014.18
		5 th	1617.22

Training of the network

The ANFIS model was adopted in the first segment in the ANFIS-AN model, while the ANN was adopted in the second segment. In the 1st segment, the input nodes were divided into 4 groups, hence each group had 3 nodes making 12 nodes in total, generating 4 output neurons in total. This is consistent with past researches such as Ustundag et al. (2011); Khoshnevisan et al. (2014); Gerami Moghadam et al. (2019) among others. The best outcome was attained when 3 inputs were adopted at each stage; *gaussmf* was used for the input MF function while *linear* was adopted for the output MF function; and adoption of a 5 number MF at 10 epoch for the four groups.

These output neurons from the ANFIS were thereafter fed into the ANN model serving as its inputs, which were yet again retrained using one single hidden layer with 22 nodes to yield the final resultant output of the ANFIS-AN model.

A feedforward backpropagation algorithm was implemented in training each of the ANN and 2nd segment of the ANFIS-AN architectural structure to model the relationship among the variables (input), and the target price (output). The parameters involving the epochs and number of hidden neurons were sufficiently adjusted using trial and error to reduce the prediction errors at the training, testing and validation phases. This is consistent with past researchers as Mora-esperanza (2004) opined that ANN does not provide the requisite number of outputs during the first trial, rather until after undergoing adequate training, as

they are required to learn, thus the need for subjecting the NN to successive trial and error sessions. This viewpoint was further buttressed in Eriki & Udegbumam (2008), the study stressed that modifications are required in NN parameters involving model specification; training cycles and the number of hidden neurons in realizing the best outcome in a NN. These adjustments in the learning rate and momentum are attainable through trial and error.

This study further adopted *trainlm* (lavernberg-Marquardt) in training the NN, although *trainlm* is the time taken, nevertheless, the algorithm is capable of attaining good generalisation. On the other hand, this study adopts *learngm* as the learning function for the NN, while the performance function adopted is the Mean Squared Error (MSE), which is in line with Hegde (2018).

RESULTS AND PERFORMANCE EVALUATION

Training and Retraining sessions

Three different NN topologies were trained adopting 12 input variables in addition to 1-output variables using several parameters for the hidden neurons. The network architecture of 12:22:1 achieved the best performance; this same structure was adopted for the proposed ANFIS-AN model for a simple comparison of their final result.

The training of both models was carried out in three dynamic stages. 16 neurons were adopted in the first stage, and this stage produced the best outcome for the proposed ANFIS-AN model over the ANN model. These numbers of neurons were increased to 19 in the second stage. The results of the second stage training session showed that ANN performed better, whereas the testing session exhibited a better result for ANFIS-AN. Nevertheless, it should be noted that the most crucial phase of a NN's learning session is the testing stage as the trained network becomes capable of adopting the learning parameters that it gained during the training sessions towards predicting the prices of untrained variables.

In the third stage of the training and testing session, the number of neurons was raised to 22 in line with the results of the formula for estimating the number of the hidden neuron as shown in equations 2 and 3 above. The results from this stage became the best of the three stages adopted, hence the best-performing architecture for the ANFIS-AN model.

Thereafter, the network was subjected to retraining five different times using the same parameter to further assess its efficiency ability. During each of these retraining sessions, all training sessions in the ANN model demonstrated good learning ability, hence a better training technique over the proposed model. However, in terms of testing, the ANFIS-AN tests demonstrated better results over that of ANN which indicates its ability to yield better results whenever it is used in predicting new untrained datasets.

Error testing models

Comparisons were made between the performance of the proposed ANFISAN and the ANN models using mean squared error (MSE) that was automatically produced from Matlab’s toolbox. To further test the prediction capability of both methods, an additional 2 error measuring techniques were adopted to include the mean absolute percentage error (MAPE) and the root mean squared error (RMSE) as shown in table 1.4;

Table 1.4: Error testing performance of ANN and ANFIS-AN models

Error Model	ANFISA	ANN	Model v ANN (% lower)
MSE	1.997046	98.84747	-4849.68
RMSE	1.413169	9.942206	-603.54
MAPE	0.208324	0.256438	-23.0955

The performance of the models as shown in table 1.4 above signify that the proposed model which combines ANFIS with ANN as a single model where the consequential outputs of the ANFIS model are fed into the ANN network model serving as inputs. The model performed better and more accurate using all the error-measuring models in predicting the price of the 255 sampled real estate.

CONCLUSION AND FURTHER RESEARCH

In conclusion, a proposed model that combines ANFIS and ANN models into a single model was adopted in price prediction of 255 sampled real estates using Matlab R2019a and network architecture of 12:22:1 and a ration 70:15:15 for training, testing and validation respectively. Thereafter, three error-testing models were adopted in comparing the performance of both the ANN and ANFIS-AN model. The results show that the proposed hybrid model, ANFIS-AN’s performance is better and more robust with a notable high forecasting accuracy over the ANN model. Hence, this study confirms the fact that fashioning a tutelage of the methods is capable of fortifying nonlinear models thereby resulting in the sophistication of the real estate price prediction model.

Consequently, its acceptance in real estate valuation practice is expected to improve the predictability of values cum prices, thus guiding practitioners and investors alike including a handful of contributions to the existing body of knowledge in AI application to real estate price prediction.

Finally, further research is feasible in the areas of adopting primary data sources in real estate price prediction in developing nations using ANFIS-AN model. Consequently, in furthering this research, the proposed model, ANFIS-AN, will be implemented in modelling commercial real estate prices for the northern part of Nigeria.

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AN INVESTIGATION OF THE ISSUES OF TENANCY MANAGEMENT PRACTICE: THE CASE OF COMMERCIAL WAQF PROPERTIES IN MALAYSIA

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Abstract

This paper concerns the sustainability of the commercial waqf properties (CWP) in regards to tenancy management (TM) since the waqf properties were underperformed due to large rental arrears in some states. The objective of the study is to investigate the issues of tenancy management that limit the achievement of the financial sustainability of CWP. This research adopts the qualitative approach which employing in-depth interviews at seven (7) CWP as a case study that covered the state of Johor, Selangor, Penang and WPKL. Semi-structured interviews were conducted with six (6) waqf property managers (WPM) and twenty-one (21) tenants to get their perspective regarding the issues of tenancy management according to TM attributes. From the findings, it was found that the tenancy businesses attribute is the most issues voiced by the tenants and WPMs followed by tenancy agreement, rental determination and enforcement. Meanwhile, tenant selection and waqf property manager attributes are less critical. Hence, the solutions have been proposed to improve the sustainability of CWP while Shariah principles and waqf needs are being adhered to in the full spectrum of waqf tenancy management.

Keywords: commercial waqf properties (CWP), rental arrears, tenancy management, Shariah compliance, waqf needs

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INTRODUCTION

In Malaysia, numerous commercial waqf properties (CWP) have been developed by State Islamic Religious Council (SIRCs) in their vicinity respectively with the cooperation of Department of Awqaf, Zakat and Hajj (JAWHAR) and Waqf Foundation of Malaysia (WFM). CWP could be income generating to the SIRCs through rent and encouraging better economic growth for Muslim society. By having a good cash flow, it will allow the SIRCs to be financially sustainable to cover all the costs and expenses of CWP and also profit distribution for waqf philanthropy. Unfortunately, the statement fails to materialize because the waqf properties were underperformed due to large rental arrears in some states (Mohsin and Mohammad, 2011; Majid and Said, 2014; Ali *et al.*, 2016). Series 3 of the Auditor-General Report 2014 confirmed that some SIRC faced outstanding rental issues; Kedah Islamic Religious Council (MAIK) (RM1,050,000), Penang Islamic Religious Council (MAIPP) (RM4,560,000) and Melaka Islamic Religious Council (MAIM) (RM420,083).

In regards to this issue, several researchers have made recommendations on the improvement of tenancy management in waqf properties. Ismail *et al.* (2015) suggested that (i) rental of waqf land should be increased in tandem with the current rental value, (ii) more staff should be hired to collect rental more efficiently and (iii) records system of waqf land and tenants must be up to date. While, Osman *et al.* (2015) urged that tenancy management should be well managed including leasing and renting existing land and buildings, internal and external expertise, selecting and upgrading potential lots. However, the disciplinary studies that deal with the management of waqf tenancy in the full spectrum are scarce.

In another context, the literature also pointed the tenancy management which complied with Shariah and waqf needs. Othman (1982) and Rani and Aziz (2010) examined in depth the management of waqf properties based on the waqf requirements and the Shariah laws embodied in them. They suggested the solutions based on Shariah features which included terms of waqf tenancy, duration, rental rate, the income of waqf properties, tenancy agreement and mutawwali. However, some attributes such as tenant selection, default rent and non-compliance penalties do not exclusively specify. Therefore, this study bridges the gap highlighted in a prior study by interpreting the full spectrum of tenancy management listed as (i) tenant selection, (ii) tenancy businesses, (iii) rental determination, (iv) tenancy agreement, (v) enforcement and (vi) waqf property manager from the Shariah perspective, investigating the current issues from tenant's and WPM perspectives, apart from offering a solution that meets the needs of waqf and Shariah.

TENANCY MANAGEMENT BASED ON SHARIAH COMPLIANT PERSPECTIVES

Tenancy management (TM) basically interpreted as tenant-landlord business affairs to sustain the building, its system and business for a lasting period (Iman and Mohamad, 2014). The scope of tenancy management may involve tenant recruitment, tenancy agreement, rental determination, rent review, provision of services including maintenance services to tenants, bill collection, marketing, etc. The entire task should be carried out by the landlord itself or may appoint the property manager on behalf of the landlord. However, property managers are better versed in the legal rights of both the tenant and the owner.

Renting or tenancy in Arabic is termed as *al-ijarah*, which means wages, rents, services or rewards. According to Islamic law terms, the people who rent are called *mu'ajir*. While, renting person is called *musta'jir* (Mohamed, 2001). The rented property is termed *ma'jur* and rent or reward for the use of the goods is called *ujrah*. From some of the meanings of the *ijarah* mentioned above, it can be taken as the essence that *ijarah* or tenancy is an agreement on benefits in return. As such, the tenant hired for a specified period, but actually they do not own the property. They only enjoy the benefit from the property and by the time rental is paid as a return for the enjoyment of benefit.

Since waqf is one of the Islamic philanthropy tools, adherence to Shariah principles are necessitated for the accomplishment of waqf philosophy Ghazali, et.al., (2021). Shariah primary sources, namely the Quran's injunctions and the Prophet s.a.w directives and practices, usually called the Sunnah. While it is possible to refer to the secondary sources of Shariah based on human interpretation and reasoning, whether at the highest level of *ijma'* (consensus of all jurists) or in the form of *qiyas*, *istihsan*, *istislah*, etc. (Engku Ali, 2013). Shariah compliance generally means adherence to the Shariah principles and conformity to them.

In the context of tenant selection attributes, tenant and landlord conditions are the same with seller and buyer conditions in Islamic law. Mansor (1998) has listed the conditions which are; (i) from those who can be held accountable – sound minded, age, and intelligence (*rusyd*), (ii) not blocked from managing muamalat (not bankrupt and not *safih*), (iii) not being forced by any party to carry out the contract. Besides, according to Paragraph (5/1/3) of SS9 stated that if the use to be made of usufructs of rented assets considered permissible, an *Ijarah* contract could be grant even with a non-Muslim (AAOIFI, 2015). However, if the landlord knows or has reason to assume in advance that the use of the asset to be rented is for an unacceptable purpose, and thus it will not be allowable.

For tenancy businesses attributes, the factors to be considered in businesses condition are permissibility of use according to Shariah law. The permissibility to rent an asset is based on the permissibility of the tenant's core

activity, although it may involve certain activities that do not comply with Shariah (No 63) of BNM (2009). The tenant shall comply with the terms and conditions of use of the asset until the expiry of the tenancy or termination of the tenancy as agreed by both parties, whichever is earlier (No 64) of BNM (2009). Furthermore, the property shall not be rented to a person or entity if it is known or if there is a very high potential to use the assets for non-conforming activities (No 68) (BNM, 2009).

In discussing rental determination attributes, the rental amount shall be determined when the tenancy contract is concluded as stated in Paragraph 76 of (BNM, 2009). Once the tenancy agreement comes into effect, the amount of rental specified and mutually agreed for the tenancy period shall not vary during the period (Paragraph 77) of (BNM, 2009). Any variation such as rental benchmarked to market rate or index is prohibited. Usmani (2000) asserted that the landlord shall not increase the rent unilaterally because it would render the agreement null and void. However, it's only could permissible upon renewal of the contract for subsequent tenancy periods that should reflect the market rate or an agreed benchmark (Paragraph 5/2/5) of SS9 (AAOIFI, 2015). Paragraph (5/2/4) of SS9 states that there are two specified parts of rental, (i) transferred to the landlord and (ii) expenses or costs approved by the landlord, such as the cost of major maintenance, insurance, etc (AAOIFI, 2015). The excess of the second part of the rental shall be treated as an advance to the landlord on the account, while the landlord shall bear any shortage.

Furthermore, in tenancy agreement attributes, legally enforceable contract or *al-'aqd* shall consist principles of offer, acceptance, obligations and consideration (Mohamed, 2001). Once an offer is accepted, then a contract is concluded. An offer can be made, either verbal, in writing or could be communicated through messenger. Then, the obligation is an essential principle could involve one relationship with Allah. According to Mohamed (2001), any consideration which is forbidden by the Shariah, renders the contract to be invalid. Therefore, to be a valid tenancy contract, all elements that prohibited by Islamic Law in connection with the consideration of usufruct or manfaah shall take into account. There are several conditions that are deemed as valid contract. Firstly, the tenant and the landlord must be legally able to contract as contracting parties. Secondly, the premises to be rented must be identified in terms of the location, accessibility, facilities, size and quality of the premises. Besides, the rental must be determined and the period of use the premises must be explicit at the time of the contract. Therefore, SS9 of Ijarah under Paragraph (4/1/2) stated that Ijarah's period should start on the date the contract is executed. If the two parties agree on a specified future start date, which will result in a future Ijarah, i.e., an Ijarah contract to be executed in the future (AAOIFI, 2015).

In regards to the rental payable, the tenant shall pay once he/ she has taken delivery of the asset. However, the tenant is not liable for rental during the

period of delay on the part of the owner in delivering the asset. If the contract does not specify when rental is to be tendered then rental is payable on a daily basis if so, demanded by the landlord. In addition, another condition has been listed is the purpose of the tenant to use the premises. The tenant may not conduct business which cause damage to the premises or if the landlord specifically prohibits business or stipulates the type of business permitted. Simply put, the tenant shall use the property only for the purpose specified in the tenancy agreement. However, in the case whereby the agreement does not specify the purpose of the tenancy, the tenant may use the property for whatever permissible purpose according to the customary practice of the market which is in compliance with sharia (BNM, 2009; Mohamed, 2001). The tenant cannot use the property for any abnormal purpose unless the landlord agrees in express terms for such abnormal use (Elias, 2001). Hence, the tenant shall obtain consent from the landlord if the property is to be used for non-specified use in the customary practice of the market (No. 67) (BNM, 2009).

In respect to enforcement attributes, there are two situations which the rental payment shall be deemed as a debt due from the tenant. First, the debt results from the tenant failure or delay to pay the rental Paragraph (92) of (BNM, 2009) and second, tenant stops using the property or returns it to the owner without the owner's consent (Paragraph 7/1/7) of SS9 (AAOIFI, 2015). According to Paragraph (7/2/2) of SS9, a termination of the tenancy shall be undertaken resulting from the tenant failed or delay to pay the rental (AAOIFI, 2015). Hence, the tenant shall be subject to all the rules prescribed for defaults and delinquencies in the payment of debt for the defined tenancy period. However, the landlord shall not charge any additional amount as income in case of delays in payment of the rental by tenant (Paragraph 6/3) of SS9 and Paragraph 92 of (BNM, 2009).

As far as the second situation is concerned, the rental will continue to be due for the remaining Ijarah period. For this period, the landlord may not rent the property to another tenant, but must keep it at the current tenant's disposal. It should not, however, be carried out if the tenant gives the remaining time to the landlord, in which case the tenancy expires. However, any compensation for actual loss incurred as a result of default and debt payment delinquencies may be claimed by the landlord rather than a rental increase (Paragraph 92) of (BNM, 2009). It also can be regarded as penalty imposed that will be channeled to charity. However, if the tenant wants to be exempted from this penalty, the claim of non-delinquent insolvency should be proven. To be summary, as result from the default payment, the tenancy may not renew and the rental amount outstanding including penalty charges becomes an outstanding debt.

METHODOLOGY

The heterogeneous purposive sample of the case study was adopted in this research which focused on the characteristics of a population and the objective of the study. Thus, the multiple case studies of CWP were selected which covered the state of Johor, Selangor, Penang and WPKL. Overall, seven (7) CWP in four states in Malaysia were used as the case study due to certain criteria like the diversity of commercial types, types of governance, strength and weaknesses of rental performance. It included shop houses, shop office, waqf community bazaar, healthcare centers, business centers and stratified commercial offices.

RESULTS AND FINDINGS

Qualitative technique through semi-structured interviews was conducted with waqf property manager and the tenants. This approach is undertaken to investigate the tenancy management issues according to TM attributes from both sides. Overall, there are 27 participants involved in this instrument. It was categorized into six (6) WPMs and twenty-one (21) tenants who agreed to be interviewed. The identified tenancy management issues were shown in the following Table 1. By considering the full spectrum of tenancy management, the attributes of tenancy management were segmented into (i) tenant selection, (ii) tenancy businesses, (iii) rental determination, (iv) tenancy agreement, (v) enforcement and (vi) waqf property manager. Four selected states were coded as A, B, C and D.

Table 1: WPM and tenant's perception of tenancy management issues

Attributes	Tenancy Management Issues	Perspective
A: Tenant Selection	Tenant Criteria Easy to deal with non-Muslim previously rather than Muslim (C)	WPM
B: Tenancy Businesses	Business Condition The tenant does not display their business license issued by CCM at the premises (A)	WPM
	Business Strategy The sale of business is seasonal especially during Friday prayer and festival of Hari Raya (B)	Tenant
	Business Strategy The sale of business is seasonal especially during the school holiday, and festival (Hari Raya) (C)	Tenant
	Businesses Location, Facilities and services (Location) A premise is not strategically located (A)	WPM

	Parking No available parking causes the difficulties of customers to come (C)	Tenant
	Building Services Passengers waiting time for lift services is too long (D)	Tenant
	Marketing No signboard provided before reaching the premises (B)	Tenant
	Marketing Many obstacles from local authority as such cannot put the signboard in front of the premises (C)	Tenant
Rental Determination	Rental Collection The tenant paid the rental through the system but as there is a problem with the system, no payment is recorded. Hence, it had been recorded as rent arrears (C)	Tenant
	Rental Increment/ renew Dissatisfaction towards the rental increment (A) & (B)	Tenant
Tenancy Agreement	Responsibility Cleaning & Maintenance (correction of faults by tenant) Premises are not being managed by the tenant and are in bad condition (A)	WPM
	Responsibility <i>(Repair and maintenance by WPM)</i> Leaking water pipes due to high usage (D)	WPM
	Responsibility <i>(Repair and maintenance by WPM)</i> The tenant carried out the repair either minor or major by themselves (C)	Tenant
	Responsibility (response by WPM) The tenant delivers their complaint through email. However, it was a late response from WM (C)	Tenant
	Sublet The premises has been sublet without permission(C)	WPM
Enforcement	Rental Default The tenants will only take an action by approaching the 3rd notice given (notice of termination). However, the payment is not a lump sum basis. But the tenant will pay gradually (B)	WPM

	Rental Default Monthly rental is not paid on time/ consistently (A) & (B)	WPM
Waqf Property Manager	Qualification No experts in regards to development (A)	WPM
	Waqf Disbursement The manfaah from the rental collection are not fairly distributed (A)	WPM

Based on Table 1, the most TM issues voiced by the WPMs and the tenants are tenancy businesses followed by tenancy agreement, rental determination and enforcement. Meanwhile, tenant selection and waqf property manager attributes are less critical. Overall, there are eight (8) tenancy management issues in the tenancy businesses attributes voiced by both WPMs and tenants. More surprisingly, the most TM issues come out from the tenants. It does mean that critical issues in TM are from the tenancy businesses attributes. Therefore, these attributes shall be managed effective and efficiently to influence and give positive impacts to tenant's satisfaction. Besides, the tenancy agreement attributes contribute five (5) TM issues. These are four issues comes from responsibility and one issue from sublet. Hence, it indicates that responsibility embedded in tenancy agreement for both WPM and tenants will influence and gives positive impact to waqf tenancy management.

Rental determination attributes have three (3) TM issues and most of the issues were voiced by the tenants. Most of them are dissatisfied with the rental collection and rental increment implemented by WPM respectively. Therefore, rental determination attributes will influence and gives positive impacts to tenant's satisfaction. However, to ensure sustainable income from waqf properties, the rental should be revised to keep up with the market rate. If there is no increment on the rental, the waqf could not mitigate the loss due to the high cost of management and maintenance. Similarly, enforcement attributes also contribute three (3) TM issues. Obviously, the issues of rental default were most voiced by the WPM. Most of the tenants were not paid their monthly rental consistently as agreed in the agreement. As mentioned by WPM, the tenants will only take an action by approaching the 3rd notice given which is called as notice of termination. However, the payment is not a lump sum basis, but the tenant will pay gradually. If these issues could be addressed, then it will enhance the tenant's satisfaction in tenancy management.

The TM issues for waqf property manager attributes were voiced by the WPM itself. The TM issues voiced are qualification whereby no experts in regards to development of waqf properties. Besides, the WPM admitted that the *manfaah* from the rental collection are not fairly distributed. It does substantiate that this attribute is significant and gives positive impacts to the tenancy management. Last but not least, TM has only one issue regarding the tenant

selection attributes. The issue raised from the WPM claimed that it was easy to deal with non-Muslim previously rather than Muslim. Thus, selective tenants should be wisely considered to avoid tenant defaults in the future.

DISCUSSION AND SOLUTIONS

The researchers have proposed the solutions based on the TM issues tabulated in the previous section. Basically, the first step to select the tenants is by giving the explanation about the nature of waqf philosophy in an understandable way. For tenant selection's attributes, the WPM shall provide clear information about the tenant's criteria and tenant screening needs to be done so that they know whether they are qualified or otherwise. Hence, the market tenants are recommended for the tenant's criteria as the rental income must be sufficient to be distributed to beneficiaries as well as to maintain and manage waqf properties. Non-Muslims are also qualified to rent out since it is permitted by Islamic law. However, priority is given to Muslim tenants.

In regards to tenancy businesses' attributes, all the conditions set forth for waqf premises must conform to Shariah principles. It does imply that the business conducted contradict to sharia principles are considered forbidden. As such there should be no elements of forbidden uses include tobacco and alcohol, pork, interest-based banking, gambling and weaponry. To strategized, this framework suggested that they shall have a good tenant profile that could attract more crowds and promote the waqf building. If possible, set up the main tenant or anchor tenant to attract more people to the waqf building especially for a big commercial centre such as a bank, GLC company, EPF, post office and others. Besides, an interesting event should be organized to attract the crowd. Importantly, the activities performed could reflect the waqf's good image and expose the waqf's principles and benefits to society.

As previously suggested, the waqf istibdal could be carried out to combat the less strategic location of waqf premises. However, istibdal issues must refer to *maslahah* instead of the potential assets and the decision of the Fatwa Committee by SIRC. Then, the researchers proposed that the services of the waqf properties must be emphasized on the provision of *ibadat* purposes while adding Shariah value such as the location of *musolla*. By right, putting the sign of *musolla* could entice more patrons or customers to business premises. However, every service to be equipped at waqf premises must in line with the intention of waqf but depends on the manager to most potential services. Also, in order to attract visitors and make large sales, the framework proposed that an attractive signboard for the waqf property is essential. By doing this, visitors are aware of the existing waqf properties and the product or services that the premise offered. Moreover, colour scheme for waqf building as building identity could also be as the strategy of marketing.

Concerning rental determination's attributes, rental collection for waqf properties suggested that rental payments should be made through a bank transfer (GIRO). A bank giro transfer is a method of transferring money by instructing a bank to directly transfer funds from one bank account to another without the use of physical checks. As the rental default was the most challenging issue faced by WPM, the researchers propose that this type of payment appears capable of disciplining tenants in fulfilling their obligations as waqf tenants. Indeed, their monthly payment could make a huge contribution to the beneficiaries. Hopefully, this alternative payment might decrease SIRC's default tenant figures. Then, the rental increment should be implemented based on market rental. But the full consideration must be given to the new facilities provided by the landlord that based on the tenant's needs and performances of businesses.

Basically, the tenancy agreement's attributes concern for the sub-attributes of responsibility suggested that the process of maintenance must be sharia compliance such as using halal and good cleaning products. Lastly, for the responsiveness dimension proposed by WPM, it shall be done in a shorter time. For on-site WPM, it should be done within half an hour. Then, it would be two hours of response time if in the case was off site but subjected to the terms and condition. Thus, any complaints or request shall be voiced by any medium and must be followed by filling up relevant form. Then, sublet not allowed to be implemented since it is presumed risky.

Besides, rental default proposed as following; i) issuance of bill-triggered to pay-(1st-7th of the month), (ii) after 7 days in rental arrears-(14th of the month)- 1st notice, (iii) if fail to pay within 14 days from the 1st notice-(28th of the month)-2nd notice, (iv) Notice of expiry (after 30 days)- LOD-letter of demand. As waqf emphasizes the social welfare, thus there is no harsh approach implemented in enforcement's attributes.

For waqf property manager's attributes, qualification suggested that the tenants shall be a competent and professional, understanding of waqf and Shariah (Islamic expertise/principle) and shall graduate in real estate and have an experience in real estate. Since maintenance should be given priority for distribution even if the waqif has stipulated it or not, this distribution is proposed. The allocation should be channelled to; (i) management and maintenance, (ii) outgoings (quit rent, assessment rate, property tax, fire insurance), (iii) sinking fund (upgrading/ major repair) and (iv) beneficiaries.

CONCLUSION

The arising issues of TM in the waqf practice have been featured prominently in this research. Tenancy businesses are the most issues voiced by the tenants and WPM followed by tenancy agreement, rental determination and enforcement. Meanwhile, tenant selection and waqf property manager attributes are less noticeable. Evidently, it can be perceived that waqf property is not sustainable

yet since the performance of TM should be more improvised effectively and efficiently. As far as Shariah law is concerned, this research proposed a possible solution guided by Shariah principles. The findings have contributed to the literature since there is a lack of studies on Shariah-compliant tenancy management. Besides, by having a good TM could contribute a more income generation will be and thus unlocking the potential of waqf properties to compete with other conventional properties.

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AGRIBUSINESS AS THE SOLUTION FOR THE UNDERUTILIZED WAQF LANDS: A VIEWPOINT FROM THE WAQF ADMINISTRATORS

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Abstract

Waqf land bank in Malaysia has huge potential to be developed but most of the lands are underutilized due to the administrative and legal (conventional and Shariah) issues that are plaguing them. The underutilized land size is estimated to be around 87% from the 30,000 hectares *waqf* lands, as at 2018. This study focuses on Selangor and Perak to explore on the same issue by interviewing the relevant key informants to gather their feedback. In order to unlock the potential of these *waqf* lands, pragmatic model or approach needs to be researched and implemented – and this study suggests agribusiness. Therefore, this study embarks on the preliminary field work that intends to assess the potential to develop the *waqf* lands in Selangor and Perak for agribusiness activities.

Keywords: *waqf*, agribusiness, lands, agriculture, model, wakaf, wakap

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INTRODUCTION

The underutilized *waqf* lands is a continuous debatable issue that has been discussed by several parties in various platforms such as seminars, workshops, conferences and even in the parliament. We need to be fair when discussing on this issue because over the years a lot of improvements in forms of projects and activities being addressed towards the *waqf* lands. Nevertheless, the underutilised land size which is estimated to be around 26,100 hectares as at 2018 or 87% from the 30,000 hectares *waqf* lands (Kamarudin, 2019) requires immediate attention from the stakeholders.

Therefore, this study discusses on this issue by exploring the perspective of the *waqf* administrator, the trustees which is the state Islamic religious council. This study believes agribusiness as the pragmatic solution that can be considered for the underutilized *waqf* lands.

The structure of this article is as follows: literature review section to discuss on the contemporary and important studies in the area, followed by methodology (it is important to highlight that this article is an excerpt from a large scale study, therefore, only several key informants who are being included in this article as per the objective of the paper – to present the *waqf* administrators' views on agribusiness). The next section is findings from the key informants and last but not least is conclusion.

LITERATURE REVIEW

Waqf Land Issues

Waqf can be segregated into two categories: *waqf* am (general endowment) and *waqf* khas (specific endowment) (Abdul Karim, 2010). These types of *waqf* are based on the intention of endower when the person endowed a particular asset.

Likewise, these two *waqf* categories share similar problems which are the *waqf* lands are not strategically located (Muhamat & Jaafar, 2012), lack of funds to develop the *waqf* land (Azmi, Hanif, & Mahamood, 2017; Mahamood & Ab Rahman, 2015), most of the *waqf* lands are small in term of size as per bequest (A. Ibrahim & Ibrahim, 2018) and in Malaysia, the administrative of the *waqf* lands are governed by various state religious councils (Ismail, Salim, & Hanafiah, 2015; Rashid, Fauzi, & Hasan, 2018).

In the context of *waqf* lands, one of the pragmatic approach to develop the *waqf* lands for productive purposes is by implementing *istibdal*. Despite this approach, as reported in the previous section, 87% of *waqf* lands are still underutilized all over Malaysia. It is not a surprise because Muhamat & Jaafar (2012) have informed that most of the lands in the country are scattered and predominantly at the remote area.

This situation suggests that for the *waqf* lands that are in the remote area, most of the lands, in general, are suitable for agriculture. Furthermore, the

individual size of the *waqf* lands which are small caused the *waqf* lands to be less attractive for commercial or residential projects. This study covers *waqf* lands in Selangor and Perak, specifically on the *waqf* lands that have potential to be used for agribusiness activities. The two state Islamic religious councils have different structure which also denote that they are governed by two different states' enactments and under the purview of the sultan in each state.

In the context of Selangor, Perbadanan Wakaf Selangor (PWS) or Selangor *Waqf* Incorporated (Abu Bakar, Md Hussain, & Hamed, 2017) was established in 2011, a subsidiary of the state religious council of Selangor. This “metamorphosis” of the PWS has injected the element of corporation into the agency that is signified from the structure of PWS. The board members of PWS includes technocrats who are businessmen and experts in their fields such as architect, state director of land and mines as well as auditor.

The development of *waqf* lands in Selangor (as depicted in the website) is focused on residential and commercial building such as shop houses at Jalan Kebun in Klang, and it seems that less attention was given to the agribusiness activities. Table 1 shows the size of *waqf* lands in Selangor as at 2016 according to the districts.

Table 1: Total of *waqf* lands in Selangor (as at 2016)

District	Registered <i>Waqf</i> Lands	
	Total Lot	Size (acres)
Klang	216	203.39
Kuala Selangor	184	210.47
Sabak Bernam	312	412.17
Petaling	65	24.25
Gombak	90	50.79
Kuala Langat	171	169.04
Hulu Selangor	50	58.48
Hulu Langat	103	151.80
Sepang	69	81.79
Others	8	10.45
TOTAL	1268	1372.63

Source: <http://www.wakafselangor.gov.my/index.php/hartanah-wakaf/statistik-hartanah-wakaf>

In Perak, the *waqf* activities are managed by the Islamic religious council of Perak under the department which is known as Bahagian Pengurusan dan Pembangunan Mal dan Wakaf (BMW) to oversee and lead the *waqf* agenda (Abu Bakar, Md. Hussain, & Hamed, 2017). Diagram 1 depicts the number of *waqf* land lot in Perak according to the districts in the state. The highest number of lots is in the

district of Kinta followed by Kuala Kangsar and Larut Matang. These three districts are well-known with agriculture produce in fact whole of Perak is blessed with fertile lands. Total is 3,591 lots of *waqf* lands (as per the year of research by A. Ibrahim & Ibrahim (2018)).

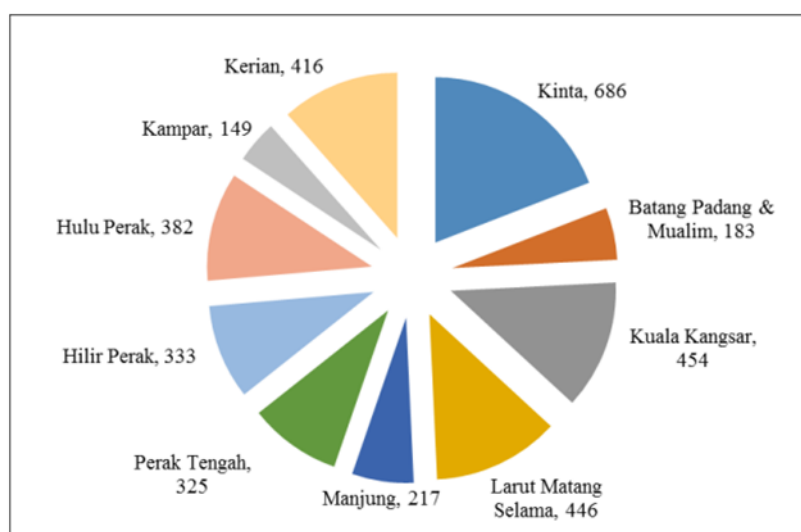


Figure 1: Number of *waqf* lot in Perak
 Source: A. Ibrahim and Ibrahim (2018)

Perak has about 3,591 lots of *waqf* lands that represent a size of 6,483.75 hectares (A. Ibrahim and Ibrahim, 2018). These *waqf* lands can be divided into five primary purposes:

Table 2: The use of *waqf* lands in Perak

Purpose	Size (hectares)
Mosque	963.5
Musolla	789.25
Islamic religious school (madrasah)	675
Cemetery	827
General	3,229
Total	6,483.75

Source: A. Ibrahim and Ibrahim (2018)

Agribusiness

Agribusiness represents the holistic process of agriculture encompasses upstream, mid-stream and downstream process of the economic activity (Clay & Feeney, 2019; Giraldo, 2019). Regardless the status of the countries; whether

developed, developing or poor, this sector is pertinent due to the foods security reason as well as potential income to the countries (Behzadi, O’Sullivan, Olsen, & Zhang, 2018).

Diagram 2 exhibits the value chain that commonly exists in agribusiness sector which are five: production, processing and aggregation, storage and distribution, marketing and consumption and lastly is after-sales service.

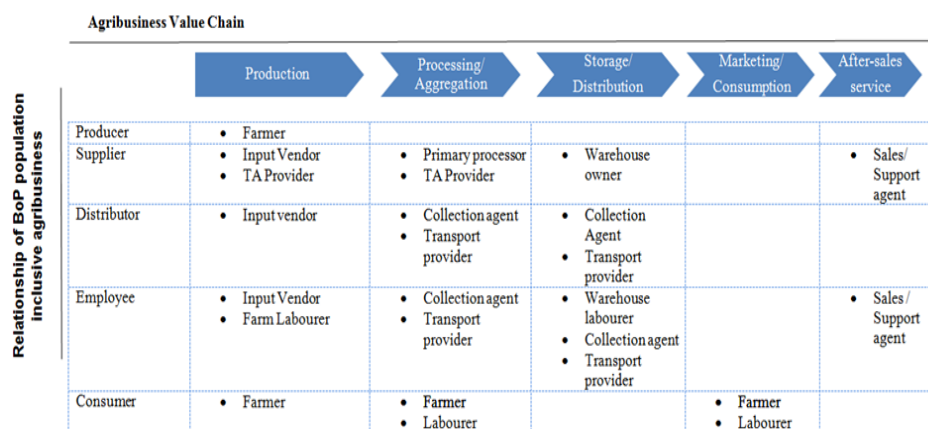


Figure 2: Agribusiness value chain from Jamal (2019)

Agribusiness is a sector that is prone to risks, thus, the value chain is subject to environment uncertainty (Yanes-Estévez, Ramón Oreja-Rodríguez, & García-Pérez, 2010). Agribusiness value chain is best to ascertain the level of commodity input and output flows within an economy (Faße, Grote & Winter, 2009). Webber & Labaste (2010) suggest that the value chain influences the parties involved either vertically or horizontally. Likewise, the consumer is vertically influenced, whereas the suppliers, farmers, wholesalers or even the community are influenced horizontally in the value chain. In Malaysia, Noordin (2018) informs that the crops are divided into cash crops and food crops, refer Table 3.

Table 3: Types of crops in Malaysia

Type	Example
Cash crops – plantation production	Rubber, cocoa, palm oil
Food crops – foods production	Rice, vegetables, fruits

The development of agribusiness in Malaysia is dictated by the National Agriculture Policy (NAP 1-3) and continued with the National Agrofood Policy (NAP 4). It is also one of the key focus in the Malaysia Plan (MP) which is

reviewed every five years. These plans have provided directions to the sector, however the planning is somewhat lacking in term of foresighting input when developing the plan because some of the gaps are widening such as the food crops.

Currently, the government, through the Ministry of Agriculture and Food Industries (MAFI) is focusing to increase the supply of foods production, particularly rice to ensure the food security needs in Malaysia can be achieved. This is consistent with Ramaloo, Siwar, Liong & Isahak (2018) recommendation for urban agriculture development based on the Penang's case study. The current local production of rice for national consumption is 70% and the remaining is imported from other countries (Abd Mutalib, 2019; Rosmiza et al., 2015; Tey, 2010). Nevertheless, the national food self-sufficiency is should be at 80% (Hadi, 2019).

RESEARCH METHOD

It has been mentioned earlier that this article presents a focused discussion or an excerpt from a bigger study. Thus, only a few key informants that are highlighted in relation to the issue of discussed in this article. The qualitative method was employed and semi-structured interview sessions were held with the key informants (senior managers) from Islamic Religious Council of Selangor, Islamic Religious Council of Perak (MAIPk), Islamic Religious Council of Federal Territory, Northern Corridor Implementation Authority (NCIA) and Wakaf Selangor Incorporated or PWS.

FINDINGS

Some of the findings gathered in this study are consistent with previous studies which signify that the issues are still exist and continuous action must be taken to reduce the gap, at least, if to eliminate them are difficult.

Shariah requirements

In general, the use of *waqf* lands for agribusiness is permissible however for *waqf* khas, there are specific requirements that need to be adhered. Firstly, the intention of the endower must be executed, however, if the endower's wishes might be impossible to be executed at that time because there is no urgent need for it then the *waqf* lands can be developed for other beneficial activities which are deemed suitable by the *waqf* trustee.

Nevertheless, it cannot be perpetuity because the original intention of the endower remains and must be executed when possible. For instance, there is *waqf* land endowed for a mosque or cemetery but in that vicinity, such facilities are available. Therefore, the land can be used for agribusiness (subject to the State Islamic Religious Council approval) within the stipulated period.

Islam is the official religion for federation of Malaysia and Muslims in Malaysia follow the Sunni's sect. In the context of religious madhhab or school of thought, the Shafie madhhab opinions are being preferred before referring to other interpretations in other Sunni's madhhab such as Hanafi, Maliki and Hanbali (Ahmad, 2017; Man, Ali, Abdullah, & Ramli, 2009). This is being practiced when the fatwa or solution on certain issues are not suitable for Malaysia as per the Shafie's madhhab due to the social, culture or the current situation.

According to the Hanbali madhhab, the waqf lands can be istibdal if the idle lands can be used to bring benefits to the beneficiaries. I would say the Hanbali madhhab is more flexible. For instance, even though the waqf land is doing well, it can be istibdal if there is better plan that could give better benefits to the beneficiaries. (Key informant 1)

There is no objection from the Shariah perspective since the agribusiness activities are just for temporary and not permanent. (Key informant 2)

Importantly, to reiterate previous point, the *waqf* lands for agribusiness is subject to the time consideration because the original intention of endower is different. When the original needs (as per endower's intention) arises, then the lands must be used for it. Thus, when drafting the agreement to develop the *waqf* lands for agribusiness, the agreement must reflect the situation, for instance the type of crops must be crops that can produce yield in a short cycle, process or clearing and cleaning the *waqf* lands before and after the agreement starts etc.

Financial constraints

Almost many corporations or government agencies face limitation with regard to funding, however, the situation of PWS and MAIPk is more critical because these are institutions that are being established for charitable causes but operating and being treated like other commercial institutions. They are responsible to manage among others; *waqf* lands that the proceeds from the *waqf* lands will be distributed back to the Muslims communities such as to the local mosques, madrasa, NGOs and others. Therefore, it is clear that the institutions are selling and marketing the "charitable products" instead of commercial products.

Accordingly, this situation has limits the institutions from being aggressive to develop and grow the *waqf* lands. It can be easily understood that MAIPk and PWS do not have sufficient funds to plan and execute more economic activities for the *waqf* lands because every project requires commitment of human resource, overhead cost, land premium, legal and administrations etc.

Interviewer: Does the state government provides MAIPk some funds to manage the waqf land?

Key informant 3: No. We are self-funded.

Expertise to develop the *waqf* lands for agribusiness

PWS and MAIPk do not have in-house expertise to plan and develop the *waqf* lands for agribusiness because that is not their forte; and this is expected. Therefore, the institutions have to outsource the talents from other agencies or companies so that they will have a committee of experts to advise them before venturing into agribusiness.

I think, in terms of expertise, MAIS and PWS do not have enough expertise and that must be outsourced. However, even though we outsourced, the committee (representative from MAIS or PWS) must be in the committee or company to ensure the interest of the stakeholders is taken care. Especially the intention of the bequether. (Key informant 2)

In other words, consortium of panel of experts to advise the PWS or MAIPk is possible, and this study believes that many Muslims experts are willing to contribute to these agencies for the sake of Allah and recognition of their expertise in forms of letters of appointment and certificates. This will not cost a lot to PWS and MAIPk.

However, the concern is in term of the governance because it involves audit process which is a continuous process in any agency that practices good corporate governance, and the situation is more critical due to the involvement of external parties with PWS and MAIPk. The agency issue is inherent in this situation particularly if the conflict of interest arises when the appointed expert or advisor leaks the information to his or her confidante or business associate with regard to the development of the *waqf* lands.

Likewise, the appointed experts also need to consistently monitor the agribusiness projects to ensure the objectives are met – this is time consuming. The statement from another key informant, who is a senior manager oversees agribusiness activities in the Northern region under Northern Corridor Economic Region (NCER) authority advises as follows:

Agribusiness cannot afford a simple mistake because the period or cycle taken before the mistake becomes visible is too long. Therefore, for this sector, better replicate the successful model and implement it rather than trial and error. The trial and error should be done at the university or research center level such as MARDI. (Key informant 4)

Proposed model

The *Waqf* Trustee-Anchor Company-Community Farmers Model (see Diagram 3) is suggested to be adopted by the *waqf* trustee or the State Islamic Religious Council based on the findings gathered from this study (Ali Azizan, Muhamat, Syed Alwi, Ali & Abdullah, 2021).

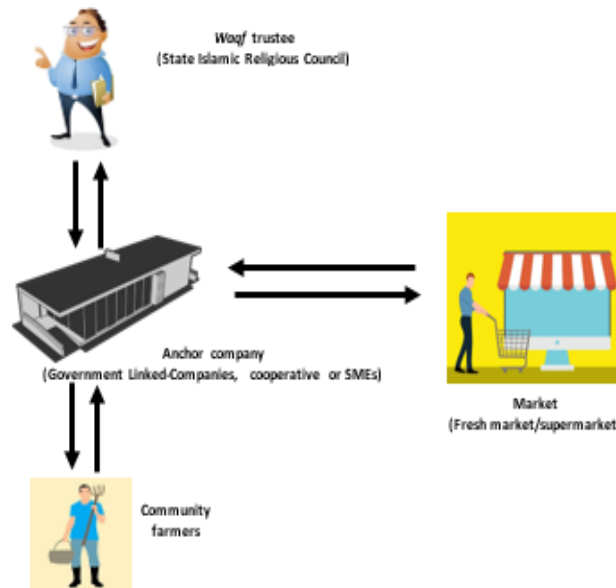


Figure 3: *Waqf* Trustee-Anchor Company-Community Farmers Model

A selection process must be developed to ensure the right anchor company is appointed for a particular agribusiness project. Amongst the criteria that should be included when assessing for anchor company is the financial capability, business plan, reputation and experience in agribusiness. The anchor company can be government linked-company (GLC), cooperative or small and medium enterprise (SME). A formal agreement should be signed between the trustee and the anchor company to ensure the responsibilities of each party are adhered and penalty if any party violates the terms.

In this model, it will include community farmers to join develop the *waqf* lands with the anchor company. This model is suitable if the *waqf* lands located far from the anchor company's location. By having the community farmers, the anchor company can nurture and train them to be successful entrepreneurs. In addition, it will save some costs for the anchor company because they do not have to monitor the activities daily.

The *Waqf* Trustee-Anchor Company-Community Farmers Model can be executed in the form of Islamic business model or contract such as profit-

sharing (musharakah) or profit and loss sharing (mudharabah) models. The musharakah or mudharabah models will offer higher return but begets higher risk (this is the consideration that the *waqf* trustee needs to consider in term of risk). The pertinent issue with agribusiness is the market place for the produce. Thus, this is the role of the anchor company that is not only to develop but also to market or sell the crops or livestock from the *waqf* lands.

CONCLUSION

This study informs that the issues or problems that were highlighted in previous studies are still exist, and they required immediate attention from the relevant stakeholders and authority to address them.

The *waqf* administrators or trustees do not against the use of *waqf* lands for agribusiness but as mentioned in the discussion, the agreement is important especially on the part of period to use the *waqf* lands for agribusiness because in general, it cannot be for a long time due to the endower's original intention on the land which is endowed.

The *Waqf* Trustee-Anchor Company-Community Farmer model is suggested based on the findings from this study. It can be executed in the form of Islamic business contract that surely will pave way financing from Islamic banks, that is compatible with the *waqf* institutions that is for the Muslims. Moreover, through this model, the rural farmers can be assisted so that they can have source of income and learn from the experienced and successful farmer – the anchor company. In addition, this study highlights the importance of urban planning and management on the *waqf* administrators and government agencies that because the *waqf* lands are scattered all over Malaysia, located in the urban and rural areas. Proper planning and modern farming technique will ensure the urbanisation process happen in order for the benefits of the *waqf* beneficiaries, endower as well as the community.

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UNCERTAINTY IN BUSINESS VALUATION FOR TAX PURPOSES

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Abstract

An important but often neglected aspect in business valuation for tax purposes is uncertainty. It is known in the literature that changes in economic structure, people's behavior, business risk, or political leader are expected. Unfortunately, these factors cannot be effectively measured and reported in business valuation for tax purposes. As such, most business valuations for tax purposes are unable to capture uncertainty adequately. Valuation reports under a tax investigation process only present an estimated value in the form of a single value, which is unable to represent uncertainty sufficiently. This paper aims to demonstrate a method to quantify uncertain variables into the business valuation for tax purposes. The research engaged scenario analysis to arrive in three different possible value estimates, and Monte Carlo simulation to take uncertainties into account to produce a frequency distribution containing all possible values between predetermined limits. Using the range of value produced in the simulation, a taxpayer will have more complete information to decide whether taxpayers submit an undervalue report or not.

Keyword: Business Valuation, Tax, Scenario Analysis, Monte Carlo
JEL Code: G170

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INTRODUCTION

In the business context, valuation is aims to work our the total market value of a company (Sinem and Saad (2020) for various purposes, including commercial transactions, financing, taxation, bankruptcy, and ownership transition. While the value of physical assets is generally known, the overall market value of a business is often unknown because market value is merely an estimate of sale price in the open market between willing buyers and sellers (Sayce et al., 2009), and the summary of the company's net assets and goodwill (Fernandez, 2007). The primary assumption is that this interaction occurs in an open market between willing buyers and sellers. The current standard defines market value as the predicted amount of an asset at the valuation date after proper marketing, which each party has acted knowledgeably, prudently, and without compulsion (IVSC, 2010). Accordingly, an accurate estimation of market value is desirable as it leads to a better decision making (Ja'afar & Muhammad, 2021).

These definitions generally say that the company's value is the result of estimation or prediction. the estimated value may be different from the actual price when a transaction occurs. In fact, it is common to find discrepancies in estimated market values reported by one appraiser from another, which Mohammad, Mohd Ali, & Haryati Jasimin (2018) as the art of valuation. Valuation is a mere attempt to predict prices that might occur in transactions., it carries an element of risk or uncertainty inherent in its process.

In the context of Indonesia's income taxation, business valuation has become increasingly important. For instance, profits from selling shares in corporate actions (e.g., mergers or acquisitions) or selling a company above the fair value are subject to income tax. However, the integrity of income tax system is undermined by taxpayers who defensively file an underreport in transaction values (Allingham and Sandmo, 1972). Meanwhile, tax valuers (tax officers who primarily performs valuation for tax purposes) strives for measuring as accurate transaction values as possible.

The effect of risks faced by Indonesian tax valuers compounds as taxpayers often do not provide an actual transaction amount. This situation makes tax valuers are unable to produce adequate report of the market value for the given transactions. As a result, the outcome of a valuation process contains a degree of uncertainty. However, the uncertainty is not fully covered in business valuation reports for tax purposes in Indonesia because the reports only provide a single value estimate. Accordingly, this paper aims to fill this gap by demonstrating the method of incorporating uncertainty in the business valuation process. For this purpose, this paper is organized as follows. Section II describes a brief literature review on valuation and the Monte Carlo approach. Section III demonstrates how uncertainty is incorporated into the valuation. Finally, the fourth section identifies several limitations with regard to the methods chosen in this paper. A brief conclusion at the end concludes this paper.

uncertainty in values estimation as either normal or abnormal uncertainty (Figure 1). Meanwhile, the typical uncertainty is the most common situation faced by valuers (van Vuuren, 2017) where asymmetric information flow is the norm. Parties with better access to information, such as data transactions tend to have a competitive advantage over the others. Consequently, comparable data transactions become limited and the valuers' subjectivity and judgment become more critical. As such, the valuers must adjust valuation approach, to not simply increase the accuracy of the assessment results, but rather provide a more comprehensive picture to the users of the valuation report. This condition can be seen, for instance, in the widely-used Discounted Cash Flow (DCF) technique.

DCF is not without weakness, and concerns have been raised on its use (Laughton, Guerrero, and Lessard, 2008; Bancel and Mittoo, 2014). Previous findings reported that DCF ignores risk and uncertainty and, therefore, may misjudge investment with non-linear returns. Further, DCF uses a single discount rate in the discounting process, regardless of risk or financing differences (Nowak and Hnilica, 2012). In fact, DCF can mostly associate its usefulness in understanding a company's average value without taking into account the risks and uncertainties that should have been built in the model.

As it only produces a single value estimate, it may not be beneficial for the users of the valuation report borrowing (Mallinson and French 2000: 15) and, more importantly, could be misleading (Nowak and Hnilica, 2012). To fully capture the variety of uncertainties, the output of valuation processes should provide a range, rather than a point, of value estimates (Prasetyo, 2018). The method to achieve this in this paper is outlined in the following section.

Business Valuation for Tax Purposes in Indonesia

In the Indonesian taxation system, business valuation has become increasingly critical. Reinforcement of valuation-based tax investigation and optimization of the role of valuation have been applied to raise tax revenue. The policy to increase the role of valuation for tax purposes has been announced in the Director General of Tax Circular Letter No 61/PJ/ 2015 concerning Optimization of Valuation for Disclosure of Tax Potential and Other Taxation Objectives. This regulation posits that the valuation for tax purposes is carried out to determine fair market value of valuation object at a particular time. Furthermore, the valuation for tax purposes should be performed objectively and professionally based on the valuation standard. Therefore, the purpose of the valuation activity is to determine the value that can be used as a basis for calculating the tax payable.

In regulating business valuation for tax purposes, the Indonesian government also ratifies the Director General of Tax Circular Letter No 54/PJ/2016 on Technical Instructions of Property Valuation, Business Valuation, and Intangible Assets Valuation for Taxation Purposes (SE 54/PJ/2016). It is stated that the business valuation for tax purposes in Indonesia aims to determine

the amount of a certain type of value in a given moment of a business entity. For tax purposes, business valuation measures, for instance, the value of transfer of assets to the company as a substitute for shares or equity participation; the value of transfer of assets to shareholders, allies, or members of a company; the value of sales, purchases, or transfers of assets in the form of a company between parties that have a special relationship; or the value of the transfer of assets in the form of a company in the context of liquidation, merger, consolidation, expansion, splitting or business takeover.

According to SE 61/PJ/2016, the tax valuer can select from several approaches, including income approach, to conduct a business valuation. The income approach valuation allows the tax valuer to apply either Discounted Cash Flow (DCF) Method or Capitalization of Income Method. The regulation also stipulates that the Estimated Value (output of business valuation for tax purposes) in the valuation report must be expressed in a single value (single amount). An example of the output of business valuation for tax purposes using DCF Method is presented in Figure 2.

Discounted Cash Flow	Present	T+1	T+2	T+3	T+4	T+5	Terminal
Unlevered FCF (Entry)/Exit		(69.181.430.858)	(6.136.528.941)	1.774.284.943	22.006.852.966	40.877.622.094	Average Exit
Transaction CF	-	(69.181.430.858)	(6.136.528.941)	1.774.284.943	22.006.852.966	40.877.622.094	672.438.950.350
Market Value							
Enterprise Value (11,51%)	403.744.592.362						
Present Cash Flow	61.945.039.704						
Company Value	465.689.632.066						

Figure 2: DCF Method

METHODOLOGY AND RESULT

Figure 2 depicts a business valuation for tax purposes conducted by tax valuer using a DCF method. Figure 2 illustrates that the main inputs for the company estimated value are the expected future cash flow, the expected terminated value, and discount rates. The underlying assumptions to the calculations believed that the expected cash flow varied according to the appraiser's calculation, the expected terminated value was based on the predicted company performance, and the estimated discount rate was 11.51%.

At this point, the element of judgment appraiser began to appear. The tax valuers predicted the expected cash flow and the expected terminate value, and estimated the future cash flow and future terminate value based on company performance in the past. This is also true for the discount rate. Based on the distribution of comparable data, we found that the capitalization rate was not exactly 11.51%. The tax valuer chose 11.51% because it seemed an appropriate discount rate to represent the company, resulting in an equity value of IDR 466 billion.

Therefore, these estimations, should be treated with caution due to the uncertainties involved in selecting the discount rate. To clarify the inclusion of judgement into the value calculations, the next sections elaborate the concept of probability using Scenario analysis and Monte Carlo simulation.

SCENARIO ANALYSIS

Scenario analysis is conducted to provide more comprehensive value information compared to the DCF approach (Prasetyo, 2018). As shown in Figure 2, the chosen discount rate is 11.51%. A review of available data showed that the actual discount rate fluctuated between 7% and 13%, so the selected discount rate was approximately in between. This arbitrary is stemmed from the inherent uncertain nature in the equity market and the likelihood of incomplete data provided by the taxpayers in their attempt to minimize tax payable.

The scenario analysis provides more comprehensive information than the conventional DCF approach as it uses three possible discount rates of 7%, 11.51%, and 13%. The results are presented in Figure 3.

Scenario Summary			
	Current Values:	Optimistic	Pesimistic
Changing Cells:			
Discount Rate	11,51%	7%	13%
Result Cells:			
Company 'SD\$2	465.689.632.066	550.624.015.479	441.313.271.169

Figure 3: Scenario Analysis Result

Although more comprehensive, it can still be asked on the decision to use only three rates. This is because there basically are an infinite number of rates between 7% and 13% that have the same probability of being ‘the correct’ discount rate. Accordingly, an infinite number of estimated values that share probability as ‘the correct’ equity value also exists. The procedure to take this fact into account is presented in the next section.

Monte Carlo Simulation

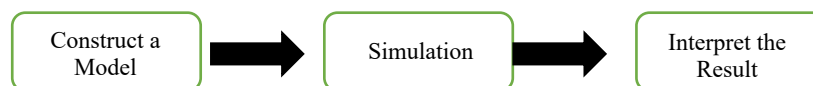


Figure 4: Monte Carlo Simulation: Step by Step

Source: Charnes (2012)

The Monte Carlo simulation is a popular tool in calculating risk and uncertainty in a model (Nowak and Knilica, 2012), mostly due to its strength, relative simplicity, and flexibility (Christie, 2018). The simulation runs a large number of possible scenarios. If the scenario analysis only produces three value points, the simulation technique produces thousands of estimated company values. The input is taken randomly between certain values based on a certain statistical distribution. The result is normally presented in the form of frequency distribution, enabling the valuer to calculate the probability of certain equity value to occur. The sequence of simulation steps is illustrated in Figure 4.

Table 1: Summary of Monte Carlo Simulation

Variable	Mean	SE Mean	StDev	Minimum	Q1	Median
VALUE	4.69107E+11	116048802	25949301105	4.11039E+11	4.50103E+11	4.67639E+11
Variable	Q3	Maximum				
VALUE	4.87173E+11	5.37908E+11				

Referring back to the scenario analysis in the preceding section, this study used three discount rates parameters of 7,59%, 11,51%, and 13%. The appropriate distribution for this type of known parameters is the triangular distribution (Prasetyo, 2018). Here, the calculation was repeated 50 thousand times to obtain consistent results (French and Gabrielli, 2004). Table 1 presents the summary of simulation results calculated using Minitab 19.2.

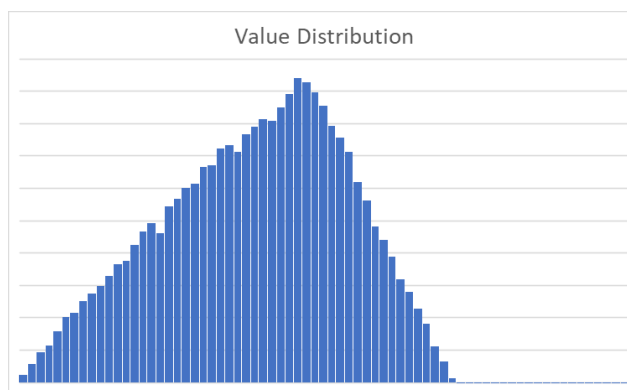


Figure 5: Value Distribution

PERCENTILE	ESTIMATED VALUE
0%	411.567.943.453
5%	424.640.999.887
10%	430.971.556.361
15%	435.370.332.807
20%	439.130.899.435
25%	442.501.399.108
30%	445.814.508.251
35%	448.831.599.431
40%	451.451.399.332
45%	454.395.034.436
50%	457.075.469.892
55%	459.680.779.833
60%	462.011.554.322
65%	464.272.211.100
70%	466.449.470.903
75%	468.755.277.254
80%	471.415.882.791
85%	474.315.902.394
90%	477.678.791.289
95%	481.804.813.458
100%	530.241.818.827

Figure 6: Estimated Value in Percentile

Interpretation

Equity value that is estimated to reach IDR 466 billion (Figure 3) should be treated with caution as it is calculated based on certain assumptions. One notable assumption is the constant discount rate of 11.51%. A quick look at the current business situation points to a fact that this assumption violates reality, as one can easily find that the discount rate fluctuates between 7% to 13%. This is the basis of the scenario analysis in Figure 3. A major advantage of this technique is the inclusion of three scenarios of an optimist, a pessimist, and a most likely. Each uses three different discount rates of 7%, 13%, and 11.5% per annum, resulting in three possible equity values, rather than one as calculated by the traditional DCF (Figure 3).

Readers should be aware that despite an improvement from the traditional DCF, Scenario Analysis could include plenty of possible discount rates between 7% and 13% that should not be ignored. Addressing this issue, Monte Carlo simulation demonstrates that the average of value estimate is IDR 469 billion (SD of IDR 26 billion) and the equity value is unlikely less than IDR 411 billion or more than IDR 538 billion.

This result can find immediate impact in the Indonesian tax office where profit from equity transactions between entities is taxed. A carefully-crafted simulation model can be used to assess whether or not the amount reported by a taxpayer is reasonable. For the context in this paper, if the model is used for

income tax purposes, a taxpayer who reports an equity transaction below IDR 411 billion clearly warrants further scrutiny. It is, by no means, a guarantee of a tax evasion scheme, but provides a basis for further investigation by tax auditors.

The simulation also provides a *safe harbor* where the equity value estimates can be considered truthful. This can be seen in Figure 6. These indicators generally partition the dataset into four distinct parts after it is arranged in ascending order. Q1 and Q3 each indicates the first and last quarter while Q2 normally is the middle of all dataset. A generally accepted view in taxation guides, such as the OECD's transfer pricing guidelines, mentions that an arm's length value is one that lies between Q1 and Q3. Hence, if the taxpayer reports a transaction value of IDR 455 billion, this transaction can be considered at arm's length and no further actions are required. On the other hand, if the taxpayer reports IDR 400 billion, the tax auditor needs to be weary as it clearly falls below the lower bound of the acceptable equity value estimate.

CONCLUSION

Valuation is an estimate of the most probable transaction price. Models are thus used to arrive at a value estimate. One of these is the DCF technique, often used in a company's equity valuation. A notable weakness of this technique is the use of a static discount factor. While a discount factor is generally probabilistic in nature, the DCF ignores this.

This paper aims to provide a way to address this issue using Monte Carlo simulation. While it is not new, the use of this technique is gaining popularity due to the rapid development of personal computers.

Using this technique, it is possible for valuers to present the probabilistic nature of business valuation in their reports. For tax purposes, this technique can find immediate application in assessing whether taxpayers report arm's length price of equity transactions in their tax return.

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WAQF LAND DEVELOPMENT APPROACHES AND PRACTICES IN THE STATE ISLAMIC RELIGIOUS COUNCILS

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Abstract

Waqf land is a religious property that is provided as a charity act by a donor and placed under the jurisdiction of the State Islamic Religious Councils (SIRCs). The SIRCs are the sole trustees in charge of governing, managing, and developing these properties. SIRCs have been working to develop waqf lands through a variety of projects and ways that adhere to best practices and a sound management system. However, the waqf's potential for greater outcomes is yet to be optimised. This research has reviewed the literature of waqf land development approaches and practices in Malaysia and it has tabled the significant development approaches that can be implemented by the SIRC. These approaches and practices may overcome the issues and challenges faced by the SIRCs in developing waqf land.

Keyword: Waqf Land, Land Development, Development Approaches & Practices, State Islamic Religious Councils (SIRCs)

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INTRODUCTION

Land is a limited resource and it is one of the main factors of production. It plays a large role in the economic growth of a country and also satisfies humans' unlimited needs and wants. Rapid developments lead to high demand for land. Hence, it should be managed effectively within the scarcity of land settings. This will unlock the value of the land to its highest and best use. This study focuses on the development of religious land known as waqf land by the State Islamic Religious Councils (SIRCs).

SIRC is a sole trustee of waqf land in Malaysia according to The Federal Constitution's Ninth Schedule, List II (State List). They are authorised to manage the waqf land within their state jurisdiction with the best standard of practice and suitable management system according to Islamic law. Previous literature has raised several issues and challenges face by SIRCs in developing land under their jurisdiction. Various efforts have been taken by the SIRCs and other recognised institutions to overcome these challenges but not all of the states are able to perform well in developing waqf lands.

Besides the SIRCs, there are also Federal Agencies involve in waqf land development in Malaysia. The agencies under the Prime Minister's Department highly involved with SIRCs are Jabatan Wakaf, Zakat & Haji (JAWHAR), and Yayasan Wakaf Malaysia (YWM). These agencies support the SIRCs in accomplishing this potential in a more orderly and efficient way. It is noted that these agencies are more of an active complementary agency and is not an actual authority because land is a state matter. JAWHAR and YWM have embarked on several projects in collaboration with the SIRCs to develop waqf land. According to JAWHAR, there are a few high-impact waqf projects that have been established in various states in Malaysia.

LITERATURE REVIEW

Waqf is a word in the Arabic language that means "stop, contain, or preserve". It is an act of philanthropy and it is a charitable endowment in Islamic law. A waqf land is a piece of land voluntarily donated by the donor as a charitable act for the social and economic development of Muslims and has strict principles such as "perpetuity, inalienability, and irrevocability" (Khaf, 1998). Among the contribution of waqf to social and economic development is that waqf has the capacity to provide affordable homes for the underprivileged and needy (Rashid, et al., 2018; Rashid, et al., 2019).

Waqf land is categorised into two, i.e "waqf am" and "waqf khas" according to its purpose. Waqf am refers to waqf land that has been endowed without any specific purpose and it is dedicated to the general welfare without stipulating any condition or any particular beneficiary. In contrast, waqf khas has a specific charitable purpose or special beneficiaries that have been precisely declared by the donor. Normally, the donor dedicated "waqf khas" for the

development of mosques, orphanage homes, religious schools, cemeteries, etc. Meanwhile, waqf am or general waqf can be developed into any type of development as long as it can benefit the ummah (Mahamood, 2006).

According to JAWHAR, the number of waqf lands recorded has been increasing over the years. In 2013, there were 4,524 lots of waqf land with a total area of 11,092 hectares worth RM99,329,171. In 2015, it had gradually increased to 5,740 lots with a total area of 16,751 hectares worth RM111,413,890. Data from JAWHAR tabled the staggering increase to 14,356 lots with a total area of 30,888.9 hectares (Mahmood, Mustaffha, Hameed & Johari, 2017). These huge numbers however do not include the unrecorded Waqf land. There are approximately 30 per cent of unrecorded Waqf lands and the actual size, location, and ownership of the waqf land are still unknown (Siraj, 2012). According to the former director of JAWHAR, there is 99.28 per cent of undeveloped and idle waqf land (Thaker & Pitchay, 2018). The shortage of financial resources has led to a huge percentage of waqf land remained undeveloped (Ismail, Salim & Hanafiah, 2015; Jalil, Yaacob, Omar, Ridza & Fadzli, 2019).

The SIRC's hold the accountability to manage the waqf land. These include the power to develop the said land. Waqf land development will improve Muslims' socioeconomic conditions by allowing them to participate in and benefit from economic development initiatives while remaining compliant with Syariah.

METHODOLOGY

This research used content analysis as the qualitative approach. The systematic literature review (SLR) method has been used in this study. Research through literature review can be described as “a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that frameworks and perspectives on the topic are generated” (Torraco, 2005).

There are four (4) stages involved in conducting SLR. The process started with the selection of databases in stage 1. Prominent databases such as Scopus and Web of Science (WoS) were identified. These databases were chosen because of their robustness and it covers many fields of studies related to this research including social science, arts, and humanities, economics, finance, business, management, Islamic studies, etc.

The 2nd stage is the keyword search configuration. Selecting the articles involve the identification of keyword and develop the search configuration. The search configuration for Scopus is TITLE-ABS-KEY (“Wakaf Land” OR “Waqf Land” OR “Awqaf Land”). Meanwhile, the search configuration for WoS is TS = (“Wakaf Land” OR “Waqf Land” OR “Awqaf Land”). In total, 51 articles were retrieved from the Scopus and WoS in this 2nd stage.

The 3rd Stage is filtering the articles. The articles were filtered for duplication. 13 duplicate articles were omitted. The process was further refined for the remaining 38 articles. There were then reviewed for the inclusion and exclusion criteria. The review focused on the publication date, language, subject area, and specifically on the articles written in the areas of land development under the SIRC's jurisdiction.

After filtering, 16 articles remain and proceed to the 4th Stage. 16 full articles were then carefully accessed. After reading the abstracts, the data were obtained. Next, the themes and sub-themes were detected by exhaustively reading the full articles. The qualitative analysis was then executed by the means of content analysis to identify themes related to Waqf land development tools and practices in Malaysia.

Articles were then further analysed through a coding process based on common characteristics. Thematic analysis was conducted in developing the appropriate themes and the sub-themes. The articles were analysed using a sophisticated Qualitative Data Analysis software called ATLAS.ti. This software finds all the keywords and phrases related to the subject matter. This approach is looking for patterns, threads, constructs, and commonalities. This data analysis technique enables the identification of key issues and challenges discussed in the articles using coding, grouping, and networking.

FINDINGS

This research has been able to provide results from the Qualitative Data Analysis using Systematic Literature Review (SLR) with the assistance of the ATLAS.ti software. The list of the 16 articles according to the titles are as in Table 1. Further analysis of the publication year from 2009 to 2019 found that there is no article related to this study indexed in Scopus and Web of Science in the years 2009, 2012, and 2014. The average number of articles published is less than 2 articles annually and the highest number of articles published is 4 for the year 2015 and 2018.

Table 1: List of articles used in the SLR

No.	Title
1.	A Comparative Study of Waqf management in Malaysia
2.	Acquisition of Waqf Lands by the State Authority: A Case Study of Land Acquisition in Terengganu
3.	Administration and Management of Waqf Land in Malaysia: Issues and Solutions
4.	Asopting Al-Hikr Long Term Lease Financing for Waqf and State Lands in Malaysia to Provide Affordable Public Housing
5.	Application of the Build, Operate, Transfer (BOT) Contract as a Means of Financing Development of Waqf Land: Malaysian Experience
6.	Classification and Prioritization of Waqf Lands: A Selangor Case
7.	Compulsary Acquisition of Waqf Land by the State Authorities: Compensation Versus Substitution
8.	Cooperative-Waqf Model: A Proposal to Develop Idle Waqf Lands in Malaysia
9.	Developing Waqf Land Through Crowdfunding-Waqf Model (CWM): The Case of Malaysia
10.	Factors Influencing the Adoption of the Crowdfunding-Waqf Model (CWM) in the Waqf Land Development
11.	Factors Influencing the Behavioral Intentions of Muslim Employees to Contribute to Cash-Waqf Through Salary Deductions
12.	Integrated Framework for Development on Waqf Land in Pulau Pinang
13.	Maqasidic Approach in the Management of Waqf Property: A Study with Reference to Malaysian Contemporary Issues
14.	Modeling Crowdfunders' Behavioral Intention to Adopt the Crowdfunding-Waqf Model (CWM) in Malaysia: The Theory of the Technology Acceptance Model (TAM)
15.	Substitution of Waqf Properties (Istibdal) in Malaysia: Statutory Provisions and Implementations
16.	Waqf Private Property Trust Fund as Property Unlock Initiative

Sixteen selected articles have been systematically analysed. This study has identified four (4) themes related to the waqf development tools and practices in Malaysia. The breakdown of these themes according to the number of articles is as follows:

Table 2: Waqf land development approaches and practices discussed in the articles

No.	Approaches & Practices	Number of articles
1	Joint-venture & Partnership	2
2	Government Assistance	4
3	Public Participation	6
4	Internal Management (SIRCs)	4

Source: Authors' ATLAS.ti Analysis

Most of the articles used in this study discussed public participation in waqf land development. Besides self-initiatives, the SIRC also involved the government in assisting them to develop waqf land. There are four (4) articles that discussed these approaches. Only two (2) articles highlight joint-venture and partnership in their article. Further details on the approaches and practices by the SIRC are as follows;

THEME 1. JOINT VENTURE AND PARTNERSHIP

The SIRC has established smart partnerships or joint ventures in developing land under their jurisdiction. This joint ventures and partnerships have been done with interested parties such as individuals, federal departments, state agencies, corporate institutions, financial institutions, and private firms in monetary forms and sharing expertise. Joint ventures between the SIRC and the interested parties are based on the principles of *mudharabah* or *musharakah*. These principles enable the parties involved to receive profit according to the agreed ratio (Abdullah & Meera, 2018; Jalil et al., 2019).

This joint venture and partnership with an interested party can be initiated because SIRC don't have to contribute huge capital because it acts as the 'owner' of the land. There are two (2) local and one (1) overseas examples of joint-venture projects highlighted. The first example is JV between SIRC of Penang (MAINPP) with UDA Holding Berhad in developing housing schemes in Seberang Jaya, Pulau Pinang (Pitchay, Thaker, Mydin, Azhar & Latiff, 2018). The second example is JV between SIRC of Federal Territory (MAIWP) and Lembaga Tabung Haji subsidiary (TH Technologies) in developing a purpose-built office known as Menara Ijarah Wakaf in Kuala Lumpur using a Built-Operate-Transfer (BOT) contract (Mohd Noor & Yunus, 2012). The overseas example given by Pitchay, Meera & Saleem (2015) is the joint venture between King Abdel Aziz waqf (KAAW) with Bin Laden Group under a BOT contract in developing ZamZam Tower in Makkah which consists of a shopping complex, a shopping mall, and hotels. These joint ventures involved financial institutions in financing the projects.

THEME 2. GOVERNMENT ASSISTANCE

Government assistance can be through funding the capital and facilitating the land development in terms of advice and expertise. The majority of the works of literature point out that SIRC are having a significant challenge in developing land under their jurisdiction because of the insufficient fund and lack of expertise (Abdullah & Meera, 2018; Awang, Hamid, Nazli & Lotpi, 2017; Salleh, Hamid, Harun & Ghani, 2015; Thaker & Pitchay, 2018).

The federal government of Malaysia has established the Department of Awqaf, Zakat, and Hajj (JAWHAR) and Yayasan Wakaf Malaysia (YWM) to coordinate

the development of waqf properties by the SIRC. It also aids, facilitates, and complements SIRC initiatives to improve waqf administration, management, and development efficiency and effectiveness. JAWHAR & YWM are also responsible for observing and assisting SIRC development projects if the project is failed to complete due to a shortage of financial resources and expertise. These organisations are in charge of administering and managing waqf-related affairs (Thaker & Pitchay, 2018).

According to JAWHAR, their JV programs with the SIRC called Waqf Property Development Program has a total of 17 large scale and high impact projects involves a total cost of RM290.25 million with a total land area of 23.771 hectares. These JVs is funded by the federal government from the Malaysia Plan (RMK) allocation. The federal government becomes the main source of funding to the SIRC for developing waqf land through many projects and developments. (Thaker & Pitchay 2018). JAWHAR also published several manuals for SIRC to improve their knowledge and practices. Six (6) manuals and guidelines have been produced to streamline the process and procedure of land development by SIRC. The notable manual is 'Waqf Lands Administration Manual 2010' (Harun, Hamid, Salleh & Bidin, 2017).

THEME 3. PUBLIC PARTICIPATION

Besides government assistance, public participation is equally important in waqf land development. The Malaysian Plan allotted some funds to the SIRC, however, the sum allotted is insufficient to develop a large area of waqf land (Jalil et al., 2019).

Participation from the public can be done through contribution in terms of monetary (cash). Cash waqf is considered a crowdfunding method because it pools money from the public to fund waqf land development (Isa, Ali & Harun, 2011; Jalil et al., 2019; Thaker & Pitchay, 2018). The cash waqf concept received a soft reaction from the public but it was found to be more realistic to practise since it can be done in any amount and it is low compared to endow property or land as waqf (Jalil et al., 2019). Cash waqf can be done online and offline at various SIRC platforms.

The public can also participate through corporate waqf by buying shares issued by corporate waqf entities. Johor Corporation (JCorp) launched the first corporate waqf in Malaysia by issuing its company's shares as Waqf in 2006. Meanwhile, SIRC of Selangor (MAIS) issued Selangor Share Scheme with the same purpose which is to elevate public participation in cash waqf by purchasing the share units (Isa et al., 2011; Jalil et al., 2019).

THEME 4. INTERNAL MANAGEMENT

SIRC can self-develop lands under their jurisdiction using internal funds and expertise. The development project can be managed internally. Normally the type of

development involve is a small-scale project such as constructing single-storey shops or bazaars for rental. The internal funds within SIRC's jurisdiction are money from the rental of premises, cash waqf from the public, proceed from istibdal, zakat fund allocation, etc. (Harun et al., 2017; Hisham, Jaseran & Jusoff, 2013; Salleh et al., 2015)

Some SIRC's have established subsidiaries known as "Perbadanan" or "Corporation" responsible for the administration and management of waqf-related concerns. States that have established the entities are Selangor, Negeri Sembilan, and Johor. In 2011, MAIS formed Perbadanan Wakaf Selangor (PWS), a subsidiary that focuses on collecting cash waqf as an in-house financing source (Pitchay et al., 2015; Thaker & Pitchay, 2018).

CONCLUSION

The issue with underdeveloped land under SIRC's jurisdiction is mainly because of insufficient funds (capital). Based on this study, there are four (4) themes of approaches and practices that have been adopted by the SIRC's in developing religious land in their state. Besides self-initiative, SIRC needs assistance from the federal government, private companies, developers, and public participation to improve its role as an effective sole trustee. There are a few rooms for improvement for the SIRC's to overcome any challenges related to land development. More continuous campaigns and promotion needed to be done to increase public awareness and participation in waqf. SIRC's have to maintain the synergy and strategic collaboration with the related parties including collaboration between SIRC's. Internally, SIRC's can improve their management system using an updated database, ICT upgrade, hiring professional experts, and strengthening the organizational structure. With all the effective approaches and best practices, SIRC's may strengthen and reform waqf administration in Malaysia and improve the economy of the Ummah.

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EXPRESS CONDITION OF LAND, USAGE OF PROPERTY, AND LICENSING OF SHORT-TERM ACCOMMODATIONS

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Abstract

Contrary to many short-term accommodation operators (STAs), short-term accommodations in Malaysia are subjected to laws relating to land and town planning. In the light of the ignorance of the STA operators about the legal aspects of STAs and complaints received by both the industry players (registered hoteliers) and the general community at large, this paper addresses the elements of an express condition of the land, usage of the property and licensing of the STAs in Malaysia. This paper uses the library-based approach, where the analysis of relevant legislation, newspaper report, decided cases, and journal articles are made. A comparative study with selected states in the U.S.A is made concerning the legal status of the short-term rentals.

Keyword: short-term accommodation, governance, land office, local authorities

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INTRODUCTION

Nowadays, many people are renting out entire houses or apartments to short-term visitors and operate as short-term accommodation (from now on referred to as STA) operators without having proper registration of the business. In worst-case scenarios, entrepreneurs lease many apartments and operate them as STAs (which is sometimes referred to as 'homestays' or 'guesthouses' with scant regard for permanent residents living there. Housing developers could switch to more one-room studio apartments with cheaper private residence utility rates, as commercial charges apply to service apartments or small office home offices. Buyers of such studio apartments are least likely to object if many units are used for so-called homestays or guesthouses. Commercialized STAs have become a trend and growing at breakneck speed in cities without specific regulations, as perceived by many people. In the light of the ignorance of the STA operators about the legal aspects of STAs and complaints received by both the industry players (registered hoteliers) and the general community at large, by using a library-based approach, where the analysis of relevant legislation, newspaper report, decided cases and journal articles is made, this paper addresses the aspects of the condition of the land, usage of the property and licensing of the STAs in Malaysia, given the challenges endured in the governance of urban complexities in the ethos of global intensities (Faizul Abdullah & Fatimah Yusof, 2016). A comparative study with selected states in the U.S.A is made concerning the legal status of the short-term rentals. The selected states in the U.S.A. are made since the U.S.A. has a diverse framework in addressing the legal issues of STAs and because of some features of similarity in the concept of federalism practiced in the U.S.A and Malaysia.

The Federal Constitution of Malaysia 1957, the country's supreme law, prescribes a two-tier governmental structure that is the Federal and State Government. Federal intervention on the grounds of achieving uniformity of land law and policy in Malaysia was initiated by the introduction of the National Land Code 1965 (herein after referred to as NLC). Landed properties in Malaysia are subjected to the governance of town planning in each district. After independence, the town and country planning system were re-organized in line with the new government system whereby the responsibilities between Federal and State Governments are stipulated in the Federal Constitution. Under Article 74(1) of the Federal Constitution, read together with the Concurrent List in the Ninth Schedule, matters related to town planning (and local government) are the concurrent responsibility of both governments. This is, however, complicated by the fact that land is under the constitutional jurisdiction of state governments.

One of the planning administrative bodies that play a significant role in the planning system under the Town and Country Planning Act 1976 (Act 172) is the Local Planning Authority, as provided under Section 5(1) of Act 172. The powers and obligations of Act 172 in the town and country planning domain are

defined in Section 12(1) of Act 172, and this includes the responsibility to immediately initiate the preparation of structure plans for the consideration of the State Planning Committee even before the State Authority gives assent to a draft structure plan that has been prepared (Izuandi Yin & Jamalunlaili Abdullah, 2020). As regulated under Act 172, powers of Act 172 in matters concerning land development are constrained as they cannot approve developments that are contrary to the approved development plans (i.e., structure and local plans). Hence, statutory development plans play an essential role in the development control system (Faizah Ahmad, 2001-2011). All Local Planning Authorities are entirely within the purview of the State Government, and the Federal Government has no direct power to intervene in their affairs.

Administratively, town and country planning in Malaysia is carried out at three levels; at the federal level, the Ministry of Housing and Local Government via Federal Town and Country Planning Department, which is responsible for formulating and administering all national policies relating to town and country planning. At the state level, the State Department of Town and Country Planning through the State Planning Committee acts as an advisory body to the state government. While at the ground level, local authorities have the task to carry out town and country planning functions as prescribed in the local plan (Abdul Aziz, Zakaria, & Hamzah, 2011) (Alden & Awang, 1985).

Beyond the legal structure prescribed in Act 172, planning administration encompasses three levels of town planning departments which provide the technical and administrative support for the respective levels of government. The Federal Town and Country Planning Department (FTCPD) under the Ministry of Housing and Local Government operates within Peninsular Malaysia, while Sabah and Sarawak each have their equivalent State-level ministries.

GOVERNANCE OF LAND OFFICE IN STA OPERATION

Can an owner of STA who operates STA use land other than what is stated in the condition? Application for land use conversion can be made under the NLC. Section 52(1)(a) of the NLC provides that all alienated lands are divided into three (3) categories of land use, i.e., "Agriculture," "Building," and "Industry." Section 52 (1) (b) of the NLC states that the State Authority may specify the conditions that attached to the alienated land to include (a) the express conditions; Section 121 for Agriculture land; and Section 122 for Building and Industry (b) the implied conditions: Section 115 for Agriculture; Section 116 for Building; and Section 117 for Industry. Section 104 of the NCL provides conditions to be complied with not only by the proprietor but also every person/body claiming an interest in the land. e.g., chargee (bank), tenant and lessee. Failure to do so will lead to a breach of the condition under Section 125 of the NLC, and the State

Authority can forfeit the land under Section 127 as illustrated in the case of *Lam Eng Rubber Factory (M) Sdn Bhd v State Director*, Kedah (1994) 1 CLJ 179.

In 2014, the Penang state government decided to regulate the conversion of residential premises by allowing limited commercial activities. With amendments to Petaling Jaya Local Plan 1 and 2, 19 areas in the city were rezoned from residential to limited commercial status (Brenda Ch'ng, 2016).

Under Section 124 of the NLC, variation of a condition of the land use can be made. Section 124 (1) State Authority is empowered to vary conditions on the application of proprietor of any category of land use: Section 124(5) Approval made by the State Authority may be conditional upon all or any of the following matters-

- (a) the payment of a further premium;
 - (aa) the payment of any other charges as may be prescribed;
- (b) the reservation of a new rent;
- (c) compliance with such other requirements as the State Authority may think fit.

In the case, *Pengarah Tanah dan Galian, Wilayah Persekutuan v Sri Lempah Enterprise Sdn Bhd* [1979] 1 MLJ 135, the state authority imposed a condition to approving conversion that the applicant has to surrender the land in perpetuity and would get back the land for a term of 99 years. The Federal Court held that the State Authority has no power to compel the proprietor to surrender its freehold title. The State Authority should act reasonably and not arbitrarily even though it may impose any other requirement State Authority thinks fit.

Section 124(8) of the NLC provides that the new rent and premium under this section shall become due to the State Authority at the time when it approved the application for the conversion of land use and served on the proprietor a notice in Form 7G requiring him to pay such sum within the specified time and if any such sum is not paid within such time the approval of the State Authority shall thereupon lapse.

For the purpose of determining the premium, the Land Administrator will request the Valuation and Property Services Department of Malaysia (JPPH Malaysia) to carry out the valuation. It is noted that the premium of commercial lands is the most expensive, followed by limited commercial and then residential. Factors such as the leasehold expiry term would also determine the valuation process. The valuation is always done on the value of the land and not on the size of the building (Brenda Ch'ng, 2016). In Penang, although the State authority allowed for the conversion from residential to limited commercial, the residents claim their land was over-valued by the Valuation and Property Services Department. Hence, although 633 lot owners were entitled to the conversion, only 110 owners applied for and received planning approval from 2014-August 2016. However, of those who have planning approval, 59 applied for a change of land use, and only 40 of them received approval. Out of the 40, only 14 owners paid

the premium (98% yet to accept land conversion in Petaling Jaya). The difference in land valuation was up to RM1mil in some cases. The land premium was between RM300,000 and RM500,000 per lot to be settled within six months, after a discount given by the state government (Brenda Ch'ng, 2016).

In Selangor, the premium rate is as follows: agriculture to residential (15%), agriculture to commercial (30%), agriculture to industry (20-30%), residential to commercial (15%), and industry to commercial (10%). The calculation of the additional premium is based on the State Land Rules. The basis and rates of premium differ between the respective states in Malaysia. Almost in all cases, a market value has to be determined. JPPH Malaysia will report the valuation to the Land Office/Land and Mines Office within ten working days upon receipt of the application. Where a valuation is required, the valuation would be the market value for the new use and the market value for the existing use. The percentage rate and the basis for the computation of additional premiums are provided in the respective State Land Rules.

Among the factors that are taken into consideration in the valuation are the condition of the land as at the date of valuation, the type of development that can be approved, location, shape, and size of the subject land. Information required from the proprietor is a copy of the title; address of the property (if any); site plan; location plan; development proposal; feasibility study (if any), and valuation report (if any).

STRUCTURE AND LOCAL PLAN VS FOREIGN ZONING LAWS

The Malaysian town planning system consists of two types of development plans: structure plans and local plans. While the former provides general policies of the state governments, the latter are statutory and detailed plans of the local authorities. The formulation of the development plans is fundamental and relevant to the growth of STAs in Malaysia. In the preparation process of both the structure and local plans, Section 7 of Act 172 requires the State Director to consider all matters expected to affect the development, such as the principal physical, economic, environmental, and social characteristics, including the primary land uses, of the State and, those of the neighboring areas. Section 8(3) of the Act 172 defines a structured plan for a state as a written statement formulating the policy and general proposals of the State Authority in respect of the development and use of land in that State, including measures for the improvement of the physical living environment, the improvement of the socio-economic well-being and the promotion of economic growth and for facilitating sustainable development. The state structural plans serve as the framework for spatial planning at the local level in the form of a local plan. Section 12(3) of the Act 172 defines a local plan as a detailed land-use plan (map) supported by written statements explaining proposals for the development and use of land in the area. The local plans can be prepared by the local planning authorities or the

state planning department at any time during the preparation of or upon the coming into effect of a structural plan.

Unfortunately, it is silent on specific matters concerning the permissibility and non-permissibility of STAs. Lack of concerns on this issue during the preparation of the structure and local plans will continue to lead to the vagueness as to the permissibility of the STA operation. It would appear that reference to the NLC about the express condition on the land and the Act 172 will continue to govern the STAs.

In foreign jurisdictions, for example, in the U.S.A, there are Zoning Ordinances which generally provide for sub-categories and statutory definitions. Residential districts are separated into single-family and multi-family. In Belle Terre, the city may go so far as to restrict a single-family dwelling use to only members of the same family unit with no more than two unrelated persons (Vill. of Belle Terre v. Boraas, 1974), whereas the Austin Ordinance limits the occupancy to six-unrelated-person rule (Austin, 2016). A foreign court had concluded that Zoning Ordinances must specify the non-permissible rule of STAs expressly to enable the local authorities to take action against illegal STAs, and in the absence of a definition of types of STAs in the Zoning Ordinances, there should be no restriction to the activities allowed in residential premises (Slice of Life, LLC v. Hamilton Twp. Zoning Hearing Board). On the contrary, there is no specific law on zoning except under Act 172. There is the development plan (Structure Plan and Local Plan) as mentioned earlier.

GOVERNANCE OF LOCAL AUTHORITIES IN USAGE OF PREMISE FOR STAs

Under Act 172, the local authorities have the right to allow or prohibit owners of properties from carrying out commercial business such as STA in their properties. Various local authorities use different approaches in addressing this issue, and this is influenced by the fact that every community's needs are different, changing, and the increasing demand of pursuit of quality life and influence of human rights (Meng Lee Lik et al., 2006). For example, the Penang Municipal Council stressed that landlords need to verify the allowed uses for their properties in Penang from the local Planning Department before they engage in a short-term rental.

On 16 October 2017, the Kota Kinabalu City Hall (DBKK) confirmed it was illegal for Sabah residents to lease their properties through Airbnb. Hence, the scrutiny behind the approval of operation of STA as a type of "property development" where planning permission needs to be obtained must be addressed.

Act 172 defines property development as “the carrying out of any building, engineering, mining, industrial or other similar operations in on, over or under land, or the making of any material change in the use of any buildings

or other land, or the subdivision or amalgamation of lands” where planning permission needs to be obtained. In broad terms, development can be divided into two categories;

- i. the carrying out of physical operations such as building or engineering works, and
- ii. the making of a material change of use

A change of use of land or buildings requires planning permission if it constitutes a material change of use. There is no statutory definition of ‘material change of use’; however, it is linked to the significance of a change and the resulting impact on the use of land and buildings (Mohammad Yusup et al., 2018). Whether a ‘material change of use’ has taken place is a matter of fact and degree, and this will be determined on the individual merits of a case. Planning permission will not normally be required to homework or run a business from home, provided that a dwelling house remains a private residence first and business second (or in planning terms, provided that a business does not result in a material change of use of a property so that it is no longer a single dwelling house). In the United Kingdom, a local planning authority is responsible for deciding whether planning permission is required and will determine this on the basis of individual facts. Issues which they may consider, whether home working or a business, leads to notable increases in traffic, disturbance to neighbors, abnormal noise or smells, or the need for any major structural changes or major renovations. This is in line with the idea that the happiness of residence is very much dependent on the neighborhood (Oliver Ling Hoon Leh et al., 2015). Hence, it may be concluded that normally planning permission is needed when (1) whether there has been a material change of use will depend on whether a space is used in a significantly different way as compared to the original position of the premise and (2) whether there are any other relevant planning considerations, such as planning conditions, which impose restrictions on the operation of the premise being opened for public accommodation (Ministry of Housing, 2014). It could also be argued that the “use” allowed is based around "A one-family dwelling on each building site." A home may be built as a one-family dwelling, but when it is converted to STA use, it may be argued that it loses that character and contributes to unauthorized changes in neighborhood character by intensifying the use both in terms of the number of people who typically use the property at any given time and by the negative impacts associated with frequent turnover. It would appear that some considerations are: if the premise is not used for a whole year period (i.e., limited operation days in a year) or where the owner stays in the same house, then planning permission is not needed. One possible way to address the ‘change of character’ issue is by differentiating the types of short-term accommodation businesses.

In Austin, Texas, STRs can essentially be characterized by: (1) home-sharing, (2) home rental, or (3) transient rental. Under the “Home sharing” model,

the guest and the host are co-occupants of the premises during the guest's stay. Home-sharing maximizes the accountability of the host because if the guest causes any nuisance to surround neighbors, the host is right there to deal with the problem.

Under the "Home rental" model, the host uses her primary residence for the STA, but instead of restricting the guest to one room or STA unit, the guest has rented the entire dwelling, and the host does not occupy the home during the guest's stay. A host under the home rental model is less accountable than under the home-sharing model.

Under the "Transient rental" model, the host is essentially operating an income property that does not serve as the host's primary residence but is for the sole purpose of STAs. Hosts utilizing the transient rental model are the least accountable of the three models. On the other hand, in the City of New Orleans, U.S. state of Louisiana, three different categorizations are provided. Under the category of Accessory Short-Term Rentals. The portion of the dwelling licensed as an Accessory Short-Term Rental is limited to three (3) bedrooms, and occupancy is limited to six (6) guests. (There must be at least one bedroom in the dwelling for the owner-occupant.) The owner-occupant shall occupy the dwelling and be present during any Short-Term Rental occupancy. Proof of owner-occupancy will be established by verification of a Homestead Exemption in the name of the applicant. However, Short-Term Accessory Rentals are prohibited in the French Quarter. Under the Temporary Short -Term Rentals category, an in-town property manager is available at all times. Temporary Short-Term Rental licenses allow a maximum of 90-rental nights per license year. Occupancy is limited to two (2) guests per bedroom or a total of ten (10) guests, whichever is less. The entire dwelling may be rented, and the owner/occupant of the dwelling does not need to be present. No signs advertising the presence of a Short-Term Rental are allowed. Temporary Short-Term Rentals are prohibited in the French Quarter.

Under the Commercial Short-Term Rentals category, rental of an entire dwelling is allowed, where occupancy is limited to five (5) bedrooms and ten (10) guests. The owner/occupant does not need to be present during the rental period, and there is no limitation on the number of rental nights per license year. This type of business must be in a non-residential zoning district. Commercial Short-Term Rentals are prohibited in non-VCE portions of the French Quarter. In the City of Charleston, South Carolina, Short-Term Rental regulations now have four Residential Short-Term Rental Permit Categories based on location. Category I refers to all properties located within the City's Old and Historic District. Within that area, the property must be individually listed on the National Register of Historic Places to be eligible for short-term renting. Category II refers to all other properties located on the Charleston peninsula, as long as they are outside the Short-Term Rental Overlay Zone. Category III refers to all other properties in the

City of Charleston. This includes incorporated areas of West Ashley, James Island, Johns Island, Cainhoy, and Daniel Island. Under the past regulations, these areas are not eligible for any short-term legal rentals, but the ordinance allows short-term renting in these areas, subject to specific requirements. The STR Overlay Zone refers to a pre-existing area in Cannonborough-Elliotborough. Commercial Short-Term Rental Permit, which follows the same rules as the past ordinances. Properties within the Short-Term Rental Overlay are still eligible for a Bed & Breakfast Permit as defined under past ordinances. No changes to this area have been made, except that an annual Permit renewal will be required.

Limiting the character of use in the property can be an option to maintain the character of the STA premise. In the City of Charleston, to ensure that the STA does not change the character of the property, a maximum guests rule is applied where up to four adults, regardless of relationship, can stay overnight in an STA according to the City of Charleston Short Term Rental Ordinance, 2018, whereas studio apartments and dwelling units shall be limited to have one (1) guest bedroom and allowed a maximum of two (2) guests in the City of New Orleans, the U.S. state of Louisiana under Article 20 of Comprehensive Zoning Ordinance, 2016 (20.3.LLL.1). In the City of Charleston also, a host must sleep overnight at the property whenever it is being rented. The Austin, Texas, Code of Ordinances 2015, § 25-2-795(E), reads: "A licensee or guest may not use or allow another to use a short-term rental for an outside assembly of more than six adults between 7:00 a.m. and 10:00 p.m." Furthermore, "assembly" was defined in the statute to encompass any activity "other than sleeping." Hence, if an STR guest wanted to host a barbeque at his rental, he would be capped at five friends or family members, no matter the scale of the rental. When read along with subsection(D) ("[a] . . . guest may not use or allow another to use a short-term rental for an assembly between 10:00 p.m. and 7:00 a.m."), there is a strong term of "a bedtime for tenants."

LICENSING OF STAs IN THE PURVIEW OF LOCAL AUTHORITIES

Under the Local Government Act 1976, section 107, a local authority in the granting of any license or permit may prescribe the fees for such license or permit and the charges for the inspection or supervision of any trade, occupation, or premises in respect of which the license is granted. Under clause (1A), any license or permit granted under this Act may be issued jointly with any other license or permit. Under clause (2), every license or permit granted shall be subject to such conditions and restrictions as the local authority may think fit and shall be revocable by the local authority at any time without assigning any reason therefor. Under clause (2A), the revocation of any particular license or permit issued jointly with any other license or permit under subsection (1A) shall not affect the validity of any other license or permit with which it had been jointly issued. Under

clauses (3) and (4), respectively, the local authority may at its discretion refuse to grant or renew any license without assigning any reason; therefore and a license shall be valid for a period not exceeding three years.

Under clause (6), any person who fails to exhibit or to produce such license under subsection (5) shall be guilty of an offense and shall on conviction be liable to a fine not exceeding five hundred ringgit or to imprisonment for a term not exceeding six months or to both. In other words, violation of the licensing requirement of short-term accommodation by respective local authorities would lead to a maximum penalty of fine not exceeding RM 500, where quite unlikely the imprisonment provision is being imposed. Hence, the small amount of RM 500 would unlikely lead to deterrence, especially when the local authorities are not given the power to stop the business physically, for example, by way of eviction.

Under section 110, an officer of a local authority duly authorized in writing may at all reasonable times enter any premises (including that of STAs) within the local authority area for the purpose of exercising any power of inspection, inquiry, or execution of works which is given to a local authority. Under section 111, the Officer of the local government may demand names and addresses. Under clause (1), the occupier of any premises within the local authority area shall, if required by any officer of a local authority, give his name and identity card number and the name and address of the owner of the premises, if known. Under clause (2), any person who refuses to give or wilfully misstates his name and identity card number or the name and address of the owner of the premises shall be guilty of an offense and shall on conviction be liable to a fine not exceeding five hundred ringgit or to a term of imprisonment not exceeding six months or to both.

Currently, different states have different treatments on STAs, but Penang has set a good path to protect and preserve the property market and hotel industry. Penang prohibits illegal short-term accommodation to support and protect their tourism industry in line with the long-known promotion of medium-cost hotels in Malaysia (Badaruddin Mohamed & Abdul Aziz Hussin, 2003) as well as to preserve the property market. Last July 2017, the Penang Island City Council issued summons to landlords after receiving complaints that they were leasing their premises for STAs purposes. The Environment Health and Licensing Department of Penang regarded short-term rental operators who operate without a legal license as operating an illegal lodging house.

Most local authorities have by-laws that govern guests' houses; for example, Hotel Act (Wilayah Persekutuan Kuala Lumpur) 2003 and Hotel Bylaws (Seberang Perai) 2017 require all accommodation providers who render accommodation as a guest house to be registered and to operate under a valid operating license. It is reported that landlords or property owners in the Penang Island City Council who ignore notices from the Penang Island City Council for

them to cease their unlicensed short-term rental activity were issued the summons as the property owners violated the Trade, Businesses and Industries Bylaws of 1991 by the Municipal Council of Penang Island. Hotels Malacca (Historic City Council) By-Laws 2011, Hotels (Alor Gajah Municipal Council) By-Laws 2011, Hotels (Jasin Municipal Council) By-Laws 2011, and Hotels (Hang Tuah Jaya Municipal Council) By-Laws 2011 are examples of a by-law which had attempted to cover STAs through its application of hotel which includes STAs, where rooms or any premise (terrace house and homes) including kampung stay, homestays and town stays are included in the definition of the hotel under the By-laws. The scale of accommodation of rooms in hotels (including STAs), fire and noise prevention are covered. Basic documents are required in the registration of the STAs by local authorities in Melaka, i.e., copy of identity card, prove of ownership/tenancy agreement, prove of business registration, visual advertisement (if available), and proof of exit signage in the premise and fire extinguisher. If there is a renovation, an approval letter from the local authority and Fire and Rescue Department Malaysia is required.

CONCLUSION

Although there is the absence of federal legislation which has been enacted in direct response to the rise of STAs, there are existing specific laws that relate to the restriction of activities in ones' properties under the federal land law (NLC) and the restriction on the use of the property by local authorities. Although STAs issue has been a complex one to resolve, the fact remains that the current NLC is still binding in the general governance of the STAs, and the enactment of some specific by-laws by local authorities are seen as proactive actions by local authorities to govern the operation of STAs in the locality.

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THE DEVELOPMENT OF PENANG SHOP PRICE INDEX (PSPI) USING LASPEYRES HEDONIC PRICE MODEL

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Abstract

The index is considered an important benchmark and is a decision-making tool in the financial and capital markets, as well as in the property market. In Malaysia, continuous monitoring of property price movements is important as almost half of banking exposure is on property. Further, NAPIC has published indicators displaying the performance of property such as MHPI and PBO-RI. However, indicators regarding the price of commercial property are still less widely published in Malaysia. This study was conducted to develop indicators related to the price of commercial property, especially to shop property. This study has focused on the state of Penang as a study area. The literature review methodology is used to identify existing methods and practices used in developing the index of commercial property both in Malaysia and internationally. In determining the appropriate form of hedonic functions for the development of PSPI, analysis of dependent and independent variables was performed. Meanwhile, the development of the index is based on the Laspeyres hedonic model which is the same as the development of MHPI and PBO-RI. The development of PSPI will be able to help the industry and investors to make decisions and benchmark the performance of shop. This is also one of the pilot studies in Malaysia to form an indicator of commercial property.

Keyword: Property Indicator, Shop Property, Penang, Laspeyres, PSPI, Investor

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INTRODUCTION

Index are considered important benchmarks and are decision-making tools in the financial and capital markets, as well as in the property market (Farragher et al, 2008). In economic maturity, its importance has led to the development of internationally renowned indexes especially in the United States such as the National Council of Real Estate Investment Fiduciaries (NCREIF) Property Index (NPI), Moody's / REAL Commercial Property Index, Massachusetts Institute of Technology and Centre for Real Estate (MIT-CRE) Transaction-Based Index. Apart from the United States, there is also an index published by Investment Property Databank (IPD) in the United Kingdom known as the IPD Index. This index shows the performance of commercial and industrial properties which are owned by investment institutions and property companies. Indexes can also help investors in managing, formulating strategies, and making decisions for their investment portfolios.

In Malaysia, the Malaysian House Price Index (MHPI) was first developed in 1997. MHPI is developed using the *Laspeyres* Hedonic Price Model, where the index is calculated by using the *Laspeyres* weighted formula (NAPIC, 2018). MHPI is considered one of the important macroeconomic indicators for Bank Negara Malaysia (BNM) and the Ministry of Finance Malaysia (MOF) (BNM, 2017). Following on the introduction of MHPI, NAPIC has published another index known as the Purpose-built Office Rental Index (PBO-RI) Wilayah Persekutuan Kuala Lumpur. The index was first published in 2011 with quarterly publications and uses the *Laspeyres* Hedonic Price Model. PBO-RI is a commercial property rental indicator focusing on Purpose-built Office in the Federal Territory of Kuala Lumpur. Starting in 2016, this index has been expanded to 3 states namely Selangor, Johor, and Penang known as the PBO-RI Klang Valley (WPKL and Selangor), Johor Bahru, and George Town.

Overall, PBO-RI is the only index published by NAPIC that shows the performance of commercial property in Malaysia, but it is related on rental. There is also a study conducted by Aina Edayu (2015) on the development of office price index in the Kuala Lumpur, but it involves office price. Thus, this study is a pioneer in the development of a commercial property index that specializes in shop property.

LITERATURE REVIEW

There are two methodologies used in the development of property indices related to commercial property there are appraisal and transaction method. NPI is a commercial property index developed using an appraisal method. NPI has been a key benchmark for measuring property performance to investment institutions since its introduction in 1978 (Fisher, 2003). According to Fisher (2003) and Chegut et al. (2013), Junainah et al. (2019) and Tuti Haryati (2018), the lack of

data record and the less of sales data at that time have led to the development of the index using this approach. However, this approach is not sensitive to current property market and having problem in the valuing process that is lack of property transaction (Geltner et al., 2003 & Chau et al., 2005).

The development of property indices using a transaction method has long been used over the past decade by using evidence of transaction (Bailey et al., 1963; Rosen, 1974; Quigley, 1995; Francke, 2010). This method can be separate into three there are the Repeat Sales Model, Hedonic Price Model, and Hybrid Model. The Repeat Sales model was developed by Bailey et al. (1963), in which the transaction of the same property is studied in two or more periods. Bailey et al. (1963) and Case and Shiller (1987) are pioneers who use the Repeat Sales method in developing index in the residential sector because of the frequent transaction. However, its use in the development of commercial property index is less suitable because it is difficult to obtain commercial property transaction in a short period. Commercial property prices are more volatile which results in them being less transferable than residential property (Hasliza et al., 2018). Yet in Florida, USA a study by Gatzlaff and Haurin (1998) found that indices developed using this model is more realistic than NCREIF indices developed using the appraisal basis.

The hedonic price model is one of the methods developed using the transaction method and has been used more than 70 years ago (Aina Edayu, 2015). This model is developed by considering the characteristics of a property and there is no need for repeat sales model (Haurin, 2003). In principle, this technique can be implemented if all the characteristics that affect the value of the property can be obtained to control the differences in quality of the characteristics of the property transferred at a time (Fisher et al., 2007). The implementation of this method is more relevant if the quality of all hedonic variables is obtainable and complete information is available. The hedonic model has a strong theoretical basis (Griliches 1971; Rosen 1974) because it uses regression techniques to control changes in composition and quality. The use of hedonic price models has been used in the development of MHPI and PBO-RI which have become important benchmarks in Malaysia.

Another model in developing index using transaction-based method is hybrid. The hybrid model essentially combines the repeat sales model and the hedonic price model developed by Quigley (1995). Even so, Quigley (1995) did not see any advantage in developing an index using a hybrid model over a hedonic price model. Tables 1 and 2 show the indexes related to property internationally and in Malaysia along with the methods used in its development.

Table 1: Summary of International Commercial Property Index and Methodology's

No.	Index	Description	Methodology
1.	NCREIF (National Council of Real Estate Investment Fiduciaries) Property Index Returns (NPI)	Measuring the property performance through income earned from property.	Appraisal
2.	IPD Market Indices	This index measures the rate of return on property and allows comparisons between major asset classes.	Appraisal
3.	NCREIF TBI (Transaction Based Index)	Complementary index to shares of NPI Index and bonds based on transaction.	Transaction & Appraisal
4.	Moody's/REAL CPPI	Measuring changes in the price of commercial property for markets in the United States and the United Kingdom	<ul style="list-style-type: none"> • Transaction • Repeat Sales Model
5.	MIT-CRE TBI *started from Q2 2011, TBI produce and publish by NCREIF.	This index measures market movements and return on investment based on the transfer price of property sold in the NCREIF Index database.	<ul style="list-style-type: none"> • Transaction • Hedonic Model
6.	S&P/GRA Commercial Real Estate Indices	This index is a reliable and consistent benchmark for commercial property prices in the United States.	Transaction
7.	GSA CPPI (Green Street Advisors Commercial Property Price Index)	This index measures the performance of the REIT portfolio which comprises a large part of the REIT capitalization sector.	Transaction
8.	S&P Australian Indices (S&P/ASX)	Major equity index invested in Australia.	The index is calculated based on a weighted aggregate methodology.
9.	EDHEC IEIF Commercial Property Price Index (France)	An index that measures the performance of unlisted property is a collective investment company investing in commercial property in France.	Transaction

Source: Literature Review

Table 2: Summary Property Index in Malaysia and Methodology's

No.	Index	Description	Methodology
1.	MHPI by NAPIC	<ul style="list-style-type: none"> Measure the performance and price movement of residential property in Malaysia 	<ul style="list-style-type: none"> Transaction Weighted Regression <i>Laspeyres</i> Model
2.	Residential Property Index (RPI) by Malaysian Institute of Economic Research (MIER)	<ul style="list-style-type: none"> It is designed to complement macro surveys, namely business situation studies and consumer sentiment studies. 	<ul style="list-style-type: none"> Surveys
3.	Indeks Harta Tanah by Bursa Malaysia	<ul style="list-style-type: none"> Measure the performance of the property company under it. 	<ul style="list-style-type: none"> Based on company performance
4.	PBO-RI Klang Valley, Johor Bahru & George Town	<ul style="list-style-type: none"> Measure the performance and movement of office rental prices in the Klang Valley, Johor Bahru & George Town. 	<ul style="list-style-type: none"> Transaction (Rental) <i>Laspeyres</i> Hedonic Model
5.	KL-OPI by Aina Edayu (2015)	<ul style="list-style-type: none"> Measure the performance and price movement of office property in Kuala Lumpur. 	<ul style="list-style-type: none"> Transaction Conventional, <i>Laspeyres</i> & <i>Chained</i> Regression Model
6.	Penang Pre-war Shop Price Index by Henry Butcher	<ul style="list-style-type: none"> Measure the performance and price movement of pre-war shop in Penang does not index. 	<ul style="list-style-type: none"> Transaction

Source: Literature Review

Refer to Tables 1 & 2, the index development by using the transaction method is frequently used. Besides, the development of MHPI and PBO-RI also uses the Laspeyres Hedonic Price Model. Therefore, this study has considered developing PSPI using the transaction method with *Laspeyres* Hedonic Price Model is appropriate based on current practices in Malaysia for property index development.

SHOP PROPERTY MARKET IN PENANG

In 2014, Penang existing stock for shops are 30,200 units which represents 7.5% of the total existing supply for shop in Malaysia. This supply is the fourth highest behind the big states in Malaysia there are Selangor, Johor, and Perak.

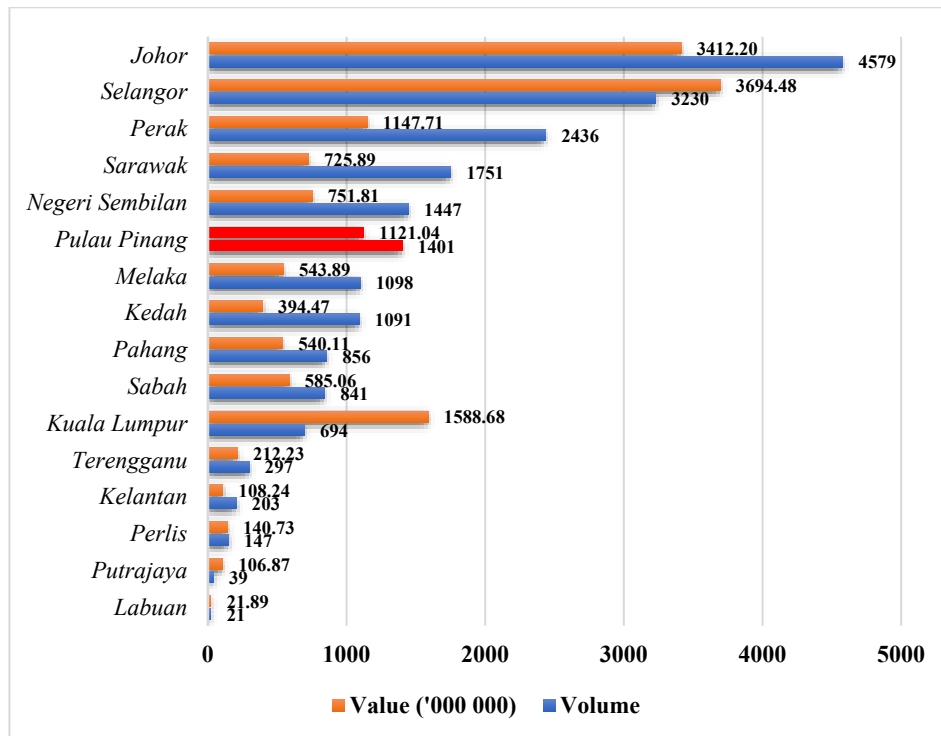


Figure 1: Volume and Value of Shop Property Transaction by State in 2014
Source: Property Market Report 2014, NAPIC

In terms of transaction volume, Penang is the sixth highest state that recorded the transaction of shop with a record of 1,401 units as shown in Figure 1 above. It represents 7.0% of the total shop transactions in 2014. However, in terms of transaction value, Penang is ranked fifth with value of RM1,121.04 million representing 7.4% of the total value transaction for shop property in Malaysia. From this data shows that Penang is one of the active states in property market. Therefore, the selection of the state of Penang as a study area is appropriate and suitable to develop an index for shop property.

FINDINGS

Data Description

Initially, total of 14,675 (year 2005 to 2008) shop transaction data were used for this study. This data that can be categorized into 3 there are physical, location, and transaction information. Table 3 shows the description of the variables.

Table 3: Variables Description

Variable	Description	Measurement	
A. Physical	1. Number of levels	Shows the number of shop floors	Ratio – measures in number
	2. Land Area	Land area size	Ratio – measures in square metre
	3. Building Area	Building area size	Ratio – measures in square metre
	4. Building Age	Shows current age of shop	Ratio – year
B. Location	1. Area Classification Describe the location of the property as follows: i. Main City Centre ii. Main Rural iii. Secondary City Centre iv. Secondary Rural Inland		Nominal
C. Transaction	1. Tenure	i. Freehold ii. Lease Hold 99 year iii. Leasehold 60 year	Nominal
	2. Date of Transaction	Date of sale and purchase agreement	Ratio – measure based on day/month/ year
	3. Transaction Share	Shows share of transaction	Ratio – measure in number
	4. First Transfer	Indicates whether the property was transferred for the first time or not.	Nominal
	5. Buyer Status	Buyer citizenship status	Nominal
	6. Seller Status	Seller citizenship status	Nominal
	7. Declared Price	The price is agreed between the buyer and the seller and is included in the sale and purchase agreement.	Ratio – measure in Ringgit Malaysia

Source: NAPIC

From 14,675 data, only 6,520 data used for PSPI development with the year involved from 2008 to 2014. This is due to problems in data descriptions such as lack of information, incomplete information, selection of area samples, and so on. This removal needs to be done to ensure index developed is more accurate and comprehensive.

Developing Index Using Laspeyres Hedonic Price Model

In Malaysia, the Hedonic Price Model with the *Laspeyres* Technique is most widely used in the development of the property price index. It is in developing MHPI and PBORI that published by NAPIC. Besides, Aina Edayu (2015) also

applies this technique in the development of office price index, namely KL-OPI. The *Laspeyres* Hedonic Model only uses model of the independent variable and ignores the time assumption variables. This technique allows estimates of different parameters to be estimated each year and requires a separate model for each year. The formula for this model is as follows:

$$\ln P = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n$$

Where;

- $\ln P$ represents declared price of the shop property in log form. Converting a dependent variable in log form makes this equation a semi log. Conversion of dependent variables to log values is intended to obtain data normality;
- $X_1 \dots X_n$ represent vectors n independent variables as described in Table 3;
- β represents an estimated parameter vector;

The parameter estimates are obtained by estimating separate regressions for each year. At the same time, it is also necessary to determine the weights for the base year i.e. the average of the quantitative variables considered in the model formation and the percentage of qualitative variables. According to Fisher et al (2007), the advantage of this technique is that the quantity of data can only be seen from the base year. This gives a better comparison and accurate over time. Thus, changes in the index can be related to price changes.

For the *Laspeyres* technique, the time assumption variables are not included in the equation and the data are regressed *according* to each year. The index generated from this technique also known as fix weighted or base weighted. The base year is 2008. The formula for calculating the *Laspeyres* index is as follows:

$$PI_t = 100 \left(\frac{e^{\beta_t X_0}}{e^{\beta_0 X_0}} \right) \quad \text{—————}$$

Where:

- PI_t represents the price index for a particular year;
- β_0 represents the regression coefficient of the hedonic model of the base year set i.e. 2008;
- β_t represents the regression coefficient of the current hedonic model;
- X_0 represents the average variable of shops sold in the base year 2008.

The use of the *Laspeyres* Hedonic Price Model Technique in the development of PSPI is similar to the development of the MHPI and PBO-RI. The different between this index is in terms of base year, where the latest base year for MHPI and PBO-RI is 2010 while PSPI is 2008. There are no significant implications, it will only create 2 different base year.

Table 4 below shows the index generated from the *Laspeyres* Hedonic Price Model, while Figure 2 shows the index change rate from 2008 to 2014. The regression results for each year showing the Adjusted R Square between 52.2% to 67.5%. Overall, it is found that the index trend generated using *Laspeyres* method shows an upward pattern. The highest change index rate was recorded in 2012, an increase of 20.3% with an index point of 165.0. A similar growth was also recorded in 2011 which was 20.2% with an index value of 137.1. However, unlike in 2011 & 2012, the index growth in 2009 recorded only 2.4% with an index point recorded of 102.4. Index growth was at 7.0% to 12.0% for 2010, 2013 and 2014. As of 2014, the reference to the index and graph growth index almost doubled compared to the base year 2008 with a record 195.9 points.

Table 4: Summary of PSPI Using *Laspeyres* Hedonic Price Model

Year	2008	2009	2010	2011	2012	2013	2014	Weight
Variables	B	B	B	B	B	B	B	2008
Intercept	10.016	10.264	10.523	10.773	10.662	10.572	10.886	
DM154	0.747	0.814	0.821	1.148	1.111	1.182	1.060	0.254
DP KEKAL	-0.190	-0.162	-0.317	-0.159	0.027	-0.041	-0.216	0.969
DKK101	0.253	0.290	0.438	0.266	0.306	0.276	0.371	0.249
DKK103	0.112	0.119	0.224	0.097	0.106	0.111	0.179	0.508
DKK104	-0.187	-0.204	-0.035	-0.177	-0.071	-0.143	0.010	0.090
DBH1	0.036	-0.097	-0.059	-0.083	-0.043	-0.036	-0.038	0.487
D PREWAR	-0.086	0.053	0.336	0.091	0.251	0.232	0.307	0.178
A TINGKAT	0.230	0.257	0.175	0.085	0.172	0.193	0.119	2.277
A SYER	1.737	1.553	1.606	1.641	1.459	1.575	1.603	0.937
A LTNH	0.002	0.003	0.002	0.002	0.003	0.003	0.003	141.636
A LBGH	0.001	0.000	0.001	0.001	0.000	0.000	0.001	280.765
A UMUR	-0.003	-0.009	-0.011	-0.013	-0.011	-0.011	-0.011	23.782
PM4	-0.027	-0.032	0.017	0.058	0.104	0.108	0.015	0.513
PN4	0.212	0.192	0.128	0.108	0.137	0.131	0.125	0.218
Product	12.731	12.756	12.863	13.047	13.232	13.302	13.404	

Source: Author

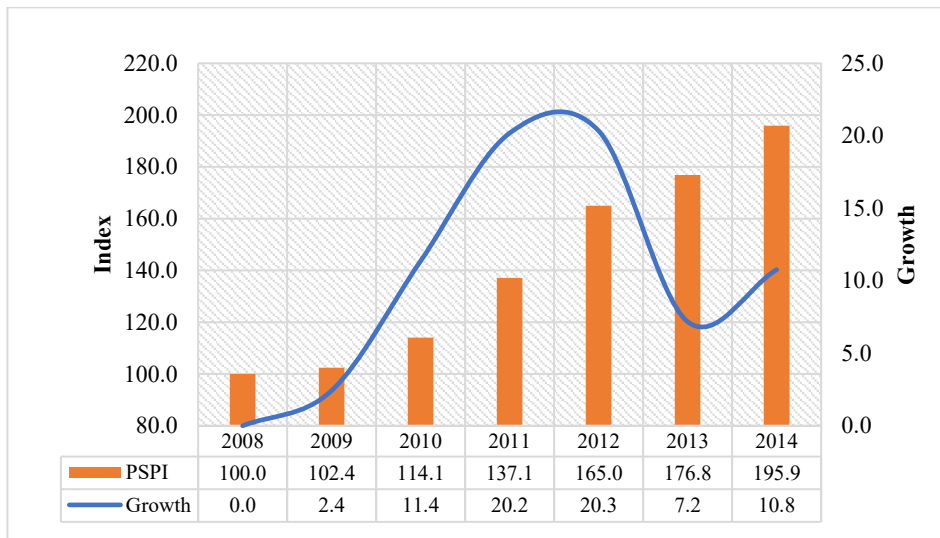


Figure 2: PSPI Index Point and Growth Rate
Source: Author

Base on the figure 2, the index growth in 2009 was relatively low compared to the year ahead. This growth may have an impact from the US economy around December 2007 to June 2009 where a subprime crisis happens. According to Sanders (2008), the crisis stems from the overly liberal and loose US credit system in the property sector. The US subprime crisis is not just contagious in the financial markets and economies of major powers with strong trade ties with it such as the United Kingdom, European countries, Japan, and China which have been tempting since 2007 but are also contagious in the financial and economic markets globally as a whole including in Malaysia (Utusan Malaysia, 2008).

DISCUSSION

Figure 6 below shows a comparison between PSPI and the Penang House Price Index (PHPI) published by NAPIC. Comparisons are made to show the difference in the change rate between these two indices.

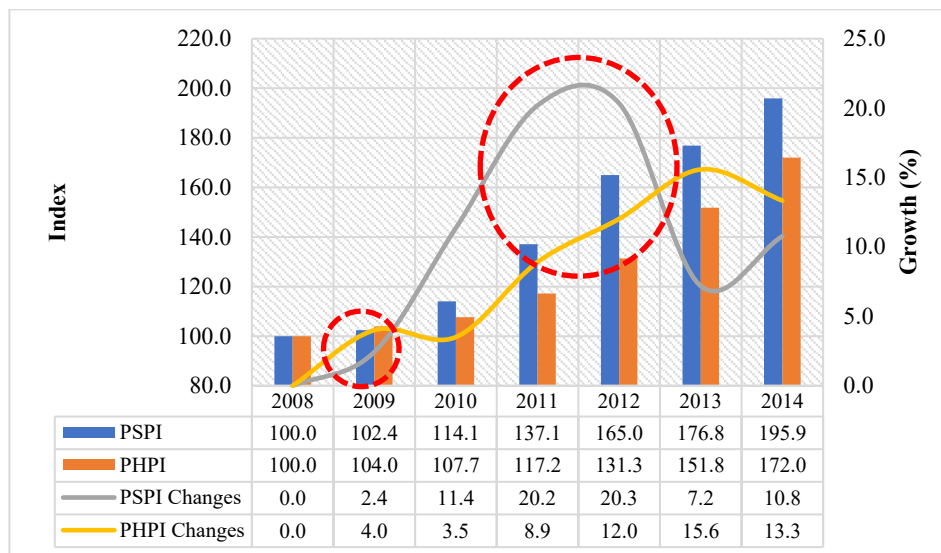


Figure 6: Comparison of Index Point and Growth Between PSPI & PHPI
 Source: Author

Overall, the growth recorded by PSPI is higher than PHPI except in 2013 and 2014. This indicates that growth for commercial property is better than residential property. Looking at the growth rate pattern for both indices, the growth rate is quite slow especially in 2009. Then the peak of growth can be seen starting 2010 and the following years. This indicates that the development of PSPI is in line with the current of the property market.

CONCLUSION

The existence of property price indicators in Malaysia is still limited. Although various property indicators have been published and disseminated by NAPIC for industry reference, the property market still needs more property price indicators related to commercial property. NAPIC is establish as a data centre, so there is no problem for NAPIC to create more property market indicators with adequate and comprehensive data availability. Therefore, with the development of PSPI, this will not only strengthen the NAPIC entity as an information centre but will also place the country on an equal footing with developed countries in terms of providing property indicators. It is hoped that this study acts as one of the pilot initiatives to develop more commercial property indices and subsequently to develop Malaysian Commercial Property Price Index.

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GROSS INCOME MULTIPLIER AS A FAIRNESS INDICATOR OF TRANSACTION VALUE ON TRANSFER OF RIGHTS ON LAND AND BUILDING IN SOUTH TANGERANG

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Abstract

As the government of Indonesia targets income tax to contribute 50,1% of the overall tax revenue target in Indonesia, the Directorate General of Taxes (DGT) is compelled to maximize the excavation of tax potential. Among others, excavation of income tax potential may apply for income tax upon the transfer of rights on land and/or building. For this final income tax, tax extraction is performed by evaluating the transfer transaction value stated in the Land Deed Officer Monthly Report which should be based on the value received or obtained by the seller based on market price. Unfortunately, there is no means to ensure that the value stated by taxpayer is the actual transaction value. Also, since data on property in Indonesia is not publicly available, the real value of the transfer remains elusive. Therefore, Tax Office requires a method or technique to determine whether the stated value is a reasonable and compliant one. This research aims to examine the feasibility of Gross Income Multiplier to determine the fairness indication of transaction value stated by the taxpayer in the transfer of rights on land and/or building. By understanding the fairness of the stated value as reported in the Land Deed Officer monthly report, DGT is expected to accurately determine the fair transaction value.

Keyword: transaction value, Gross Income Multiplier, fairness indication

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INTRODUCTION

Tax revenue is the current focus of state revenue in Indonesia that accounts for 82.5% of the total revenues in the Indonesian State Budget of 2019 (Directorate General of Budget , 2019) generated from taxation sectors including value added tax, income tax, land and building tax, import duty, customs clearance, excise, and other taxes. In the Indonesian State Budget of 2019, income tax and value added tax are targeted to provide the highest contribution of 50.1% and 36.7%, respectively. Despite the increasing target year to year, the past 6 years has never seen a fulfilment.

Addressing this missed target, the government, in this case the Directorate General of Taxes (DGT) needs to make various efforts that include excavating the potential taxation. Excavation of potential tax is an attempt to equalize a tax payment with the potential of theoretical tax owned, or an attempt to make taxpayers fulfill their potential theoretical taxes (Aribowo & Rinaningsih, 2013). DGT, an institution primarily tasked with collecting tax revenue, analyzes the difference between tax potential and data obtained from taxpayers. The largest source of national tax revenue is non-oil income tax at 52.18% contribution (Directorate General of Taxes , 2019), which is also the largest taxes managed by central government.

Excavation of income tax potential applies to income tax upon the transfer of rights on land and/or building. For this final income tax, alternative tax extraction is feasible by evaluating the value of the transfer transaction stated in the Tax Payment Slip, a compulsory document presented to a Land Deed Officer prior to sign the deed of transfer of rights on land and/or building. The Government Regulation No. 34 of 2016 regarding Income Tax on Income from The Transfer of Rights on Land and/or Buildings and Sale and Purchase Binding Agreements on Land and/or Building (GR-34) stated that if the transfer of rights on land and/or building (L&B) made through a sale is not influenced by associated enterprises, the value of the transfer should be reported as the tax basis and reflects the *real* value that the taxpayer receives. As of transfer made through exchange, waiver, submission of rights, grants, heirs, or other means that do not involve value of money, the tax basis is a value that *should be* received or obtained based on market price. After the deed is made, Land Deed Officer reported all acts signed in a Land Deed Officer's Monthly Report to be submitted to the head of the Tax Office of the area where the L&B object is located. Tax Payment Slip examination and Land Deed Officer's Monthly Report submitted to the head of Tax Office shall be preliminary data in the examination of taxation obligations.

The stated value of the taxpayer's transaction needs to be examined by Tax Office because there is currently no means to ensure that the value stated by taxpayer is the actual transaction value of the transaction. Although the

examination procedure requires an attached proof of transfer, there is no procedure to cross check the transaction value with data from the third parties, such as the beneficiary bank. Also, since data on property in Indonesia is not publicly available, the real value of the transfer remains elusive. It is different from the systems in other countries, such as the UK Residential Yield Index data in England or data on lease at the Ministry of Housing in New Zealand (Hargreaves, 2005). Any indication of misaligned or unnatural values between the stated and the provision ones, the Tax Office will clarify to taxpayers or audit the tax against the applicable provisions. Therefore, Tax Office needs a method or technique to determine whether the stated value is reasonable and compliant.

This research aims to determine whether Gross Income Multiplier (GIM) can be an alternative valuation technique to be used by the Tax Office. GIM is a method in valuation under the market data approach, and the multiplier is obtained by dividing sales price with rental price. This study used GIM because the reasonable rental price is generally easier to obtain than the reasonable selling price. This can be understood because psychologically, property owners tend to set rental price similar to the market price to boost sale. Also, tax officers, probably not an expert in valuation, need a simple method to determine the market value. Hence, it is vital to engage a simple and informative method, which expected can be achieved by using GIM.

THEORETICAL AND CONCEPTUAL FRAMEWORKS

Final Income Tax on The Transfer of Rights on Land and/or Building and Land Deed Officer Obligation to Submit the Monthly Report

Under the provisions of Article 4 Paragraph (1) of Law No. 7 of 1983 concerning Income Tax as amended by Law No. 36 year 2008 (Income Tax Law), income received or obtained from sale or transfer of property is an object of income tax. Therefore, in the event a person or a corporate receives or earns income from the transfer of property in form of land and/or building, the income is included as an object of income tax. In GR-34 is stated that the transfer of rights on L&B is subject to a final income tax. Revenue refers to income received or acquired by the party who transferred the right through the sale, exchange, waiver, submission of rights, auction, grant, heir, or other means. Furthermore, the laws stipulated that the final income tax tariff is 2.5% of the gross amount of transfer value, except for taxpayers whose main business is to sale L&B the tariff is 1%, and for the transfer of rights to the Government is 0%. The transfer value used as the basis for calculating the outstanding income tax are the value that should be received (actual value).

The person or entity who receives or earns income from the transfer of rights on L&B shall be obliged to deposit his or her own income tax owed to the bank or postal collecting agent before the deed, decision, agreement, or the

treatise of the auction on the transfer rights is signed by an authorized officer. The payment made for any transfer of rights on L&B uses the tax payment slip or other administrative means on behalf of the receiver (person or entity) of the payment, then the slip will be examined by the Tax Office. While both formal and material obligations are subjected to tax examination by Tax Office, the former will receive a certificate of formal examination as a proof of fulfillment of formal obligations. Meanwhile, material examination is conducted after formal examination to ensure the correctness of the tax amount owed.

Transaction of transfer of rights that has been ratified by the authorized officer shall then be reported to the Director General of Taxes in the form of monthly report on the issuance of the deed on the transfer of L&B rights. The Land Deed Officer monthly report must be submitted for a period of 20 (twenty) days after the month of rights transfer to the Tax Office where the relevant office is registered.

Fairness of Value Concept

Fair value as the basis of income tax imposition cannot be waived from an understanding of the fairness of value in the Income Tax Law. Some regulations govern the transaction with associated enterprises, such as Article 4 Paragraph (1) Letter d, it is stated that if there is profit due to sale or because of property transfer higher or lower than market price, then market price will be used to calculate taxation obligation. This market price is considered to reflect the reasonable value of the income tax object, so it is used as the basis of tax imposition.

According to Indonesian Valuation Standard (SPI), the fair value of a fixed asset is usually the market value (Indonesian Society of Appraiser, 2018) that corresponds to the fair value used in financial accounting. SPI defines market value as an estimated amount of money earned from or paid for converting an asset or liabilities on the valuation date between buyers who intend to buy with sellers interested in selling in a transaction-free bond, reasonable marketing, and each party act prudently and without undue duress. Therefore, market value is expressed in a currency and measured as the most possible price obtained reasonably in the market. It is the best, sensible price for the seller and the most profitable price for the buyer. Meanwhile, Appraisal Institute (2013) defines market value as the most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions exquisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress.

In the sale of L&B property, the sales value for the seller is the actual value received or based on the actual transaction. If the taxpayer does not use the market price as stipulated, DGT is authorized to redefine the magnitude of income and deduction and determine the debt as the capital to calculate the amount of taxable income for the taxpayer having associated enterprises with other taxpayers in accordance with the fairness and the dignity of the business that is not influenced by the associated enterprises. If the sale of property of L&B is influenced by associated enterprises, the sales value for the seller is the value that should be received based on reasonable market price or based on assessment by independent appraiser. Accordingly, the expertise of a valuer is necessary to determine the reasonable market price.

Gross Income Multiplier Technique

There are three common approaches in valuation: market data approach, cost approach, and income approach. One of the simple and widely used methods in market data approach is the Gross Income Multiplier (GIM) method. GIM are used to compare the income producing characteristic of properties, most often small residential income properties (Appraisal Institute, 2013). GIM measures the relationship between a property's gross income and its selling price and is a combination of an income approach and a market data approach (Lusht, 1997). Therefore, in order to use the GIM technique, sales and rental data of the property must be available. The general Formula of GIM is as follows:

$$GIM = \frac{\text{Selling Price}}{\text{Gross Income}}$$

Gross income used to calculate GIM is an annual gross income from the property being valued. Perceived as a simple but informative measure in property cycles (Bjorklund & Soderberg, 1999), GIM is utilized in valuation mechanism to multiply the gross income that the property can obtain with the GIM extracted from the comparison property. For example, if GIM is 8, the property with gross income per year Rp 40 million will be worth Rp 320 million (Rp 40M x 8). However, two conditions should be taken into account when utilizing this method (AIREA, 1978), namely consistency in net income ratio against gross income and enough sales data on the market to acquire a clear GIM pattern. According to Lusht (1997), the similarity of property with the comparable to which the GIM will be determined includes the ratio of operating costs, prospects of profit and changes in future value, and risk. It is in accordance with Appraisal Institute (2013) that the property being analyzed should be a property that is comparable to the subject property in terms of physical, location and investment. Similarly, Zainuddin & Yusof (2020) stated that the rental price

is driven by the current rents for nearby houses (location) and the amount of mortgage that the owner has to pay.

Lusht argues that because of its simplicity, GIM is often perceived too harsh to use as a value estimating technique. However, this assumption is questionable because this technique is, in fact, common, especially for simple properties. WF Smith (in Hargreaves, 2005), stated that for some relatively homogeneous groups of residential property, gross income is a more reliable value gauge than traditional valuation methods. Confirming this, Wendt (in Hargreaves, 2005) stated that GIM is easily understood by investors, property sales agents, and lenders.

RESEARCH METHODS

This research is an exploratory descriptive study. The purpose of the descriptive research is to create a systematic, factual, and accurate adjective about the facts and properties of a specific population or region (Suryabrata, 2013). Also, exploratory study investigates a problem that has never been explored or examined and attempts to unravel the issues despite the poor circumstances and scarce research information (Bungin, 2009). This study expected to obtain a simply and feasible alternative method to evaluate the fairness of transaction value of rights transfer on L&B and to determine the follow-up of the transfer transaction reporting.

Research Area

The study was undertaken in South Tangerang City, Banten Province, a satellite city of Jakarta that experiences rapid growth and is predicted to be the center of emerging economic growth in greater Jakarta (Sulaiman, 2017). This region has the most complete urban facilities, especially with the presence of major developers, such as Bumi Serpong Damai (BSD) City, Alam Sutera, and Bintaro Jaya. Also, South Tangerang City is an area in Banten province that is directly adjacent to Jakarta and West Java provinces.

In order to obtain proof of entitlement, the transfer of rights to L&B must be ratified by the Land Deed Officer who is in charge with the district/city working area where the L&B is located. The published data of the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency revealed as many as 355 Land Deed Officers in South Tangerang who are to validate the transfer of rights.

Data

For this study, the monthly report data of the Land Deed Officer was taken from Serpong Tax Office between January and October 2019. Data on the rental and sale of land and building offers to determine the GIM in the research area were obtained from the online property offering listings in South Tangerang city. Data on property for sale and rent on the internet were obtained from the site www.olx.co.id and

www.rumah123.com, while the price data referred to the asking price. One of the main advantages of indices constructed from asking price is their timelines (Eurostat, 2013). However, indices based on initial asking prices have a major drawback; houses can be withdrawn from market and the agreed selling price may not equal the seller's asking price. However, given the availability and accessibility of this type of data, we had them as an optional source.

The GIM was determined for the chosen housing estates: Alam Sutera and Bumi Serpong Damai (BSD). The two housing areas were selected to ensure similarities in age, size, and location characteristics of the properties from which the GIM would be measured (AIREA, 1978). Aiming to establish more thorough results, we only analyzed particular type of property in the obtained data, namely property with a land area below 500 m². Property larger than 500 m² was opted out because the wide variation of land and building would made it difficult to obtain comparable data. The analysis was conducted by categorizing the property based on the land area: small property (<100 m²), medium property (100 m² - 200 m²), and large property (200 m² - 500 m²).

Stages of data analysis

Data of rental and property sale offers were analyzed to determine the GIM in an area. Before the GIM was applied to examine the fairness of the transaction value, it was first tested whether the gross income (annual rent) could explain the variation that occurred in the value of property in the research area. Testing was conducted with regression analysis – the process of constructing a mathematical model or function to predict or determine one variable by another variable or other variables (Black, 2011). The independent variable in this analysis was the rental value, and the dependent variable was selling value. Given the lease value was proven to affect the value of property, the GIM and rental value would be utilized to analyze the fairness of the value of transactions reported in the monthly report of the Land Deed Officer.

RESULTS OF RESEARCH

The transaction data of the sales and rent used in the study were the offers for house sale and rental in two housing estates Alam Sutera and BSD which, according to Ririh (2011) were the large ones in South Tangerang. While BSD has a higher average rent value in BSD, the average selling value is only slightly higher compared to Alam Sutera (Table 1). The significantly higher median of the selling point in Alam Sutera than in BSD suggests a more dynamic trend of buying and selling transactions. Also, the standard deviation in Table 1 shows a greater variation in selling value and rent value in BSD than in Alam Sutera.

Table 1: Descriptive statistics of sales and rental offers In Alam Sutera and BSD housing Estate

	Alam Sutera Housing Estate	BSD Housing Estate
<i>Rental value (in Rp 000)</i>		
Number of Samples	98	67
Mean	65,594	75,634
Median	55,000	55,000
Deviation Standard	36,770	54,358
<i>Selling value (In Rp 000)</i>		
Mean	2,983,507	3,065,343
Median	2,400,000	2,300,000
Deviation Standard	1,873,975	2,207,962

Source: Data on rental and selling offers on www.olx.co.id and www.rumah123.com, processed

Table 2 showed that GIM tends to increase in properties with higher values as evident from the GIM's upgrade from small property groups to large property groups. This tendency occurs in both Alam Sutera and BSD, except that lower GIM was more prevalent in large property than the medium one in BSD. It is consistent with Hargreaves (2005) that stated that the yield (the opposite of GIM) will decrease as the value of the property increase.

Table 2: GIM calculation of each property group

Type of Property	Alam Sutera Housing Estate	BSD Housing Estate
<i>Small Property</i>		
GIM	40.1	39.6
Average Sale price (thousand Rp)	1,830,000	1,724,036
Average Gross Income (m2)/year	501.8	554
<i>Medium Property</i>		
GIM	46.9	45.3
Average Sale price (thousand Rp)	2,174,333	2,631,944
Average Gross Income (m2)/year	459.5	529
<i>Large Property</i>		
GIM	47.9	44.6
Average Sale price (thousand Rp)	4,808,289	6,533,929
Average Gross Income (m2)/year	491.3	552

Source: Analysis

A regression analysis was then conducted to determine whether the independent variable of gross income in form of rental value had a significant influence on the amount of variation on the selling value (Table 3).

Table 3: Summary of Regression Analysis Results

Type of Property	R ²	Adjusted R ²	Number of Observations	Coeff	F	P-value
Alam Sutera						
<i>Small Property</i>	0.744	0.733	25	41.600	66.949	0.000
<i>Medium Property</i>	0.517	0.506	43	44.996	43.935	0.000
<i>Large Property</i>	0.303	0.276	28	29.986	11.304	0.002
BSD						
<i>Small Property</i>	0.446	0.424	28	19.794	20.913	0.000
<i>Medium Property</i>	0.113	0.069	22	13.618	2.552	0.126
<i>Large Property</i>	0.254	0.205	17	20.105	5.116	0.039

Source: Analysis

The results of regression analyses of Alam Sutera housing estate showed a high coefficient of determination (R²) values for small property which continued to decline for larger property. It is likely due to variations in larger property, such as varied characteristics of land and building areas, so it requires another variable to describe the variation. The overall models for three types of property can explain the variation that occurs at the selling value, evidenced by the higher F value than F table.

The result of regression analysis for BSD housing did not show as strong results as that of Alam Sutera despite the same tendency. Of the three models for three types of properties, the models for small property and large property significantly describe the variation in selling value, while the medium one does not. It may be due to a variation in the too-large location area. BSD is a residential area that emerges into a self-sufficient city of Jakarta sitting in a > 6,000 hectare of area (BSD City Developer, 2019). Therefore, the selling price could be influenced by the rent, but also the accessibility of clusters such as proximity to the main road, urban facilities, and other development phase. These results correspond to those expressed by Wendt (in Hargreaves, 2005) that the gross income multiplier approach represented a blending of sales comparison and income approaches to valuation, but cautions should take place when applying this valuation tool for heterogeneous property. The results are also in accordance with Hing & Kuppasamy (2018) that proximity to infrastructure and facilities are among factors that affected home ownership in Malaysia. This is different from Alam Sutera housing which is relatively centralized because its area is only

around 700 Ha, about 10% from the area of BSD. Taking these results into consideration, the next analysis of this research, which is the implementation of GIM to test the fairness of the value of transactions reported in the Land Deed Officer monthly report, would be limitedly performed for data on sale and purchase transactions in Alam Sutera housing.

The fairness indication determination of the value of transactions using the GIM was done by first specifying the mean and standard deviation for rental value per m² area for each type of property being analyzed. Once known standard deviation for each type, we could determine the highest and lowest rental value per m² for each property type (Table 4). This analysis could only be done to land and building properties and not for vacant land, so we did not analyze the data for transactions of vacant land.

Table 4: GIM and Rental Value/m2 per year

	Rent/m2 (Rp 000)		GIM
	Mean	Deviation Standard	
<i>Small Property</i>	501.8	134	40.1
<i>Medium Property</i>	459.5	93	46.9
<i>Large Property</i>	491.3	174	47.9

Source: Analysis

Table 5 presents the results of the fairness test done with the GIM, using the highest rental value per m² (mean + 1 standard deviation) and the lowest rental value per m² (mean -1 standard deviation).

Table 5: The Results of Fairness Measurement of Transaction Value

	Number of Transaction	%
Transaction Value is fair	55	38.5%
Transaction Value Under Estimated Value	86	60.1%
Transaction Value Above Estimated Value	2	1.4%
Total Number of Transactions:	143	

Source: Analysis

Based on the analysis, the value of the transaction which was relatively reasonable was 54 transactions, accounted for 38,5% of the total buy and sell transactions. The remaining 86 transactions or 60,1% indicated that the value of the transaction was under the actual transaction value and two transactions declared the value of the transaction being above the fair value. Upon a closer look, we found that these two transactions arose because they were for a land

larger than the property analyzed (500 m²), so we considered it inappropriate to include them in the analysis.

CONCLUSION

Although GIM is often perceived as a very simple method, it is undeniably informative and easy to understand, even for those unfamiliar with valuation. This study shows that GIM is an alternative method to estimate market value as the basis of income tax for transaction of transfer right of land and/or building (L&B). Most of the transaction values reported in the monthly report of the Land Deed Officer were under estimated market value, indicative of failure to meet the stipulated regulation.

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SPATIAL AUTOCORRELATION ANALYSIS OF HOUSING DISTRIBUTION IN JOHOR BAHRU

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Abstract

Geographic location naturally generates spatial patterns that are either clustered, dispersed, or random. Moreover, Tobler's First Law of Geography is essentially a testable assumption in the concept where geographic location matters and one method for quantifying Tobler's law of geography is through measures of spatial autocorrelation. Therefore, the purpose of this study is to identify the spatial patterns of housing distribution in Johor Bahru through the spatial autocorrelation method. The result of the global spatial autocorrelation analysis demonstrates a high degree of clustering within the housing distribution, as well as the identification of a clustered pattern with a highly positive Moran's I value of 0.995207. Following that, the LISA cluster map successfully identified individual clusters of each housing unit with their neighbours through the red and blue colours displayed on the map, as well as revealing home buyers' preferences for a property in each location.

Keyword: Tobler's First Law of Geography, housing distribution, spatial patterns, spatial autocorrelation

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INTRODUCTION

Housing is seen as a unique commodity with a variety of characteristics such as design, neighbourhood condition, location, accessibility and other attributes that influence customer decision-making in order to achieve maximum use (Tam *et al.*, 2019). Numerous factors influence home ownership, including housing characteristics, employment and income trends, and socio-cultural and demographic descriptors (Lim & Chang, 2018). In addition, housing continues to be one of the primary growth engines for developing economies, as it contributes to urbanization and infrastructure development (Nor *et al.*, 2019). Apart from that, real estate is one of the most important economic activities in the world, influencing settlement patterns and shaping built environments (Cecchini *et al.*, 2019). Moreover, three qualities of a house that are frequently emphasized by home buyers are the building quality, location of the property, and neighbourhood conditions, all of which can affect housing prices (Mohamad *et al.*, 2016).

According to Scott (2015), data associated with locations can be mapped, and mapping geographic data is an important first step in analyzing spatial patterns. The following steps entail identifying, describing, and measuring data's spatial characteristics (Scott, 2015). Bivand (1998) agreed, emphasizing that in cases where data are located at geographical coordinates, mapping the data alone is insufficient because it appears imprudent not to investigate the possibility of dependence. Thus, in the context of this study, the housing distribution data containing location information can be visually mapped, allowing for further spatial analysis research.

Naturally, everything that has a geographic location will create or contribute a spatial pattern that is either clustered, dispersed, or random (Klippel *et al.*, 2011). Furthermore, spatial distributions or patterns are of interest in many fields of geographic research because they can identify and quantify patterns of features in space, allowing the underlying cause of the distribution to be determined (Er *et al.*, 2010). Besides, Laohasiriwong *et al.* (2018) affirmed that spatial pattern detection could be an effective tool for understanding geographical distribution. These statements demonstrate that identifying the spatial patterns of housing distribution can lead to a better understanding of the housing distribution.

As a matter of fact, a testable assumption in the concept where geographic location matters are Tobler's First Law of Geography (TFL). In addition, TFL stated that: "everything is related to everything else, but near things are more related than distant things", which has become central to the core of spatial analytical techniques as well as geographic conceptions of space (Miller, 2004). The concept of TFL is implied in spatial analysis practice because near and related are useful concepts at the heart of spatial analysis and modelling (Miller, 2004). TFL also claims that spatial data are defined by their spatial dependence or spatial autocorrelation (Waters, 2018). Similarly, Miller (2004) emphasized that TFL is at the heart of spatial autocorrelation statistics, which are

quantitative techniques for analyzing correlation in relation to distance or connectivity. Spatial autocorrelation refers to the pattern in which observations from nearby locations are more likely to have a similar magnitude compared to those from distant locations (Nunung & Pasaribu, 2006).

Therefore, according to TFL, it is possible to conclude that spatial association existed in geographic data, with proximity playing a significant role. Because the housing distribution in Johor Bahru has a geographical location, the existence of spatial association and spatial pattern can be measured by taking TFL into account. Miller (2004) emphasised that one method of quantifying TFL is through measures of spatial autocorrelation. Hence, the purpose of this research is to identify the spatial patterns of housing distribution in the Johor Bahru area through a spatial autocorrelation analysis.

This paper is divided into four sections. The first section is dedicated to the introduction. The methodology section, which is the second part of the paper, goes into great detail about the two types of spatial autocorrelation analyses used in this research. Following that, the results and discussions section includes an in-depth discussion of the findings from both spatial autocorrelation analyses. The conclusions section, which comes last, wraps up all the findings and makes recommendations for further research.

METHODOLOGY

Spatial Autocorrelation Analysis

The spatial autocorrelation method was used in this study to identify the patterns of housing distribution in the entire Johor Bahru area, including the Kulai district. The Department of Town and Country Planning Johor provided the 2018 housing data used in this analysis. The global spatial autocorrelation was computed first to demonstrate the presence of clustering within the data set. The individual clusters of the housing distribution were then visualized using local spatial autocorrelation.

Spatial autocorrelation primarily exists because geography is important (Griffith & Chun, 2018). Tsai *et al.* (2009) defined spatial autocorrelation as the relationship between the values of a single variable caused by the geographic arrangement of areal units on a map. In fact, spatial autocorrelation is a pattern component limited to object clustering or dispersion rather than measuring geometric aspects of the pattern (Boots, 2003). Furthermore, the spatial autocorrelation concept aids in pattern analysis by measuring the relationship between values of a variable based on their spatial arrangements and determining whether the data is clustered, random, or dispersed based on the similarity of the values and their spatial proximity (Bandyopadhyay *et al.*, 2012).

Clusters form in a geographic distribution when features are found close to one another or when groups of features with similarly high or low values are discovered together (Aghajani *et al.*, 2017). According to Griffith and Chun

(2018), the spatial autocorrelation perspective focuses on clustering similar or dissimilar phenomena in geographic space to form map patterns typified by TFL rather than random mixtures of phenomena. Furthermore, the indicators used to calculate spatial autocorrelation can be divided into two types which are global spatial autocorrelation indicators and local spatial autocorrelation indicators (Wang *et al.*, 2019).

Global Spatial Autocorrelation Analysis

Moran's I, developed by P. A. P. Moran in 1948, is a significant indication of spatial autocorrelation (Wang *et al.*, 2019). It is a measure of global spatial autocorrelation, which indicates whether similar values of a particular variable are closer together in space, detecting the presence of similar value clustering (Bandyopadhyay *et al.*, 2012). Moran's I measures spatial autocorrelation based on both feature location and feature values simultaneously (Er *et al.*, 2010). The value of Moran's I ranges from -1 to +1. The Moran's I is positive when the observed values of locations within a certain distance or their contiguous locations are similar (Ma *et al.*, 2008). It is negative when they are dissimilar (checkered pattern), and it is close to zero when the observed values are distributed randomly and independently across space (Musakwa & Niekerk, 2014).

However, global autocorrelation tests are unable to distinguish between high and low clustering within the data set (Wang *et al.*, 2019). As Boots (2003) emphasizes, global approaches produce a single value for the entire data set, whereas local approaches produce a local value for each data site in the data set. Aside from that, Zhang *et al.* (2010) suggested that it is important to remember that the spatial autocorrelation level of different census areas is not exactly the same, which prompted the need for a local indicator. Therefore, local Moran's I statistics must be performed in order to identify the individual locations of the clustering within the entire data set.

Local Spatial Autocorrelation Analysis

Local Moran's I, in contrast to global Moran's I, which assumes homogeneity of the entire dataset, is a local indicator of spatial association and shows the level of spatial autocorrelation at various individual locations within the data set (Musakwa & Niekerk, 2014). Local Moran statistics, also known as Local Indicator of Spatial Association (LISA), are more commonly used to quantify local spatial concentration or clustering (Ayadi & Amara, 2009). According to Zhang *et al.* (2008), local Moran's I does not range between -1 and +1. However, a positive value still implies positive spatial autocorrelation (clusters), and a negative value indicates negative spatial autocorrelation (outliers). The LISA cluster map basically categorises those locations based on the type of association either high values with high values (HH), low values with low values (LL), high

values with low values (HL), or low values with high values (LH) (Anselin *et al.*, 2006).

Moran's I, both global and local, sought to quantify spatial autocorrelation. The most notable difference between the two measures, as most scholars pointed out, was the method by which the spatial autocorrelation was computed. Since global Moran's I refers to the dataset as a whole while implying homogeneity, it fails to identify individual clustering, necessitating the use of local measures, which can identify spatial autocorrelation at the local level as well as identifying high and low clustering and spatial outliers. Moreover, Anselin *et al.* (2006) distinguished between the two measures by stating that global Moran's I is used to test for clustering in the data set, whereas local Moran's I is used to identify the location of the cluster. Therefore, to overcome the limitation of global Moran's I, additional analysis of local Moran's I must be performed in order to obtain deeper and more thorough results.

RESULTS AND DISCUSSIONS

The housing distribution in Johor Bahru was used to measure the degree of spatial autocorrelation in this study. The data entry contains a total of 403 606 housing locations for the year 2018. In fact, TFL can be used to further investigate housing distribution, which is the arrangement of housing in space. It can be deduced from TFL that things that are closer together are more related than things that are farther apart. Moreover, spatial autocorrelation is a technical term that refers to the measure of similarity or correlation between nearby observations. Since both TFL and spatial autocorrelation place a premium on the nearest distance, this study employs the spatial autocorrelation method to identify the spatial patterns in the studied area.

Global Moran's I Scatter Plot

First, a global autocorrelation measure based on global Moran's I was used to test for homogeneity and the presence of clustering across the entire housing data set. Figure 1 depicts the results of the analysis using a Moran's I scatter plot.

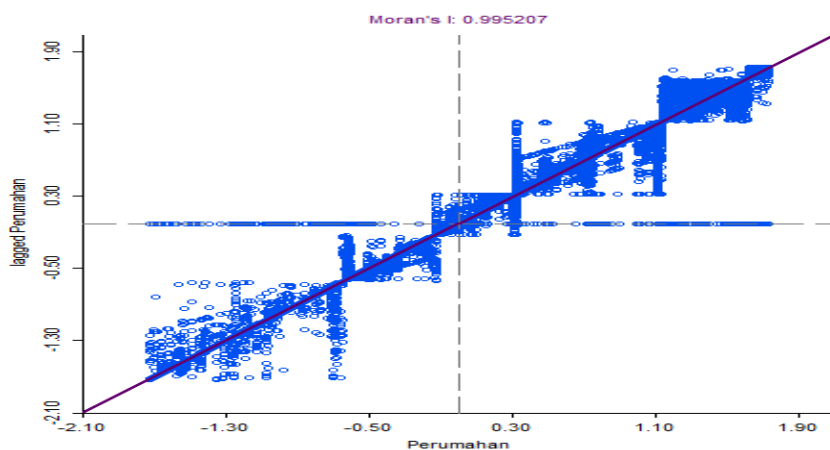


Figure 1: Global Moran's I Scatter Plot for Housing Distribution in Johor Bahru
Source: own study

Moran's I scatter plot yielded a clustering result, as shown in Figure 1. The highly positive Moran's I value of 0.995207, which is also close to the value 1, demonstrated the presence of clustering among housing units in the Johor Bahru area, indicating a strong clustered pattern of housing units in Johor Bahru. Furthermore, the above scatter plot clearly shows that the points from the housing data form a square-shaped pattern. This result implies that the same housing types are distributed within the same residential area as according to Anselin (2017), the upper right and lower left, indicate a positive spatial autocorrelation, which depicts similar values at neighbouring locations; nonetheless, similar values in this study are from structural and locational characteristics of housing.

Although global Moran's I has successfully demonstrated clustering among Johor Bahru housing data, it fails to specify whether the structural characteristics and locational characteristics were clustered with similar or dissimilar values with its neighbours. As a global Moran's I can suggest clustering without designating any specific location as clustered; the next step is to identify the individual location of the clusters using Local Indicator of Spatial Association (LISA) while detecting the types of association between the structural and locational characteristics of housing in Johor Bahru.

LISA Cluster Map

Based on the LISA cluster map depicted in Figure 2, the results revealed specific locations with different colours of either red or blue, revealing the type of associations between housing units and their neighbours. Both the Johor Bahru city centre and the Kulai area displayed red colour within their region, in contrast to the Iskandar Puteri and Pasir Gudang areas, which both displayed blue colour. As a result, it was determined that housing units in Johor Bahru city centre and

Kulai share similar structural and locational characteristics with their neighbours (HH). In contrast, Iskandar Puteri and Pasir Gudang housing units are clustered together with dissimilar structural and locational characteristics with their neighbours (LL), indicating clustering patterns in both cases.

A house's structural characteristics may include building quality, space arrangement, and physical characteristics such as land size, building scale, and housing age, as well as attributes such as having a garage and the number of bedrooms and bathrooms (Chung *et al.*, 2018). The locational characteristics of a residential community, on the other hand, are linked with the accessibility to the targeted location, which is related to the evaluation of transportation accessibility (Tam *et al.*, 2019). As per the traditional definition of location, accessibility is measured in terms of proximity to the Central Business District (CBD) (Kemunto & Nyangena, 2017). Furthermore, location and accessibility are important factors in a household's choice of a home (Aluko, 2011).

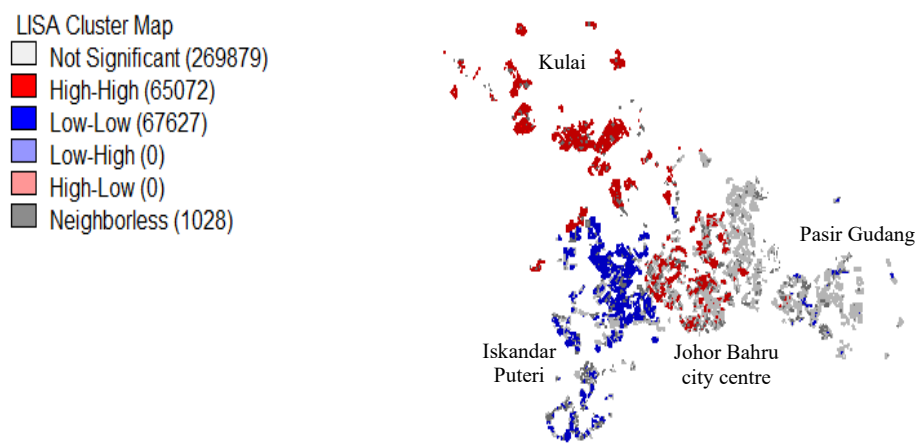


Figure 2: LISA Cluster Map for Housing Distribution in Johor Bahru
Source: own study

Aside from revealing the type of associations within each location, the clustering patterns visible on the map via the red and blue colours aid in identifying housing submarkets and buyer preferences based on their perception of the structural and locational characteristics of the housing units. As previously discussed, spatial autocorrelation measures feature similarity based on both feature locations and feature values, and in this case, it was based on both locational and structural characteristics of the house. It was also mentioned in the preceding paragraph that locational characteristics influence buyer preferences and housing choices. Thus, the results also hinted at detecting buyers' housing preferences for each area via the red and blue clusters. Housing preferences are

verbal expressions for the quantitative and qualitative housing characteristics that residents would prefer to have in their homes (Thanaraju *et al.*, 2019).

Johor Bahru city centre serves as the CBD in the Johor Bahru area. The decision to buy property near the CBD is typically motivated by the fact that the CBD provides more job opportunities, enticing buyers to relocate closer to their workplace (Taubenbock *et al.*, 2013). The red colour that appeared in the Johor Bahru city centre area indicated that the housing units in the city centre shared similar locational characteristics with their neighbours, explaining the role of CBD as a factor influencing buyers to purchase properties in that area. However, due to the high residential prices in the CBD, not all buyers are able to purchase properties there. This fact also aids in determining the economic background of property buyers in the Johor Bahru city centre area, as only households with higher incomes can afford to purchase expensive housing in the city centre. In fact, among 140 other administrative districts, Johor Bahru had the six highest income groups (Department of Statistics Malaysia, 2017). This statistic manages to back up the findings of the LISA cluster map.

The existence of Kulai Highway, which is part of Federal Route 1, in the Kulai district may have contributed to the similarity of locational characteristics within that area. The Kulai Highway connects to other highways such as the Skudai-Pontian Highway 5, Senai Airport Highway 16, Jalan Kulai-Kota Tinggi 94, and Diamond Interchange, which connect to Bandar Putra and Indahpura. As previously discussed, although properties closer to Johor Bahru are more expensive, buyers benefit from lower transportation costs and less time on the road. Residents living in Kulai but working in the CBD, on the other hand, can enjoy affordable properties but must pay more for transportation. Senai airport and Kulai railway station are also located in Kulai. Therefore, it can be concluded that the Kulai district provides a reasonable level of accessibility to the area's residents while attracting a group of buyers with similar locational preferences. According to Kaur (2019), an efficient transportation system would not only help to reduce congestion, but it would also help to increase demand for residential units in the area.

Iskandar Puteri, a rapidly developing area that is currently serving as the new administrative centre for Johor state, demonstrated a clustering of dissimilar values. This reveals that before purchasing a property in Iskandar Puteri, each home-owner has different locational preferences. It is reasonable to suggest that Iskandar Puteri has it all. Apart from Kota Iskandar, which serves as the administrative centre for the state government of Johor, Iskandar Puteri is home to a number of prestigious educational institutions, including Marlborough College Malaysia and the well-known University of Technology Malaysia. Iskandar Puteri also draws visitors with its well-known Legoland Malaysia and Puteri Harbour. Since Iskandar Puteri is home to a diverse range of key economic activities such as education and medical tourism, entertainment and recreation,

and state administration, each buyer is expected to have distinct purchasing objectives. Fewer households may purchase the property because it is closer to their place of employment. Because Iskandar Puteri is home to a plethora of important economic activities, their working place may vary. Furthermore, the presence of higher education institutes attracts buyers to purchase residential properties for the purpose of renting to students. Nasongkhla and Sintusingha (2013) found that the economic transformation of Iskandar Malaysia benefits upper-middle-income groups while encouraging cultural diversity and community participation in development.

Pasir Gudang is well-known for various industrial activities, including transportation and logistics, shipbuilding, petrochemicals, and other heavy industries. Despite being Johor's most well-known industrial city, the results revealed a clustering of dissimilar values. According to Gasper (2013), Pasir Gudang has grown well over the years due to the development of an education hub, shopping complexes, and several private hospitals. Furthermore, the presence of high education institutes such as Politeknik Ibrahim Sultan, Kolej Komuniti Pasir Gudang, and UiTM Pasir Gudang influenced a wide range of buyer preferences. Apart from that, infrastructural improvements such as the construction of the second bridge in Permas Jaya that connects directly to the Eastern Dispersal Link, which leads to the city centre, serve to make the area more accessible (Gasper, 2013). As a result, the residents of Pasir Gudang have different reasons and preferences for purchasing properties there, resulting in the clustering of dissimilar locational characteristics.

Aside from that, both spatial and structural factors were revealed to aid in determining the dimensions of housing submarkets (Watkins, 2001). Thus, the clustering patterns and spatial factors identified by the LISA cluster map also revealed the submarkets for each area. For example, higher property prices in Johor Bahru city centre due to its role as the CBD indicate that the households in that area are from a higher income group. On the other hand, householders in Kulai form a submarket with similar locational preferences as Kulai provides easy access to other regions in addition to being home to the Kulai railway station and Senai airport.

CONCLUSIONS

In a nutshell, the results of both spatial autocorrelation analyses confirm the existence of clustering in the housing distribution in Johor Bahru while also identifying a clustered pattern of the housing distribution. The significantly positive Moran's I value of 0.995207 from global measures of spatial autocorrelation revealed the presence of clustering within the housing distribution in Johor Bahru. Then, the local measures of spatial autocorrelation through the LISA cluster map were able to identify the type of clustering within the study area specifically. The red color seen in Johor Bahru's city centre and Kulai area

represents the clustering of similar structural and locational characteristics with their neighbour (HH). In contrast, the blue color seen in Pasir Gudang and Iskandar Puteri area represents the clustering of dissimilar structural and locational characteristics with their neighbour (LL).

The LISA cluster map results provide valuable information not only on the clustering of structural and locational characteristics but also on buyer preferences, household incomes, and the actual housing scenario in Johor Bahru. As previously stated, each of the areas included in this study, namely Johor Bahru city centre, Kulai, Iskandar Puteri, and Pasir Gudang, has its own set of locational factors that entice home buyers and even investors to purchase property there. Among the locational factors influencing buyers' housing choices in the study areas are the presence of higher education institutes, job opportunities, the city center, and accessibility. However, it is important to note, that the spatial autocorrelation analysis was carried out using a simple housing location data without knowledge of the specific housing characteristics that cause the clustering. As a result of the LISA cluster map findings, additional research into the structural and locational characteristics of housing units that cause red and blue clustering in the Johor Bahru area is recommended.

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CONSTRUCTING HOUSING PRICE INDEX FOR TERRACED PROPERTIES IN JOHOR BAHRU, MALAYSIA

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Abstract

Housing is a country's biggest asset. Hence, the pattern of the housing price index (HPI) is an important topic to gain insight into the housing market while identifying the prevailing housing issues. The determinants of housing price vary for each city and state based on the different characteristics in each location. Accordingly, HPI should consider the property's quality differences. Besides, national HPI is insufficient and restricted to the housing price at the state level. Thus, the study focused on constructing a specified HPI model for different cities, districts, and states. Effective HPI can give parties a better idea of the current property market situation and act as an analytical tool in managing the sector. Specifically, the study aims to examine the relationship between the heterogeneity housing attributes and housing prices of the terraced properties in Johor Bahru, Malaysia. Additionally, the study provides detailed information on the key determinants of the housing price variation in Johor Bahru. Hedonic price analysis is useful in constructing HPI, expressing housing price as a function of vector property characteristics. Furthermore, HPI is constructed based on the yearly indices and by pooling the data into certain periods. The results show the percentage of variance explained by the factors of HPI for the terraced properties in Johor Bahru. Correspondingly, the underlying correlation between the tested housing attributes with the housing price is explained through the analysis results.

Keyword: Housing market, housing price index, hedonic analysis, residential property

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HOUSING PRICE INDEX (HPI)

As no two properties are identical due to heterogeneity, housing prices vary based on numerous attributes, such as locational and structural features (Lim et al., 2018). The attributes significantly contribute to the formation of housing prices (Tan, 2010). Essentially, property transaction prices are reflected through structural and locational attributes, such as lot area size, tenure, property age, proximity to the central business district (CBD), neighbourhood, facilities, transit stations, and others (Dziauddin, Ismail and Othman, 2015; Wilhelmsson, 2000; Laakso and Loikkanen, 1995). Summarily, regressing the property locational and structural attributes against the transaction price enables estimating the significant effects of these traits on the property price.

The HPI is a widely used indicator in the real estate property market that portrays the general fluctuation of housing prices across the period. Besides, HPI is a broad indicator of the operation and transaction of the property market (Kassim, Redzuan and Harun, 2017). Rosen (1974) stated that HPI is computed based on the hedonic regression model with the working hypothesis that housing price encloses significant determinants by considering the property's locational and structural attributes.

Issues of Housing Price Index

The HPI is more challenging to measure than other goods and assets due to three key distinguishing characteristics. Firstly, properties are heterogeneous, meaning that every property has a different housing price summed up by different combinations of structural and locational attributes. Abdul Rahman et al. (2019) suggested that the sampled HPI could be a weak indicator of all housing prices, and predicting the sales prices of a given property from the price of another is unfair. Additionally, simple HPI conducted based on mean and median excludes all the property attributes of the dwellings (Burhan, 2014). Thus, no exact single HPI works as the best measure of central tendency for the properties based on the various attributes.

Secondly, past studies express that the housing price of a given property cannot be simply observed without being sold or transacted. Generally, properties are commonly transacted at an agreed price upon the consensus of both parties through negotiation or auction, making the advertised housing price a poor substitute for the eventual selling price (Burhan, 2014; Wood, 2005). Thirdly, properties are generally sold infrequently (Chandler and Disney, 2014; Wood, 2005). Hence, the illiquidity of the property market is explained through the infrequently transacted dwellings, as the types of property sold at different times may vary.

Consequently, changes in the reported HPI between years may be influenced by the different composition of property sold rather than reflecting on the actual changes in the property market (Nagaraja, Brown and Wachter, 2014).

Thus, the property market cycle is unpredictable, leading to volatility in the real estate market (Rosmera, Mohd Diah and Omar, 2012). Based on past studies, many determinants or property attributes are included to examine its relationship with the housing price. Nevertheless, Sutton (2002) and Chen and Patel (1998) argued that the housing price model in the market failed to clarify the correlation between housing price and the determinants due to confusion and uncertainty.

Chen and Patel (1998) supported the argument, indicating possible reasons for the failure resulting from misunderstanding the interrelation between housing price and the tested determinants. As the nature of the property market is complex and always fluctuating, substantial uncertainty exists. MacLennan (1994) cited that *“the housing market is a large sector of the economy and it is highly possible that the housing market and the economy interact. Although the feedback mechanism is possible, it is not very clear. It is not only important to determine a timing relationship, but also a direct relationship between house price and its aggregate determinant series”*.

Presently, the relationship between property attributes and housing price is still a debatable issue in the property market. Every property has a different housing price summed up by the various combinations of property characteristics and attributes. Moreover, housing price factors vary for each city and state due to its different characteristics in every location. Therefore, the national housing price is insufficient and limited to the housing price at the state level. Thus, the study emphasises the importance of constructing different models for different cities or states in the country.

The study evaluates the time-series aggregation effects on the HPI in Johor Bahru by using a comprehensive transaction-based data set from 2009 to 2018. The hedonic approach enables a full appraisal and estimation of the property attributes on the housing price. Besides, the analysis results focus on the R-squared (R^2) value for each selected period. The R^2 value is the coefficient of determination, the proportion of variance in the dependent variable explained by the independent variables (Cameron and Windmeijer, 1997). Hence, the analysis results measure the percentage of variance explained by the property attributes of the HPI.

HEDONIC PRICE ANALYSIS

Basically, the hedonic method is a widely used analysis for constructing HPI (Burhan, 2014; Rosmera, Mohd Diah and Omar, 2012). Many researchers apply the hedonic price model to examine the relationship between property attributes and housing price. Previously, the hedonic pricing model was implemented expansively into the housing market research and explored the link between the housing price and the housing characteristics. The model also examines housing demand for attributes and guides housing price (Fenwick, 2013). The hedonic

price analysis is performed by referring to the multiple regression technique based on the correlation method (Md Yusof and Ismail, 2012).

Two main types of variables are identified for the analysis, i.e., independent variables and dependent variable. It is important to carefully determine the variables that contribute to the housing price. Subsequent effect, if the essential variables are not being identified, it will lead to omitted variables bias (Rosmera, Mohd Diah and Omar, 2012).

Two main types of variables are identified for the analysis: independent variables and dependent variables. Significantly, the variables that contribute to the housing price must be identified, failing which lead to omitted variables bias (Rosmera, Mohd Diah and Omar, 2012). Property housing price is commonly used to model the dependent variable to determine the correlation or contribution of each independent variable in price variation (Haron and Ibrahim, 2019; Md Yusof and Ismail, 2012). Meanwhile, independent variables are related to two categories: locational attributes of property (distance to CBD, area category) and structural attributes of property (lot area size, building size, property type) (Owusu-Ansah and Abdulai, 2014; Watkins, 1999).

Nonetheless, no specific or compulsory variables are included when constructing HPI for the property market (Dorsey *et al.*, 2010; Osland, 2010). The common variables mainly used to describe the physical characteristics are listed as follows. The locational and structural attributes often incorporated in the regression model are lot area size (specifically for landed property, such as terraced, detached); the number of storeys for strata property (specifically for high rise units only, such as flat, condominium and apartment); building size; building age; distance to the nearest town centre; property type; building condition; type of tenure (freehold or leasehold); and neighbourhood classification.

Generally, housing is heterogeneous goods, with each unit comprising a group of unique attributes and characteristics. Each attribute included could have its implicit price. Hedonic price analysis enables further identification of a substantial relationship between housing price and its characteristics with the following simplified equation (Ebru and Eban, 2009):

$$HP = x_i\beta + \varepsilon_i$$

where HP = housing price, x_i = set of independent variables, β = coefficient matrix and ε_i = error term.

Aggregating hedonic price analysis enables the researchers to identify the extent of selected attributes or characteristics in the housing price variation. The hedonic analysis could also provide significant evidence and detailed assumption on the impact of each attribute on the housing prices. Studies propose that the hedonic analysis of each housing attribute is governed by its supply and demand,

with its own ‘market’. As housing is heterogeneous, each housing attribute would have its own ‘hedonic price’ (Burhan, 2014). Thus, one can create HPI based on hedonic price analysis, and this analysis could aid in examining the volatility of the overall housing market condition. Ultimately, the analysis enables researchers and relevant authorities to gain better insight into a particular property market.

ANALYSIS AND RESULTS

Model 1: Regression Analysis for Terraced Property from the Year 2009-2018

In order to construct Model 1, multiple regression analysis was conducted based on the property transaction dataset obtained from the Department of Valuation and Property Services (JPPH). The regression analysis included all the transacted terraced properties in Johor Bahru for the past ten years, 2009 to 2018.

Table 1: Regression Analysis Summary for Model 1 Before Data Cleaning

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.534 ^a	.285	.285	188083.770

a. Predictors: (Constant), Year (Y), Building Size (BS), Type of Construction (TC), Lot Area Size (LS), Area Category (ACT), No. Bedroom (NB), Property Condition (PC), Tenure (T), No. Storey (NS), Subdistrict (S), Area Classification (ACL), Completion Date (CD), Property Type (PT), Valuation Date (VD)

b. Dependent Variable: Housing Price (HP)

Source: Researcher’s study, 2020

Table 2: Regression Analysis Summary for Model 1 After Data Cleaning

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.773 ^a	.598	.598	131051.651

a. Predictors: (Constant), Y, BS, TC, LS, ACT, NB, PC, T, NS, S, ACL, CD, PT, VD

b. Dependent Variable: HP

Source: Researcher’s study, 2020

Based on **Table 2**, the R^2 value was approximately 0.598, which could evaluate the overall goodness of fit for Model 1. The results showed that 59.8% of the variation of housing prices could be explained by the 14 independent variables. Referring to **Table 1**, the model before data cleaning yielded an R^2 value of approximately 0.285 or 28.5%. Thus, the R^2 value for Model 1 achieved a marked improvement of 31.3% by removing missing values and unwanted observations from the dataset.

Table 3: Coefficient Summary for Model 1 After Data Cleaning

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-23698969.20	2837106.98		-8.35	.000
Subdistrict	-1548.91	211.91	-.020	-7.31	.000
Tenure	-20545.10	1835.11	-.029	-11.20	.000
Property Condition	3943.23	408.81	.024	9.65	.000
Type of Construction	13302.95	9996.35	.003	1.33	.183
Lot Area Size	655.67	7.22	.236	90.77	.000
Building Size	2106.90	17.76	.422	118.62	.000
No. Bedroom	48637.45	1246.82	.120	39.01	.000
Property Type	-17394.34	2749.72	-.040	-6.33	.000
No. Storey	-6955.36	2770.89	-.016	-2.51	.012
Completion Date	3656.33	67.43	.169	54.22	.000
Valuation Date	.001	.000	.377	16.70	.000
Area Classification	21183.34	639.50	.093	33.13	.000
Area Category	6775.69	588.56	.033	11.51	.000
Year	1643.33	1790.24	.021	.92	.359

a. Dependent Variable: Housing Price

Source: Researcher's study, 2020

For **Table 3**, the results indicated that 12 of the 14 variables were statistically significant and good predictors for the variation of housing price as the corresponding *p-value* was highly significant and less than the alpha value of 0.05 ($p < 0.05$). Hence, the *Type of Construction* (TP) and *Year* (Y) were not statistically significant for Model 1 as its *p-value* was larger than 0.05. The R^2 value for Model 1 is 59.8%, suggesting that about 40.2% of the housing price behaviour was not explained and undiscussed by the model. As some outliers and unexplained variables were identified while constructing Model 1, the study proposes to further the analysis by dividing the aggregation of the dataset into independent years for an in-depth analysis.

Model 2: Regression Analysis for Terraced Property Per Annum Basis

The study aims to divide the property transaction dataset into its independent year, one multiple regression analysis for each year as an in-depth evaluation for Model 2.

Table 4: Regression Analysis Summary for Model 2

Year	R	R Square	Adjusted R Square	Std. Error of the Estimate	N
2009	.756 ^a	.571	.570	51249.175	5534
2010	.726 ^a	.527	.526	66544.367	6087
2011	.737 ^a	.544	.543	64805.029	5924
2012	.709 ^a	.503	.502	75364.017	4278
2013	.699 ^a	.488	.488	159881.220	11702
2014	.738 ^a	.545	.544	149830.532	8624
2015	.778 ^a	.606	.605	141447.948	8045
2016	.759 ^a	.575	.575	141039.285	6340
2017	.744 ^a	.554	.553	131981.039	6159
2018	.756 ^a	.572	.571	113382.065	4055

- a. Predictors: (Constant), Y, BS, TC, LS, ACT, NB, PC, T, NS, S, ACL, CD, PT, VD
 b. Dependent Variable: HP

Source: Researcher's study, 2020

Table 4 above tabulates the movement for the model of fitness throughout the determined independent time frame. Calhoun *et al.* (1995) and Burhan (2014) mentioned that when the time interval is shortened in aggregation, the variance of housing prices should increase. Nonetheless, the results indicated that the R^2 value for each independent year was slightly lower than the R^2 value of Model 1 (0.598). The average R^2 value of the independent year was approximately 0.549, as the lowest R^2 value was 0.488 in 2013. Nevertheless, the R^2 value for 2015 is an exception, with the highest recorded value within the ten years, at 0.606, whereby 60.6% of the variation of housing price is explained by the included independent variables. As the R^2 value for Model 2 was between low and moderate effect size, the study proposed conducting a stepwise regression to identify and delineate the statistically significant variables with the variation of housing price for terraced properties in Johor Bahru.

Table 5: Stepwise Regression Analysis Summary for Model 2

Year	R Square	R Square (Stepwise)	No. of Predictors Entered	No. of Predictors Removed
2009	.571	.571	14	4
2010	.527	.526	14	5
2011	.544	.544	14	3
2012	.503	.503	14	2
2013	.488	.488	14	5
2014	.545	.544	14	3
2015	.606	.606	14	2
2016	.575	.575	14	5
2017	.554	.553	14	6
2018	.572	.572	14	5

a. ²⁰⁰⁹Predictors: (Constant), BS, LS, NB, CD, NS, ACL, VD, PC, ACT, S

a. ²⁰¹⁰Predictors: (Constant), BS, LS, NB, CD, ACL, S, NS, VD, PC

a. ²⁰¹¹Predictors: (Constant), BS, LA, NB, CD, ACL, NS, VD, ACT, S, PT, T

a. ²⁰¹²Predictors: (Constant), BS, LS, NB, CD, NS, ACL, VD, S, T, PC, PT, ACT

a. ²⁰¹³Predictors: (Constant), BS, LS, CD, ACL, NB, VD, PC, ACT, S

a. ²⁰¹⁴Predictors: (Constant), BS, LS, CD, ACL, NB, NS, VD, ACT, S, T, PT

a. ²⁰¹⁵Predictors: (Constant), BS, LS, NB, T, VD, CD, ACL, PC, S, ACT, PT, NS

a. ²⁰¹⁶Predictors: (Constant), BS, LS, NB, ACL, CD, T, PT, ACT, VD

a. ²⁰¹⁷Predictors: (Constant), BS, LS, ACL, NB, CD, VD, NS, T

a. ²⁰¹⁸Predictors: (Constant), BS, LS, NB, ACL, CD, NS, VD, T, PT

b. Dependent Variable: HP

Source: Researcher's study, 2020

Stepwise regression is an analysis conducted when many variables and authors identify a useful subset of predictors to narrow down the independent variables into a list of the top predictors of housing price variation. In order to reduce the effect of multicollinearity, the variables strongly correlated to other variables will be removed (Makido, Dhakal and Yamagata, 2012; Yen and Tan, 1999). The results in **Table 5** found almost zero to less than 0.01 difference for the R^2 value after stepwise regression.

Based on Burhan (2014), the implicit assumption of constant quality is difficult to verify with small to almost no differences in the variance across the years and models. Hence, the study suggests exploring the later years or the recent year of the database. The proposal comprehensively highlights the predictors of that holding year instead of the whole database set, whereby bias may have occurred in the earlier years. Thus, the study further discussed the results from the stepwise regression for the variation of housing price in Johor Bahru for 2018, as in **Table 6**.

Table 6: Stepwise Regression Coefficient Summary for Model 2

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-20007266.44	3211764.40		-6.23	.000
Building Size	2095.85	67.41	.499	31.09	.000
Lot Area Size	888.75	31.73	.310	28.01	.000
No. Bedroom	48312.80	4445.08	.141	10.87	.000
Area Classification	24116.44	2117.70	.125	11.39	.000
Completion Date	2756.87	227.69	.151	12.11	.000
No. Storey	-39947.56	9365.04	-.112	-4.27	.000
Valuation Date	.001	.000	.047	4.56	.000
Tenure	-20312.24	7050.39	-.030	-2.88	.004
Property Type	18237.73	9049.61	.051	2.02	.044
Excluded Variables			Beta In		
Subdistrict			-.002 ^j	-1.91	.848
Property Condition			-0.01 ^j	-.07	.947
Area Category			.011 ^j	.97	.334

Source: Researcher's study, 2021

The most statistically significant variables for the variation of housing price in 2018 are identified as follows, with eight structural attributes and one locational factor.

Table 7: Predictors for Model 2

Predictors	Descriptions
(a) Building Size	It has a significant impact on housing prices because a larger home has a higher value and worth.
(b) Lot Area Size	Property is estimated based on the price per square meter. Hence, the larger the area, the higher the value of the property.
(c) Number of Bedroom	The number of bedrooms is highly related to predictors in (a) and (b), as the larger the area acquired, the greater the number of bedrooms.
(d) Area Classification	Properties in areas with facilities, amenities, and commercial centres have higher values than rural properties.
(e) Completion Date	It provides insight details of the property age and condition.
(f) Number of Storey	The greater the number of housing storey, the larger the property size.
(g) Valuation Date	It is related to the market value during that period.

Source: Researcher's study, 2020

Table 7 (continued): Predictors for Model 2

Predictors	Descriptions
(h) Tenure	Ownership of freehold property remains intact with its titleholder with no time limit unless transferred legally to another party. Hence, providing more value in terms of housing price compared to leasehold ownership.
(i) Property Type	The physical characteristics of a double-storey terraced house are larger and greater than a single-storey terraced house, such as area size and building size. Refer to predictors (a), (b), (c), and (f).

Source: Researcher's study, 2020

Stepwise regression excluded certain variables as each irrelevant predictor would decrease the precision of the estimated coefficients and predicted values. Based on **Table 6**, the *p-values* for the three predictors, *Subdistrict (S)*, *Property Condition (PC)* and *Area Category (ACT)*, were above the alpha value of 0.05. Hence, the predictors were not statistically significant to the model and were excluded from the analysis.

Table 8: Housing Price Index (HPI)

Model (Year)	Median of Property Price (RM)	Index
2009	170,000	100.00
2010	180,000	105.88
2011	185,000	108.82
2012	210,000	123.53
2013	300,000	176.47
2014	300,000	176.47
2015	350,000	205.88
2016	400,000	235.29
2017	409,000	240.59
2018	450,000	264.71

Remark: Year 2009 as base.

Source: Researcher's study, 2020

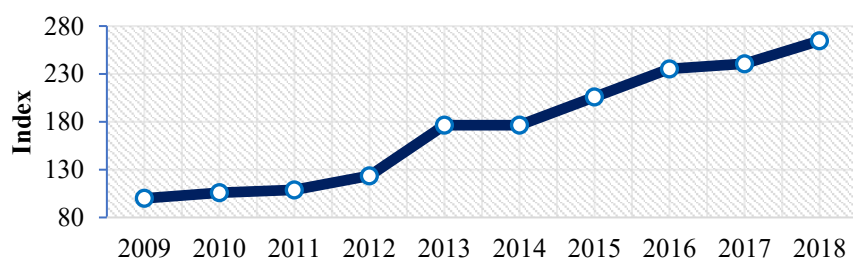


Figure 1: Housing Price Index (HPI) for the Year 2009 - 2018

Source: Researcher's study, 2020

Based on the two analyses conducted, the R^2 value for both models was generally in between low and moderate effect size. As the tabulated R^2 value was weak and less convincing, further tests should be considered and applied to increase the efficiency of the overall goodness of fit. Besides, extended future research should be conducted by considering other omitted variables to discover more about the underlying relationship of the variables towards housing prices.

CONCLUSION

The results signify that the most significant variables identified for the variation of housing price are structural characteristics, such as lot area size, building size and the number of storeys. The results also show that only approximately 50% of the variation in housing price were explained by the model with the current list of independent variables. Hence, about 50% of the behaviour of housing prices was not explored nor explained by the model. Past studies mentioned that structural and locational attributes of the property are the two crucial predictors for the housing price. Thus, the study strongly suggests performing other extended analyses by including the omitted variables, such as environmental and neighbourhood attributes, in the analysis model. As locational characteristics from the current dataset were inadequate for the analysis, the study aims to obtain and include another necessary dataset. The omitted variables from the new dataset could provide useful insights and discuss its extent on the variation of housing price.

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THE GAP BETWEEN HOUSING AFFORDABILITY AND AFFORDABLE HOUSE: A CHALLENGE FOR POLICY MAKERS

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Abstract

Much of the literature defines housing affordability as the relationship between household income and housing expenditure (housing costs). Affordable housing refers to the affordability of the household to own or rent the housing. Housing becomes unaffordable if the housing costs exceed the income of the household. Thus, the objective of this paper is to define the difference between housing affordability and an affordable house and to identify the factors influencing the gap between housing affordability and an affordable house. To achieve the objectives of this paper, 28 variables or factors have been identified. These variables or factors are then analysed by using the descriptive method of analysis. After analysing 28 identified variables or factors, the findings show that a high house price, a high monthly repayment, the type of property ownership and the land area either extremely or moderately influenced the gap between housing affordability and an affordable house.

Keyword: Housing Affordability, Affordable House, Mortgage, Housing Policy

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INTRODUCTION

Public concern over housing affordability arises from housing being the single largest expenditure item in a household budget and the increases in housing and rental prices (Quigley and Raphael, 2004). This situation creates problems for the medium- and low-income groups. Devenport (2003) found that low and medium income families found it increasingly difficult to access adequate affordable housing. The existing housing policy restricts the maximum income level for affordable housing without explaining the exact affordable amount. Thus, this condition will create a gap between affordable housing and housing affordability. According to Yates (2008), the rising issues of housing affordability are due to the increment of house prices compared to household income. In addition, the current trend of housing development focuses more on high-cost housing than affordable housing. The property market report in the first half of year 2019 (NAPIC, 2019) revealed that only 20% of the launched residential units in Johor are priced at RM300,000 and below in the first quarter of year 2019. The new stocks of housing supply in Johor are unaffordable for the majority of the community with a median income of RM5,197. The mismatch between demand and supply has led to a large number of unsold properties.

There is evidence of discrimination in the affordable housing schemes launched by the government such as PR1MA, which has a price range of RM 400,000.00 and below. The price tag is beyond the affordability of the population. As a result, there is the excess of unsold properties including the ones under the affordable housing scheme. According to the property market report in the first half of 2019 (NAPIC, 2019), there were 6,195 units of unsold properties worth RM4.46 billion in Johor. Hence, policymakers should be aware of the new paradigm for the concept of affordable housing and housing affordability. The objectives of this study are to analyse the gap between affordable housing and housing affordability and identify factors that increase the gap between affordable housing and housing affordability.

HOUSING AFFORDABILITY VS AFFORDABLE HOUSING

Housing affordability is linked to the relationship between household income and housing costs (Kutty, 2010; Hancock, 1993; Crowley, 2003). Ndubueze (2007) defined housing affordability as the ability to own a house. There are various interpretations of the relationship between housing costs and income. For example, the United States targeted 30% of the income (Linneman & Megbolugbe, 1992) while Canada set 20 to 25% of the income for housing expenditure (Hulchanski, 1995). Gan and Hill (2009) and Bujang, Zarin, and Jumaidi (2010) proposed the concept of housing affordability according to three matters:

i) Purchasing Affordability

Purchasing ability refers to the ability to obtain sufficient loan for home purchase (Gan & Hill, 2009; Bujang, Abu Zarin & Jumaidi, 2010). Bourassa (1996) mentions that the main restrictions on homeownership are obtaining housing loan, the ability to pay housing deposits, and the housing costs in homeownership. Bourassa (1996) also highlights the importance of financial stability in obtaining a mortgage loan. This statement is similar to Trimbath and Montoya (2002) who highlight the three dimensions for housing affordability, namely house price, household income, and mortgage or end financing interest rates. In addition, the purchasing ability depends on house prices and interest rates that affect the overall cost of homeownership financing (Yates, 2008; Osman et al, 2016).

i) Mortgage repayment Affordability

Mortgage repayment ability refers to the burden experienced by the household members in repaying the mortgage loan. The household members have the repayment ability if they could afford to repay the mortgage loan after deducting other non-housing related costs (Yang & Wang, 2011). It is the act of setting aside fixed payments for housing costs on a monthly or yearly basis without facing other costs of living pressures. Besides that, they should also consider other housing costs in ensuring homeownership security. In Malaysia, property owners have to deal with monthly and annual costs such as land tax, assessment tax, and management fees as stated in the National Land Code 1965, Local Government Act 1976 and Strata Management Act 2013.

ii) Income affordability

Income affordability refers to the purchasing power of the household. Besides that, income affordability refers to the ratio of house price to the annual income median which affects the type or price of the house that can be owned or rented by owners. Income affordability can also influence the ability to buy and repay mortgage loans. When the ratio of house price to household income is high, the household's ability to own a house becomes low.

There is no specific definition of affordable housing. Gabriel, Jacob, Arthurson, Burke, and Yates (2005) defined affordable housing as the housing project provided by the government or private sector to meet the benchmark level of affordability (house price or income). In Australia, Urban Research Centre (2008) defined affordable housing as a suitable home for low and medium-income households due to the low and medium house prices that allow them to afford other basic living expenses without any pressure. Stone (2006) affirms that affordable housing is not only the provision of affordable housing but also a scheme or financial assistance for low and medium-income groups that are experiencing difficulties in the housing market. Some houses are affordable to some people despite their exorbitant price (Stone, 2006). On the other hand, some

people cannot afford them unless the houses are free. Hence, affordable housing project should be affordable to the community.

HOUSEHOLD AFFORDABILITY BASED ON THE PRESENT VALUE OF AN ANNUITY (PV_A)

Baum and Mackmin (1989) explain the formula as follow: when \$1 is invested today at the interest rate, i , the total return on investment during the first year is $(1 + i)$. When the total return on investment is A at the end of n years, the formula is as follows:

$$A = (1 + i)^n [1]$$

If x is invested today at an interest rate i for n years, and assuming the investment amount is \$1. By putting 1 and x into equation 1:

$$1 = x(1 + i)^n$$

$$x = \frac{1}{(1 + i)^n} \quad [2]$$

x is the present value of \$1. The present value of the first year of income instalment is $\frac{1}{(1 + i)}$. For the payment for n year, the present value for n year is as follows:

$$\frac{1}{1 + i} + \frac{1}{(1 + i)^2} + \frac{1}{(1 + i)^3} + \dots + \frac{1}{(1 + i)^{n-1}} + \frac{1}{(1 + i)^n} [3]$$

Thus, geometric progression is performed and the present value of annuity, PV_A, is as follows:

$$PV_A = \frac{1 - \frac{1}{(1 + i)^n}}{i} [4]$$

The present value of annuity is also known as year purchase single rate by the valuation surveyors (Baum et al., 2011). The assumption of this formula is the fixed interest rate throughout the financing period.

MEASURING HOUSE PRICE BASED ON HOUSING AFFORDABILITY RATES

The standard used to measure housing affordability is the allocation of 30% from the household income for housing costs Hulchanski, 1995; Linneman & Megbolugbe, 1992). Bujang (2006) suggested measuring house prices based on

the housing affordability levels of homebuyers using the mortgage loan formula (Goebel & Miller, 1981) as follows:

$$SPV = SPV_A (annuity)[5]$$

$$Mortgage\ loan\ value = SPV_A (annuity) [6]$$

Figure 1 shows the annuity in the mortgage loan equation, which is 30% from the household income for housing costs. Figure 1 describes the estimation of home price or housing loan (including interest rates for financing period, n) of the maximum mortgage loan that can be achieved by households. It is based on the ratio standard used in housing affordability study, which is 30% from the household income. Hence, equation 4 and 30% of the household annual income are included in equation 6. H_g is the maximum house price that can be bought or owned.

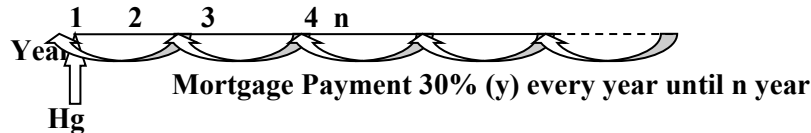


Figure 1: The estimation of the present price of affordable housing is based on household income using the year’s purchase single rate. y = household income at an interest rate, H_g = mortgage loan, and n = financing period

$$H_g = 30\%(y) \times \frac{1 - \frac{1}{(1+i)^n}}{i} \quad (7)$$

Where y = household income

H_g = household’s maximum housing loans

n = housing loan financing period

i = end financing interest rate

The above formula shows the relationship between household income (y) and interest rate (i) throughout the financing period (n) to obtain the housing prices based on housing affordability (income affordability). The above formula also explains how much money is allocated for housing fixed cost from the income, either yearly or monthly, after purchasing the affordable house. The common allocated percentage is 30% of household income that considers the interest rate for end financing over a specified period. This formula shows that affordable home prices can be calculated using household income, interest rates, and financing period. The 30% of household income should consider other housing costs such as maintenance, insurance, and other aspects.

AFFORDABLE HOUSE PRICE

Goebel and Miller (1981) presented the following formula:

Mortgage loan = $\$PV_A$ (annuity)

Where, annuity is the housing loan annual payment.

$$\text{Mortgage payment} = \text{Mortgage loan} (1/PV)[8]$$

Equation 4 is included in equation 8,

$$\text{Mortgage payment} = \text{Mortgage loan} \left(\frac{1}{1 - \frac{1}{(1+i)^n}} \right) [9]$$

$$\text{Mortgage payment} = \text{Mortgage loan} \left(\frac{i}{1 - (1+i)^{-n}} \right) [10]$$

Where n = housing mortgage period

i = end financing interest rate

Figure 2 shows the movement of mortgage loans that should be paid by households during the house financing period. Affordable housing concept is based on the price offered that calculates the amount of monthly or annual instalment payment based on the interest rate and specified financing period.

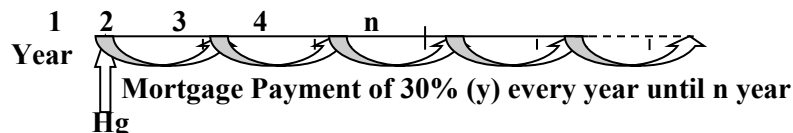


Figure 2: The movement of the mortgage loan, H_g = the sum of affordable house price/mortgage loan, and n = financing period

FACTORS THAT INFLUENCED THE GAP BETWEEN HOUSING AFFORDABILITY AND AFFORDABLE HOUSE

Generally, house prices are influenced by demand and supply, which are important in the residential property market. The relationship between demand and supply can determine a balance point in the market prices. Bujang (2006), Rowan-Robinson & Llyod (1988) and Harvey & Jowsey (2004) affirm that house prices are influenced by demand and supply, as well as household ability and desire. Household ability and desire are closely related to the aspects of socio-economic, environment, type and accommodation besides being subjected to market speculation, including the existing stocks.

Economists debated that the rise in commodity prices is due to the macroeconomic and socio-demographic of the population. Positive economic and socio-demographic growth of the population, such as gross domestic product (GDP) growth (Clark & Coggin, 2011; Dreger & Zhang, 2013; Ren, 2012), household income growth (Clark & Coggin, 2011; Garcia & Hernandez, 2008), population (Ren & Xion, 2012), household size (Garcia & Hernandez, 2008), and interest rates (Dreger & Zhang, 2013; Himmelberg, Mayer & Sinai, 2005; Mayer & Quigley, 2003) can influence changes in the commodity demand. In addition, the government policy on housing, either fiscal or non-fiscal policy, can influence the demand in the housing market. When the fundamental economic factors cannot justify price growth, the market bubble will occur as investors are confident in obtaining profit returns. The bubble in the market happens if there is an increase in commodity price when investors are engaged in speculative activities and manipulative prices for profit. This situation will increase the demands in the market (Mill, 1885). Stiglitz (1990) (cited by Himmelberg, Mayer & Sinai, 2005) define a bubble as, *“If the reason that the price is high today is only because investors believe that the selling price is high tomorrow -- when ‘fundamental’ factors do not seem to justify such a price -- then a bubble exists. At least in the short run, the high price of the asset is merited, because it yields a return (capital gain plus dividend) equal to that on alternative assets”*

The market bubble occurs when there is a financial liberalisation by the central bank, which focuses on the credit growth that can increase housing demand and asset prices (Malpezzi & Wachter, 2005). This situation happens because the end financing for buying or investing the residential property sector is readily available by the speculative investors. A market bubble occurs when there is a rapid rise in the demand in the market at a given time (Melpezzi & Wachter, 2005; Glaeser, Gyourko & Saiz, 2008; Huang & Tang, 2012; Capozza, Hendreshott & Mack, 2004). At the same time, the supply rate remains constant with the inelastic demand. This situation has led to a rapid rise in the commodity market price. In Johor, the housing market experienced a bubble from year 2012 to 2014 before the downturn in year 2015 due to the introduction of developer interest bearing scheme (DIBS) by Bank Negara Malaysia in resolving the excess amount of unsold properties since the global economic decline in year 2009. The DIBS scheme is similar to an adjustable mortgage, which is one of the major causes of the subprime mortgage crisis. The scheme encourages the speculative activity as the end financing is readily available to homebuyers. The scheme also causes a 30 per cent increase in the DIBS house prices. Homebuyers are generally unaware of the additional costs due to the lack of transparency concerning important information. The scheme has resulted in a median increase in house price although there has been a decline in the excess of real estate as a result of the global economic downturn in year 2009. According to Khazanah Research Institute (2019), the value of compound annual growth rate (CAGR) from year

2012 to 2014 for median house prices was 23.5 per cent compared to the 11.17 per cent increase in household income for the same period. The system was discontinued in year 2014 to control the high house prices in the market (Bank Negara Malaysia, 2017).

The supply reaction increases due to the excess supply of unsold or overhang market (Pirounaski, 2013). Gross (2007) stated that the bubble in the real estate market causes the excess of unsold properties due to the rise of excessive properties during the market bubble. Barras (2007) mentioned that the demand for new development in the real estate sector is decreasing after the bubble bursts that produce excessive properties. The residential property condition is undervalued due to the high supply and surplus as there is a lack of demand for certain types and prices of properties. The lack of demand is due to high costs, undesirable location and accessibility, less attractive design, less attractive neighbourhoods, and failure to attract the target group. The difficulty of obtaining end financing loan has also affected the number of unsold residential properties.

Beside that, location and microeconomic factors in housing market should be considered because it also gives impact to houses price. Harvey and Jowsey (2004) provided the three main determinants of residential location valuation, namely accessibility, environmental features, and rentals. Location is the most important factor in the housing market. The features of an attractive location are as follows: (1) the physical features of the neighbourhood; (2) neighbourhood social characteristics; (3) public services and facilities in the neighbourhood; (4) environmental quality in the neighbourhood; and (5) accessibility. Hassan et al (2018) & Hassan et al (2021) found that location factor give impact on housing affordability. The micro-economic factor in the housing market can influence house prices. Previous studies revealed that housing characteristics, such as land area, lot location, and lot size have a big impact on house prices (Nashan, 2010; DiPasquale & Wheaton, 1995; Yang & Shen, 2008; Tiwari & Parikh, 1998).

METHODOLOGY

The results from previous studies and questionnaire survey were gathered to achieve the research objectives. This study used random sampling method. Besides that, the researcher used the formula by Israel (1992) to determine the population size and the number of respondents in this study. The chosen confidence level is 95 per cent with the assumption of 5 per cent probability in which the actual percentage is not within the selected confidence interval (Israel, 1992). The researcher referred to the number of households in Johor Bahru and determined that the number of respondents for this study should be at least 400. This study used the calculation of sample size as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where, *n*: the number of questionnaires, *N*: total population, *e*: confidence level, thus;

$$\begin{aligned} \text{Number of questionnaires} &= \frac{331095}{1 + 331095(0.05)^2}, \\ &= \frac{331095}{828.7375} \\ &= 399.5 \cong 400 \text{ respondents} \end{aligned}$$

The questionnaire was divided into three sections, namely the socio-demographic of the respondents, house ownership status, and the factors affecting the incompatibility of housing affordability and affordable housing. This study used the 5-point Likert scale (not influential, slightly influential, moderately influential, influential, and highly influential) to test the variables. The nominal data were analysed using frequency and percentage distribution, whereas the ordinal data were analysed using relative importance index (RII). The RII formula by Ensansi et al. (2012) is as follows:

$$RII = \frac{\sum W}{AN} = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{5N}$$

Where: *w*: weighting given to each factor by the respondents

A: highest scale value

N: total number of respondents

The RII range is from 0 to 1.

RESULTS AND FINDINGS

In general, the majority of the respondents are Malay (278 or 77%), the working group is in the age range between 21 to 60 years old (345 or 96%), and married (203, 56%). Besides, the majority of the respondents earned RM5,000.00 and below (267 or 74%). The housing ownership rate among the respondents was moderate. About 178 people or 49.4% of the respondents owned a house while the remaining respondents rented houses or stayed with their family.

Table 4 shows the incompatibility rankings of housing affordability and affordable housing. RII analysis shows that housing affordability factor has the highest ranking for the following variables: high house prices and high monthly commitment of housing costs experienced by households. The least dominant factor is close to the recreational area. It can be concluded that house price is an important indicator compared to household income.

Table 4: RII analysis

Variables	RII Value
KP1 High house prices	0.88
KP2 High monthly payment (more than 30% of the monthly household income)	0.80
FR5 Types of property ownership (e.g.: freehold or leasehold)	0.80
FR4 Land area	0.79
L5 Have a good public transport system	0.78
L1 Close to workplace	0.78
CKP2 Security aspect influences house price (e.g.: gated community)	0.78
Variables	RII Value
CKP4 Guarantee a good and conducive environment in the housing package	0.78
L4 Close to community facilities (e.g.: post office, places of worship, hospital)	0.77
FR3 The quality of building and finishing materials (e.g.: using expensive tiles, etc.)	0.77
L2 Close to the city centre	0.76
FP3 Speculation in the housing market	0.76
CKP1 Additional provision of community and public facilities which lead to increasing the house prices (e.g.: sports club, swimming pool)	0.76
FR1 Types of house in the market	0.75
L3 Close to commercial/business facilities	0.75
FP1 Basic factors in the market (e.g.: interest rate, population)	0.74
KP4 Not receiving financial facilities	0.74
FR2 Luxury home design (e.g.: in-house landscaping, bathtub, etc.)	0.74
CKP3 Luxury lifestyle is offered and sold in housing packages by developers (e.g.: sports club, golf course)	0.74
KP5 Side costs in the home buying process (e.g.: legal fees, stamp duty)	0.73
FP2 Government housing development plans and policies	0.72
KP3 Unable to prepare 10% of deposit payment charged during home purchase	0.71
L6 Close to the recreational area	0.70

DISCUSSION AND CONCLUSION

Housing affordability is an important indicator of the economic well-being of a country (Berry, 2006). The existing housing policy restricts the maximum income level for affordable housing without explaining the exact affordable amount. This finding resulted in a mismatch between affordable housing and housing affordability, particularly its conceptual foundations, and the supply and demand of affordable housing. In addition, to formulate policies to solve the problem of housing affordability, the identification of the factors that cause the occurrence of a mismatch or gap between affordable housing and housing affordability is

important; this will also bridge the mismatch that occurs. This formulation can indirectly control house prices and reduce the excess property.

Housing affordability has emerged as the key challenge confronting housing policy makers. Therefore, addressing affordability problems is currently a priority for governments in many countries, and a broad variety of strategies are being enacted to improve the efficiency of housing markets, to increase supplies of affordable housing, to respond to housing-related financial pressures on individual households and to promote housing finance options for those households being excluded from the housing market. Changes to the social housing system are required to ensure the viability of this existing source of low-cost housing and to better integrate existing service providers and assets into an expanding sector of affordable housing. In particular, reform should be oriented towards overcoming the current residualisation of this sector and towards increasing housing and other options and, where needed, the mobility of those lower-income households who rely most on social housing. In conclusion, a joint, strongly coordinated national framework is important to address Malaysia's housing affordability catastrophe and to mitigate the broader risks that the systemic decline in housing affordability poses to future generations. Addressing this crisis requires leadership from all sectors of government and a long-term commitment to a whole-government approach that uses housing and non-housing public policy levers.

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VALUE OF BUILDINGS IN VOLCANIC VULNERABILITY: A CALCULATION CONCEPT

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Abstract

Indonesia has diverse geographical conditions in each region that causes different impact in assessing real estate value, one of which is the active mountains especially in Ternate, North Maluku. This research discusses the experience of volcanic hazards that influences the model of cost valuation method in building. Drawing on technical calculation, the paper first examines the historical volcanic hazard at Mt. Gamalama, Ternate, Province North Maluku. This work also introduces in how volcanic vulnerability requires a specific approach to play complementary roles in appraising the real value of a building. Following cost approach method, by computing the specific formula to determine the characteristic of a building which directly related to its depreciation, this model predicts the implications of the expected value of a building which is typically located in the volcanic vulnerability.

Keyword: volcanic vulnerability, building, cost approach method

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INTRODUCTION

Called as “Pacific Ring of Fire”, the natural disasters such as earthquakes, floods, tsunamis, and volcanic eruptions are common threats to many countries, in the Asia-Pacific region including Indonesia (Primanti et al 2018). For the last decades in Indonesia, a volcanic hazard has been assessed at the regional scale and the assessment of volcanic vulnerability is a particular step within the real estate analysis at the specific region. Precisely, in order to conduct a valuation, specifically in the location of the volcanic eruption recorded, an appraiser needs to determine the effect, in terms of possible damage to buildings and other built facilities due to volcanic eruption (Spence et al 2005).

Characterized with four thematic areas as physical, social, economic and environmental, (Birkman and Wisner, 2006) the vulnerability which related to the physical aspects is usually described as the ‘degree of losses’ of an element or set of elements at risk resulting from the occurrence of a natural phenomenon. In this context, particularly for the structure of a building, an appraiser is expected to express a judgement in terms of volcanic vulnerability for the building constructions.

Indonesia has public appraisers that is officially appointed by the Minister of Finance through The Directorate General of State Asset Management (DGSAM)- with specific duty to conduct state asset valuation. Established at 2006, DGSAM answered the need of public asset management practice issues, one of its positive agenda is to identify the accuracy and reliability of existing value of Indonesian asset with up-to-date database. Written down in its mission to realize a fair value of the State Asset that can be used for various purposes, moreover, to achieve the target, then DGSAM need a new set of rules and regulations in valuation.

Several regulations as guidance for public appraisers in conducting valuation have been made, one of which is related to building valuation. Thus, the regulation must meet the necessity of a particular asset to be identified. Specifically in this research objective for assets located in a volcanic hazard, within the context of the impact of volcanic vulnerability towards building. Several indicators have set up to be considered in building valuation such as: (1) age of buildings; (2) construction materials; (3) building function; (4) number of floors. All of the indicators henceforth will be useful to assess building New Reproduction Cost when appraisers conduct a Cost Method approach.

In view of the lack of research in how to assess the fair value of a building at the potential hazardous location and its significance, based on technical calculation, this study analyses each volcanic action and describe their effects on the fair value of building at a regional scale, in the municipality of Ternate, located in the North of Maluku. The example is given by applying the model to part of the potentially affected area based on calculation output.

STUDY AREA

In reference to The Statistics Indonesia (2019), the study area is the municipality of Ternate (162,7 km²—Fig. 1), located in the Province North Maluku - Indonesia. Ternate City consists of 3 large islands and 5 small islands which consists of 8 sub-districts and 78 villages divided amongst the islands. The Government Center is on its largest island, Ternate Island. There are five (5) subdistricts within the Ternate Island, namely, Ternate, South Ternate, Central Ternate, North Ternate and West Ternate.

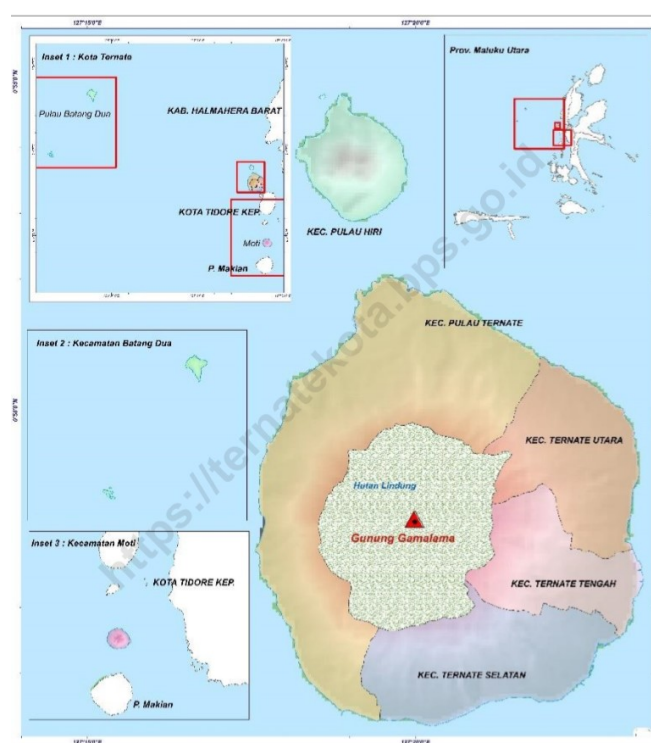


Figure 1: Ternate Municipality
Source: The Statistics Indonesia (2019)

Specifically, look into the geomorphological point of view, Ternate Island is estimated as the meeting area of the plates of which the Pacific Plate, Eurasian and Philippines and other small plates which was formed by an active volcanic mountain named Mt. Gamalama, an active strato-volcano with altitude of 1715m. Active volcanoes which in general seems flat on the coast, but becomes steeper as it reaches the top (Sinaga et al 2017). Compiled and hosted by Smithsonian's Global Volcanism Program at www.volcano.si.edu, named as The Volcanoes of the World database (Cotrell 2015 in Papale et al), the first eruption of Mt.

Gamalama was begun on 1500 to the latest one in October 2018. Based on historical observations, more than 80 Holocene eruptive periods have been confirmed (volcano.si.edu 2019).

According to the Statistics Indonesia (2019), it is reported that the climate in the study area concentrates during the summer and rainy, and the summer drought typically lasts up to 6 months. The average annual precipitation during 2018 was 212.75 mm with average temperature of 27.5 C. The main source of demographic data is population census that is conducted every 10 years, the latest census was held in 2010. The population of Ternate City is based on the population projection of 2018 as many as 228,105 inhabitants consisting of 115,891 inhabitants of men and 112,214 inhabitants of women, which population density in Ternate City in 2018 reached 1,407 people/km². Compared to the projected population in 2016, Ternate residents experienced a growth of 2.24%. Eight volcanic earthquakes were recorded about an hour before volcano eruption (Program 2018), and the Statistics Indonesia (2019) reported the situation impacted to 2 subdistricts at Ternate Barat and Ternate Utara. There were no victims reported during the eruption.

THE METHOD

Combining the literature review and technical calculation, an analytical framework for expected value of buildings were developed. Figure 2 below illustrates this methodological flowchart framework that conceptualizes fair value of a building as a complex interaction between the capacities of actual inherent conditions at particular building and the result of hazard impacts as the volcanic vulnerability post-event at Ternate Municipality.

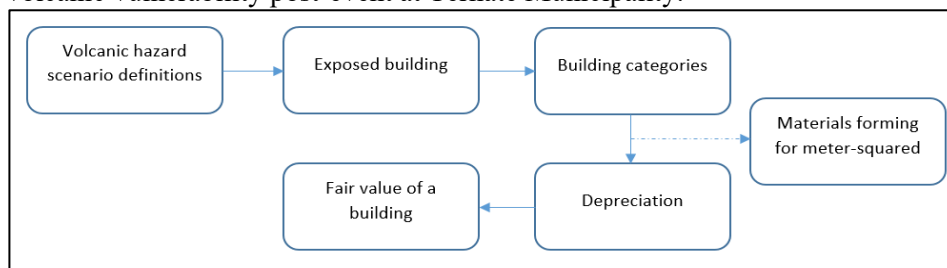


Figure 2: Research Flowchart

Source: Author

Volcanic Vulnerability and Exposed Building

Spence et al (2005) mentioned that the crucial factor through volcanic vulnerability closely related to the terms of damaged state and the intensity level of the particular hazard. This includes the tephra fall, pyroclastic flow pressure earthquake ground shaking (Spence et al 2005), ballistic material and gas (Paton 2006).

Moreover, Spence et al (2005) defined the tephra fall as the damage state of collapse, meaning “the failure of a major structural element” such that “the roof covering and the structural members supporting it will fall inwards along with the thick tephra layer above”. The focus is on this damage state because it is only roof collapse which leads to significant casualties. Related to pyroclastic flow pressure, Spence et al (2005) notices four specific variables started from the occurrence of first damage state when glazed openings start to fail, allowing pyroclastic flow materials to invade building interiors. A second damage state occurs when shuttered openings and solid doors fail. As pressure further increases, wall panels without opening may begin to fail, third damage state. As pressure increases further, roofs and whole buildings may fail, which is the fourth damage state. And taking into account to the hazard concerned in volcanogenic earthquake, categorized by two types as collapse and partial collapse of a building.

Thus, even though the hazard contributes to building resilience both in times of quiescence, during a disaster, and after a disaster (De Terte et al 2009), this study focusses on the post disaster impact on the buildings which is related to the Perceived risk and adaptability to hazards that are especially significant in measuring local resilience.

Building categories and meter-squared material forming

In the way due to lack of comparable market transaction information, many instances of buildings opinion about its value are required even though no market activity took place (Scarrett 2008). To solve this situation, the replacement cost method seeks to estimate the usual costs associated with the constructing of a building rather than exchange price (Wyatt 2007). In details, the DGSAM, based on the Director General Decree 12/2019, stated, in order to find the new replacement or reproduction cost, appraisers must multiply the identified total area of building with meter-squared cost of building. Specifically, there are 4 categories of meter-squared cost of a building such:

- a. 1st Category is a building that is generally known and well-functioned as a residential building. Buildings of this category usually consist of many rooms separated by permanent walls for residential activities such as bedrooms, living rooms, family rooms, kitchens and bathrooms. To be more specific, the 1st category can be divided into three sub-categories with characteristics below:

- 1) Char 1.1

Building functioned as a place for housing activities which has simple structure with dimensions of columns are no more than 18 cm squared or flattened with walls, and more than 50% of distance between columns that is less than 6 m in which the overall construction does not require special construction/structural design.

- 2) Char 1.2
Building that is built as a place for housing which has medium structure with several dimensions of columns are 18cm², more than 50% of distance between columns that more than 6 m and there are several rooms with special construction.
 - 3) Char 1.3
Building functioned as a place for housing activities which has complex structure or has multi-storey structures with or without shear wall/core wall. This building specification requires more than 50% of distance between columns are more than 6 m and there are several rooms with special construction.
- b. 2nd Category is a well-known as business (commercial) building. Building of this category is functioned as a place of business or a combination between place of business and residence. Generally, buildings of this category only have a few spaces that separated by permanent walls. However, the separation between spaces sometimes can be insulated with non-permanent walls or consist of a collection of small spaces of common size area and these spaces are corridors-connected. To be more specific, the 2nd category could divide into three sub-categories with characteristic below:
- 1) Char 2.1
A rectangular less-space simple building structure with smaller width than the length. This building specification requires more than 50% of distance between columns that less than 6 m with overall no require special construction.
 - 2) Char 2.2
Building functioned as a commercial place with multi-storey structures without shear wall and core wall. This building specification requires more than 50% of distance between columns maximum 6 m with no rooms with special construction.
 - 3) Char 2.3
Building functioned as a commercial place with complex structure and had two-tiered portal which combined with shear wall and core wall structures. This building specification requires more than 50% of distance between columns that more than 6 m with no rooms with special construction.
- c. 3rd Category are buildings that are generally used for industrial activities such as warehouses, workshops, and factories. These buildings has a saddle-roof construction and has a single space that covers at least 80% of the building area. To be more specific, the 3rd category could divide into two sub-categories with characteristic below:

- 1) Char 3.1
There is only 1 permanent room without mezzanine. Building has unidirectional horse-span for 12 to 16m with main supporting pillar at 5m height.
 - 2) Char 3.2
Building has less space with mezzanine. Building has unidirectional horse-span for 16 to 22m with main supporting pillar more than 7m in height.
- d. 4th Category is a building that does not represent particular function; however, this category has special structural characteristics due to its function, even for such as a simple structure or through a complex structure. To be more specific, the 4th category could divide into three sub-categories with characteristic below:
- 1) Char 4.1
Building has a simple structure with lightweight building materials and the building has a maximum width of 7 m.
 - 2) Char 4.2
Building has a simple multilevel portal building structure with parallel space with relatively equal area in each space that is connected by a corridor.
 - 3) Char 4.3
Building has a complex structure, wide span between column, a very large spaces the likes of a hall, meeting place, or place of worship. Several buildings of this category have a special construction specific such as a dome or a high steep roof.

Material forming and depreciation

Defined as the measure of wearing out, consumption, or other reduction in the useful economic life of a fixed asset, whether arising from use, effluxion of time or obsolescence through technological or market changes (Scarrett 2008), depreciation could be caused from deterioration as the wearing out of the building fabric (Isaac 2001) and obsolescence (Wyatt 2007). Related to depreciation, DGSAM has implemented by following the Circular Letter 4/KN/2013 from Director General as guidance for public valuer to appraise a building by using cost approach method.

In estimating the depreciation, firstly, to identify in cluster the physical condition of building into 5 categories which are estimate the depreciation, firstly, by clustering the physical condition of a building by 5 categories as very good condition, good condition, average condition, bad condition and very bad condition. These 5 categories, which were captured during the field survey by

appraisers, must consider the real condition of building at the stipulated time. Due to the impact of volcanic vulnerability, appraiser should define clearly this physical condition as deduction. Precisely, Spence et al (2005), notified there are seven classes of construction materials of the vertical load-bearing structure to be considered as shown in Table 1 below:

Table 1: Classes of construction materials

	Type	Other Descriptive Notes
1	Reinforced concrete, infilled frame	
2	Reinforced concrete, shear wall	
3	Masonry, block/squared/cut stone	unreinforced
4	Masonry, confined or reinforced	reinforced
5	Masonry, rubble	
6	Steel Frame	
7	Timber	with lightweight cladding

Source: Spence et al (2005)

Secondly, after the physical condition of a building has been defined, we need to estimate the effective age of a building, even the building is with or without renovation, and even the building has been changed in overall dimension and physical structure (restoration).

Next, estimation should be based on the condition of building and the affective age of building, DGSAM has implemented specific formula in order to obtain the depreciation (number of percentage) which this percentage particularly different in each characteristic of buildings.

And lastly, the formula to calculate the total depreciation could be written as

$$\% \text{ of Total Depreciation} = PD + \{FD * (100\% - PD)\} + \{ED * (100\% - PD)\}$$

Where PD defined as physical depreciation, FD as functional depreciation of building dan ED defined as economic depreciation of a building.

SAMPLE CALCULATION

This section demonstrates case sample calculations relate to cost method valuations for rating. Case 1 shows the value of residential purpose, while Case 2 applies the commercial building to newly built premises. Both of this sample case includes the impact of hazard scenario which corresponds to a real condition of building when appraiser conduct a survey.

1. Case 1

A 100 m2 simple residential house located at Ternate City, no specific reference thereto, no specific rooms and construction, no multi-storey, was erected in 1990 and has renovated at 2012. At the date of field survey,

building was in well maintained with good condition should be calculated as Table 2 below:

Table 2: Calculation Case 1

		Area coverage (m2)	Cost per Meter squared (IDR)	Value (IDR)
A	New Reproduction cost of building	100	3.316.171	331.617.100
B	Effective age	13 Yrs		
C	Depreciation	32%		106.117.472
D	Fair value			225.499.628
E	Roundings			225.500.000

Source: Author's calculation

2. Case 2

A simple multi-storey building with basement and the rest of its two-story used for office which located at Ternate City. When the valuation officers conducted the physical survey of the building, they found the building were in average condition. This office was erected in 2001 with 3000 m2 of the total area and no renovation has been made. The calculation should be as Table 3 below:

Table 3: Calculation Case 2

		Area coverage (m2)	Cost per Meter squared (IDR)	Value (IDR)
A	New Reproduction cost of building	3000	4.952.106	14.856.318.000
B	Effective age	17 Yrs		
C	Depreciation	49%		7.279.595.820
D	Fair value			7.576.722.180
E	Roundings			7.576.722.000

Source: Author's calculation

DISCUSSION AND CONCLUSION

Prior to exploring the challenges in state asset management in Indonesia, it is clear that there is a notion for the DGSAM to accelerate implementation in valuation practices for state asset management due to specific condition of the asset itself.

In this work, we explored two components that are crucial to analyze volcanic vulnerability: the vulnerability itself and the value of exposed elements.

However, this contribution only focuses on the single type of exposed elements: buildings. One of the innovative contributes of this study was supported by very detailed component materials in order to develop the precise cost per meter squared that allowed the appraisers to calculate the reproduction cost for each single building within the study area. Such information was used to evaluate the buildings condition bases on physical survey conducted based on empirical data which supported by expert opinion.

In this study, we assume a unique value for every single of building in the municipality. Value of a building was obtained for each single building taking into consideration the construction cost, the area, the building characteristic, location and its age.

The complete information regarding buildings in the volcanic hazard was aggregated into a geodatabase that may be explored in future work in order to improve the estimation of magnitude values for other types of volcanic vulnerability in the study area. We believe that this methodology may be exported to other areas with similar building characteristics. However, the application of this method to large cities appears to be very difficult because it implies the data collection for each individual building.

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MACHINE LEARNING FOR PROPERTY PRICE PREDICTION AND PRICE VALUATION: A SYSTEMATIC LITERATURE REVIEW

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Abstract

Machine learning is a branch of artificial intelligence that allows software applications to be more accurate in its data predicting, as well as to predict current performance and improve for future data. This study reviews published articles with the application of machine learning techniques for price prediction and valuation. Authors seek to explore optimal solutions in predicting the property price indices, that will be beneficial to the policymakers in assessing the overall economic situation. This study also looks into the use of machine learning in property valuation towards identifying the best model in predicting property values based on its characteristics such as location, land size, number of rooms and others. A systematic review was conducted to review previous studies that imposed machine learning as statistical tool in predicting and valuing property prices. Articles on real estate price prediction and price valuation using machine learning techniques were observed using electronics database. The finding shows the increasing use of this method in the real estate field. The most successful machine learning algorithms used is the Random Forest that has better compatibility to the data situation.

Keyword: machine learning, real estate, property price prediction, valuation

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INTRODUCTION

Machine learning (ML) was first found in the early years and has since been further developed and vastly applied to date. ML technologies have grown and raised its capabilities across a suited of application (Ja'afar & Mohamad, 2021). ML is a computer program and a branch of artificial intelligence which is applied to identify, acquire and improve data performance carrying out its roles as a prediction model (Kamalov & Gurrib, 2021). In other words, ML learns from previous experiences to predict current performance and improve for future data. In ML, there are several categories learning such as supervised and unsupervised. Every learning category has several algorithms that studies different patterns. How ML works is done by studying previous patterns using selected algorithms and predicts future result upon observations (Oladunni, 2016).

The benefits of ML includes to improve the performance of iterative algorithms by caching the previous accessed datasets Park & Kwon (2015) that avoids the overfitting on datasets which contain noise or many other features, able to predict unstable and unpredictable market with reasonable accuracy Sarip (2015), manufacturing, education, financial modelling, policing Jordan (2015), medicine (Christodoulou, 2019), transport system (Maalel, 2011), healthcare Ghassemi (2018) and engineering (Begel, 2019). This proved ML has a wide application and is being used in many sectors in addressing various issues.

METHODOLOGY

Based to the Preferred Reporting Items for Systematic Review (PRISMA) and Meta-Analyses, there are four steps involved in reviewing methodology e.g. starting with identification, screening, eligibility and finally, the inclusion (Lalu, Li, & Loder, 2021). In identification step, authors conduct literature searches by using electronic databases with variety of keywords to identify related articles. The objective of PRISMA is to ease the identification of the literature review. Authors studies several previous journals in producing a comprehensive literature review. Referring to the checklist studied by Lalu et al. (2021), it comprises items to be analysed such as defining clear research questions, identifies inclusion and exclusion criteria, besides examine a few database for scientific literature. In addition, in conducting literature review, researchers used two databases of peer-reviewed publication database which is Scopus and Web Science, it is the most profound database, used by many, to be the primary competitor database for citation analysis and journal ranking statistics. This subsection is classified as phase one in identification of literature review.

The first phase is to identify the related journal article relating to ML in real estate price prediction which leads to the search for systematic literature review based on the topic from two licensed database which is the Scopus and Web of Science. Through the advanced search, using the query string, the database has disclosed over 2,254 articles available. In identifying related

literature, the keywords and queries string information strategy were used during penetrating keywords. The query string search done by authors from Scopus includes TITLE-ABS-KEY (“machine learning”) AND “real estate” AND “price” AND “price prediction” AND “predict” AND “real estate” OR “price predict” OR “property” OR “house” OR “housing”), (“Machine Learning” AND “Real Estate” AND “price AND predict”). Meanwhile for the query string search for Web of Science are TITLE-ABS-KEY “machine learning” AND “real estate” AND “price” AND “price prediction” OR “property” OR “house” OR “housing”), (“Machine learning” AND “Real Estate” AND “price AND predict”).

The second phase is via screening identified literature; this is to choose the suitable article that is associated to this topic of study. Based on 135 literatures found, only 47 literatures are used for this study.

The third phase is the eligibility and exclusion, there are several eligibility and exclusion criteria that were decided by authors. First and foremost, will be based on the literature type, authors selected articles from journals with empirical data and theoretical data which means, non-research articles, book chapters and book series are excluded. Secondly, authors only focused on English publication and excluded non-English publication in order to avoid difficulty and confusing in translating. Third, authors only considered publications between 1999 until 2021, but emphasised more on articles published from the year 2009 and above, this is to observe the published articles development areas. This process only focused on the application of ML on real estate prediction and articles will be selected if it was social science indexed. Lastly, authors also focused the objectives of the studies that is the ML in real estate prediction in general, so that articles studies are compatible to any region.

Table 1: Criteria Selection

Criteria	Eligibility	Exclusion
Article Type	Research article and conference proceeding	Non-research article and book sections
Language	English	Non-English
Timeline	1999 until 2021	<2009
Indexes	Social Science and Web of Science	None
Countries	Any countries	None

The fourth phase is on the data abstraction and analysis. This phase consists significant information, whereby the data from the articles were assessed and analysed, this is to concentrate on specific studies to respond to this study’s questions and objective. Through the collected data, the classification types of ML on the real estate price prediction are found and proceeded to analysis.

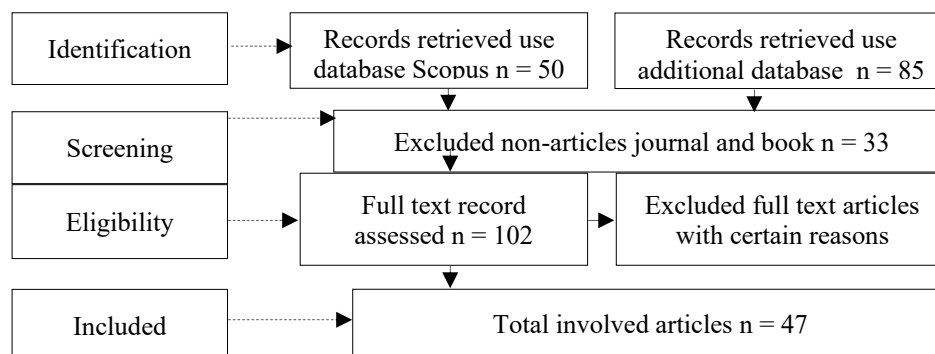


Figure 1: Articles Filtering Phase

Table 2: Previous Machine Learning on Real Estate Articles

Author	Country	Property	Involved Units	Method Supervised Machine Learning		Best Prediction
				Regression	Classification	
(Scherthanner, 2011)	Germany	Housing	74,098 Units	Random Forest	Nil	Random Forest
(Mu, Wu, & Zhang, 2014)	America		452 Units	Partial Least Square, Regression	Support Vector Machine, Least Square	Support Vector Machine
(Mccluskey & Daud, 2014)	Malaysia		313 Units	Linear Regression, Boosted Regression Tree	Nil	Boosted Regression Tree
(Oladunni & Sharma, 2015)	America		135 Units	Linear Regression, Gradient Boosting	Nil	Gradient Boosting
(Park & Kwon, 2015)	Virginia		5,359 units	Decision Trees, Ensemble	Naïve Bayesian	Ensemble
(Crosby & Davis, 2016)	UK		12,000 Units	Decision Tree, Random Forest	Nil	Decision Tree
(Oladunni, 2016)	America		2,075 Units	Principal Component Regression (PCA)	Support Vector Machine, k-Nearest Neighbors	PCA
(Valle & Crespo, 2016)	Chile		16,472 Units	Neural Network, Random Forest	Support Vector Machine	Random Forest

(Nejad, Lu, & Behbood, 2017)	Australia		1,967 Units	Random Forest, Ensemble, Decision Tree	Nil	Random Forest
(Trawiński & Telec, 2017)	Poland		12,439 units	Neural Networks, Linear Regression, Decision Tree	Nil	Decision Tree
(Horino & Nonaka, 2017)	Japan		6,320,631 Posts	Nil	Support Vector Machine	Support Vector Machine
(Gu & Xu, 2017)	China		253 Units	Linear Regression, Gradient Boosting	Nil	Gradient Boosting
(Di, Satari, & Zakaria, 2017)	India		21,000 Units	Linear Regression, Multivariate Regression, Polynomial Regression	Nil	Mix all models
(Kilibarda, 2018)	Serbia		7,407 Units	Linear Regression, Random Forest, PCA	Nil	Random Forest
(Ma & Zhang, 2018)	Beijing	Warehouse	25,900 Rental listings	Linear Regression, Random Forest, Gradient Boosting	Nil	Random Forest
(Varma & Sarma, 2018)	Mumbai	Housing	Nil	Linear Regression, Neural Network, Random Forest,	Nil	Neural Network
(Pow & Janulewicz, 2018)	Montreal		25,000 Units	Linear Regression, k-Nearest Neighbors, Random Forest	Support Vector Machine	k-Nearest Neighbors
(Dellstad, 2018)	Swedish		57,974 Units	Regression, Random Forest, Neural Network	Support Vector Machine	Random Forest
(Medrano & Delgado, 2019)	China		89 Units	Linear Regression, Support Vector Regression, Neural Network	k-Nearest Neighbors	Support Vector Regression

(Chardon & Javier, 2018)	Chile		334,353 units	Artificial Neural Network, Random Forest	Support Vector Machine	Random Forest
(Niu & Feng, 2019)	China		44,113 Units	Decision Tree, Gradient Boosting, Random Forest	Nil	Random Forest
(Mohd, Masrom, & Johari, 2019)	Malaysia		19 Features	Random Forest, Decision Tree, Ridge, Lasso, Linear Regression	Nil	Random Forest
(Mohamad, Ja'afar, & Ismail, 2020)	Malaysia		19 Features	Linear Regression, Decision Tree, Random Forest, Lasso, Ridge	Nil	Random Forest
(Ja'afar & Mohamad, 2021)	Malaysia		248 Units	Ridge, Lasso, Linear Regression, Decision Tree, Random Forest	Nil	Random Forest

LITERATURE REVIEW

Method and Statistical Price Prediction

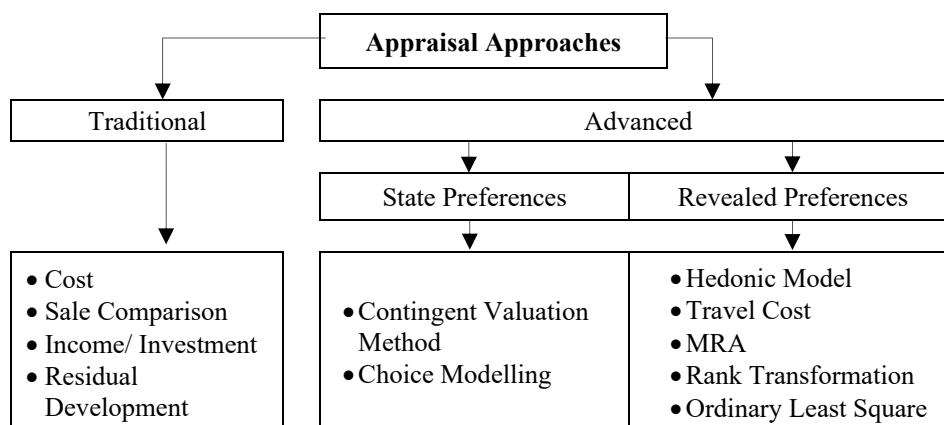


Figure 2: Diagram of Appraisal Approach

The market value of real estate is assessed through the valuation methods by following the existing procedures to reflect the nature and circumstances of the property to meet the market value definition. Every country has a different cultural and environment backgrounds, thus it has dissimilarity in determining the appropriate method for each particular property (Pagourtzi, Assimakopoulos,

& Thomas, 2003). In the valuation process, there are several methods used such as traditional and advanced method (Mohamad & Ismail, 2019). Traditional valuation method has been practiced in Malaysia and it has several methods as stated in the diagram. Due to the nature of the method which has several limitations and restrictions to produce accurate value, the advance method has been adopted in carrying out valuation prediction (Olanrewaju & Lim, 2018). Advanced method is better than traditional method in terms of the availability and amount of data to run which is less time consuming. In addition, in determining the price of real estates, valuation also have a different purpose in valuing market transaction to compulsory purchase, the purposes of this valuation are for sale report, accounting purpose, loan security, auction, insurance, taxation and investment (Pagourtzi et al., 2003).

In reference to the study by Nejad et al., (2017), authors indicated the accurate sale price of property transaction process is significant in price prediction. It is important to achieve fair value during transactions of valuable property for home sellers and buyers, similar to the price assessment which is also important for investors to learn better decision making in obtaining investment opportunities and as well as to avoid risk. However, there are also difficulties in producing accurate value because the prices of residential property are affected by various factors including the property location, neighbourhood, market condition and many other internal and external factors that should be considered in value real estate property.

The current ML is found to be a practical application in various fields (Jordan, 2015). As stated by Park & Kwon (2015), ML is a statistical learning of predictive analysis which is a subset of artificial intelligence used in various task such as modelling, designing, programming and recognition. Besides that, ML is about extracting knowledge from data input to deliver output. A study from Kilibarda (2018) stated that researchers have concluded in this twentieth century, ML is known as an alternative in model predicting.

Based on Figure 3 of ML, it shows ML has two types of learning algorithms. These two learnings process has different algorithms due to dissimilar method learn datasets condition. From the previous studies, the most common learning being used is supervised machine learning, this learning dataset is structured by human then this learning will learn and train the dataset automatically in producing result based from the previous data experiences. This learning consists of two types of problem such as regression and classification. In short, regression was used to identify or learn the value output of “distance” and “kilogram”, while classification was used for output e.g., “colour”, “talking” and “thinking”.

The application of ML must provide complete dataset for further prediction, ML will learn the given dataset in the entire system from start until the produced result. Previous study has applied ML techniques to predict various

study to observe the possibility to get an accurate result (Varma & Sarma, 2018). The hedonic price regression is mainly been used for inferences. In contrast, ML has a great potential in predictions.

Machine Learning Algorithms

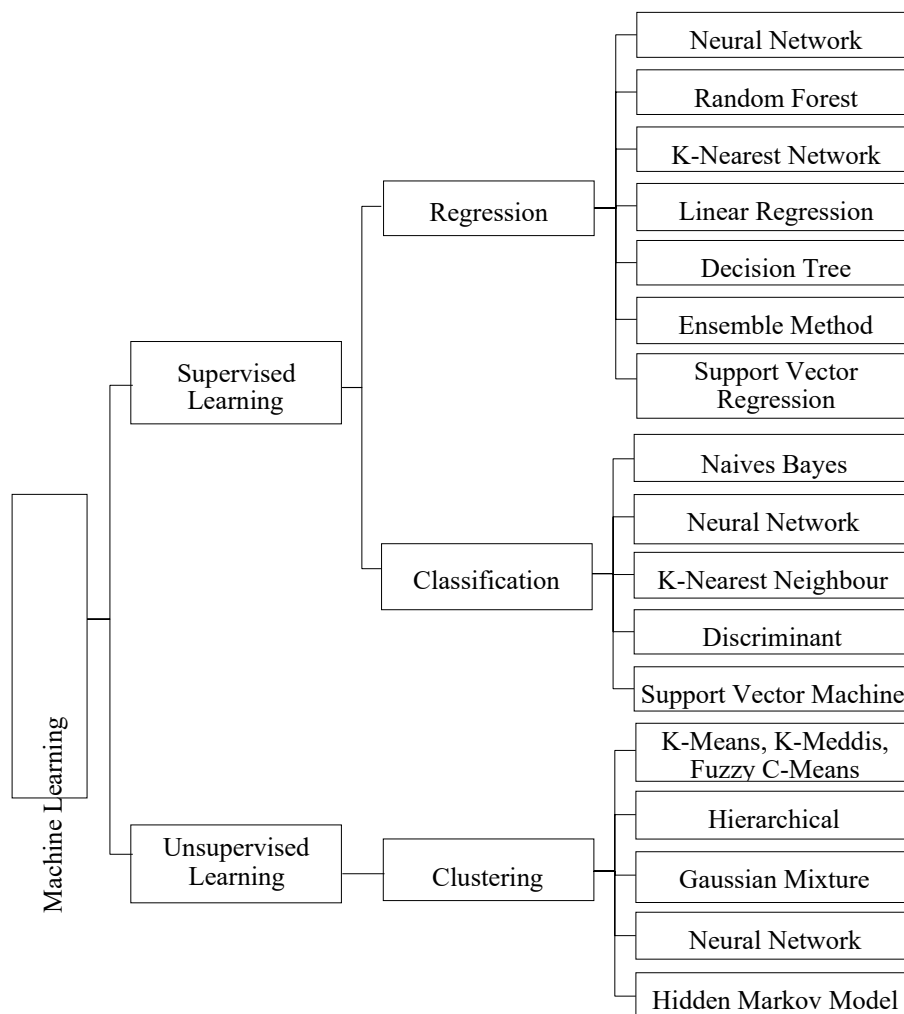


Figure 3: Types of Machine Learning Algorithms

RESULT AND DISCUSSIONS

Table 2 has presented 24 articles that have been selected in the ML price prediction studies. From previous studies of real estate price prediction using ML, most researchers applied supervised ML techniques. From previous literature

studies, authors have concluded that the ML techniques have been discovered in the real estate field in the past 5 years as property price prediction. The most popular learning used are supervised learning which is refer to regression and classification. Furthermore, from all the studies, there are few algorithms that has always been selected as the most popular model in prediction which is the algorithm of Random Forest, Decision Tree, Gradient Boosting, Neural Network and Linear Regression. The best model in prediction is the Random Forest, this algorithm can adapt well with dataset situation and produce accurate and effective results, it is also recommended by previous researchers to consider in study prediction.

The decision made by ML algorithm is based on its previous data experiences. The application of ML has been applied in many fields as predicting analysis. However, the use of ML in real estate industry in Malaysia is not often been discovered. Thus, authors have considered to use ML in real estate as a tool in predicting price of property to observe the significant improvement that can be achieved in price prediction. However, there may be some restrictions when exploring the ML algorithms in achieving accuracy.

There are several suggestions when it comes to ML algorithms for real estate price predictions. The first would be the most selected algorithm which is Random Forest (RF). This algorithm is known as one of ensemble method used in supervised, it is usually used as prediction in analysing the price of property and decision making in real estate (Shinde & Gawande, 2018). Random Forest has the same concept like Decision Tree by reproducing a large number of trees in forest then this algorithm will restart training sample and randomly choose features and observe to build decision tree and choose in improving the accuracy (Ja'afar & Mohamad, 2021). Besides that, Random Forest has less error than the other algorithms when it comes as property price prediction, this algorithm are among popular ML algorithm (Shinde & Gawande, 2018).

The second most used algorithm is the gradient boosting (GB) algorithm, it also known as another ensemble method created in ML. GB algorithm were built to construct new base learners to be optimal and relevant in learning the data. This algorithm used as prediction by convert weak learners to strong learner, usually in decision tree. From previous studies, GB generate accurate result as prediction of house price and it also shows good performance than LR algorithm, but RF is the best in estimating rental (Borde & Rane, 2017).

The third algorithm is the Support Vector Machine (SVM). This algorithm been applied in regression and classification learning, however it mainly used in classification. SVM were imposed to plot each data item or variable as a point in two dimensional spaces with the value of each feature of particular coordinate, besides that it also can reduce the bias problem during forecast and deliver a better simplification after consider the item of DV and IV

(Phan, 2019; Sarip, 2015). For the summary, SVM is among the best algorithm in supervised ML and mostly been used as recognition in classification learning.

Here, the fourth algorithm is Decision Tree (DT), this algorithm is a supervised learning that covered in both regression and classification. DT algorithm are used in visualise the decision, decision tree was drawn from root, branches and bottom. Commonly, DT used for variable selection, assess the significant connection of variables, monitor the missing value, prediction and data management (Song & Lu, 2015).

Lastly but not least, the fifth algorithm is Linear Regression (LR), this algorithm is one of the most frequent algorithms been used in predicting. This algorithm also known as Ordinary Least Square (OLS), Simple Linear Regression (SLR) and Multiple Linear Regression (MLR). The one independent in predicting will be SLR, while more than two independents will use MLR in predicting the linear between Y and X. From previous studies, LR is popular in house price prediction (Mayer, Bourassa, & Hoesli, 2019). Basically LR is used for prediction, forecasting and seeking to study plus to analyses the straight line relationship between variables (Borde & Rane, 2017).

CONCLUSION

This study has reviewed the application of machine learning techniques in real estate prediction analysis studied by previous researchers, from the result studied there are several existing machine learning algorithm techniques that have been applied. The types of real estate forecasting in appraisal approach and statistical learning been discussed in above sections. Besides that, the overview types of machine learning algorithms, number of transactions involved and result of several previous studies are also reported in this study. This study summaries few suggestions of potential machine learning algorithm for future studies. Authors strongly believe that this study is desirable, because of the outlined basic information of previous studies especially in discovering methods price prediction using machine learning techniques.

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BIG DATA ANALYTICS FOR PREVENTIVE MAINTENANCE MANAGEMENT

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Abstract

Maintenance data for government buildings in Putrajaya, Malaysia, consists of a vast volume of data that is divided into different classes based on the functions of the maintenance tasks. As a result, multiple interactions from stakeholders and customers are required. This necessitates the collection of data that is specific to the stakeholders and customers. Big data can also forecast for predictive maintenance purposes in maintenance management. The current data practise relies solely on well-structured statistical data, resulting in static analysis and findings. Predictive maintenance under the Big Data idea will also use non-visible data such as social media and web search queries, which is a novel way to use Big Data analytics. The metamodel technique will be used in this study to evaluate the predictive maintenance model and faulty events in order to verify that the asset, facilities, and buildings are in excellent working order utilising systematic maintenance analytics. The metamodel method proposed a predictive maintenance procedure in Putrajaya by utilising the big data idea for maintenance management data.

Keyword: Big data, analytics, maintenance, forecasting, Malaysia

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INTRODUCTION

Building maintenance management is an issue that must be handled at every stage of the construction process. Buildings must be maintained on a regular basis, and in most nations, building maintenance is a substantial undertaking (Horner et al. 1997). In reality, it plays a role in the company's long-term success. Because of the consequences of a building without facilities and maintenance, maintenance management and asset management work closely together. Human intervention has recently resulted in the production of a large amount of data. This data, especially for the government, must be treated with extreme caution, since it is a critical component for top management in making successful and informed decisions based on true data and information. Big data refers to the phenomena of massive amounts of data growing at a rapid rate and in a variety of formats, both structured and unstructured.

Preventive maintenance is crucial in maintenance management because it protects the good state of facilities before they fail. Once the method is implemented, a considerable amount of data about operation and maintenance will be generated. JKR is responsible for the preservation of government and asset maintenance data in Malaysia; nevertheless, this is a problem because the stored data is vast and underutilised. The analysis of this data is critical for better decision-making. Furthermore, although much Big Data (BD) has been undertaken in Malaysian business, particularly the government, it is not used in the maintenance management of government facilities. Aside from that, numerous Information and Communications Technologies (ICTs) are suggested for use in the industrial realm; however, this does not provide a comprehensive picture of the BD method. Most organisations nowadays rely on computer-assisted services, including maintenance management. Normally, this assistance comes in the form of a decision-making mechanism. Eventually, this will contribute to the organization's overall efficiency. Poorly maintained resources can cause a company's operations to come to a halt and result in a loss of revenue. Maintenance management actors must re-orient themselves as globalisation and shifts in information and communication technology increase (Dixon 2007). (Razali & Juanil 2011).

Despite the fact that mySPATA was created to make data collection of government building assets and maintenance data easier, it is currently unavailable due to system integration involving a large amount of data. The system is attempting to adopt Business Intelligence (BI), but so far it has been unsuccessful. According to JPAK (2014), there has been poor record management, non-centralized information that has not been updated to mySPATA, and hence there are concerns that need to be addressed. Furthermore, whether CMMS and mySPATA are useful in assisting senior management in making decisions about the assets and maintenance of government buildings in

Putrajaya is a significant question. The data contained in the Computerised Maintenance Management System (CMMS) is still incomplete for analysis and projection to aid or support strategic decisions in the management of facilities, according to the research and monitoring done. Although it is capable of producing dynamic dashboards for decision-making, it does not use BI to provide real-time analysis or an interactive dashboard to the user, making the system easier to grasp for beginners. With the rise of BD and the advancement of smart technology, an organisation can use 'business intelligence' to modify its daily operations in a more intelligent manner (BI). Property players can benefit from BI because it keeps them more informed, which helps them make better decisions. People's high expectations for real-time analysis are critical. It enables governments to make choices more quickly and to monitor them in real time. With the usage of smart technologies, BD plays a larger role in acquiring and analysing data, while BI assists the maintenance department in making educated decisions. Due to issues occurring in the administration of government building maintenance, particularly during the decision-making stage, the research to be conducted is critical. Maintenance data that is scattered, insufficient, and inaccurate has become a burden for the maintenance department, making modelling the process or managing maintenance activities extremely difficult and complex.

LITERATURE REVIEW

BD has evolved into a new field that necessitates the collection of data and the integration of data systems. Academic and professional professionals have been drawn to the evolution of BD. This area highlights the most recent advancements in the world of electronic commerce today. The industry's top buzzword is BD (Waller & Fawcett 2013). The application of BD in corporate decision-making and enhancing efficiency has also been demonstrated in Malaysia's commercial industry. Companies, academia, and the business press have been drawn to a quantitative information explosion caused by human behaviour on the internet and social media. Roger Mouglass of O'Reilly Media coined this term in 2005 (Beebe 2019), a year after the business coined the term Web 2.0. The term BD was coined by Mouglass to describe reference datasets that are too vast to be analysed and handled using typical BI techniques. Traditional data-processing systems can no longer handle massive volumes of data, necessitating the development of new technology (Provost & Fawcett 2013). This is referred to as BD. BD has become a buzzword that has been used in a variety of industries around the world. Despite the fact that the genuine benefit of BD is unknown (Boyd & Crawford 2012; Desouza & Jacob 2017), analysts have noticed that BD solutions have been marketed as a means of focusing on public issues (Desouza & Jacob 2017).

Governments can benefit from BD in a variety of ways, including cost savings, improved services, and occupancy insights. The real estate data can be utilised to provide valuable recommendations to top officials, administrators, and the general public about how facilities are used, how efficiently assets are operated, and how to anticipate possible liabilities and possibilities ahead of time. A complicated portfolio of different sites, construction kinds, and oversights might also benefit from centralised information. Because buildings may be centrally owned and operated or leased by different agencies and departments, viewing the big picture can be difficult for many governments. A centralised data management system can provide cost-saving insights and innovative methods to serve constituents, as well as inform typical buy, sell, lease, and occupancy decisions. The effort will make it easier to put land to its best and greatest use, opening up new development possibilities (CBRE 2018).

Predictive analytics can be used to forecast future events, such as real estate requirements and expected staff growth or reductions as a result of public policy efforts. Another major problem is determining where different departments and individuals will be most productive and collaborative. The potential benefit of co-locating agencies that serve the same constituents or operations can be shown via BD insights. According to CBRE (2018), combining counter-parties with BD analytics allows for more efficient resource allocation, resulting in savings for homeowners who have more options. The impact of BD on supply networks will be enormous. BD will support a change from production-led supply chain management to consumer-centric demand chain management by improving visibility of end-customer demand or offering insight into future demand. This is more than a semantic shift; it will shift the focus away from the supply of items pushed out to markets and toward the demand for products, better connecting producers and customers. One method to get around this is to use open-source software. Essentially, organisations can start to rely on open-sourcing by exposing the source code of their software, allowing users and staff to change programmes and apps to improve connection inside their processes. It is believed that BD will be able to provide data management solutions that range from a simple repository to an open-source solution. BD has the potential to be used in the future to manage knowledge, particularly for governments handling building maintenance data. Governments have begun to use BD to assist in making real-time choices and expanding in-motion, according to Kim et al. (2014). He went on to say that government decision-making typically takes longer and involves a variety of stakeholders, including officials, interest groups, and individuals. As a result, BD seeks to make quick judgments with a small number of players. According to the findings of the investigation, BD will create extremely relevant data that will assist management in making better decisions.

METHODOLOGY

Putrajaya was chosen as the research region since it is the seat of Malaysia's new federal government. It's in the middle of a multimedia corridor. Many government buildings and ministries are located in Putrajaya, Malaysia. Putrajaya is an excellent location for performing this study because it focuses on government buildings.

This study employed a metamodeling approach to collect maintenance data in order to give it more structure and to make it more complete. It would be fascinating to learn how a BI application in the form of a metamodeling approach may make Malaysian building maintenance management methods more realistic without requiring a large crew. It also allows maintenance managers to make quick judgments based on more structured data in a short amount of time. According to Thompson (2004), BI enables for faster and more accurate reporting by as much as 81 percent, with 78 percent enhanced decision-making, 56 percent improved customer service, and 49 percent more income. As a result, a large number of BI applications have been implemented in a range of fields, and the field is considered to be rapidly evolving (Aruldoss et al. 2014).

Metamodeling is a technique for generating properties for a model of a model (Sprinkle et al. 2010). A domain metamodel will be created using the metamodeling approach. The metamodeling technique is effective in situations when there is a lot of information that isn't properly organised, such as in emerging fields like maintenance management. Metamodeling, according to Othman (2013), is an artefact that can represent the modelling language that describes all of the constituents in a model. A metamodeling approach might combine different domain models to create a metamodel for the domain that generates the abstraction. It includes a list of themes (issues) as well as a diagram illustrating the relationships between the concepts. The data in this situation pertains to maintenance management.

Some refer to the metamodel as a model of model, whereas it is actually the model's explanation. When the model is the subject's representation, or, in other words, the real-world problem, the metamodel is the explanation of the subject's model (Völter et al. 2013). According to Susi et al. (2005), a metamodel is a set of possible instantiations in some modelling languages that are all and only syntactically correct models. It is possible to change and reuse the metamodel for specialised needs. Metamodel is also known as a domain model glossary since it collects all of the properties from multiple sources to serve as a language for domain metamodels. As a result, the model is easy to grasp and is developed by domain experts, which may aid in the development of a system that is not reliant on technology expertise. As demonstrated in Figure 1, this will result in a viable and efficient system as well as encourage information sharing among domain experts. The subject of a real-world problem is to manage maintenance

management data in the case of maintenance management data. As mentioned in the previous section, Putrajaya's maintenance data is still mostly managed manually. As a result, the metamodel notion was adopted as a solution to turn data management into a systematic process.

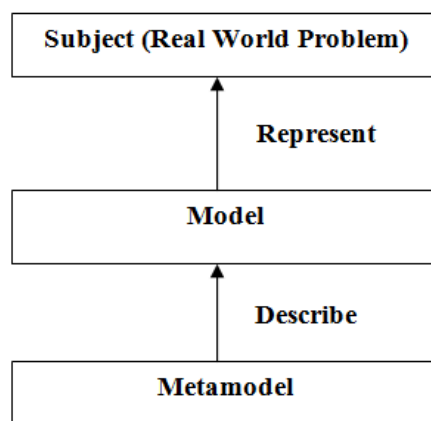


Figure 1: Subject, model, and metamodel relationship
Source: *Völter et al. (2013)*

BIG DATA IN MAINTENANCE MANAGEMENT

The maintenance manager should have complete information on maintenance data before making a judgement on a building's maintenance. The vendors, who are under JKR's management, have access to all maintenance data in the Putrajaya Federal Government Office Building, which includes mechanical, electrical, civil, housekeeping, landscaping, and pest control services. Each ministry building in Putrajaya typically has a single facilities management business that oversees services such as mechanical, electrical, civil, and landscaping. The work process for government-owned property assets is very transparent and organised at the structural level. Nonetheless, property asset management should never be viewed as an afterthought in the growth process, but rather as a systematic approach to a specific goal. The government mostly regards its property assets as a tool of carrying out social and regulatory tasks, rather than recognising the properties' inherent value. The current property administration of government buildings in Malaysia is more akin to maintenance management, according to the popular consensus. According to a prior study by Razak (2010), the majority of ministry buildings are not involved in the property's complete existence. Due to the process including both data management and processing, one of the biggest problems for maintenance management is transforming data into usable information to assist predictive analytics. Because of the large number of

buildings and job tasks in maintenance, there is a difficulty in terms of data expansion, processing analytics, and decision tree analysis. Few scholars have looked at big data from the perspective of maintenance management since its inception. As a result, when complex interactions and nonlinearities are present in dataset models in maintenance management systems, it is influenced in terms of practical constraints in developing statistical methodologies. The goal of predictive maintenance is to infer all duties related to civil works based on the technician's inspection and data records, which are then validated by the superior. As a result, understanding how to predict civil works is crucial. For example, understanding the asset condition lifespan, also known as lifecycle assessment (LCA), for each asset in a building is critical. A predictive model, such as regression analysis, can usually anticipate the assets' lifespan state. In order to anticipate future failures, the model can examine the variables and conditions that contributed to previous failures. Predictive analytics technology was utilised to create data-driven models of specific assets using machine-learning algorithms. As a result, maintenance staff must be well-versed in statistics, modelling, machine learning, and data mining in order for the big data system in maintenance management to function at its best.

BIG DATA PREDICTIVE MAINTENANCE SYSTEM BY USING THE METAMODEL METHOD

Before the construction of the Building Metamodel (BMM) metamodel began, the data for BMM was acquired by analysing prior studies of BMM variables and performing research into the concerns and obstacles that affect BMM performance. The methods listed below were carried out in order to establish the Building Maintenance Metamodel (BMM) framework.

- a) Identifying the major factors
Building maintenance management factors were gathered before the development in order to discover the source, issue, and challenges that produced the problem in the existing domain.
- b) Candidate shortlisting definition
Following the extraction of the BMM factor from the acquired data, the definition of each of the factors will be presented in order to group the factors into a common meaning for BMM.
- c) Definitions must be reconciled
Following the determination of the BMM determinant, the procedure for maintaining the common definition specified earlier in order to create the metamodel will be followed.

- d) **Factor designation**
The group of factors for BMM can be split into distinct sets of views when the various groupings of the factor are completed.
- e) **Identifying Relationships**
After determining the BMM factor, the relationship between the factor and the sub-factors will be examined and validated in order to establish a link or connection between the factors.
- f) **Metamodel Creation**
The building of a BMM metamodel will begin after recognising the factors of BMM and their relationships. The model will be drawn using tools such as Microsoft Visio. During this procedure, the metamodel's class, entity, attributes, and operation will be incorporated.
- g) **The Metamodel's Validation**
This stage will be completed after the factor and its connection have been developed in the metamodel. This stage is critical in the BMM metamodel design process because it determines whether the component is consistent, well-presented, and coherent in relation to the listed objectives. It is that the relic provided by DSR must be fully described, formally talked to, aware, and consistent on the inside (von Alan et al., 2004). As a result, the model necessitates metamodel validation. In this phase, two strategies will be used:
 - i. Frequency-based Selection is a technique for confirming the accuracy of inferred ideas' beginnings and examining any missing concepts from the domain models being studied in the early stages of the first BMM's development.
 - ii. Face Validity is a research method in which the developer interviews experts in the topic.

The development will begin with the extraction of generic BMM factors such as BMM determinants; next, from the materials obtained prior to the start of this research, the candidate for definition will be shortlisted and designated. The relationships between the factors will be determined after all of the factors have been defined. All of the phases will be detailed as illustrated in Figure 2 utilising the 8-Steps of Metamodeling Creation Process developed by Othman and Beydoun (2010a). The metamodel phases are described in the following method, which is based on a large data approach to BMM generation.

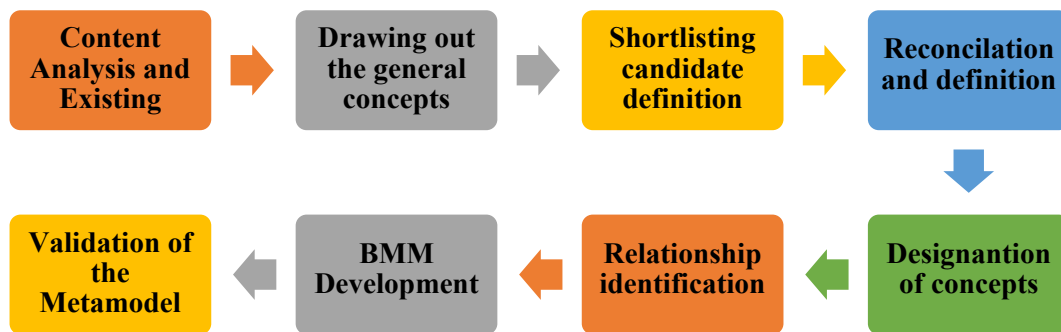


Figure 2: Steps of Creation Process BMM

Phase 1 (Figure 3) describes how governments, professionals, maintenance management units, communities, and individuals can effectively anticipate, respond to, and recover from the effects of likely, imminent, or current maintenance events or conditions using knowledge and capacities developed by them. These include a maintenance plan that involves practising, generating, documenting, and updating responses as well as technical plans for all of their components. The Descriptive Analytics Model (DAM) highlights fundamental concepts in government building maintenance management. Contractors, the federal government, property data, regulations and guidelines, buildings and land all play key roles in descriptive analytics, regardless of the type of data (textual and non-textual). To mitigate data into business intelligence processes, all of these actors must collect and combine all objectives, measurements, and software types (Unit 1, Unit 2 and Unit 3).

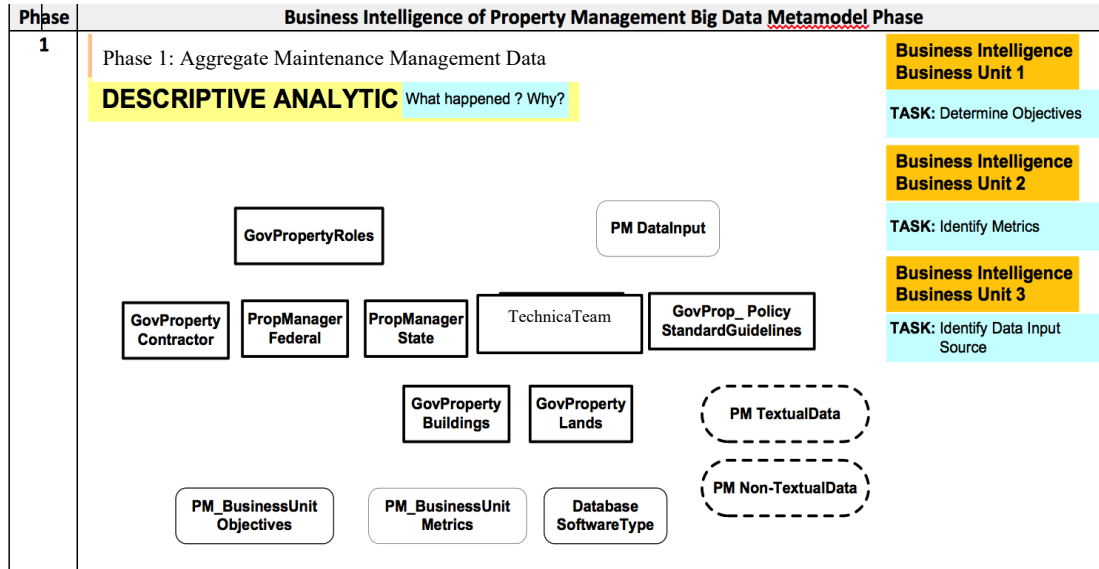


Figure 3: Phase 1: Aggregate Maintenance Management Data

Phase 2 (Figure 4) contains current maintenance management data, which includes "Government property roles," "Maintenance management data input," "Maintenance management dashboard," "Business intelligence tools," "Database software ready," and "Maintenance management business unit objectives," among other major actors. Within the maintenance management data repository system, these pieces are still connected.

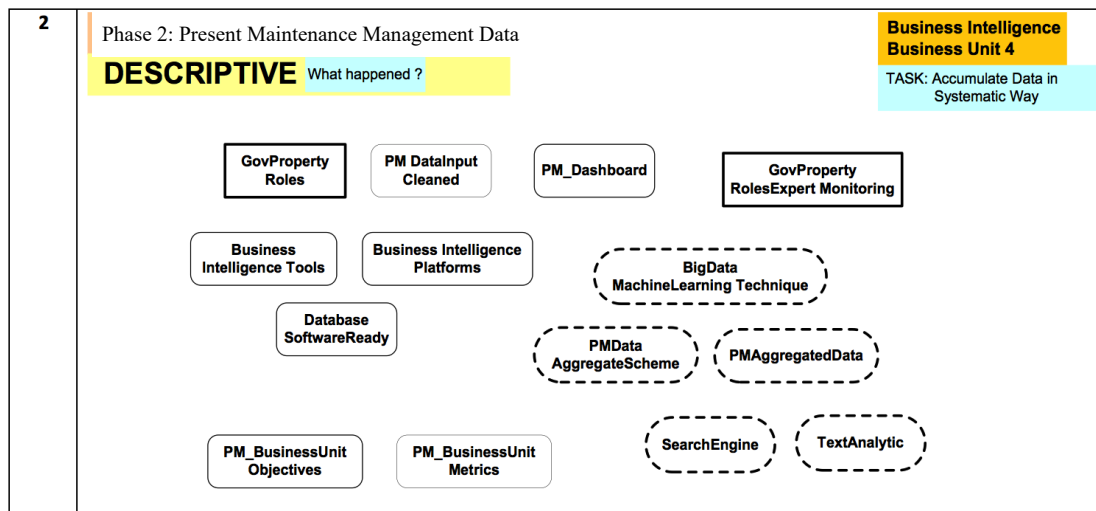


Figure 4: Phase 2: Present Maintenance Management Data

Phase 3 (Figure 5) is dubbed "Enrich Maintenance Management Data" and consists of a number of tools aimed at boosting the use of big data analytics in maintenance management, including artificial intelligence, automation, and predictive analysis. This entails the use of human resources, with government asset consultants tasked with identifying real issues with the asset upkeep management of government buildings in Putrajaya. As a result, it will start the following phase, such as data visualisation preparation, data visualisation validation, real problem data for government buildings and assets, and error handling operations. This phase's output process will be able to provide a variety of user interfaces, such as data visualisation. All of these procedures necessitate IT system integration, which involves all prior process stakeholders.

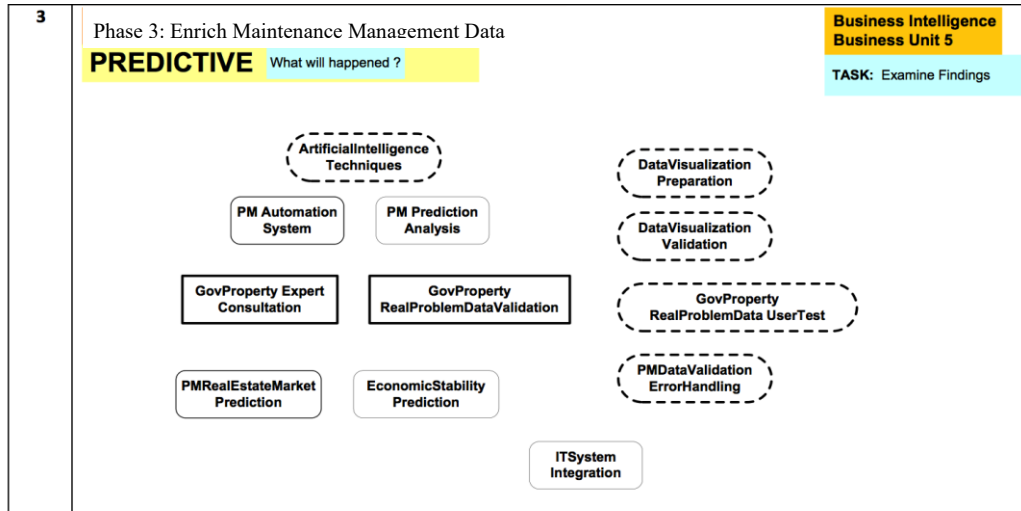


Figure 5: Phase 3: Enrich Maintenance Management Data

Phase 4 (Figure 6) focuses on "Inform Maintenance Management Decisions," and the role of all stakeholders in the maintenance management process is critical. This is where all of the data has been organised and is ready to utilise, resulting in the "Big Data Business Intelligence Results" domain. The application of "Artificial Intelligence Techniques" will improve the upkeep of large data analytics systems. Stakeholders can develop reports and forecasts of outputs in this phase, which can be utilised to make financial decisions about maintenance management. Users can use the outcome for strategic decision-making in organisations based on the objectives and matrix during this phase.

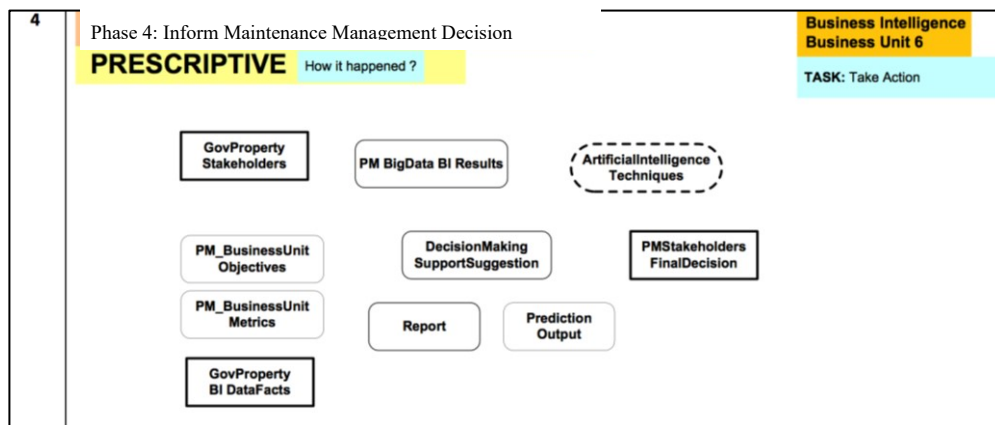


Figure 6: Phase 4: Inform Maintenance Management Decision

Figure 7 illustrates the overall structure of the system. In this system, the data is acquired from various resources which is extracted from all vendors involved in maintenance management. The architecture of the predictive maintenance system is derived from the metamodel method.

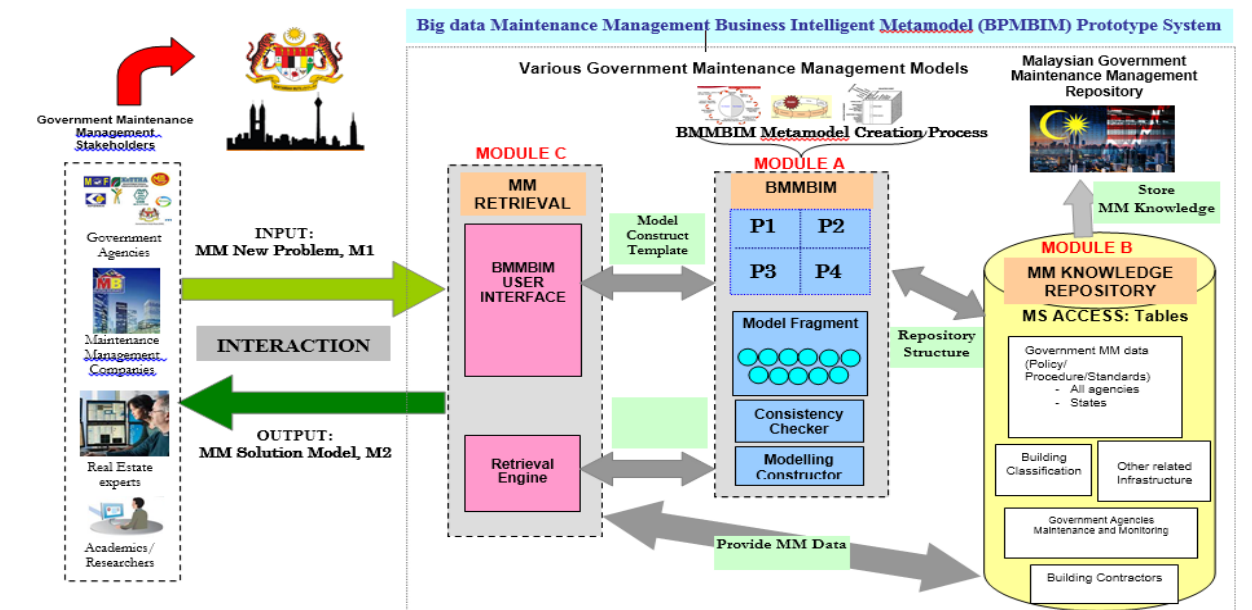


Figure 7: Big Data Analytics' Architecture for Maintenance

CONCLUSIONS

Building upkeep is an issue that must be addressed at every stage of the property life cycle. Buildings must be maintained on a regular basis, and in most nations, building maintenance is a substantial undertaking. The massive amount of public property created as countries evolve over time has necessitated the implementation of systematic maintenance management systems. These properties must be handled in a methodical manner, as property management generates revenue for the government. Existing buildings' functionalities can be preserved and tenants' demands met through appropriate maintenance techniques. This approach, however, has not been explicitly or consistently emphasised. There have been several reports of faults in public structures. This is especially true in Putrajaya, which is home to government offices. Government offices must be well-maintained not only for the sake of the country's image, but also to ensure that the government can govern successfully. As a result of this problem, it is

necessary to manage government properties in a methodical manner, with proper databases of maintenance data. This information may be easily transmitted to users for decision-making, resulting in well-structured knowledge. As a result, the goal of this research is to discover characteristics in BD apps that can be used to produce maintenance management data for federal government buildings. Using Business Intelligence (BI) methodologies in the form of a metamodel framework, this study seeks to offer a novel strategy to managing a fragmented and complicated domain structure. The metamodeling technique can help stakeholders in the maintenance management domain (government, Public Works Department, facilities manager) comprehend and guide them through the decision-making process in the future. Importantly, the metamodel provides a comprehensive structure of general principles and best practises for distinct collections of maintenance management improvement models. If the metamodel-based repository system is established and disseminated, the study will be valuable to the government, particularly policymakers and auditors for decision-making. As a result, maintenance management metamodels promote information sharing and, more crucially, maintenance management in federal government facilities. Systematic management of infrastructure and properties, particularly those under government control, will benefit governments.

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A REVIEW OF SPATIAL ECONOMETRICS IN EXPLICIT LOCATION MODELLING OF COMMERCIAL PROPERTY MARKET

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Abstract

‘Location, location, location’ is a real property parlance mostly used to describe the influence of location in the property market. Location is mainly considered as the most significant influencer of commercial property prices. Location is modelled traditionally using hedonic pricing model by either proxy location dummies or distances relative to other neighbourhood features. This was shown to be inadequate due to spatial autocorrelation and heterogeneity inherent in spatial data, which jeopardises the estimates' consistency. Consequently, spatial econometrics is used to explicitly model location into property pricing by controlling spatial effects of autocorrelation and heterogeneity. Housing studies dominate the use of this approach with limited application in the commercial property market. This paper reviewed spatial econometrics and found that the commercial property market exhibits significant spatial dependence and heterogeneity. Accounting for such effects improves model accuracy significantly. It, therefore, recommends increase use of spatial econometrics in commercial property market modelling.

Keyword: Location, Spatial Econometrics, Commercial Property Market, Hedonic Pricing Modelling, Spatial dependence

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INTRODUCTION

The strategic prominence of the commercial property to the world market has been noted in the literature (Usman & Lizam, 2020; Jeong & Kim, 2011; Raposo & Evangelista, 2017). The commercial property market, like the residential counterpart, is imperfect. Commercial properties have high information asymmetry, high cost of transactions, highly heterogeneous, relative low liquidity and are rarely traded (Beracha, Hardin III, & Skiba, 2018; Chegut, Eichholtz, & Rodrigues, 2015; Hardin III, Jiang, & Wu, 2017; Wiley, 2017). These features of the commercial property make it relatively volatile. Similarly, besides heterogeneity and thinness, a different characteristic of commercial property is the distinctiveness of each commercial property's location (Chegut, Eichholtz, & Rodrigues, 2013; Chiang, 2016). This characteristic makes the location an influential factor in modelling the commercial property market. It is also the reason why location is considered as one of the most critical determinants of commercial property prices (Bhattacharya, Lamond, Proverbs, & Hammond, 2013; Li, He, Xu, Wang, & He, 2013; Droj & Droj, 2015; Hayunga & Pace, 2010; Özyurt, 2013, 2014). This, therefore, underscore the necessity for modelling the commercial property market such that the state of the market and performance of the property market is reflected in the pricing (Corgel, Liu, & White, 2015).

Traditionally, the hedonic pricing model is used to model commercial property market. The composites of properties – location characteristics, neighbourhood attributes, and physical characteristics – constitute the property price (Noh, 2019; Usman, Lizam, & Adekunle, 2020; Usman, Lizam, & Burhan, 2021; Zhang, Zheng, Sun, & Dai, 2019). While the neighbourhood attributes and physical characteristics are relatively straightforward to model in HPM, the location is more challenging to model objectively and objectively (Özyurt, 2014). The traditional location modelling using the hedonic has not explicitly accounted for location impact on commercial property prices even though spatial dispersion of commercial property prices is imminent in the market (Droj & Droj, 2015; Özyurt, 2014). Alternatively, spatial analytical techniques are developed to account for location effect in real estate market modelling explicitly and are shown to improve the accuracy of price prediction (Aliyu, Sani, Usman, & Muhammad, 2018; Noh, 2019; Seo, Salon, Kuby, & Golub, 2019; Usman, Lizam, & Adekunle, 2020). However, the application of explicit spatial treatment of location is skewed towards the residential market with relatively scarcer research works on the commercial property market (Montero-Lorenzo, Larraz-Iribas, & Paez, 2009; Özyurt, 2014). Consequently, this paper reviewed the application of spatial econometric approaches in explicit location modelling of the commercial property market.

LOCATION AND COMMERCIAL PROPERTY MARKET

The phrase 'location, location, location' is widely held parlance among real estate professionals to symbolise location's influence on property prices (Orford, 2017; Özyurt, 2014). Locations are immobile, fixed, and distinctive. Spatially, no property is identically the same as others (Wyatt, 2010). Such distinctiveness of location exerts a substantial effect on property prices with the consequent concerns to all stakeholders in the property market (Orford, 2017). Location is interrelated to local amenities, social ties, and environmental factors. These form positive and negative externalities and affect commercial property prices differently.

The mid-20th-century urban economic theories underpin the modelling property market location. The theories emphasised the trade-off between space relating to Central Business District (CBD) and accessibility (Alonso, 1964; Ibeas, Cordera, Dell'Olio, Coppola, & Dominguez, 2012). High accessibility attracts higher property prices due to accessibility premium (Chiarazzo, dell'Olio, Ibeas, & Ottomanelli, 2014; Muth, 1969). The commercial property market is more sensitive to the influence of location on prices than other property types markets. This is partly because location factors such as access to customers, traffic, market access, employment centres and other location factors determine the acquisition of commercial properties.

Consequently, valuers consider location factors seriously when modelling the property market. In such consideration, the main concern is how to incorporate location into the commercial property market modelling.

COMMERCIAL PROPERTY MARKET LOCATION MODELLING

Commercial properties are modelled traditionally using the conventional hedonic pricing model. This is a quantitative concept and requires a quantitative analysis technique (Bawuro, Shamsuddin, Wahab, & Usman, 2019). Property prices in HPM are treated as the function of the properties' neighbourhood characteristics, location factors and physical attributes (Usman, Lizam, & Burhan, 2020b). Several previous studies have modelled property markets empirically (Abdullahi, Usman, & Ibrahim, 2018; Montero-Lorenzo et al., 2009; Özyurt, 2014). The traditional HPM model location implicitly in two ways. Firstly, neighbourhood effects are modelled using location dummies to control their effects on prices (Raposo & Evangelista, 2017). This method, however, does not explicitly account for the specific individual locations in the model and therefore the uniqueness and distinctiveness of each property's spatial identity is not sufficiently accounted for.

Secondly, the HPM implicitly models location by controlling for the relative distance of major spatial landmarks such as CBDs, highways, bus terminals, rail stations, airports, and other externalities to the subject property (Abdullahi et al., 2018; Bujanda & Fullerton Jr., 2018; Usman, Lizam, & Burhan,

2020a). These implicit location modelling methods have some limitations when dealing with spatial data such as commercial properties. The methods do not capture spatial interactions, which affect the resultant predicted prices (Özyurt, 2014). This spatial interaction makes the model's residuals spatially correlated and not random, violating the assumption of uncorrelated error and constant variance of the Ordinary Least Squares (OLS) (Can, 1992; Özyurt, 2014; Pace, Barry, & Sirmans, 1998). The traditional hedonic models do not explicitly control the effect of spatial autocorrelation, spatial dependence, and spatial heterogeneity inherent in real estate data, making the model estimates biased and inconsistent (Chegut, Eichholtz, & Rodrigues, 2015; Pace et al., 1998). With the sophistication of Geographic Information System (GIS) technology to determine exact property location, spatial econometric models are developed to model such location effects explicitly. This made the commercial property location modelling more efficient, reliable and have better predictions (Droj & Droj, 2015; Özyurt, 2014).

MODELLING SPATIAL DEPENDENCE AND HETEROGENEITY IN COMMERCIAL PROPERTY MARKET

The characteristics of the commercial property market include infrequent and thin transactions, heterogeneity, and high information asymmetry (Özyurt, 2014; Tu, Yu, & Sun, 2004). The commercial property market value depends on a comparable transaction within the neighbourhood called the adjacency effect. The adjacency effect may be because property agents or sellers use comparable information of a particular property in arriving at the price of the subject property, thereby leading the price obtained in the property influencing the price of a nearer property in the neighbourhood (Kim et al., 2003; Yu, Pang, et al., 2017). The presence of statutory homogeneous building codes tends to make properties homogenous in a particular neighbourhood (Chegut, Eichholtz, & Rodrigues, 2015). The presence of these property characteristics leads to a correlation in space among property characteristics. Such correlation is called spatial autocorrelation or dependence (Meen, 2016; Noh, 2019).

Based on Tobler's first law of geography, properties that are located closer together are more expected to be interrelated than with farther properties (Liang, Reed, & Crabb, 2017; Tobler, 1970). When a property attribute in a particular location is correlated spatially with similar attributes closeby, spatial autocorrelation occurs (Dziauddin, Powe, & Alvanides, 2014). Spatial dependence, therefore, is the situation where property price is correlated spatially with the prices of closeby properties. On the other hand, spatial heterogeneity is when the association between property attributes and price vary spatially. It happens when estimates for the property feature in the regression vary over a spatial area (Dziauddin et al., 2014).

The existence of spatial autocorrelation, dependence, and heterogeneity in the property market severely affects property pricing estimation. Failure to account for it in modelling the property prices leads to spurious, distorted, biased and inconsistent parameter estimates (Anselin, 2010; Noh, 2019; Pace et al., 1998; Yu, Pang, et al., 2017). Spatial econometrics models are developed to solve the concern of spatial dependence and heterogeneity in spatial data such as property market. Although various studies were conducted to control the influence of spatial dependence in property pricing, the bulk of these studies are on housing markets (Dziauddin et al., 2014; Montero-Lorenzo et al., 2009; Osland, 2010; Özyurt, 2013). To date, fewer studies have been conducted to explicitly control the influence of spatial dependence in commercial property pricing with divergent findings (Chegut et al., 2015; Ke et al., 2017; Kim & Zhang, 2005; Liang et al., 2017; Nappi-Choulet & Maury, 2009; Seo, Salon, Kuby, et al., 2018; Tu et al., 2004; Xu et al., 2016; Zhang et al., 2015).

The study of Tu et al. (2004) appears to be the first study to control the spatial and temporal dependences in the commercial property market using spatial econometrics. Using the Spatio-temporal Autoregressive (STAR) model, adopted from the housing study of Pace, Barry, Gilley, & Sirmans (2000), they found significant and substantial spatial and temporal dependence in Singapore office market price. Nappi-Choulet & Maury (2009), using a similar methodology, also found significant spatial and temporal dependence in Paris office prices. Ke et al. (2017) also found significant spatial dependence in Central London office market prices. Zhang et al. (2015) estimated commercial property prices for mass appraisal in Shenzhen, China using Spatial Error Model (SEM) and found significant spatial heterogeneity in the commercial property market associated with omitted neighbourhood variables as indicated by significant lambda (λ) value of 0.0850. Liang et al. (2017) also found significant spatial dependence affecting Melbourne office prices.

The study of Chegut et al. (2015) provided a broader coverage of the commercial property market by accounting for spatial and temporal dependence in six established global commercial property markets (Los Angeles, London, Hong Kong, Tokyo, Paris, and New York). The result shows divergent findings across the markets. While spatial dependence was significant in New York, London, Tokyo and Paris commercial property markets, no significant spatial dependence was found in Hong Kong and Los Angeles markets. The lack of spatial dependence in the Hong Kong and Los Angeles markets may be due to the homogenous commercial property market. However, Ke et al. (2017) found significant spatial dependence in commercial property prices even after accounting for market segmentation using submarkets dummy.

SPATIAL ECONOMETRIC MODELS IN COMMERCIAL PROPERTY LOCATION MODELLING

Spatial econometrics is an improved econometric model that is developed to address the issues and failure of Ordinary Least Squares regression hedonic price modelling when dealing with spatial data to adequately account for spatial location effect (Yang, Wang, Zhou, & Wang, 2018). The HPM provides the basis for the application of spatial econometrics. Spatial data are characterised by spatial heterogeneity and autocorrelation (Meen, 2016; Noh, 2019). The major spatial econometric models are the Spatial Lag Model (SLM), Spatial Error Model (SEM) and Spatial Durbin Model (SDM). The choice of a particular model depends on the nature of spatial autocorrelation. These methods have been applied to model the commercial property market spatially and explicitly.

The spatial lag model is used to model the influence of neighbouring commercial property prices on the price of subject commercial property (Droj & Droj, 2015; Özyurt, 2014). The SLM lags the dependent variable by adding a spatially weighted matrix to the spatially lagged variable to modulate the spatial correlation between the property variables and their neighbours. The studies that model location explicitly using spatial lag model include that of Özyurt (2013, 2014), who modelled the commercial property market including retail, office and industrial properties in Netherland, found significant spatial dependence. The respective studies found that the spatial lag model improves modelling accuracy above the traditional hedonic price model. Other studies that utilised the spatial lag model in modelling commercial property market spatially include Chegut et al. (2015, 2013), Ke et al. (2017), Liang et al. (2017), Nappi-Choulet & Maury (2009) and Tu et al. (2004). The studies found significant spatial dependence in office market accounting for which significantly improved accuracy of commercial property price prediction.

The Spatial Error Model (SEM), on the other hand, is used to control the influence of spatial autocorrelation in modelling regional data. SEM models how the residuals are spatially correlated. The spatial error model is also based on the premise that spatial autocorrelation is generated by omitting key neighbourhood variables that are not observed (Yu, Zhang, et al., 2017). Thus, instead of lagging the dependent variable, the model incorporates the spatial effects in the error terms (Yang et al., 2018). The spatial error model has been used to model the commercial property market. The study of Seo et al. (2019) found a significant correlation in the error terms. Another study that used a spatial error model is Zhang, Du, Geng, Liu, & Huang (2015) who modelled the commercial property market for mass appraisal in Shenzhen, China, and found significant spatial heterogeneity. Accounting for the spatial effect in these models significantly improved the commercial property market modelling.

The Spatial Durbin Model (SDM), adds a spatial lag to the property price to control the dependence of property prices on the neighbouring property

prices and another spatial lag to the error term to control the spatial autocorrelation in the error terms (Li et al., 2015; Noh, 2019). Although the SDM has been applied in the residential property market and was found to significantly improve property price prediction accuracy (Li et al., 2015; Osland, 2010), there appears to be no evidence of its usage in modelling commercial property market.

CONCLUSION

Location is regarded as one of the most critical influencers of property prices. The popularised real estate parlance – Location, Location, Location – is a pointer of importance attached to the location in property pricing. The influence of location is more in the commercial property market. It is modelled traditionally using the conventional HPM by either controlling the neighbourhood effect using location dummies and by a relative distance of the subject property relative to other important landmarks. This implicit modelling of property location do not account for the spatial interactions inherent in the commercial property market. Such spatial interactions lead to spatial autocorrelation and heterogeneity. The error terms are spatially correlated against the Ordinary Least Squares (OLS) assumption of uncorrelated error terms and constant variance. The deficiency of the traditional method to account for the spatial effect leads to the estimated coefficients being bias, inconsistent and distorted. The spatial econometric techniques are developed to explicitly account for the location effect in property modelling by controlling spatial autocorrelation. Empirical researches show a superior performance of the spatial econometric models over the conventional hedonic pricing modelling in modelling location. However, despite this improved performance, the spatial econometric approach in modelling commercial property is rather minimal. This may not be unconnected with the general nature of the commercial property market lack of transaction data relative to other property classes. Accordingly, this paper reviewed the application of the spatial econometric models used in modelling the commercial property market. The review found that the spatial lag model has been applied in the commercial property market and found significant spatial dependence accounting, which improved the model's performance. The spatial error model was also found to enhance the performance of commercial property market modelling. However, the review does not found evidence of the application of SDM in the commercial property market even though the model was found very effective in housing market modelling. The review also found most of the studies that used spatial econometrics to be limited to the office submarket of the commercial property market. Thus, the paper recommends the application of spatial econometric models in modelling the commercial property market more especially the retail submarket. Similarly, the paper recommends the exploration of SDM in the commercial property market in future studies.

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INNOVATIONS OF VILLAGE ASSET MANAGEMENT: A CASE OF THE BEST INDONESIAN VILLAGE

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Abstract

The purpose of this paper is to analyze Innovation Patterns in Utilizing Village Assets. The data collections were conducted by interviewing three village asset managers and implementing field observation on the research object. The study suggested that innovative asset management implemented in Panggungharjo successfully provided fundamental contributions to its community. The village assets have been successfully managed to increase the community's earnings by creating innovative businesses such as technology-based business innovations and using exceptional business processes. This study was conducted in the Indonesian background. Nonetheless, the study results may not apply to village asset management in other countries, particularly the Western ones. At last, these findings are likely to have substantial implications for village asset managers from other villages in designing and implementing how to maximize village asset utilization for the benefit of the village community.

Keyword: Village, Asset Management, Innovation, Community

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INTRODUCTION

Policymakers, public sector managers, and employees agreed to increase innovation in their public services. That addresses the challenges of public service delivery in terms of efficiency and budget savings (de Vries, Bekkers, and Tummers 2016; Lindsay, 2018) as well as maintaining high levels of welfare services and helping to address economic and social challenges facing the public sector (Borin, 2001; Koch and Hauknes, 2005; Eggres and Singh, 2009). Successful innovation is the creation and implementation of new processes, products, services, and delivery methods, resulting in significant improvements in outcomes, efficiency, effectiveness, or quality (Albury, 2005).

One form of policy makers' support for village innovation in Indonesia is the issuance of Law Number 6 of 2014 regarding Village that gives the village authority to regulate and manage government affairs and the interests of its people independently. One of the objectives of village governance is to encourage village communities' initiatives, movements, and participation to develop village assets for the common welfare (Law 6/2014). Optimizing the use of village assets is one of the priorities of development and empowerment of rural communities, increasing original village income (Natalia, 2017) and playing a role in sustaining and mobilizing community livelihoods (Anwar, 2018). Optimizing the use of village assets is necessary to have good village asset management.

Village asset management practices have been carried out according to applicable regulations, but the implementation of its utilization has not been going well (Sutaryo, 2016; Risnawati, 2017). Village treasury land management is used more for the interests of the village head and village apparatus instead of the village apparatus income and less for the interests of the village community (Permatasari, 2013).

Unlike the condition of village asset land use in general, the utilization of village asset land in Panggungharjo village, Sewon District, Bantul Regency, Yogyakarta can be considered innovative. As one of the best villages in Indonesia, Panggungharjo utilizes village assets land in developing the economy with a community asset-based development concept approach (Nurjaman, 2018). This innovation in the use of village assets land has led Panggungharjo to get an international award from the 2019 ASEAN Leadership Award in Myanmar for contributing to rural development and poverty alleviation. Innovations made by the village government of Panggungharjo can be a benchmark for optimizing the utilization of village assets.

The village assets land of Panggungharjo are utilized for domestic waste management processes, the production of diesel fuel substitutes from used oil, the production of *tamanu* oils/*nyamplung* oil – a vegetable oil from *nyamplung* fruit seeds, the development of village tourism services, and the production of rice commodities as complementary products for the village's tourism business service. Innovations related to the use of village assets have become the domain of research

conducted. Previous research had been carried out by Nurjaman (2018) regarding the opportunities provided by the village law, village leadership, the strategy of the Village Owned Enterprises (VOEs) as an instrument of driving the village economy. However, this research has not identified innovation patterns related to the use of village assets. Therefore, we aim to fill in the gap to identify patterns of innovation related to the utilization of village assets, particularly in Panggungharjo. The results of this study can contribute practically to other village governments and policymakers in the use of village assets.

The rest of this paper is organized as follows; the second section reviews the literature addressing the definition of innovation and asset management. The third section explains the research methodology used and how the data were collected. The result of the research is presented in the fourth section. The fifth section explains the conclusion and the implications of the finding. The final section provides the limitation of this research and a suggestion for future research.

LITERATURE REVIEW

Innovation is a concept that Joseph Schumpeter introduced in 1934. Innovation is a final element of organizational change (Robbins, 2012; Griffin, 2012). It is the synergized effort of an organization to develop new products or services or new uses for existing products or services. Innovation started from creativity. Creativity refers to uniquely combining ideas or making unusual associations between ideas. A creative organization develops unique ways of working or novel solutions to problems. Hence, creativity by itself is not enough. The outcomes of the creative process need to be turned into valuable products or work methods, which is defined as innovation (Robbins, 2012). Innovation is crucial because, without new products or services, any organization will fall behind its competition or create customer satisfaction. Innovation is the key to sustainable success.

Governments around the world promote innovation as a critical tool to improve public services. Financial pressures and bureaucratic controls, along with the demands for better services, make innovation difficult but also necessary as the only practical way to approach citizens and respond to their requests (Robertson and Ball, 2002). Finally, encouraging innovation in public service delivery can create innovative governance (Tahir, 2016).

As the smallest government, the village government must also promote innovation in their every activity. One of the much-needed innovations is innovation in managing village assets. The Village law (Law 6/2014) stated that village assets belong to the village that originates from the village's original wealth are bought or obtained at the expense of the Village Budget and other legal rights. Village assets can be in the form of village treasury land, customary land, village markets, animal markets, boat moorings, village buildings, fish auctions, agricultural product auctions, village forests, village springs, public baths, and other village assets. Regarding the management of village assets, it is further regulated in Regulation of

the Minister of Internal Affairs No. 1 of 2016. Village asset management is a series of planning, procurement, use, utilization, security, maintenance, deletion, alienation, administration, reporting, appraisal, guidance, supervision, and control of village assets. Village asset management is based on functional principles, legal certainty, transparency and openness, efficiency, accountability, and value certainty.

Village assets can be utilized as long as they are not utilized directly to support village governance. Forms of use include rent, borrow and use, cooperation in utilization, built-operate-transfer, or built-transfer-operate. Utilization of village assets is stipulated in Village Regulation.

Utilization of assets in a lease does not change ownership status, and the maximum term is three years but can be extended. Utilization of assets in the form of loan-use/lease is carried out between the village government and other village governments and village community organizations. Leasing is excluded for land, buildings, and movable assets in the form of motorized vehicles. Collaborative use of land or buildings with other parties is carried out to optimize the effectiveness and effectiveness and increase village income. Collaboration on the use of village assets in land and buildings with other parties can be carried out if there are not enough funds available in the Village Revenue and Expenditure Budget. That collaboration covers the operational, maintenance, and repair costs needed for the land and building. However, other parties are prohibited from lending or mortgaging village assets which is the object of the utilization cooperation.

RESEARCH METHODS

The data collections were conducted by interviewing three village asset managers and implementing field observation on the research object. All the participants are the key person of asset management in Panggungharjo village. Interviews were conducted with the village head of Panggungharjo, the Manager of the Village-Owned Enterprises, and the treasurer of the Village-Owned Enterprises. In addition, observations were made to elaborate on more exciting findings.

FINDING AND DISCUSSIONS

A. Profile of Desa Panggungharjo

The Village of Panggungharjo consists of 14 hamlets divided into 118 household units that inhabit 560,966.5 hectares. Panggungharjo Village combines three villages, namely Cabeyan Village, Prancak Village, and Krapyak Village. Panggungharjo Village is one of the villages in Bantul Regency, directly bordered by the city of Yogyakarta, the capital city of the Special Region of Yogyakarta. Yogyakarta City borders the northern part of Panggungharjo village; the eastern part is Bangunharjo Village, Sewon District; the southern part is Timbulharjo Village, Sewon District; the western part is Pendowoharjo Village Sewon District and Tirtanirmolo Village Kasihan District.

As an area directly adjacent to the Yogyakarta urban area, Panggungharjo Village is an urban agglomeration area of Yogyakarta, a strategic economic area. As a result of the development of this strategic economic area is the development of land use. In the last five years, the pattern of land use in the village of Panggungharjo has experienced a significant change. The type of land has changed its function to become a settlement and business activity at around 2% per year.

Based on aggregate population data in 2018, the population of Panggungharjo Village was 28,141 people, consisting of 14,140 male inhabitants and 14,001 female residents. When compared with the population in 2017, there was a population growth of 1.89%. Population character is more characteristic of urban society because the income source of the population is no longer supported by the agricultural sector but is more dominated by the service and trade sectors. Poverty in this village characterizes the urban poor characterized by homeless, landless, and jobless conditions. This condition of poverty is a special concern for the Village Government, which should be alleviated through the use of village assets.

B. Profile of Asset Utilization

Panggungharjo Village is one of the leading villages in utilizing village assets. Panggungharjo village assets are used for several types of businesses, including domestic waste processing, the production of substitute diesel fuel from used oil, the production of tamanu oils/nyamplung oil, the development of village tourism services, and the production of rice commodities as complementary products for the village tourism business. The Village Owned Enterprises manage all utilization of village assets. Utilization of assets in 2017 generated Village Original Income of Rp 1,453,977,200 or contributed around 30% of total village income.

Table 1: Utilization of Panggungharjo Village Assets

Type of business	Form of Asset Utilization
Local Waste Management	Economic waste sorting
Production of diesel fuel substitutes	Processing used cooking oil / used cooking oil with diesel fuel substitute.
<i>Tamanu</i> Oils Production	Production of <i>Tamanu</i> Oils/ <i>nyamplung</i> oil as a raw material for cosmetics and medical stuff.
Village tourism services	a village tourism concept restaurant called " <i>Kampoeng Matraman</i> "
Rice Production	Rice production under the brand name "Bestari" in the <i>Mataram</i> -era village environment, as a supporting unit for tourism service businesses.

Source: processed from interviews

C. Analysis of Innovation Patterns in Utilizing Village Assets

The land assets of the village of Panggungharjo are not coming from natural resources. Unlike other villages that have village assets with abundant natural resources. The lack of value of village assets is not a reason to discourage steps from exploring the potential of these assets for the welfare of village communities. Informant 1, Head of the village of Panggungharjo said:

"If we do not have a landscape, then (we have to focus on) the life-scape. The social-scape, about culture, about economics, about technology, merely needs to be highly-utilized."

The statement of the village head is a motivation for village asset managers to be creative in producing innovative products or services. Not only relying on the natural wealth contained in village assets but also how to do innovative businesses to benefit through existing village assets by paying attention to what business is appropriate to run. The initial form of innovation is to determine good business in utilizing village assets. Informant 2, as the manager of village assets, said:

"What needs to be considered is how to start the Village-owned enterprise business focus; when we decided to build the wrong business unit, the business will be finished. Therefore, it must be very observant on how to choose a business unit. Therefore it needs to conduct a study before the establishment of the business. Next, we have to make a business plan, complete the business analysis."

Regarding the community's characteristics in Panggungharjo village that resembles the character of urban communities, asset utilization businesses tend to provide services. Informant 3 said:

"The business is more into services-based because there are five campuses around here, mostly for its citizens who set up boarding houses and restaurants. Laundry business too, so many services that can be explored."

Next, we will identify the forms of innovation found in each business unit that effectively utilizes village assets.

1. Domestic Waste Management

Waste management was established in 2013, starting with concern over increasingly worrisome environmental conditions. This domestic waste management is managed by the "KUPAS", a business unit that stands for Waste Management Business Group. The establishment of KUPAS by carrying the slogan "Caring Waste for the Future of Our Children and Grandchildren" means bringing together the strengths

of the village community with a caring orientation to the future of children. That is an affirmation of the commitment of the Panggungharjo Village Government to the community of Panggungharjo Village with its great potential through waste management which has become a classic problem in the Panggungharjo Village area.

This asset utilization innovation captures business opportunities that meet the livelihoods of the people. As long as the community needs it, we can take advantage of the effort. Informant 2 stated that:

“The business unit that controls the basic human life, garbage, as long as humans (it is unclear) how much additional human will produce waste, he will need forever related to waste management and processing, it becomes a basic human need.”

The revenue generated from waste management consists of three sources, firstly the income from retribution, secondly, the income from the sale of waste that still has economic value, and thirdly from making organic fertilizer. Village assets are used as a waste sorting process that still has economic value, such as plastic bottles. In addition, village assets are also used to process organic waste that can produce organic fertilizer. These organic fertilizers are marketed to plant traders and primarily to help healthy rice production business units.

When viewed from the perspective of the Habitability concept, the domestic waste management program is included in the elements of social-cultural and psychological aspects, which relate to people and their activities that affect the quality of a living environment. In socio-cultural aspects, the social needs of the people are a prerequisite in habitability (Meng, 2006). Finally, it can be said that this innovation is beneficial for public services.

2. Production of Solar Substitute Fuels

The processing of used cooking oil / used cooking oil with diesel fuel results is an innovation from Informant 1 that has been researching for two years. Informant 3 said that:

“The business of managing used cooking oil is also coming from Wahyudi’s contribution himself, who researched for years. The used cooking oil is only filtered, and the results are sent to the AQUA factory to fuel the factory as much as 10 tons per month. The results of this used fried oil processing are used as a substitute for fuel, 20% using used cooking oil, 80% is diesel fuel. Moreover, those who did the research were Wahyudi. The equipment in the box is all the initial bottles used by Wahyudi to conduct research. Suppose he researches returning to college. So, he likes to do research.”

The source of used cooking oil comes from collectors who have collaborated with the manager of this business unit. Informant 3 said that:

“So, we have collectors who deposit to us. Because if we look for it from the household, it will be difficult and time-consuming to collect. We work with collectors, and collectors usually take it in catering, large restaurants, hotels, something like that. Sometimes there are VOEs around Jogja that we always offer cooperation as collectors of used cooking oil.”

3. Tamanu Oils production

Village assets are used as a production location for Tamanu Oils / nyamplung oil. Tamanu Oils is a raw material for making cosmetics and medical drugs. The production process of Tamanu oils uses appropriate technology to utilize the fruit called *Nyamplung* waste that is on the southern coast of Java.

4. Village Tourism Services

Village tourism services in the village of Panggunharjo take advantage of the village's assets by establishing "Mataram village", a restaurant with a village tourism concept. The innovation presented in the Mataraman village presents the atmosphere of the life of the people of the Mataram Islamic era. Description of innovation explained by Informant 2:

"All forms of creativity are there, but when creativity is formed, no innovation will die. There is not the natural landscape that we are prioritizing, but education, so we have the Mataram village by the concept. We want to turn on, bring back the life of the era of the 19th time, the triumph of Islamic Mataram. We present an agrarian society that still uses buffalo for plowing. It became exciting and became a business opportunity. Jogja is a tourist destination, and tourists are returning, wanting to remember back to the life of his grandfather or his childhood, that is what they will tell his grandchildren, long time ago we were like this, seeing the shape of his house just remembered, the shape of the limasan house, seeing people wearing traditional clothes, using trousers to go to rice fields, to the market, using a headband. So that when we get there, already, that is innovation, we are aware, creativity if there is no innovation will die, so the innovations that we are doing now are adjusted to the desires of tourists or the community towards village life, again need a selfie, yes we prepare, there is a bridge from bamboo yes there is no connection. It cannot be bent, it becomes a question, the curved shape is confused, yes the bamboo is curved without a connection, we can see there is no connection, the archway is also curved, it can bend, the curved bridge is unbroken, it is an innovation that makes something, people Yes, we provide selfies, the culture of eating alone is different now, before eating it was praying. However, it is

innovation before eating, taking a picture, and uploading, so the Mataraman village is different from other food stalls because there is a concept. In Mataraman Village, non-MSG, non-MSG food is sold there, and the rice is also healthy, so that makes a difference. Because we are different from the others, the segments are different, right. The prices are affordable, the food served is healthy. In the past, Mataram was free from MSG."

The initial idea for establishing of the Mataraman village began with a problem that had arisen since Panggungharjo village became a pilot village for other village governments. The consequence of becoming a pilot village is that it often receives visits from other village governments nationwide. Informant 3 said:

"If there are visiting guests at the village hall, because our schedule is indeed a lot, I only receive three visits a day. Many visitors from outside the area cause the village hall filled by traders who sell like the incidental market."

Due to being overwhelmed by visits, it will be transferred to mataraman village when there is a visit from outsiders. There was also a team there that facilitated the visit. The effect is that if the visit would interfere with services to residents and drain the Panggungharjo village budget, now the citizens' service is prioritized, and guests will bring income to the village of Panggungharjo, because guests will spend money to get the facilities. Informant 3 says:

"Because it is we who take care of guest visits like that. At first, the one managing it was a village, but there were so many requests for a visit. Moreover, Pak Yudi is like, "This village takes care of guests, not taking care of citizens". Then finally at VOEs, right? We also contribute, especially if there are many like that. We provide snacks, consumption, and hospitality. So, after that, we make it a business opportunity."

5. Rice Production

The use of village assets is then the usage of land to produce healthy rice. In addition, healthy rice production in the mataram village environment, as a supporting unit for the Mataraman village tourism service business. Informant 3 said:

"We used to have healthy rice. That is the rice field in Matraman village. That is the village treasury and crooked. We rent crooked land per year of 20 million. In total, there are 6 hectares we use about 3 hectares we plant."

The innovation in utilizing village assets is the production of healthy rice. Rice produced is rice with quality and price that is more attractive than conventional rice. Informant 2 said:

"We do not call this organic rice, but we call it healthy because if it is organic, we have to go through water management. If in Panggungharjo it is wastewater, it requires quite expensive costs when we do water management, so this is 0% contamination of pesticides. We only call it healthy. The price is only Rp 12,000, almost the same as the hope that the lower-middle-class people can still access it because we serve not only the upper-middle class, there are middle-lower-class villagers, and some are upper-middle class."

CONCLUSION

This study is a qualitative study that identifies the patterns of innovative asset management in Panggungharjo, a village located in Yogyakarta, Indonesia. The village assets have been successfully managed to increase the community's earnings by creating innovative businesses such as technology-based business innovations and using exceptional business processes.

There is a pattern in the innovation of the use of village assets to provide income to the original village income and provide benefits to the community. First, the utilization of village assets must be directed to businesses that can provide profits and benefits, so it needs to be managed by a notable profit-oriented Village Institution (VOEs). Second, innovation in utilizing village assets must be posted on businesses that can meet the community's needs so that the market share is evident. Third, innovation in utilizing village assets needs to be combined with appropriate technology.

LIMITATION AND FUTURE RESEARCH

This study was conducted in the Indonesian settings. Nonetheless, the study results may not apply to village asset management in other countries, particularly the Western ones. At last, these findings are likely to have substantial implications for village asset managers from other villages in designing and implementing how to maximize village asset utilization for the benefit of the village community.

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SIGNIFICANCE AND PERFORMANCE OF PROPERTY MARKETS IN MALAYSIA

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Abstract

The importance of the global real estate market has been widely debated over the last decade. Prior discussion has focused on various aspects of analysis used to evaluate the performance of the property market, such as statistical analysis, surveys, academic or industrial literature. As a result, it is also necessary to examine the global and Asian property markets while also evaluating the significance and performance of the Malaysian property market in comparison to other Asian markets to determine Malaysia's international contribution to the global property market. The performance of Malaysia's property market from 2015 to 2018 was examined in this study. Data was gathered using Thomson Router Data Stream from Real Capital Analytic, Asia Pacific Real Estate Association (APREA), World Economic Forum, and Transparency International, among others. The study's findings will extend knowledge not only of the performance and significance of the Malaysian property market, but also of GDP growth, inflation rate, market ranking global, competitiveness business environment index, corruption perception, and risk and transparency index in Malaysia and across Asian countries. The overall results indicate that the performance and signs of the Malaysian real estate market were better compared to other Asian and developing markets.

Keyword: significance, performance of property market

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RESEARCH BACKGROUND

The importance of the global real estate market has been widely debated over the last decade. Prior discussion has focused on various aspects of analysis used to evaluate the performance of the property market, such as statistical analysis, surveys, academic or industrial literature. As a result, it is also necessary to examine the global and Asian property markets while also assessing the significance and performance of the Malaysian property market in comparison to other Asian property markets. To strengthen the findings of this study, a comparison with other countries will be made to determine the international contribution of the Malaysian property market in global portfolios. The study included perspectives from Malaysians, Asians, and selected developed countries as a benchmark for the home nation. It begins by addressing the global countries, Asian countries, and previous studies that have influenced this research.

LITERATURE REVIEW

There have only been a few studies that focused on Malaysian property market performance. As an example, Ting and Tan (2008) expressed an interest in the Malaysian real estate market, but only for residential properties. Ting (2002) investigated the comprehensive comparative analysis of Malaysian listed property companies; however, the research was limited to shares of property market significance and performance.

Global real estate has been going to look for real estate investment opportunities in emerging real estate markets, particularly in Asia, in recent years. This trend reflects research highlighting the benefits of including international real estate in mixed-asset portfolios for portfolio diversification (Wilson and Okunev, 1996; Steinert and Crowe, 2001; Bond, Karolyi, and Sanders, 2003; Conover, Friday, and Sirmans, 2003; and Hoesli, Lekander, and Wit-kiewicz, 2005). This has contributed in recent emphasis on the dynamics of specific Asian real estate markets (e.g., Hong Kong) (Newell and Chau, 1996; Chau, MacGregor, and Schwann, 2001; Chau, Wong, and Newell, 2003; Schwann and Chau, 2003; and Newell, Chau, and Wong, 2004), the development of Asian REITs (UBS, 2005; and Ooi, Newell, and Sing, 2006), and the rapidly growing real estate (Tse, Chiang, and Raftery, 1998; Webb and Tse, 2000; Chu and Sing, 2004; and Newell, Chau, Wong, and Mc-Kinnell, 2005). In summary, recent research of the Malaysian property market is still limited when compared to other countries; thus, there are several opportunities to explore Malaysia property market research. Nevertheless, no evident study has been undertaken on the significance and performance of the Malaysian property market.

Global Economy Context

The first quarter of 2018 saw a big decline in real estate investment activity that was globally closely linked. Confidence has since improved, but after five years of growth in investment turnaround, investors are starting to wonder if the cycle's end is near. Most likely not, for two reasons: The first is strong economic growth. Property investment does not exist in a vacuum; it is part of a larger economic integration process. According to economists, GDP growth is the most important single driver of total capital flows and real estate flows. GDP growth generates occupier demand for space and thus supports rent values, but it also generates market confidence and banks' lending confidence. Surprisingly, the global economy has been growing in both real and nominal terms over the last seven years. Overall, it has grown much faster than real estate investment flows, so real estate investment remains well below its recent peak as a percentage of global GDP. As a result of previous nominal growth and future real growth, global economic support for real estate investment remains strong.

The Malaysian Performance Economy

Malaysia's economy grew by 4.3 % in the third quarter of 2016 (2Q 2016: 4.0 %), primarily driven by continued growth in private sector spending and additional support from net exports. On the supply side, the major economic sectors continued to drive growth. On a seasonally adjusted quarterly basis, the economy grew by 1.5 % from one quarter to the next (2Q 2016: 0.7 %). The Malaysian economy weathered through significant headwinds in 2014 and 2015, such as the fall in commodities prices, a dismal global trade environment, and a weakened Ringgit to emerge relatively unscathed. Nominal GDP grew 22 times from 1980 to 2015, while nominal GDP per person grew 9.9 times in the same period. Malaysia's GDP per person remains higher than the average for upper-middle-income countries. In absolute terms, this meant that average monthly household incomes grew by RM1,141, while median household incomes grew by RM959 per month. Progress in household income, in turn, drove a decrease in the poverty rate, which stood at 0.6 % in 2014, down from 1.7 % in 2012.

Services grew 6.1 % backed by wholesale & retail trade, information & communication, and food & beverage and accommodation. Manufacturing sector increased to 4.3 % contributed by electrical, electronic & optical products and petroleum, chemical, rubber & plastic products. Meanwhile, the mining and quarrying sector rebounded to 2.9 % driven by the recovery in natural gas production. The agriculture sector posted a growth of 4.2 % following a moderation in Oil palm and contraction in Fishing and Forestry & logging. The construction sector grew marginally at 0.5 % contributed by Civil engineering and Specialised construction activities. Businesses are more confident for the second quarter of 2019, with the overall confidence indicator rising to +2.8 % from -2.2 % in the first quarter of 2019.

Global Real Estate Transparency Index

The ninth edition of the Global Real Estate Transparency Index (GRETI) contains the most comprehensive country comparisons of data availability, governance, transaction processes, property rights, and the regulatory and legal environment around the world. The Index is updated every two years and has been charting the evolution of real estate transparency across the globe for 17 years. The 2018 Index includes 109 markets. The 2018 Index has increased granularity in response to the real estate industry's need for more detailed data to inform decisions. Additional elements include the availability of disaggregated datasets; data on alternative sectors (such as student housing and self-storage); and aggregate data on debt and financing conditions. This has resulted in a 21% increase in the number of individual factors covered to 139. Although the survey's consistency is not compromised, increased scrutiny and the explicit inclusion of more factors account for some of the changes in score between 2016 and 2018. Since the index's inception in 1999, its components have evolved and been refined to reflect the changing needs of global investors and corporate occupiers. As a result, in order to allow for cross-temporal comparisons, the index has recreated a historic Transparency Index based on current weights and questions, emphasising that the recalibrated historic Indices differ from those published at the time of each survey.

METHODOLOGY

In order to provide convincing results, the three research objectives will be examined using a variety of scientific methodologies. The primary source for this research is secondary data. Secondary data was gathered at Western Sydney University using Thomson Router Data Stream. Secondary data sources included journals and annual reports from Real Capital Analytic, Asia Pacific Real Estate Association (APREA), World Economic Forum, and Transparency International, among others.

DATA ANALYSIS

Malaysia GDP

GDP at purchaser's prices equals the sum of the gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the product value. It is calculated without accounting for the depreciation of manufactured assets or the depletion and degradation of natural resources. The figures are in current US dollars. Dollar GDP figures are calculated by converting domestic currencies to US dollars using one-year official exchange rates. An alternative conversion factor is used in a few countries where the official exchange rate does not accurately represent the rate effectively applied to actual foreign transactions.

Table 1: Malaysia GDP vs Asian GDP

Country	2015	2016	2017	2018
Brunei Darussalam	16953505122	16110693734	17104656669	15492035784
Cambodia	14038383450	15449630419	16777820333	18049954289
Indonesia	9.1787E+11	9.12524E+11	8.90487E+11	8.61934E+11
Lao PDR	9359185244	11192471435	11715619756	12327488341
Malaysia	3.14443E+11	3.23343E+11	3.38104E+11	4.96218E+11
Myanmar	74690222131	58652652371	64330041773	64865515159
Philippines	2.50092E+11	2.71927E+11	2.84777E+11	2.91965E+11
Singapore	2.89269E+11	3.00288E+11	3.06344E+11	2.92739E+11
Thailand	3.97291E+11	4.19889E+11	4.0432E+11	3.95282E+11
Vietnam	1.5582E+11	1.71222E+11	1.86205E+11	1.93599E+11

Source: Author's Compilation

Malaysia GDP Growth vs Asian GDP Growth

The annual percentage growth rate of GDP at market prices is based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

Table 2: Malaysia GDP Growth vs Asian GDP Growth

Country	2010	2014	2015	2016	2017	2018
Brunei Darussalam	2.60	3.43	0.95	-1.75	-2.34	-0.50
Cambodia	5.96	7.07	7.26	7.48	7.07	7.04
Indonesia	6.22	6.17	6.03	5.56	5.02	4.79
Lao PDR	8.53	8.04	8.02	8.47	7.52	7.00
Malaysia	7.43	5.29	4.47	4.71	4.50	4.95
Myanmar	8.52	8.50	6.99
Philippines	7.63	3.66	6.68	7.06	6.13	5.81
Singapore	15.24	6.21	3.67	4.68	3.26	2.01
Thailand	7.51	0.83	7.23	2.70	0.82	2.82
Vietnam	6.42	6.24	5.25	5.42	5.98	6.68

Source: Author's Compilation

The World's Top 5 Economies Country & Asian Inflation Rate:

Inflation, as measured by the annual growth rate of the GDP implicit deflator, shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.

Table 3: The World's Top 5 Economies Country & Asian Inflation Rate

Country	2010	2014	2015	2016	2017	2018
World	4.49	5.69	3.59	2.27	2.11	1.43
The World's Top 5 Economies Country						
United States	1.22	2.06	1.84	1.63	1.64	1.00
China	6.94	8.14	2.39	2.23	0.82	-0.45
Japan	-2.16	-1.85	-0.93	-0.56	1.67	2.01
Germany	0.76	1.07	1.50	2.09	1.73	2.06
United Kingdom	3.11	2.10	1.63	1.99	1.84	0.27
Asian						
Brunei Darussalam	5.31	20.35	-0.05	-3.15	10.09	-1.22
Cambodia	3.12	3.36	1.37	2.25	1.68	1.26
Indonesia	15.26	7.47	3.75	4.97	5.39	4.23
Lao PDR	10.02	3.80	4.31	8.22	-0.30	-0.45
Malaysia	7.27	5.41	1.00	0.18	2.47	-0.39
Myanmar				5.45	6.59	11.31
Philippines	4.22	4.02	1.97	2.09	3.21	-0.68
Singapore	-0.05	1.11	0.73	-0.70	0.04	1.64
Thailand	4.08	3.75	1.91	1.73	0.96	0.26
Vietnam	12.07	21.26	10.93	4.76	3.66	-0.19

Source: Author's Compilation

Table 4: Top 10 Global Competitiveness Business Environment Index 2018-2016

Year's	Global/Score	Asia Pacific vs Global /Score
2018	1. Switzerland – 5.81	1. Singapore (#2) – 5.72
	2. Singapore – 5.72	2. Japan (#8) – 5.48
	3. USA – 5.70	3. Hong Kong (#9) – 5.48
	4. Netherlands – 5.57	4. New Zealand (#13) – 5.31
	5. Germany – 5.57	5. Taiwan, China (#14) – 5.28
	6. Sweden – 5.53	6. Australia (#22) – 5.19
	1. UK – 5.49	7. Malaysia (#25) – 5.16
	8. Japan – 5.48	8. Korea (#26) – 5.03
	2. Hong Kong – 5.48	9. China (#28) – 4.95
	10. Finland – 5.44	10. Thailand (#34) – 4.64
2017	1. Switzerland – 5.76	1. Singapore (#2) – 5.68
	2. Singapore – 5.68	2. Japan (#6) – 5.47
	3. USA – 5.61	3. Hong Kong (#7) – 5.46
	4. Germany- 5.53	4. Taiwan, China (#15) – 5.28
	5. Netherlands – 5.50	5. New Zealand (#16) – 5.29
	6. Japan – 5.47	6. Malaysia (#18) – 5.24
	7. Hong Kong – 5.46	7. Australia (#21) – 5.15
	8. Finland – 5.45	8. Korea (#26) – 4.99

2016	9.	Sweden – 5.43	9.	China (#28) – 4.89
	10.	UK – 5.43	10.	Thailand (#32) – 4.64
	1.	Switzerland – 5.70	1.	Singapore (#2) – 5.65
	2.	Singapore – 5.65	2.	Japan (#6) – 5.47
	3.	USA – 5.54	3.	Hong Kong (#7) – 5.46
	4.	Finland – 5.50	4.	Taiwan, China (#14) – 5.25
	5.	Germany – 5.49	5.	New Zealand (#17) – 5.20
	6.	Japan – 5.47	6.	Malaysia (#20) – 5.16
	7.	Hong Kong – 5.46	7.	Australia (#22) – 5.08
	8.	Netherlands – 5.45	8.	Korea (#26) – 4.96
9.	UK – 5.41	9.	China (#28) – 4.89	
10.	Sweden – 5.41	10.	Thailand (#31) – 4.66	

Source: Author's Compilation

Table 5 : Top 5 Global Corruption Perceptions Index

Global_Rank	Score	Country
1	91	Denmark
2	90	Finland
3	89	Sweden
4	88	New Zealand
5	87	Netherlands & Norway

Source: Authors compilation

Table 6: Asia Pasific Corruption Perceptions Index

Asia Rank	Global Rank	Score	Country
1	4	88	New Zealand
2	8	85	Singapore
3	13	79	Australia
4	18	75	Hong Kong & Japan
6	27	65	Bhutan
7	30	62	Taiwan
8	37	56	Korea (South)
9	54	50	Malaysia
10	72	39	Mongolia
11	76	38	India & Thailand
13	83	37	China & Sri Lanka
15	88	36	Indonesia
16	95	35	Philippines
17	112	31	Vietnam
18	117	30	Pakistan
19	123	28	Timor-Leste
20	130	27	Nepal

Table 7 : Asian Corruption Perceptions Index

Asian Rank	Asia Rank	Global Rank	Score	Country
1	2	8	85	Singapore
2	9	54	50	Malaysia
3	11	76	38	Thailand
4	15	88	36	Indonesia
5	16	95	35	Philippines
6	17	112	31	Vietnam
7	21	139	25	Laos
8	24	147	22	Myanmar
9	25	150	21	Cambodia

Source: Authors compilation

Table 8 : Global Transparency Index

Global Rank	Score	Country	Transparency Level
1	1.24	UK	High
2	1.27	Australia	High
3	1.28	Canada	High
4	1.29	USA	High
5	1.34	France	High
6	1.45	New Zealand	High
7	1.49	Netherlands	High
8	1.60	Ireland	High
9	1.65	Germany	High
10	1.66	Finland	High

Source: Authors compilation

Table 9: Asia Pacific Transparency Index

Asia Rank	Global Rank	Score	Country	Transparency Level
1	2	1.27	Australia	High
2	6	1.45	New Zealand	High
3	11	1.82	Singapore	High
4	15	1.89	Hong Kong	High
5	19	2.03	Japan	Transparent
6	23	2.14	Taiwan	Transparent
7	28	2.35	Malaysia	Transparent
8	33	2.52	China – Tier 1	Semi
9	36	2.61	India – Tier 1	Semi
10	38	2.65	Thailand	Semi

Source: Authors compilation

Table 10: Asian Transparency Index

Asian Rank	Asia Rank	Global Rank	Score	Country	Transparency_Level
1	3	11	1.82	Singapore	High
2	7	28	2.35	Malaysia	Transparent
3	10	38	2.65	Thailand	Semi
4	13	45	2.69	Indonesia	Semi
5	14	46	2.78	Philippines	Semi
6	19	68	3.49	Vietnam	Low
7	22	95	4.17	Myanmar	Opaque

Source: Authors compilation

Table 11: Summary of Size of the Total Real Estate Market for Developed and Emerging Market

Countries	2018					
	GDP (\$ Bn)	GDP per capita	Real Estate	Total	Number of	Of which
	(\$ Bn)	(\$ Bn)	(\$ Bn)	Listed (\$ Bn)	Companies	REITs
Australia	1,501.04	69,767.29	675.47	84.78	70	48
Hong Kong	276.46	39,313.79	276.46	165.07	30	8
Japan	5,252.07	41,166.48	2,363.43	190.07	123	50
N. Zealand	184.66	43,433.30	83.10	5.02	8	5
Singapore	299.34	58,225.19	299.34	85.26	50	36
South Korea	1,320.64	27,155.50	594.29	1.44	6	4
Austria	431.27	52,506.30	194.07	6.61	10	-
Belgium	527.10	50,573.31	237.20	11.95	22	16
Denmark	337.00	61,100.21	151.65	1.79	12	1
Finland	268.46	51,090.39	120.81	10.12	11	2
France	2,799.54	43,110.58	1,259.80	66.35	52	28
Germany	3,828.76	46,888.89	1,722.94	42.07	54	2
Greece	243.99	22,699.94	109.80	1.29	11	2
Ireland	242.42	52,436.11	109.09	2.75	3	3
Italy	2,139.69	35,231.08	962.86	5.52	12	2
Luxembourg	61.61	123,808.48	27.72	0.31	2	-
Netherlands	862.27	52,029.05	388.02	31.12	9	5
Norway	510.38	104,319.40	229.67	7.16	7	-
Portugal	225.08	20,968.36	101.28	0.68	5	-
Spain	1,393.49	29,965.12	627.07	22.28	25	4
Sweden	567.37	60,176.54	255.32	37.57	36	-
Switzerland	690.01	88,795.78	310.50	45.76	38	-
U.K	2,862.16	45,906.65	1,287.97	83.92	63	28
Israel	476.58	64,329.53	214.46	12.75	31	1
Canada	1,816.27	53,800.81	817.32	61.46	85	55
US	16,908.43	54,685.02	7,608.80	925.97	211	165
China	9,908.20	7,448.91	2,935.12	415.17	132	-
India	1,943.45	1,656.77	348.83	12.31	90	-

Indonesia	933.91	3,837.10	221.78	21.51	50	1
Malaysia	324.93	11,492.33	111.22	25.54	92	15
Pakistan	189.36	1,119.79	29.83	0.25	3	1
Philippines	267.92	2,681.76	56.46	42.08	47	-
Taiwan	355.47	15,375.18	134.07	12.10	34	5
Thailand	404.54	6,063.80	111.89	43.95	107	54
Czech Rep.	210.11	19,927.41	86.40	-	-	-
Egypt	214.15	2,742.50	45.47	7.53	28	-
Hungary	139.08	13,919.87	50.75	0.13	4	-
Morocco	96.34	3,078.28	21.26	1.18	4	-
Poland	529.43	13,764.82	192.45	2.50	37	-
Russia	1,963.14	13,776.39	713.82	2.45	1	-
South Africa	367.11	7,139.40	107.22	29.20	38	28
Turkey	804.47	10,340.70	265.84	7.62	28	21
UEA	307.48	64.38	76.87	32.66	11	2
Brazil	2,395.51	13,031.28	855.04	12.27	56	25
Chile	265.70	16,785.55	103.19	1.50	10	-
Colombia	372.59	9,104.84	118.01	-	-	-
Mexico	1,253.49	11,911.76	434.22	19.79	17	11
Peru	197.19	7,268.16	57.94	0.34	1	-
World	69,469.66	1,579,950.28	28,106.12	2,599.15	1,776	628

Source: Authors compilation

Table 12 (cont.): Summary of Size of the Total Real Estate Market for Developed and Emerging Market

Countries	2018				
	Index	No. of Index	Stock Market	RE/Stk Mkt	Listed RE/Ttl RE
	Market Cap (\$ Bn)	Constituents	(\$ Bn)	%	%
Australia	74	13	1,072	7.91%	12.55%
Hong Kong	99	14	4,105	4.02%	59.71%
Japan	140	37	5,030	3.78%	8.04%
N. Zealand	1	1	69	7.27%	6.04%
Singapore	25	11	463	18.40%	28.48%
South Korea	-	-	1,196	0.12%	0.24%
Austria	4	3	97	6.79%	3.41%
Belgium	6	7	408	2.93%	5.04%
Denmark	-	-	391	0.46%	1.18%
Finland	2	3	201	5.03%	8.38%
France	20	7	1,916	3.46%	5.27%
Germany	39	12	1,843	2.28%	2.44%
Greece	-	1	39	3.35%	1.18%
Ireland	-	-	119	2.32%	2.52%
Italy	1	2	599	0.92%	0.57%
Luxembourg	-	-	21	1.52%	1.13%

Netherlands	31	5	394	7.89%	8.02%
Norway	1	2	203	3.52%	3.12%
Portugal	-	-	62	1.10%	0.67%
Spain	7	4	659	3.38%	3.55%
Sweden	15	11	675	5.56%	14.71%
Switzerland	11	4	1,519	3.01%	14.74%
U.K	81	32	3,374	2.49%	6.52%
Israel	1	1	41	28.68%	5.94%
Canada	32	20	1,615	3.80%	7.52%
United States	693	132	23,544	3.93%	12.17%
China	74	53	7,092	5.85%	14.14%
India	2	5	1,516	0.81%	3.53%
Indonesia	8	12	350	6.14%	9.70%
Malaysia	5	12	377	6.77%	22.96%
Pakistan	-	-	-	0.00%	0.84%
Philippines	11	7	235	17.91%	74.53%
Taiwan	-	1	860	1.41%	9.02%
Thailand	5	14	333	13.20%	39.28%
Czech Rep.	-	-	26	0.00%	0.00%
Egypt	-	2	42	17.77%	16.56%
Hungary	-	-	17	0.73%	0.25%
Morocco	-	-	41	0.00%	5.55%
Poland	-	-	136	1.83%	1.30%
Russia	2	1	388	0.63%	0.34%
South Africa	13	10	41	39.65%	27.23%
Turkey	2	4	181	4.21%	2.78%
UAE	4	4	41	17.50%	42.49%
Brazil	5	17	454	2.70%	1.43%
Chile	-	1	191	0.79%	1.46%
Colombia	-	-	85	0.00%	0.00%
Mexico	9	7	358	5.53%	4.56%
Peru	-	-	46	0.74%	0.59%
World	1,423	472	62,465	4.16%	9.25%

Source: Authors compilation

CONCLUSION

This paper has significantly contributed to the literature on real estate performance, especially in the Malaysian context. This study, in particular, looked at the performance of the Malaysian property market. Malaysia can still offer very great opportunities in real estate investment if politics are stabilised, there is high transparency, there are fewer natural disasters. Secondly, other asset classes seem able to attract more investors to Malaysia compared to other pan-Asian countries. Malaysia has one of the largest investment market portfolios in Asia. This has been proven based on the performance of GDP growth, top 3 for

Asian market ranking, top 10 for global competitive business environment index in the Asia Pacific and transparent country. The opportunity to gain more profits from investments may come from property investment portfolios, as this investment type has had an outstanding previous performance record.

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PREVENTIF STATE ASSET MANAGEMENT VS SULTAN GROUND: A STUDY CASE IN SPECIAL REGION OF YOGYAKARTA

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Abstract

This research uses principal negotiation theory to identify further a dispute emerging between the state asset manager, the central government, and the special local government, the sultanate government. This study examines the dispute resolution and the implementation of the dispute resolution between applying the Yogyakarta Privileges Act to the management of State Property. This research uses study literature, secondary data and then is analyzed qualitatively. This study explains that dispute resolution outside the court is more effective and efficient in managing state property. The costs incurred are enormous, and the time required is extensive. Therefore, it is better to immediately design policies, breakthroughs, and arrangements for resolving disputes between state property and sultanate ground. This study was conducted in the Indonesian context. However, the study's findings may not be generalizable to State Asset Management in other countries, especially the Western ones. These findings are likely to have significant implications for State Asset Management in designing and implementing how to resolve dispute problems in asset management in the unique region of Yogyakarta.

Keyword: State Asset Management, Sultanate Ground, Dispute Resolution, State Asset Management policy

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INTRODUCTION

The authority of the Special Region of Yogyakarta, referred to like DIY, as an autonomous region encompasses authority in the affairs of Regional Government and the affairs of Privileges. Privileged affairs have the authority to include rules for staffing commissions, standpoints, and authority of the Governor and Deputy Governor, DIY Regional Government institutions, culture, land, and spatial planning. It provides a broader understanding of terms that are commonly known without making new definitions. The Special Region of Yogyakarta has a more comprehensive specialty stated in Act Number 13 of 2012.

The Land Special Privileges of the Special Region of Yogyakarta are very broad and connected with regulations regarding the Management of State Property. Land disputes are protracted and expensive. Management of state property is the smallest part of State Finance Management. From the point of view of the State Finance, only court decisions that have permanent legal force are recognized and implemented. On the other hand, there are procedures outside the court line regulated in Law Number 30 of 1999 relating Arbitration and Alternative Dispute Resolution. Although there is a legal basis for resolving cases in the land sector through Law Number 30 of 1999 relating Arbitration and Alternative Dispute Resolution, it does not provide legal certainty for the executor of the agreement on arbitration and alternative dispute resolution. In the context of DIY Specialties in terms of land, it connects to state property. In the context of resolving disputes that are fast, simple, inexpensive, providing legal certainty, maintaining the authority of the state and the legal entity Privileges of the Special Region of Yogyakarta, alternative disputes settlement in the land sector is needed.

LITERATURE BACKGROUND

A. Pure Theory of Law according to Hans Kelsen

The Pure Law Theory is a theory that aims to notice and explain its goal. This theory seeks to answer what law is and how it exists, not how it should exist. It is named pure legal theory since it merely describes the law and investigates to refine the object of its explanation of everything that has less linked with the law. The purpose is to clear jurisprudence from unknown elements (Kelsen, 1967:1).

Hans Kelsen also stated that in the process of legislation formation, the theory of the level of law (*Stufentheorie*). In this theory, Hans Kelsen says that legal regulations are layered in a hierarchy. Higher regulations are applied, originate, and are based on higher regulations, and arrive at regulations that cannot be traced further are hypothetical and fictitious, called the basic regulation (*Grundnorm*). Basic Norms are the paramount regulations in a system of regulations no longer formed by higher regulations, but the basic regulations are determined in advance by the society as the basic norms, which are the source of

the following norms. Therefore, a Basic Norm is said to be pre-supposed (Farida, 2010).

Hans Nawiasky, a colleague of Hans Kelsen, developed the theory of the level of law. Regulations that are leveled and at several levels, the legal regulations of a country are also organized, and the organization of legal regulations in a country consists of four main groups, among others:

- a) First association: Staatsfundamentalnorm (Basic Regulations of the State);
- b) Second association: Staatsgrundgesetz (Basic Rules / Basic Rules of the State);
- c) Third association: Formell Gesetz ("formal" law);
- d) Fourth association: Verordnung & Autonome Satzung (Implementation of norms/autonomous norms).

Staatsfundamentalnorm is norms that underlie the formation of a constitution or a country's constitution (*Staatsverfassung*), including the norms for its changes. The legal nature of a *Staatsfundamentalnorm* is a condition for the validity of a constitution. It was available before the constitution (Farida, *ibid*). Furthermore, Hans Nawiasky argues that the highest norm, which Kelsen calls the fundamental norm in a country, should not be called staatsgrundnorm but staatsfundamentalnorm or the state's fundamental norm. *Grundnorm* tends not to change or be permanent, whereas, in a country, the country's fundamental norms can change at any time due to rebellions, coups, and so on (Sihombing, 2016).

Law Number 12, 2011, concerning Formation of Regulations (Law on the Establishment of Regulations). In Article 7 paragraph (1) of the Law, Establishment of Law regulates the hierarchy of laws and regulations as follows:

1. The 1945 State Constitution.
2. Decree of the People's Consultative Assembly;
3. Government Act / Regulation in Lieu of Law;
4. Government Regulations;
5. Presidential Regulation;
6. Provincial Regulations; and
7. Regency / City Regional Regulations.

In addition to Article 7 paragraph (1) of the Law on the Establishment of Laws, also regulated in Article 8 paragraph (1) includes regulations stipulated by the People's Consultative Assembly, the House of Representatives, the Regional Representative Council, the Supreme Court, the Constitutional Court, the Supreme Audit Board Judicial Commission, Central Bank, Ministers, agencies, institutions, or commissions of the same level formed by Law or Government by order of the Law, Provincial Regional Representative Council, Governor, Regency / City Regional Representative Council, Regent / Mayor Village head or equivalent. The provisions mentioned above are recognized and

have binding legal force insofar as they are ordered by higher Regulations or are formed based on authority.

The contents of the lower material must be following the content of the laws upper degree. Otherwise, the legislation does not have binding legal force.

B. Previous Researches

No	Author	Theme	Research Gap
1.	M Syamsudin	Procedural and Substantive Justice in <i>Magersari</i> Land Dispute Decisions	In the study done by M Syamsudin, the object of research is a court decision regarding the <i>Magersari</i> land dispute, while the object of this study is the substance of the regulation itself.
2.	Diaswati Mardiasmo and Paul Barnes	A Pandora Box Effect to State Asset Management in DIY Yogyakarta	In the research conducted by Diaswati Mardiasmo and Paul Barnes, the emphasis is more on the process of managing state asset management, while this research emphasizes alternative dispute resolution beyond those previously set.

RESEARCH METHOD

The main issues in this study are reviewed in a juridical-normative manner, namely by studying or analyzing primary data in the form of primary legal materials by understanding the law as a set of rules or positive norms in the legislative system governing the issues in this study. Hence, this research is understood as library research, namely research on secondary data. The paradigm used in this study is the legal positivism paradigm based on Guba and Lincoln (1994).

This study using the legal meaning is interpreted as a product of the ruling. *Law* is defined as a set of written regulations made by the government under its authority. In addition, the legal approach used in this study is that law is assumed to be natural moral values of justice and universal (law as what ought to be). The approach used in this study is the statutory approach and the historical approach.

This study carried out a literature search with secondary data as information, both in the form of primary legal materials and secondary legal materials. Primary legal material consists of the 1945 Constitution, which has been fourth amended. Law Number 1 of 2004 concerning the State Treasury, Law Number 13 of 2012 concerning Privileges of the Special Region of Yogyakarta,

Law Number 12 of 2011 concerning Formation of Legislation, HIR (*Het Herziene Indonesisch Reglement*) / Indonesian Regulations that are renewed: S. 1848 no. 16, S. 1941 no. 44, Rbg (*Rechtsreglement Buitengewesten*) / Regional regulation opposite: S. 1927 no. 227, Rv (*Reglement op de Burgerlijke rechtsvordering*): S. 1847 no. 52, S. 1849 no. 63, RO (*Reglement op de Rechterlijke Organisatie in hed beleid der Justitie in Indonesie*) / Regulations on Judicial Organizations: S. 1847 no. 23, Law Number 30 of 1999 concerning Arbitration and Alternative Dispute Resolution, Law Number 20 of 1947 of the Trial Court, Law Number 14 of 1970 concerning Basic Provisions of Judicial Power joucto Law Number 48 of 2009 concerning Judicial Power, Law Number 14 of 1985 concerning the Supreme Court joucto Law Number 3 of 2009, Law Number 2 of 1986 concerning General Judgment joucto Law Number 49 of 2009.

FINDINGS AND DISCUSSION

A. Outstanding Land Location of the Special Region of Yogyakarta

Yogyakarta has been a special region since its establishment in 1950 and since its recognition was in 1945. In the law on DIY formation, DIY has a legal status as a provincial-level special area. The specialty lies in appointing special regional heads and deputy heads of special regions for Sultan and Paku Alam, who are on the throne. However, the specialties of DIY are not included in the training law but only in local government laws that govern the entire territory of Indonesia in general. In 1965, the legal status of do-it-yourself was reduced to an ordinary provincial territory, and finally, in 1999 and 2004, the right of do-it-yourself entered the territory without law.

After the issuance of Law Number 13 of 2012, DIY functions consist of (a) the techniques for filling the positions, positions, responsibilities, and government of the Governor and Deputy Governor; (b) DIY Local Government institutions; (c) culture; (d) land; and (e) spatial. Privileges with inside techniques for filling positions, positions, responsibilities, and government of the Governor and Deputy Governor consist of unique situations for the possible governor of DIY, particularly Sultan Hamengkubuwana, who has enthroned, and the deputy governor is the Duke of Paku Alam, who has enthroned. The Governor and Deputy Governor have equal position, responsibilities, and government as different Governors and Deputy Governors, plus privileged affairs. The unique functions withinside the institutional region of the Regional Government of DIY are the association and resolution of institutions, with unique nearby regulations, to acquire the effectiveness and performance of governance and public carrier primarily based totally on the ideas of responsibility, accountability, transparency, and participation through contemplating the shape and composition of the authentic government.

The specialty in culture is the care and development of creations, tastes, initiatives and works in the form of values, knowledge, norms, customs, objects, arts and noble traditions that are rooted in the DIY society and regulated by regional regulations. Privileges in the land sector, namely the Sultanate and the District, have authority to manage and utilize the land of the Sultanate and the District land intended to use the most incredible opportunity to develop culture, social interests, and community welfare. The specialty in the spatial layout is the authority of the Sultanate and District on the management and utilization of the Sultanate's land and the District's land.

The form of this privilege is the Sultan Ground (SG) which is the land owned by the Ngayogyakarta Hadiningrat Sultanate and managed to benefit the people's welfare. The Sultanate provides a sign of permission to use SG land with a letter of concern, which is the "Consequence of the Signing of the Cooperation Agreement to anyone occupying land that is categorized as the Sultan Ground as the basis for issuing building construction permits and occupying permits." Based on Article 32 paragraph 2, Law Number 13 the Year 2012 concerning the Privileges of the Special Region of Yogyakarta, the Sultanate as a legal entity is the subject of rights that have ownership rights to the Sultanate's land. Kasultanan Land includes Keprabon land and non-Keprabon land found in all regencies/cities in the DIY region. The Sultanate and the District are authorized to manage and utilize land of the Sultanate and the District intended for the maximum possible development of culture, social interests, and welfare of the community.

Based on Article 33, it is explained that the title to the Sultanate land and the Duchy land is registered with the land agency. Registration for the Sultanate's land and the Duchy's land, which another party carries out, must obtain written approval from the Sultanate for the Sultanate's land and written approval from the Duchy for the Duchy's land. The Sultanate in the period before independence was contained in *Rijksblad* Kasultanan Number 16 Year 1918 and *Rijksblad* of Pakualaman Number 18 Year 1918 which stated that "*Sakabehing bumi kang ora ana tanda yektine kdarbe ing liyan mawa wewenang eigendom, dadi bumi kagungane keraton ingsun*". That sentence means that all the illegal land without any proof of belongings (land ownership letter called *eigendom*) belongs to the Sultanate. Conflicts over land tenure arrangements also occur between the laws of the former governor of the *swapraja* government and the Basic Agrarian Law. This evidence in the Special Region of Yogyakarta has caused conflicts between individuals and government agencies related to the existence of the palace land.

It is known that in the fourth Dictum of the Second Book in letter (A) the Provisions for the Conversion of the Basic Agrarian Law which states that the rights and authorities over land and water from the *swapraja* or *ex-swapraja* regions that were still in existence at the time this Law came into effect were this Law is abolished and transferred to the State. Then, it will be further regulated in

Letter (B) matters related to the provisions in letter A above, which Government Regulation further regulates. The absence of a Government Regulation that specifically regulates swapraja and former swapraja lands raises legal uncertainty for swapraja and former swapraja lands in Indonesia, especially in the Special Region of Yogyakarta. That is also supported by the public and bureaucrats' perception in the Special Region of Yogyakarta that lands that have not been clung to individual rights/state land belong to the Palace. According to information from the special secretary of Yogyakarta in 2014 as follows:

Table 1: Land area of Sultan Ground and Pakualaman Ground in DIY

No.	Regency Location	Area (m ²)	Percentage (%)
1.	City of Yogyakarta	82.000	0.16
2.	Bantul Regency	22.767.859	44.97
3.	Sleman Regency	928.338	1.83
4.	Kulon Progo Regency	26.451.247	52.24
5.	Gunungkidul Regency	402.950	0.80
	Total amount	50.632.394	100.00

Source: Results of the Setda DIY Governance Inventory Activity, 2014

Suppose that the sum of the sultan's ground and the land area in the special area of Yogyakarta is 50,632,394 m² or 50,632394 km² compared to the province of Yogyakarta special area of 3,185.80 km² if presented with ± 1.58%. This description shows the potential for a considerable dispute between property in the special province of Yogyakarta with sultan ground and Pakualaman ground in special regions of Yogyakarta.

In terms of land ownership after the promulgation of Law Number 13 of 2012 concerning Yogyakarta Privileges, the Sultan Ground belongs to the Sultanate while Pakualaman belongs to the duchy. In addition, Article 32 paragraph (1) of Law Number 13 of 2012 states that in the implementation of the authority of land affairs, the Sultanate and the Duchy are declared as legal entities. The position of the Sultanate and duchy in the land sector became dualism. The meaning of dualism is because the position of the Sultanate served as the governor of the Yogyakarta Special Region and the duchy served as the deputy governor of the Yogyakarta Special Region.

Land ownership concepts that are hereditary do not apply to Sultan Ground because the ownership rights are attached to the position of the Sultan of Yogyakarta, so if the Sultan of Yogyakarta later dies, then the Sultan Ground will not automatically descend to his heirs. However, the status of the property belongs to the king who continues to govern the palace in Yogyakarta. The Sultanate Land and the Duchy Land in development have been reduced, and this is since many ownership rights have been released to other parties, including:

1. According to domein, as stated in Article 1 *Rijksblad* Kasultanan Number 16 of 1918, and Duchy *Rijksblad* Number 18 of 1918, it appears that there have been lands that have been given to foreigners with ownership rights under western law called eigendom rights.
2. There is also the Sultanate land and the Duchy land, given to indigenous citizens, for example, those in the Township. They have been utilized by indigenous people based on the *Rijksblad* Kasultanan Number 23 of 1925 and the *Rijksblad* of the Duchy of the Republic of Indonesia Number 25 of 1925, in which they were granted the rights of *andarbe* or property rights under customary law.

B. Legal Perspective of State Finance

In the perspective of state finance law, it has been regulated in Law Number 1 of 2004 concerning State Treasury. The main focus of this research is related to securing state land so that the ownership is not transferred to third parties. The General Explanation of the State Treasury Law states that the point of view adopted in the regulation of state property is a view to preventing the transfer of ownership of state property, including land, to other parties.

In line with the development of state financial management needs, the importance of the treasury function is related to the context of efficiently managing limited government financial resources. The treasury function includes, in particular, good cash planning, prevention so as not to leak and deviate, finding the cheapest source of financing, and utilizing idle cash to increase the added value of financial resources. In line with the security point of view, Article 49 paragraph (1) of the State Treasury Law also regulates that any state / regional property in the form of land controlled by the Central / Regional Government must be notarized on behalf of the Government of the Republic of Indonesia / the relevant regional government. Of course, the regulation in the Article also explains that the paradigm of securing state property adhered to in the State Treasury Law is technically realized by certification, an example of asset performance is part of an asset management strategy intended to align with the expenditure strategy in achieving organizational goals (Brown and Humphrey, 2005).

The regulation of State Property appears in Government Regulation Number 27 of 2014 concerning Management of State / Regional Property as an implementing regulation for the State Treasury Law. The Government Regulation in Article 3 paragraph (2) regulates that the obligation to certify State land falls within one of the stages of the scope of management of state / regional property, namely at the security and maintenance stage. Meanwhile, Article 43 paragraph (1) of this regulation is also reaffirmed by certifying state-owned land in the security stages.

Using the point of view to prevent the transfer of ownership of state property, including land, to other parties, it removes state property from the list of goods by issuing a decision from an authorized official to free the Property Manager, Property User, and or Authorization of the User of Goods from administrative and physical responsibility for the goods under their control. However, then enacted Law Number 13 of 2012 concerning the Privileges of the Special Region of Yogyakarta has the potential to come that many disputes will occur between court-owned land, either Sultanate or duchy by Law Number 13 of 2012 with State Property in the Special Province of Yogyakarta. In a broader scope, the management of state assets has never been separated from Strategic Asset Management (SAM). The SAM approach encompasses asset management throughout the entire lifecycle, from planning to disposal (Puspitarini and Akhmadi, 2019). The disharmony between the State Treasury Law and the Yogyakarta Special Region Privilege Law on the Management of State Property does not interfere with SAM. From the considerations above, it is deemed necessary to seek the resolution of disputes in the land sector.

C. Land Dispute Resolution

Dispute resolution is a case settlement that is conducted between one party and another party. Dispute resolution consists of two ways, namely through litigation (court) and non-litigation (outside court). In the process of dispute resolution through litigation is the last option (*ultimum remedium*) for the parties to the dispute after settlement through non-litigation to no avail.

According to Article 1 number 10 of Law Number 30 of 1999 relating to Arbitration and Alternative Dispute Resolution, conflict resolution through non-litigation (out of court) consists of 5 ways, namely:

1. Consultation: an action taken between one party and another party called a consultant.
2. Negotiations: a settlement outside the court to reach a mutual agreement based on more harmonious cooperation.
3. Mediation: settlement through negotiations to achieve an agreement between the parties with the aid of the mediator
4. Conciliation: A conciliator assists dispute resolution, whose function is to mediate between parties to find solutions and reach an agreement.
5. Expert Assessment: expert opinions on matters of a technical nature and under their area of expertise.

Another form of settlement outside the court that turned out to be one of the settlement processes carried out in court (litigation) is mediation. From this article, we know that mediation is an out-of-court settlement, but mediation is carried out in court in its development. Article 1 number 1 of Law Number 30 the Year 1999 relating Arbitration and Alternative Dispute Resolution

explains that the settlement of disputes outside the court recognizes the existence of an arbitration method, namely the settlement of a civil conflict outside the court based on an arbitration agreement created in writing by the parties disputing party.

The advantages of conflict resolution outside the court, namely

1. Provide a final decision.
2. Measurable and more cost-effective than arbitration or court.
3. Flexibility in the process can help resolve disputes.

However, on the other hand, there is a lack of dispute resolution outside the court, i.e.

1. Have no tools to carry out executions of decisions.
2. It does not contribute to legal confidence for the management of state property.

On the other hand, dispute resolution through a court of law, i.e., is submitted to a general court in civil if the dispute is about settling land ownership rights or settling a dispute through a state administrative court. However, based on Law Number 51 / PRP / 1960 regarding Prohibition of Use of Land without a Right of Permit or Proxy, the central government has a stronger position than other parties. The regulation weakness is that a dispute arises between the central government and the palace or duchy as the owner of the sultan ground and Pakualaman Ground.

The drawback is that the land disputes that are resolved through the courts are less effective since these require a relatively long time and immeasurable costs. However, the advantages of dispute resolution through the court, namely

1. Provide a final solution.
2. Having the tools to carry out executions of decisions.
3. Provide legal certainty for the manager of state property.

Both of weaknesses and strengths resolved through court and non-court, it is necessary to resolve disputes outside of the two systems above, namely to draw up a draft Government Regulation or the same level that regulates agreements between the regional government and the palace or duchy. In addition, the matters that need to be regulated include procedures for settlement, compensation process according to the agreement, taking legal actions in good faith without involving other parties.

CONCLUSION

Dispute resolution both inside and outside the court has consequences, both strengths, and weaknesses. State property managers have fears of disputes and dealing with the law for an extended period.

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Undang Nomor 3 tahun 2009 tentang perubahan kedua atas Undang-Undang
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NOTES TO CONTRIBUTORS AND GUIDELINES FOR MANUSCRIPT SUBMISSION

INTRODUCTION

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