JOURNAL OF VALUATION AND PROPERTY SERVICES

Volume 20

National Institute of Valuation (INSPEN)
Valuation and Property Services Department (JPPH)
Ministry of Finance Malaysia

Publication / Printing
National Institute of Valuation (INSPEN)
Valuation and Property Services Department
Ministry of Finance
Persiaran INSPEN
43000 Kajang
Selangor Darul Ehsan
Malaysia

Tel: +603-8911 8888
Faks: +603-8925 0640
E-mail: research@inspen.gov.my
Website: www.inspen.gov.my

Subscription rate:
RM50.00

ISSN:1511-3345

Objective
The Journal of Valuation and Property Services is a publication specifically intended for property professionals to keep abreast with the developments in the property industry as well as the real estate profession.

This journal serves as a platform for the exchange of information and ideas on property issues. It seeks to:

i. address areas of major interest and practical relevance to the real estate profession.
ii. create awareness of new theories, techniques and applications as well as related concepts relevant to the real estate profession.
iii. discuss policy issues and regulations and their implications on the property market.

We therefore welcome articles with theoretical and practical relevance to the real estate industry and profession, property valuation, property management, property investment and market analysis.

Copyright Reserved

JOURNAL OF VALUATION AND PROPERTY SERVICES
Volume 20

CONTENTS **PAGE**

COST BENEFIT ANALYSIS IMPLEMENTING GREEN WALL AT COMMERCIAL BUILDING ROXY HOTEL PADUNGAN, SARAWAK, MALAYSIA

Shazmin Shareena Ab. Azis[1], Nurul Suhailla Kamarudin[2], Nur Hannani Ab Rahman[3], Nur Amira Aina Zulkifli[4], and Shastitharran Baskaran[5]

Real Estate, Faculty of Build Environment and Surveying,
Universiti Teknologi Malaysia,
81310 Skudai, Johor Bahru, Malaysia

ABSTRACT

The building sector is consuming high energy consumption which could lead to the negative impact to the environment. Building and property are partly responsible for this increment. Several efforts have been conducted to overcome this issue. Integrating green wall on building has proved to reduce building annual energy consumption. Although there are many benefits in annual energy savings, several studies have shown that the implementation of green walls is associated with high maintenance costs. Therefore, the aim of this research is to assess the worth of implementing the green wall through comparing the maintenance cost and its energy saving benefits. There are three main objectives outlined in this research: 1) To identify percentage of green wall efficiency in reducing building energy consumption; 2) To analyse the monetary electricity saving due to the green wall implementation on building; and 3) To compare between maintenance cost and annual energy saving using cost benefit analysis. This research is conducted at Roxy Hotel Padungan, Kuching, Sarawak, Malaysia. It has been found that the benefit of green wall is higher than cost of the green wall by using cost benefit analysis. The value of energy saving in the building is RM3.00 per square foot meanwhile the value of maintenance cost is RM2.70 per square foot. The ratio of cost benefit analysis between annual energy saving and maintenance cost is 1:1.1. This research is significant for the investor, developer, and property owner to make decision in implementing green wall on building.

Keyword: *Green wall, commercial green building, cost benefit analysis, annual energy saving, maintenance cost.*

shazmin@utm.my[1],nurulsuhaillakamarudin@gmail.com[2],nanirhmn98@gmail.com[3],naaina3@live.utm.my[4],sashiraj73@gmail.com[5]

1. INTRODUCTION

Global warming nowadays known as an international environmental issue is getting important as it has adverse effect to the environment and humankind. In recent years, the climate change and global warming issue are being addressed at international, national, and local level. At the late of December 2019, the new COVID-19 virus has spread to the entire planet like a fire and has lowered the quality of human life. This pandemic has affected all lives and prompted more individuals to stay at home for safety. This is where green building plays a part in making people's lives more comfortably and at the same time giving the world a positive influence. Before the advent of antibiotics, ventilation and daylight were considered to be important safeguard against infection, from the history of the past pandemic.

Oleiwi, et al. (2014) stated that green building is a building with modern architectural concept which focuses on the environment by reducing energy consumption, materials and resources and also minimize the impact of construction. Furthermore, green buildings are designed to harmonise with the local climate, traditions, culture, and the surrounding environment. Green wall is a vertical greening typology, where a vertical built structure is intentionally covered by vegetation (Medi et al., 2017; Gunawardena et al., 2017). Green wall systems can maximise the functional benefits of plants to buildings performance (Lundholm, 2006). In addition, greening systems can also make part of a sustainable strategy (Ghaffarian et al., 2013) of urban restoration and building retrofitting (Saadatian et al., 2013). This shows that green wall can be one of the solutions in improving the quality of human life.

2. LITERATURE REVIEWS

2.1 Green Building

Green building is a structure of green development, the process, innovation, and design that inspire the worldwide (World Green Building Council, 2013). The main principles adapt is to be responsible towards environment and resources consumption efficacy reflected through as early as the design construction stages up to the building processes and through the life cycle of the building. According to U.S. Environmental Protection Agency (2003), green building is aimed to reduce the negative impacts of properties development to the environment and residents in the earth by being resources and energy efficient when recycling usable building materials to reduce waste and emissions.

2.2 Green Building Benefits

Kibert (2016) stated that sustainable beneficial environmental and economic advantages could be achieved by practising green building. This statement shows that green building was one of practise that help to achieve sustainability in the environment, economy, and society (Anuar et al., 2012; Mohammad et al., 2014).

Table 1: Benefit of Green Building

BENEFITS OF GREEN BUILDING	
Financial	• Longer economic life of the facility • Lower employee turnover • Staying ahead of regulations • Lower litigation risks because of improved indoor air quality • Lower health related costs such as insurance premiums • Lower absenteeism/ increase productivity • Optimize life cycle economic • Improve employee productivity and satisfaction • Reduce life cycle energy costs • Decrease operating costs
Environmental	• Protect natural resources • Decrease solid waste • Enhance and protect ecosystem • Develop water and air quality
Health and Community	• Set example in the community • Contribute the overall quality of life • Minimise strain on local infrastructure • Enhance occupant comfort and health • Improve air, thermal, daylight and acoustic environments

Source: Ashuri and Durmus-Pedini (2010)

2.3 Green Rating System

Green building rating system, as defined by Nguyen and Altan (2011), is a tool that the industry uses to assess, enhancement and promotion of sustainable development. According to Altin (2017), green building rating system is transforming the construction industry by focusing on high-performance, energy-efficient, economical, and environmentally friendly buildings. Green building rating system plays a crucial role in supporting this transformation (Pandey, 2014). There are two rating tools in green rating system which are Building Research Establishment Environmental Assessment Method (BREEAM) and Leadership in Energy and Environmental Design (LEED) (Awadh, 2017; Cole & Jose, 2013; Reed et al. 2009; Rivera, 2009; Lee & Burnett, 2008; Kawazu et al. 2005).

2.4 Green Building Index (GBI)

Green Building Index (GBI) is a rating system for benchmarking that incorporates best practices in environmental performance and design that are internationally recognised. GBI has highlighted the eco-friendly characteristics or criteria that have to be or have to be incorporated into industry practice. Mun (2009) claimed that GBI is officially established on May 2009 and developed by Association of Consulting Engineers Malaysia (ACEM) and Malaysia Institute of Architects (PAM). There are two categories of GBI which are GBI residential rating tool and non-residential rating tool. Green Building Index Sdn. Bhd. (GSB) is the agency responsible for the management of this assessment rating system and certification.

Table 2: GBI Classification

RATING	POINTS
Certified	50 - 65
Silver	66 - 75
Gold	76 - 85
Platinum	86 - 100

Source: GBI (2013)

Basically, GBI rating system was created based on the Singapore Green Building Index and Australian Green Star System. GBI consist of six key criteria for rating the Green Building in Malaysia (Md. Hussin et al., 2013) which state at table 3.

Table 3: GBI Rating Criteria

CRITERIA	DESCRIPTION
Energy Efficiency	i. Minimise solar heat gain and capture natural lighting to reduce energy usage. ii. Practice regular maintenance, proper testing, and commissioning. iii. Use renewable energy. iv. Optimising building orientation through design.
Indoor Environmental Quality	i. Improving indoor air quality, acoustics, visual comfort, and thermal comfort. ii. Materials with a low volatile organic compound content should be used. iii. Utilise high-quality air filtration and proper temperature, movement, and humidity regulation.
Sustainable Site Planning and Management	i. Appropriate site selection with community facilities, planned public transportation connections, open spaces, and green areas enable redevelopment of existing sites and brownfield developments. ii. Implementation of proper management practices during construction, reduce the burden on established capacity for infrastructure and management of storm water.
Material and Resources	i. Promoting the use of renewable and recycled forms of environmentally friendly products ii. Implement the right management of waste with storage and collection. iii. Encourage the re-use of recycle materials, formwork, and waste.
Water Efficiency	i. Water efficiency can be described as the usage of water-saving fittings, rainwater harvesting system and water recycling.
Innovation	i. The innovation design and initiatives must be aligning with GBI's objectives.

Source: Md. Hussin et al. (2013) and World GBC (2013)

2.5 Green Component

Green building components are described as being the combination of green components deriving from green criteria of green rating tools with those of building (Zuo & Zhao, 2014). The main advantage is to enhance occupant health in order to improve indoor environmental quality (IEQ) and healthier living space, energy savings and greater long-term cost savings or profits and most importantly the reduction of greenhouse gas emissions and hence the impact of buildings on the environment (McGraw-Hill Construction, 2013).

Many studies have concluded that green building components provide a great opportunity for stakeholders, including developers, contractors, and policymakers, to minimise the environmental impact of the construction industry (Carter & Fowler, 2008). A broad range of green building elements, such as green-roof technologies (GRHCC, 2003); waste management technologies (Shen et al., 2009); solar power systems (Huang & Wu, 2007); and technologically improved heating, ventilation, and air-conditioning systems (UNEP, 2003).

2.6 Green Wall

Green wall is a vertical garden appended to the interior or exterior of a building. Vertical greening, also known as facade greening, green wall, planting wall, vertical garden, living wall, or ecological wall, where it is basically a building coating system and revitalisation (Kingsbury & Dunnett, 2008). At a building scale, green wall systems can be used as a passive design solution (Perez et al., 2011) that lead to contribute to the buildings sustainability performance (Eumorfopouluo & Kontoleon, 2009). Randy et al. (2020) noted that the integration of the living, organic system characteristics by green wall could change an inorganic and lifeless structure of building into a new type of 'living' architecture.

The common term to refer to all forms of vegetated wall surfaces is green wall. Since the era of the Hanging Gardens of Babylon and the Roman and Greek Empires arise, traditional green wall techniques are historically known. The Hanging Gardens of Babylon has given an impact on the evolution of the green wall because later, from Scandinavia to Japan, numerous civilisations used climbing plants to cover building.

2.7 Green Wall Classification

Green walls can be subdivided in two main systems which are green facades and living walls (Kohler, 2008; Manso & Castro-Gomes, 2015).

a. Green Facade

Green facades are implemented for the purpose of climbing or hanging plants along the wall. Dunnet et al., (2008) stated that green facade is the plants that hanging in certain height, can grow upwards on the vertical surface, like traditional examples, or grow downward on vertical surface. Green facade can be anchored to existing walls or built as freestanding structures such as columns or fences. According to Randy (2020), self-

clinging plants such as English Ivy have commonly been used to create green walls. There are two types of green facade which are direct green facade and indirect green facade. The differences between these two types of green facade are easy to differentiate them. The direct green facade is directly attached to the wall meanwhile indirect green facade presents is a structural support for the growth of vegetation.

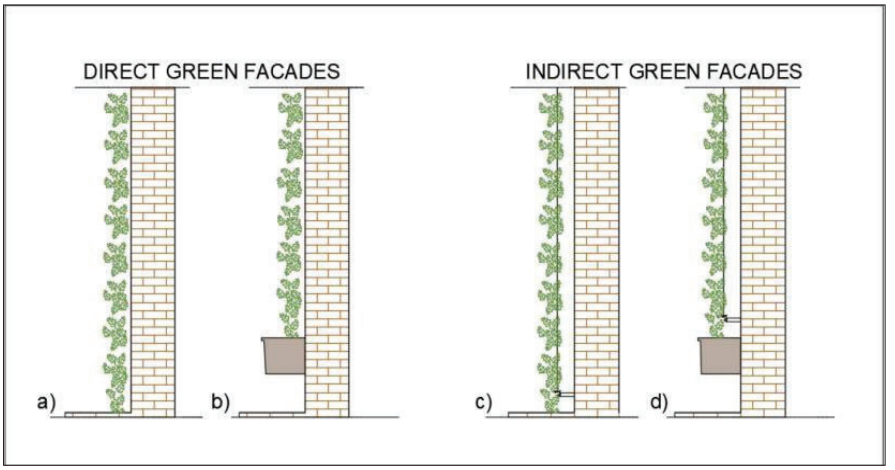

Figure 1: Direct Green Facade and Indirect Green Facade

b. Living Walls

Living wall system uses lightweight and permeable screens to which plants are added individually. It involves the installation of a frame to the wall, with a void in between them. This frame not only holds the base panel, but also protects the wall from moisture. Palermo & Turco (2020) mentioned that there are two types of living wall which are continuous living wall and modular living wall. Continues living wall supported by a base panel and directly attached to a supporting structure which consisting of a frame indirectly fixed to the wall. This type of system is mainly based on hydroponic technique. Koumoudis (2010) stated that green wall is a modular living wall system have a component that in certain dimension, which includes the growing media reinforcing the plant's growth. Each component is held by a corresponding structure or is directly mounted to the vertical surface.

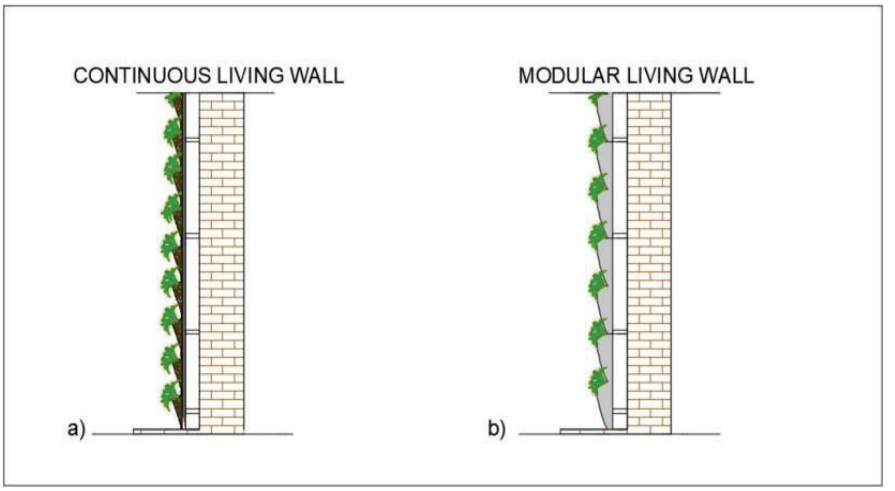

Figure 2: Continuous Living Wall and Modular Living Walls

2.8 Green Wall Benefits

a. Enhance Cities Image

Green wall has a therapeutic effect by inducing a psychological wellbeing through the presence of vegetation, enhance cities image (Theodoridou et al., 2012), and increase property value (Ichihara, 2011). There were the work of Patrick Blanc, a botanist and researcher. The original design of the 25m high wall, and the building is constructed over 237 plants and covers the original graffiti that covered the concrete wall. The green wall was an additional that improve beautifies of the walls on the street that could be enjoyable sight to see.

b. Urban Biodiversity

Covering buildings with vegetation will enhance the urban environment by contributing to urban biodiversity (Francis, 2011). Furthermore, green colour has been proven as one of the colours that can enhance vision, boosts appetite, stimulate healthy living and relaxed mind and our body.

c. Manage Storm Water

Green wall helps to manage storm water (Schmidt et al., 2003), improve air quality reduce temperature (Santamouris, 2014) and mitigation of the heat island effect (Gago, 2013). Green wall can manage of storm water because green wall has a layer of plant material that could potentially absorbs water like a sponge. They capture water when it rains, slowly releasing it through evaporation and plant use.

d. Complementary Thermal

Implementation of green wall on seasonal country will bring benefits in aspect as a

complementary thermal (Sadineni et al., 2011). Cheng et al. (2010) has conducted and experiment approach to assess the effect of vegetation on the thermal performance.

e. Acoustic Protection

Green wall enables to provide an acoustic protection (Renterghem et al., 2013). Acoustic protection is an application of soft or porous material that were used to protect individuals against undesirable sounds and noises. Acoustics protection is employed not in physical health aspect but also in physiological wellbeing. Wong et al. (2010), has conducted a study and the study shows that the greater greenery coverage, the higher frequencies of sound observation on the building.

f. Air Purification

Green walls are the plant that lives on the wall. Planting trees and plants is a common way to enhance air quality. Every square metre of greenery removes at least 300g (10 oz.) of carbon dioxide and in one year, and a 50 square feet green wall can consume as much carbon dioxide as a 14-foot tree ("The Benefits of Living Green Walls", 2014).

g. Positive Environment

Green wall can be directly linked to the sense of wellbeing, positive moods, enhance learning and more efficient decision-making on complex tasks. Green wall has also been known to enhance social relationships between neighbours.

2.9 Maintenance of Green Wall

The installation process of green walls, including climbing species, are more cost-effective, but have limits on the diversity of plants. These systems present difficulties in ensuring vegetation continuity when there is a need for plant replacement. Some climbing plants on the green wall also need guidance during plant growth to ensure that the plant can cover the entire surface of the wall. Some of the climbing plants can bring damage to buildings surface by destroying it with their root sand entering into the voids or cracks in the wall.

Randy et al. (2020) noted that the installation cost of living wall is higher than green facade. This is because the living wall require much more material than green facade, therefore the costs is higher. However, in term of maintenance cost, living wall provide several benefits. In certain unexpected situation, living wall panels can be easily replaced and provide more rapid renewal of vegetation (Manso & Catro, 2015; Besir et al. 2013).

2.10 Annual Energy Saving of Green Wall

Several researches have shown that green wall have empirically proven to convey annual energy saving through reduced energy cooling demand of building (Niachou et al. 2007; Santamouris et al., 2007; Wong et al., 2010; Jaafar et al., 2013; Coma et al., 2017; Perez et al., 2011).

Kontoleon & Eumorfopoulou (2010) conducted study on the influences of the orientation green wall on the thermal performance of the building. The study shows that green wall is able to provide annual cooling load with 18%. The study modelled on a green wall with 20 cm thickness and places on four direction which is north wall, south wall, east wall, and west wall.

Wong et al. (2010) has conducted an experimental study to shows the thermal performance among several configurations of vertical green facade under the hot and typical humid climate of Singapore. The study shows that grid and modular panels are the best green wall configuration that could use to reduce temperature in hot and humid climate. The study also concludes that green wall on the building is able to provide annual energy savings with 18% to 34%.

Green living wall reduce indoor air temperature under hot and arid climate of Abu Dhabi. The study was conducted on school building and using plastic planter boxes with dimension of 30 cm x 30 cm x 25 cm. The green wall was permanently attached on the wall. The study shows that the green wall is enabled to provide 20% of energy savings for cooling.

Coma et al. (2017) also conducted a study which title of comparing the thermal performance of two experimental vertical greenery system which is green wall and with evergreen species and green facade with deciduous creeper plants. The study shows that the potential of energy saving by green wall is at 58.9% with evergreen species and 33.8% for double green facade. Both of the green wall has its own energy saving which is beneficial to the building.

Perez et al. (2011) also investigated a green wall that has been implemented on building with Mediterranean continental climate. The experimental shows that green system as a passive system and obtaining an energy saving up to 34% with a leaf area index of 3.5 to 4. Furthermore, because of the shadow effect of green facades on the East and West orientations was realistic, the result reveals that this, as well as the South orientation they also should be considered on implementing green wall.

2.11 Cost Benefits Analysis

Shim & Siegel (1989) claimed that cost benefit analysis could assist to justify the result of alternative taken is worth by taking the estimated cost. Other than that, according to Mott Linn (2011), cost benefits analysis is significantly helpful in saving money once the decision is taken whether want or not to build an outsized cost. Cost benefit analysis also used to show the transaction cost of theory to analyse all the costs and benefits as stated by Fan et al. (2018).

The cost of integrating sustainable design elements are relatively small but still give noticeable impacts on the overall cost. The environmental impacts of projects should be into the cost benefits analysis framework to improve the quality of decision making (Fan et al. 2018).

3. METHODOLOGY

This research embarks on a literature review and qualitative method approach using semi-structure interview. It is acted as an approach for data collection and data analysis will be used to achieve the outcomes of the study.

3.1 Data Collection

There are two types of data, which are primary data and secondary data. The primary data is the data collected by interview and paper from the specialist and expert. Data collected from some literature reviews and previous studies are the primary data. Literature review gives general understanding of green building and green wall, identifying what is green wall and the evolution of green wall. Literature review expose the needs to identify the benefit of green wall which is the energy saving that convey by the green wall on a building and the explanation from the previous research proves that maintenance cost of the component is high.

Secondary data gained from interview conducted on respondent. The interview is conducted to extend the knowledge about green wall. A semi-structure of interview is conducted to the manager in the buildings and management team or the landscape architecture to get their point of view to get the data about the attributes related in maintaining green wall and then manage to get the cost of the attribution.

3.2 Data Analysis

The main purpose of conducting the data analysis is to achieve the research objective and to support the conclusion of a research. In this research, the annual energy saving by green wall has been obtained by referring to the finding of the previous study. The literature review will provide a list of number regarding the contribution of green wall in reducing energy on the building.

The second objective is to analyse the monetary electricity saving due to green wall implementation on building. This objective obtained from comparing two attributes which are maintenance cost of the green wall and annual energy saving by green wall. The data will be simplified to form a ratio.

For the last objective is cost benefits analysis can be form by compare the cost and energy saving. The number will be smaller due to the calculation will be in per square foot. The number will be transformed to ratio and the ratio will determine which attribute has a bigger number.

4. RESULT AND DISCUSSION

4.1 Percentage of Green Wall Efficiency in Reducing Building Energy Consumption

The first objective to this research is to identify the percentage of green wall efficiency in reducing building energy consumption. This objective is the most important part of this study so

that actual percentage of reducing energy consumption by green wall could be achieved. The percentage is obtained by referring to the literature review as shows at Table 4.

Table 4: Annual Energy Saving of Green Wall

GREEN WALL ANNUAL ENERGY SAVING	AUTHORS
18%	Kontoleon and Eumorfopoulou (2010)
18% - 32%	Wong et al. (2010)
20%	Hanggag et al. (2014)
33.8%	Coma et al. (2017)
34%	Perez et al. (2011)

4.2 Monetary Electricity Saving Due to the Green Wall Implementation on Building

The second objective of this research is to analyse monetary electricity saving due to green wall implementation on building. The finding of the annual energy saving has been proven on Table 5 that has shown the calculation of the annual energy saving of the green roof using data, which is the electricity bill, obtained from Tenaga National Berhad (TNB), Malaysia. The data obtained from the ground floor and the first floor of the building shown in the Table 5 is used to identify the effectiveness of the implementation of the green wall through the energy saving, since the first floor has more exposure to the benefit of the green wall than ground floor.

Table 5: Electricity Used in Ground and First Floor of Roxy Hotel Pandungan

Storey	kWh	RM/Month	RM/Year
Ground Floor	3640	2,063.84	2,4766.08
First Floor	3057	1,710.97	2,0531.64

From this, the energy saving that has been calculated is shown as Table 6.

Table 6: Energy Saving

Storey	RM/Year	Size of Wall (sqft)	Electricity Per Square Foot (RM)
Ground Floor	2,4766.08	1345.49	18
First Floor	2,0531.64	1345.49	15

Based on the calculation after being analysed, it can simply conclude that energy saving of Roxy Hotel Padungan is RM3.00 per square foot.

4.3 Maintenance Cost

The purpose of conducting maintenance is to implement the replacement of dead plant if there is any on the green wall. Other than that, they also maintain the irrigation system, timer check and testing it to make sure that irrigation frequency set to water the plant follow the schedule that has been set. They also remove all the weeds in order to make the plants grow healthily.

Table 7 shows that the cost estimation for each mobilisation of normal maintenance work is in the range of RM3,672.00 per visit. The maintenance is conducted four times in a year which the cost would be RM14,688 per year.

Table 7: Maintenance Cost

Maintenance Cost (RM)	Size of Green Wall (sqft)	Maintenance Cost per Square Foot (RM)
14,688.00	5381.96	2.70

Based on the calculation made, maintenance cost of the green wall per square foot is RM2.70 per year.

4.4 Comparing Between Maintenance Cost and Annual Energy Saving Using Cost Benefit Analysis

The third objective of this study is to compare the cost of maintenance on maintaining green wall and the annual energy saving of the green wall through cost benefit analysis. The final result shown in Table 8.

Table 8: Cost Benefit Analysis

Energy Saving (RM)	Maintenance Cost (RM)	Ratio
3.00	**2.70**	**1:1.1**

Overall, result shows that annual energy saving by green wall gives slightly benefits than the cost on maintaining the green wall.

5. CONCLUSION

This research has found the difference and knowledge regarding green wall. Even though green wall has been used for ages, but the amount of building that implementing green wall is still little. Besides, there are many benefits that can be provide by green wall and one of benefits that can be highlighted is energy saving. In order to maintain the green wall, the greenery system can be monetarised which has been calculated in this study. This research can be one of the references to the public to gain knowledge and spread awareness regarding green wall and green building.

REFERENCES

Altin, M. (2017). Green building rating systems in sustainable architecture. *Green building Rating Systems, 46(11)*, pp. 601-611.

Anuar, A., Nor Kalsum, M., Zulkiflee, A., & Mohd Yazid, M. (2012). *Green and sustainable buildings: Preliminary research on the benefits and barriers.* Paper presented at the International Real Estate Research Symposium, Malaysia.

Ashuri, Baabk and Aler Durmus-Pedini, "An overview of the benefits and risk factors of going green in exisiting buildings", *International Journal of Facility Management 1*, no.1 (2010).

Awadh, O. (2017). Sustainability and green building rating systems: LEED, BREEAM, GSAS and estidama critical analysis. *Journal of Building Engineering, 11,* 25-29.

Besir, A.B., & Cuce, E. (2018). Green roofs and facedes: A comprehensive review. *Renewable and Sustainable Energy Reviews, 82*, 915-939.

Carter, T. & Fowler, L. (2008). Establishing green roof infrastructure through environmental policy instruments. *Environmental Management, Vol. 42 No. 1*, pp. 151-164.

Cheng, C. Y., Cheung, K. K. & Chu, L. M. (2010). Thermal performance of a vegetated cladding system on facade walls. *Building and environment, 45(8),* 1779-1787. https://doi.org/10.1016/j.buildenv.2010.02.005

Cole, R. J. & Jose Valdebenito, M. (2013). The importation of building environmental certification systems: International usages of BREEAM and LEED. *Building Research & Information, 41(6),* 662-676.

Coma, J. Perez, G., A., Bures, S. Urrestarazu, M. & Cabeza, L.F. (2017). Vertical greenery systems for energy savings in buildings: A comparasive study between green walls and green facedes. Building and Enviroment, Vol.III,pp. 228 - 231

Dunnett, N. & Kingsbury N. (2008). *Planting green roofs and living walls*. Portland, London. TimberPress.

Eumorfopoulou, E., & Kontoleon, K. (2009). Experimental approach to the contribution of plant-covered walls to the thermal behaviour of building envelopes. *Build Environment, 44,* 1024–38.

Francis R, & Lorimer J. (2011). Urban reconciliation ecology: The potential of living roofs and walls. J *Environment Management 2011,* 92, 1429–37.

Gago, E.J., Roldan J., Pacheco-Torres, R. & Ordóñez J. (2013). The city and urban heat islands: review of strategies to mitigate adverse effects. *Renew Sustain Energy Rev 2013, 25,* 749–58.

Ghaffarian Hoseini, A. Dahlan, N. Berardi, U., Ghaffarian Hoseini, A., Makaremi, N., Ghaffarian Hoseini, M. (2013). Sustainable energy performances of green buildings: A review of current theories, implementations and challenges. *Renew Sustain Energy Rev 2013, 25,* 1– 17.

GRHCC. (2003). *Green roofs for healthy cities (GRHCC).* GRHCC, Toronto. Available at: https://goo.gl/6w8Ctq

Gunawardena, K. R., Wells, M. J. & Kershaw, T. (2017). Utilising green and bluespace to mitigate urban heat island intensity. *Science of the Total Environment.* 584–585, 1040–1055. Bibcode:2017ScTEn.584.1040G

Huang, Y.H. & Wu, J.H. (2007). Technological system and renewable energy policy: A case research of solar photovoltaic in Taiwan. *Renewable and Sustainable Energy Reviews, Vol. 11 No. 2,* pp. 345-356.

Ichihara, K. & Cohen J.P. (2011). New York city property values: What is the impact of green roofs on rental pricing? *Letters in Spatial and Resource Science 4,* 21–30.

Jaafar, B., Said, I., Reba, M.N.M., & Rasidi, M.H. (2013). Impact of vertical greeney system on internal building corridors in the tropic. *Procedia-Social and Behavioral Sciences, 105*, 558-568.

Kawazu, Y., Shimada, N., Yokoo, N., & Oka, T. (2005). *Comparison of the assessment results of BREEAM, LEED, GB Tool and CASBEE*. Paper presented at the Proc. of Int. Conf. on the Sustainable Building (SB05), 1700-1705

Fan, K., Chan, E.H.W & C.K. (2018). Costs and benefits of implementing green building economic incentives: Case study of a gross floor area concession scheme in Hong Kong. *Sustainability 2018, 10* 2814

Kibert, C. J. (2016). *Sustainable construction: Green building design and delivery. (4th ed.)* John Wiley & Sons.

Kohler, M. (2008). Green facades: A view back and some visions. *Urban Ecosystem, 11,* 423-6.

Kontoleon, K. & Eumorfopoulou, E. (2010). The effect of the orientation and proportion of a plant-covered wall on the thermal performance of a building zone. *Build Environment 2010, 45,* 1287–303.

Koumoudis, S. (2010). *Green wall planting module, support structure and irrigation control system.* Available at: www.google.com/patents/US7788848

Lee, W. & Burnett, J. (2008). Benchmarking energy use assessment of HK-BEAM, BREEAM and LEED. *Building and Environment, 43(11),* 1882-1891.

Linn, M. (2011) Cost-benefits analysis: example, *the Bottom Line.*

Lundholm, J. (2006). Green roof sand facades: a habitat template approach. *Urban Habitats, 4,* 87–101.

Manso, M. & Castro-Gomes, J. (2015). Green wall systems: A review of their characteristics. *Renewable and Sustainable Energy Reviews, 41,* 863-871.

McGraw-Hill Construction. (2013). *World green building trends.* Smart Market Report, McGraw-Hill Construction, Bedford.

Md.Hussin, J., Abdul Rahman, I. & Memon, A.H. (2013). The way forward in sustainable construction: Issues and challenges. *International Journal of Advances in Applied Sciences (IJAAS). 2(1),* 15-24.

Medi, A., Stangl, R. Florineth, F. (2017). Vertical greening systems – A review on recent technologies and research advancement. *Building and Enviroment. 125,* 227-239. doi: 10.1016/j. buildenv.2017.08.054. ISSN 0360-1323

Mohammad, I. S., Zainol, N. N., Abdullah, S., Woon, N. B., & Ramli, N. A. (2014). Critical factors that lead to green building operations and maintenance problems in Malaysia. *Theoretical and Empirical Researches in Urban Management, 9(2),* 68.

Mun, T. L. (2009). *The Development of GBI Malaysia (GBI)*. PAM/ACEM, 1-8.

Nguyen, B.K., & Altan, H. (2011). Comparative review of five sustainable rating systems. *Procedia Engineering, 21,* 376-386.

Niachou, K., Santamouris, M., Parlou, K., Synnefa, A., & Kolokotsa, D. (2007) Recent progress on passive cooling techniques: Advanced technological developments to improve survivability levels in low-income households. *Energy and Buildings, 39* (7), 859-866.

Oleiwi, M. Q., Ali, A., Utaberta, N. & Surat, M., (2014). The application of principles of green building in traditional housing in Iraq. *Advances in Green Science, Engineering and Built Environment, 747(1),* pp. 7-11.

Pandey, S., (2014). Impact of green building rating systems on the sustainability and efficacy of green buildings: Case analysis of Green Building Index, *Malaysia. Malaysia Sustainable Cities Program, Volume 1,* pp. 1-25.

Palermo, S A & Turco, M. (2020). Green wall systems: Where do we stand?. Department of Civil Engineering and Department of Environmental and Chemical Engineering, University of Calabria, Italy.

Pérez, G. Rincón, L. Vila, A. González, J. & Cabeza, L. (2011). Behaviour of green facades in Mediterranean Continental climate. *Energy Convers Management,* 52, 1861–7.

Randy, S., James, S., Flavia, B., Eva, M., & Steven, P. (2020), Green Roof for Healthy Cities. Introduction to Green Walls – www.greenroofs.org

Reed, R., Bilos, A., Wilkinson, S., & Schulte, K.W. (2009). International comparison of sustainable rating tools. *Journal of sustainable real estate, 1* (1), 1-22

Renterghem, T. Hornikx, M. Forssen, J. & Bottel dooren D. (2013). The potential of building envelope greening to achieve quietness. *Build Environment 2013, 61,* 34–44

Rivera, A. G. (2009). International applications of building certification methods: A comparison of BREEAM and LEED.

Saadatian, O. Sopian, K. Salleh, E. Riffat, S. Saadatian, E. Toudeshki, A. & Sulaiman, M.Y. (2013). A review of energy aspects of green roofs. *Renew Sustain Energy Rev 23,* 155–68.

Sadineni, S., Madala, S. & Boehm, R.F. (2011). Passive building energy savings: A review of building envelope components. *Renewable and Sustainable Energy Reviews, Vol. 15,* pp. 3617-3631.

Santamouris, M., Pavlou, C., Doukas, P., Mihalakakou, G., Synnefa, A., Hatzibiros, A., & Patargias, P. (2007). Investigating and analysing the energy and environmental performance of an experimental green roof system installed in a nursery school building in Athens, Greece. *Energy, 32(9),* 1781-1788.

Schmidt, M. (2003). *Energy saving strategies through the greening of buildings. The example of the Institute of Physics of the Humboldt University in Berlin* – Adlersh of, Germany. Rio3 – World Climate and Energy Event, Riode Janeiro, Brazil.

Shen, W., Chen, X., Pons, M.N., & Lorriou, J.P. (2009) Model predictive control of wastewater treatment process with feedforward compensation. *Chemical Engineering Journal, 155* (1-2), 161-174.

Shim, J.K., & Siegel, J.G. (1989). *Encyclopedic dictionary of accounting and finance*. Prentice hall direct.

Theodoridou, I. Karteris, M. Mallinis, G. Papadopoulos, A.M. & Hegger, M. (2012). Assessment of retrofitting measures and solar systems' potential in urban areas using geographical information systems: application to a Mediterranean city. *Renew Sustain Energy Rev 2012, 16,* 6239–61.

UNEP. (2003). Sustainable building and construction: facts and figures. *UNEP Industry and Environment, Vol. 26* Nos 2–3, pp. 5-8.

Wong, N. H., Tan, A. Y. K., Tan, P. Y., Chiang, K., & Wong, N. C. (2010). Acoustics evaluation of vertical greenery systems for building walls. *Building and Environment, 45(2),* 411-420. https://doi.org/10.1016/j.buildenv.2009.06.017

World GBC. (2013). *The business case for green building: A review of the costs and benefits for developers, investors and occupants.* London: World Green Building Council.

Zuo, J., & Zhao, Z.-Y. (2014). Green building research-current status & future agenda: A review. *Elservier-Renewable & Sustainable Energy Review,* 271-2.

IMPORTANT ISSUES IN MAINTAINING VERTICAL GREEN WALL

Shazmin Shareena Ab. Azis[1], Chiew Shoek Hua[2], Nur Hannani Ab Rahman[3], Nur Amira Aina Zulkifli[4], and Shastitharran Baskaran[5]

Real Estate, Faculty of Build Environment and Surveying,
Universiti Teknologi Malaysia,
81310 Skudai, Johor Bahru, Malaysia

ABSTRACT

Vertical green wall is referred as systems that installed and applied the plantation and vegetation across the vertical wall of building in order to provide impact on improving the built environment. Vertical green wall has been proposed as an alternative for space cooling and reduce building energy consumption. From this, the maintenance of vertical green wall system is necessary to be carried out. However, there are several issues in implementing the maintenance of green wall according to the previous studies, and none of these studies have accentuated the most critical issues in vertical green wall maintenance. Therefore, this research is conducted to identify and rank the most critical issues in maintaining vertical green wall from the perspective of property managers. This study adopts case study approach which carries out on few selected types of buildings that installed with green wall system which is located at Kuching District and Kota Samarahan District in Sarawak, Malaysia. This research involved in mixed method and undertook systematic review analysis, descriptive analysis, and frequency analysis. The finding of the study has ranked the most important issues in maintaining green wall. Overall, finding proved that safety issue and high maintenance cost are the most important issues in maintaining vertical green wall. This research is significant as it could assists building designers and property managers in maintaining vertical green wall through discovering the most critical issues in vertical green wall maintenance.

Keyword: *Vertical green wall, maintenance issues, property management.*

shazmin@utm.my[1],chiewsh0818@gmail.com[2], nanirhmn98@gmail.com[3], naaina3@live.utm.my[4], sashiraj73@gmail.com[5]

1. INTRODUCTION

The growth of population and urbanisation has led to the volume of green space reduced in city areas and this situation causes the problem of Urban Heat Island. Vertical Green System (VGS) has been proposed as an alternative for space cooling and it has the potential to reduce the building energy consumption. VGS is referred to the plants grow vertically attached to the building wall surface. VGS is occasionally considered as green wall, vertical garden, and green vegetation. It could be categorised into two classes which are green facades and living walls (Bustami et al., 2018; Perez et al., 2014; Ahmad Ridzwan, and Norshamira, 2016, as cited in Othman et al., 2018).

There are several advantages of green wall implementation. According to Manso & Castro-Gomes (2014), it provides a noise barrier, enhances the quality of air, and reduces the temperature which directly bring implications for improving the environmental issues of urban areas. Other than that, the green wall has the functions which act as an insulation layer to the building in winter meanwhile also act as shading that provides cooling effects towards the building in summer. Besides, installation of green wall provides more significant impacts of building environment compared to green roof application because the area surface of building wall is usually greater than area of roof of building especially for the high rise buildings (Bustami et al., 2018; Perez et al., 2014).

The earliest implementation of natural elements on the building design is from the ancient time, which is the Hanging Gardens of Babylon that was built in 600 B.C. (Jain, & Janakiram, 2016, as cited in Othman et al., 2018). Since then, the green wall concept has been established. Over the last few decades, it is developed by using various techniques and species of plants in application of green wall as there is a professor of landscape architecture, names Stanley Hart White has presented the modern green wall concept. In the year of 1980, Dr. Patrick Blanc has also developed the theory of vertical garden and the concept was becoming widespread in the sector of built environment (Othman et al., 2018).

There are some defects for the green wall application to the buildings. For instance, green facades which also known as climbing plants could damage the building surfaces because of the moisture of the plants and the plant roots attached towards the building wall. For the living wall, as its attributes are different from green facades as it needs several of support systems and planting media to be installed onto the building wall and consequently it would become heavier and more complex than green facades (Sari, 2017). Thus, the maintenance of green wall is necessary to be carried out in order to sustain the performance of green wall building.

Nevertheless, it consists of some issues of vertical green wall maintenance. According to Dr. Patrick Blanc, who is a scientist of The National Centre for Scientific Research (CNRS) and a professional for vertical greenery system had indicates that without the knowledge and ideas on implement the green wall maintenance would causes the plants withered. In fact, inferior or mediocre regime in maintaining the vertical greenery could diminish the survival of plant (Chew & Conejos, 2016). Dr. Blanc also express that vertical green must be more sustainable compared to horizontal green due to the maintenance of VGS is more difficult as it is hard to access. Moreover, green wall is considered new which compared to rooftop greenery. It consists of more issues on fall protection and safety access meanwhile it is lack of technical information related to the safety assessment. Indeed, it could have safety risk for the maintenance if the safety measure or site risk assessment is not conducted

priory (Behm & Hock, 2012). Green wall building is expensive to install and maintain because it involves with high cost of installation, irrigation system, plan species and panels as well as the high maintenance costs which is comprising of substitution of plant species, water pipes, panels, and prunig costs (Rakhshandehroo, Yusof & Arabi, 2015). The green wall development focused on many systems design and elements in order to implement better technical solutions and great performance in every phase of installation, replacement and maintenance of building (Manso & Castro-Gomes, 2014). In short, there would require many working process or activities to be conducted during green wall maintenance. Therefore, there are obviously several issues on maintenance of vertical green wall according to previous studies.

However, none of these studies have accentuated the most critical issues in vertical green wall maintenance. Therefore, the aim of this study is to assists building designers and property managers in maintaining vertical green wall through discovering the most critical issues in vertical green wall maintenance. Henceforth, this research is conducted to identify the issues in vertical green wall maintenance and rank the most important issues in maintaining vertical green wall to achieve this research aim. This research will rank the most important issues in maintaining vertical green wall from property management perspective based on selected case studies.

2. LITERATURE REVIEW

2.1 Green Wall

Green wall is a system that the plant attached vertically on the building surface and the different green wall typology are used to design by architects which integrating the green wall system with construction of residential, commercial, public building and so on (Wood et al., 2014). Green wall also known as “vertical garden” which is the vegetation that covering on the vertical wall surface (Green Roofs for Healthy Cities GRHC, 2008, as cited in Jaafar et al., 2011).

2.2 Classification of Green Wall

According to Manso and Castro-Gomes (2014), the green wall is classified into two categories which are living wall and green facades. It is assorted according to the construction system of green wall.

Living wall is defined as the plantation attached or fixed to the internal or external vertical wall surface. The living wall system is amalgamated the plantation, irrigation system, growing medium, and drainage system to the wall surface of buildings (Growing Green Guide, 2014). It also comprised of vertical modules, plant panels, or prevegetated blankets which attached vertically to the wall of building surface (Green Roofs for Healthy Cities, 2008; Birkeland, 2009; Chiang and Tan, 2009; as cited in Jaafar et al., 2011). This living wall implementation can apply variety species of plants. Living wall can be categorised into continuous living wall and modular living wall. The continuous living wall is a vertical green wall system that do not need subtract of soil and it is installed in lightweight and absorptive screens in which the plantation are interposed individually. This type of green wall system generally required hydroponic technique where the water supply is mainly guaranteed by installing irrigation system to the building

structure. The nutrients and water that absorbed by roots are through the permeable layer. The modular living wall is requiring the complementary structure of supporting elements such as planter tiles, vessels, trays and so on in order to fix and support the plants grow on the vertical wall. The growing media with organic or inorganic of soil substrate is required for the modular living wall. Meanwhile, the irrigation system is usually applied between the panels so that the plants can be irrigated through the panels by the irrigation system (Palermo & Turco, 2020). The living wall could act as attractive public art as it could be implemented with beautiful design features by green architectural designer. It also has the function of buildings insulation from the aspect of noise pollution and shading of building wall surface. With this, it would lead to enhance of air quality and cool down the microclimate in urban areas (Growing Green Guide, 2014).

Green facades is a system which implementation the hanging or climbing plants across the building wall. It could be either grow upwards or grow downwards along the vertical surface of wall (Manso & Castro-Gomes, 2014). Green façade generally rooted at the base of structures such as from the rooftop, ground, or in intermediate planters (Kontoleon & Eumorfopoulou, 2010). In other words, green facades can be identifying based on the growing media that placed either on the ground, rooftop, or intermediate heights of the building while the plantation grow vertically across the building wall surfaces (Azis, et al., 2019). Green facades can be classified into direct and indirect green facades. Direct green facades is the climbing plant attached directly to the wall surface of building while the indirect green facades is the application of climbing plant with a supporting structure towards the building. There are several types of support system such as steel mesh and wire cable, fibreglass mesh, wooden trellis panels, and so on. The selection of types of support system for implementation green facades is according to the species of green facades and its growing patterns characteristics. The green facades usually require about three to five years to have full coverage on the building wall (Manso & Castro-Gomes, 2015; Jaafar et al. 2011). The planter boxes placed at the intermediate heights are required for the situation of the very high building or lack of space at the base or rooftop of building (Palermo & Turco, 2020).

2.3 Maintenance of Green Wall

According to the Oxford Dictionary, maintenance means that an action of preserving a situation or condition of being preserved. In other words, it also defined as an action of sustaining and keeping something in good condition. Maintenance in terms of buildings is defined as a process to manage, regulate, preserve, and conserve the conditions and physical of the buildings, equipment, facilities in order to sustain the current standards and the value of it (Nawi et al., 2017).

2.4 Categories of Green Wall Maintenance

There are some defects which would lead to the green facades damage the surface building as well as the replacement of plantation is required for the green wall building. With this, the maintenance and protection of green wall system is needed based on the plants selected, conditions of surrounding, design of the green wall and so on. Based on El-Zoklah (2016) as cited in Thakor et al. (2020), there have several categories of green wall maintenance.

Firstly, the green wall maintenance can be categorised in establishment maintenance. It is

the procedures of maintenance that is necessary to be carried out within the first year or second year after the implementation of green wall system is accomplished. The maintenance activities consist of weed control, pruning, nutrient management, and irrigation management for magnificent growth of the plantation in order to sustain the aesthetic of the green wall system.

Besides, there has a category of green wall maintenance known as regular maintenance. It is a routine or periodic maintenance. By conducting regular maintenance, the recurrent and repetitive maintenance activities such as pruning, trash removal, and weeding would be carried out to ensure the green wall system is maintain in a satisfactory image.

In addition, cyclic maintenance is the maintenance activity that is scheduled less often than regular maintenance. The maintenance is carried out for the green wall components contact with the building wall and structure of building itself in order to ensure the vertical green wall structure is secure and meet the safety standards.

Not only that, but there has also reactive and preventative maintenance. This category of maintenance is conducted when there is any part of system break down or it is detected there has a sign of failure of the green wall system. It is also referring to measure undertaken towards the green wall system in case of sudden damages happened. Usually, the failure of green wall system is result from the bad weather and the long-term issue which is unnoticed such as weeds or roots block the drainage system.

Apart from that, another category of green wall maintenance is renovation maintenance. It is a maintenance work which involves activity of changing the existing design of green wall system. It is carried out when the ownership of building has changes or even there has a situation of failure of design and installation of green wall system.

2.5 Issues of Vertical Green Wall Maintenance

First of all, a famous French botanist, Dr. Patrick Blanc indicated that one of the issues of maintenance works for green wall building is difficult to be accessed and carried out. With this, he highlighted that the vertical greenery must be more sustainable compared to other types of green infrastructures in order to assure that the lifecycle of green wall can last for many years (Twenty6 Magazine, n.d.).

Moreover, according to The Straits Times (2016), Dr. Patrick Blanc depicted that without the idea and knowledge to execute the maintenance of green wall would results to the dying of plantation on the vertical wall. In fact, it has the situation where majority of the management teams or gardeners are lack of experiences on implementing the maintenance of green wall as well as they have no specific techniques to execute in maintaining the vegetation installed on the building wall surface (Peck, et al., 1999).

Furthermore, green wall system is involving the issues of fall protection and safety assessment in execution of maintenance works. It is lack of technical information related to the green wall compared to the rooftop greenery. This situation might lead to the uncertainties problem of the implementation of maintenance works for green wall system. Consequently, the safety measure

or site risk assessment could not be conducted priory for the maintenance works of green wall building and thus result to the existing of safety risk (Behm & Hock, 2012).

Besides, according to the opinion of architectural, the application of green wall system is less than the installation of green roof system because it requires greater implementation of maintenance in green wall compared to the rooftop greenery (Singh et al., 2017). The green wall system that involving the elements such as vegetation, irrigation system, drainage system, growing media, and support system is important in every stage of installation, replacement, and maintenance of it. With this, there would be more maintenance considerations on the green wall system as it needs much more execution of maintenance activities such as preservation and replacement on those systems and vegetation across the wall (Manso & CastroGomes, 2014; Chew & Conejos, 2016).

In addition, the cost of maintenance is also considered as the issue of green wall maintenance. It is requiring high maintenance cost for the activities of piping and pruning as well as the replacement species of plantation and panels systems of the green wall (Rakhshandehroo et al., 2015). The maintenance works for the activities such as management of irrigation system, pruning the vertical vegetation across the wall using the boom lifts, substitution of plantation and panels structures, disposal of fallen leaves and so on are the costly activities for implementation green wall in term of maintenance (Mir, 2011). The cost of its construction and maintenance is higher as it is required professional knowledge and technology for this field (Peng, 2013).

Table 1: Summary of Issues in Maintaining Vertical Green Wall

FINDINGS	AUTHOR
Hard to access the vertical green wall maintenance	Dr. Patrick Blanc (Twenty6 Magazine, n.d.)
Lack of knowledge and experiences in maintaining vertical green wall	Zachariah, N. A. (2016); Peck, et al. (1999)
Issue of safety risk in maintaining vertical green wall	Behm and Hock (2012)
Required many maintenance work process or activities for vertical green wall	Singh et al. (2017); Manso and CastroGomes (2014); Chew and Conejos (2016)
High cost in maintaining vertical green wall	Rakhshandehroo et al. (2015); Mir (2011); Peng (2013)

3. METHODOLOGY

This research study focused on the issues in maintaining the vertical green wall for real practices in Malaysia. In this study, sequential form of mixed model research design is applied. The combinations of qualitative and quantitative approach are used to produce the results findings for this study.

3.1 Data Collection

Firstly, the study is conducted to identify the issues in maintaining vertical green wall. The previous research findings are referred, and semi-interview survey is carried out with plantscape consultants of case study in order to achieve the objective one. The outputs from objective one also utilized for the input of questions in questionnaire survey.

Secondly, this research study is also carried out to analyse the ranking of the most important issue in maintaining vertical green wall. In order to fulfil the objective two, the questionnaire survey is executed to study the opinion of the property managers of selected case studies toward the most important maintenance issues for vertical green wall. With this, there are several types of buildings that implemented with green wall system which available in Kuching District and Kota Samarahan District in Sarawak, Malaysia are selected as case studies for this research study. There are five case studies selected for this research which are Roxy Hotel Padungan, Roxy Hotel Kuching, car-park building of Mercedes-Benz Hap Seng Star Sdn Bhd, corner lot of shop office building (Perinsuran Brokar Sdn. Bhd.), and 14-storey apartment tower of the Eden On The Park. The green wall buildings are managed by property managers whereas the maintenance works of green wall system are done by gardeners.

Source of data is categorized into two types which are primary data and secondary data. The secondary data is used to meet the research objective one. The literature review from several journals, magazines, and websites are utilized for data collection in this research objective one. Besides, the primary data used for this research objective one to collect data is semi-structured interview survey. Besides, the type of data used to achieve the objective two is primary data. The questions of questionnaire are based on the output from objective one and the questionnaire survey is distributed to the property managers of the selected green wall buildings based on the selected case study.

The secondary data collected of literature review for this study consists of journals, articles, thesis, magazines, and websites from Universiti Teknologi Malaysia Online Database. The semi-structured interview survey is conducted with the property managers or plantscape consultants of the selected case study of Roxy Hotel Padungan which is located at Kuching District at Sarawak, Malaysia. The virtual interview is carried out because of implemented of movement control order in Malaysia due to pandemic COVID-19 outbreaks at the mid stage of data collection. English language is used for interview session in order to align with the language for this paper of study.

The set of questionnaires is designed with the questions related to the issues in maintaining the green wall. The questionnaire surveys are distributed to the property managers who manage the vertical green wall buildings according to the case studies selected. It would be carried out in English language and the survey is aimed to collect the opinions from the green wall building management perspective which related to the rank of the most critical issues of vertical green wall maintenance. The questionnaire survey is divided into three sections which are section A, B and C. The section A is obtained the information of the respondents such as the gender, age, highest level of education and year of working experiences. Questions in section B are involved the general information of green wall building. The section C consists of the questions related to the issues of implementation of maintenance green wall buildings. The source of question

in section C is from the output of the first objective which is through the literature review and interview survey in related to the maintenance of green wall building.

3.2 Data Analysis

The data collected for the first objective is analysed using systematic review analysis and descriptive analysis. A systematic review is a research method that used to identify and review the pertinent research as well as collect and analyse the data from the research. The purpose of this method is to investigate the verifiable evidence that meets the inclusion criteria in order to answer the research question and achieve the research objective (Snyder, 2019). In this study, the data includes definition, classification of green wall and issues in maintaining vertical green wall are obtained by referring the previous findings of study with systematic review analysis. Moreover, the data obtained from the interview survey is analysed by descriptive analysis. It is used to elaborate the information collection in this study. The data is explained in description forms to meet with the opinion from the interviewees.

The data collected for second objective is analysed using frequency analysis that has been collected from the questionnaire survey. Frequency analysis is an organized graphical or tabulation form that representing the number of individuals on the scale of measurement which allow researchers to be able to review the entire data collected conveniently (Manikandan, 2011). The data collected from the questionnaires gathered from the respondents are analysed to disclose the results. The results are interpreted in tabulation and graphical forms as well as with the summarize description.

4. RESULT AND DISCUSSION

4.1 Issues in Maintaining Vertical Green Wall

The first objective is to identify the issues in maintaining vertical green wall. There are several issues in maintaining vertical green wall. It is identified by using systematic review analysis from previous studies. The interview survey is also adopted, and the data collected is analysed using descriptive analysis to fulfil the first objective.

Table 2: Issues in Maintaining Vertical Green Wall based on Systematic Review Analysis

FINDINGS	AUTHOR
Hard to access the vertical green wall maintenance	Dr. Patrick Blanc (Twenty6 Magazine, n.d.)
Lack of knowledge and experiences in maintaining vertical green wall	Zachariah, N. A. (2016); Peck, et al. (1999)
Issue of safety risk in maintaining vertical green wall	Behm and Hock (2012)
Required many maintenance work process or activities for vertical green wall	Singh et al. (2017); Manso and CastroGomes (2014); Chew and Conejos (2016)
High cost in maintaining vertical green wall	Rakhshandehroo et al. (2015); Mir (2011); Peng (2013)

From the Table 2, it can be summarised that there are several issues in maintaining vertical green wall from previous studies. Firstly, Dr. Patrick Blanc mentioned that the green wall maintenance work is hard to access, and it is required to be carried out the maintenance works as to assure the green wall lifecycle can be last for long period and become sustainable compared to other types of green infrastructure (Twenty6 Magazine, n.d.). In addition, there has an issue of lack of knowledge and experiences in maintaining the vertical green wall (Zachariah, 2016; Peck, et al., 1999). Moreover, the safety issue is one of the issues in maintaining vertical green wall as compared to green roof (Behm & Hock, 2012). Furthermore, there is an issue of requiring many maintenance work process or activities for vertical green wall. Green wall system involves with vegetation, irrigation system, drainage system, support system, growing media and others which requires more maintenance considerations such as preservation and replacement of those elements installed to the wall of building. From this, it requires many process or activities in maintaining vertical green wall (Singh et al. 2017; Manso & CastroGomes, 2014; Chew & Conejos, 2016). Besides, high maintenance cost is also considered as one of the issues in maintaining vertical green wall (Rakhshandehroo et al., 2015; Mir, 2011; Peng, 2013).

Table 3: Issues in Maintaining Vertical Green Wall based on Interview Survey

Case Study: Roxy Hotel Padungan	
Question	Based on your experience, what is the common issues that might happen during green wall maintenance?
Interviewee's Answer	a) Safety issue of the workers. It is always the most concerned issue in the green wall implementation and maintenance works. Whatever we go up to three meters, once you fall down, that would be an issue. So, we need to be careful when we carry out these maintenance works. b) Cost and budget of the company. (Roxy Hotel Padungan)

According to the experience and opinion of interviewee, safety issue of workers is one of the common issues in maintaining vertical green wall. This issue is always being the most concerned matters during the installation and maintenance of vertical green wall. Besides, the cost and budget of company in maintaining green wall system is also one of the issues because it costs high meanwhile it has to be conducted few times in a year.

4.2 The Most Important Issues in Maintaining Vertical Green Wall

The second objective is to analyse the most important issues in maintaining vertical green wall. Questionnaire survey is carried out based on the property managers of the case studies in Kuching District and Kota Samarahan in Sarawak, Malaysia. It is identified by using frequency analysis.

Table 4: Ranking of Important Issues in Maintaining Vertical Green Wall

ISSUE	MEAN	RANK
Safety issue	4.6	1
High maintenance cost	4.4	2
Hard to access vertical green wall maintenance	3.4	3
Lack of knowledge and experience in maintaining vertical green wall	3.2	4
Required many maintenance work process or activities	3.0	5

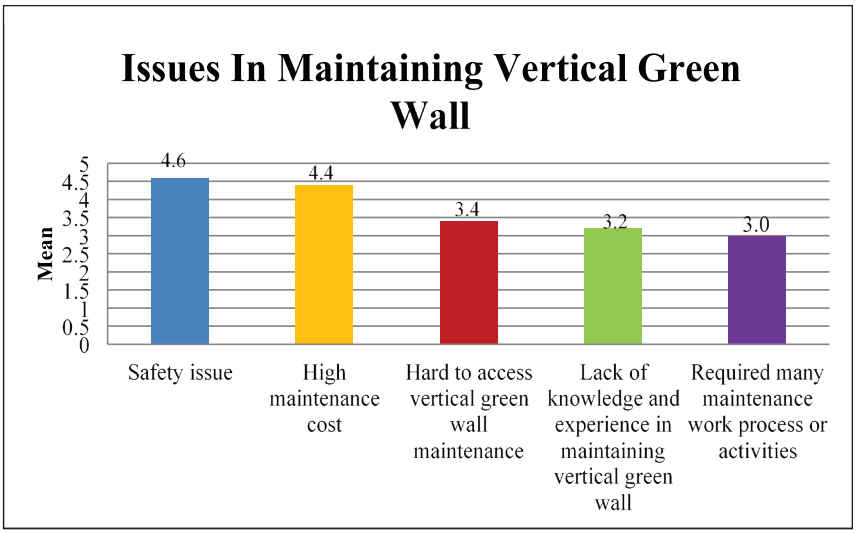

Figure 1: Important Issues in Maintaining Vertical Green Wall

Table 4 and Figure 1 shows the ranking of important issues in maintaining vertical green wall. Based on the table above, the highest rank of issue in maintaining vertical green wall is 'safety issue' with mean value of 4.6. The second and third highest rank of issues is 'high maintenance cost' and 'hard to access vertical green wall maintenance' with the mean values of 4.4 and 3.4, respectively. The issue of 'lack of knowledge and experience in maintaining vertical green wall' is ranked at number 4 with mean value of 3.2. The mean value of issue of 'required many maintenance work process or activities' is 3.0 which ranked at the lowest ranking.

4.3 Index Range of Important Issues in Maintaining Vertical Green Wall

After ranking the issues in maintaining vertical green wall as results shown above, index range is determined to figure out the scale of important level of issues in maintaining vertical green. The formula is as follow:

$$\text{Index range} = \frac{\text{Maximum mean value} - \text{Minimum mean value}}{\text{Number of scale categories}}$$

By referring to the index range formula stated above, the index range of issues in maintaining vertical green wall is calculated as follows:

$$\text{Index range for issues in maintaining vertical green wall} = \frac{4.6 - 3.0}{5}$$

$$= \mathbf{0.32}$$

The maximum and minimum of mean value for the important issues in maintaining vertical green wall are 4.6 and 3.0, respectively. Thus, the index range calculated for important issues in maintaining vertical green wall is 0.32.

Table 5: Index Range for Important Issues in Maintaining Vertical Green Wall

CATEGORY OF SCALE	RANGE OF MEAN VALUE
Very Important	4.28 – 4.60
Important	3.96 – 4.27
Moderately Important	3.64 – 3.95
Slightly Important	3.33 – 3.63
Not Important	3.00 – 3.32

The Table 5 displays the index range for important issues in maintaining vertical green wall according to their scale category. The results show that the range of mean value from 4.28 to 4.60 is 'very important' issues in maintaining vertical green wall. The 'important' issues in maintaining vertical green wall is in range of mean value from 3.96 to 4.27, meanwhile the range of mean value among 3.64 to 3.95 is 'moderately important'. However, the mean value between ranges of 3.33 to 3.63 is 'slightly important' issues in maintaining vertical green wall and the mean value in range of 3.00 to 3.32 is considered as 'not important' issues in maintaining vertical green wall.

4.4 Rescaling of Important Issues in Maintaining Vertical Green Wall

Rescaling is required to be carried out based on the range of mean value that has been calculated in order to identify the important level of issues in maintaining vertical green wall. Therefore, the table below indicates the entire rescale for important issue in maintaining vertical green wall which is according to their mean value.

Table 6: Rescale of Important Issues in Maintaining Vertical Green Wall

ISSUE	MEAN	SCALE
Safety issue	4.6	Very Important
High maintenance cost	4.4	Very Important
Hard to access vertical green wall maintenance	3.4	Slightly Important
Lack of knowledge and experience in maintaining vertical green wall	3.2	Not Important
Required many maintenance work process or activities	3.0	Not Important

The Table 6 shows that the rescale for important issues in maintaining vertical green wall which based on their range of mean value. The safety issue and high maintenance cost is recorded under level of 'Very Important' as the mean value are 4.60 and 4.40 respectively which is in between the range of 4.28 to 4.60.

Followed by the 'Slightly Important' level which is hard to access vertical green wall maintenance has the mean value of 3.4 is recorded in between the mean value range from 3.33 to 3.63. Moreover, issues of lack of knowledge and experience in maintaining vertical green wall, and required many maintenance work process or activities are recorded in the range of mean value from 3.00 to 3.32 and thus considered as 'Not Important'.

5. CONCLUSION

In conclusion, this research has fulfilled the research objectives. However, there has limitation of respondents for this study. In fact, the case studies selected for this study is only in the scope of Kuching District and Kota Samarahan District, Sarawak, Malaysia. With this, future study should involve more case study or respondents by expand the scope of areas for the study. Besides, the data collection is also conducted through online platform with limited respondents due to the implementation of movement restriction order. By this, future study has to involve with many respondents with experiences of professionals such as property managers, plant scape consultants, property engineers, property architects. There are some implications of study which could be redounding to three parties. The result findings could enhance the knowledge and efficiency of property managers towards the green wall maintenance. Moreover, the research also contributes to building designers and professionals that provide an overview to develop well in implementation of the vertical green wall projects. Furthermore, the findings of this study also make contribution to future researchers who are interested to further explore this related field of topics.

REFERENCES

Azis, S. S., Sipan, I., Sapri, M., Yusoff, N. S., & Hashim, H. A. (2019). Comparison on energy saving: Green roof and green wall. *Planning Malaysia Journal, 17(9).* doi:10.21837/pmjournal.v17.i9.585.

Behm, M., & Hock, P. C. (2012). Safe design of skyrise greenery in Singapore. *Smart and Sustainable Built Environment, 1(2),* 186-205. doi:10.1108/20466091211260677.

Bustami, R. A., Belusko, M., Ward, J., & Beecham, S. (2018). Vertical greenery systems: A systematic review of research trends. *Building and Environment, 146,* 226-237. doi:10.1016/j.buildenv.2018.09.045.

Chew, M. Y., & Conejos, S. (2016). Developing a green maintainability framework for green walls in Singapore. *Structural Survey, 34(4/5),* 379-406. doi:10.1108/ss02-2016-0007.

Growing green guide: A guide to green roofs, walls and facades in Melbourne and Victoria, Australia. (2014). Melbourne: Victorian Government Department of Environment and Primary Industries.

Jaafar, B., Said, I., Reba, M. N., & Rasidi, M. H. (2014). *An experimental study on bioclimatic design of vertical greenery systems in the tropical climate.* The Malaysia-Japan Model on Technology Partnership, 369-376. doi:10.1007/978-4431-54439-5_37.

Kontoleon, K., & Eumorfopoulou, E. (2010). The effect of the orientation and proportion of a plant-covered wall layer on the thermal performance of a building zone. *Building and Environment, 45(5),* 1287-1303. doi:10.1016/j.buildenv.2009.11.013.

Manikandan, S. (2011). Frequency distribution. *Journal of pharmacology & pharmacotherapeutics, 2(1),* 54–56. https://doi.org/10.4103/0976-500X.77120.

Manso, M., & Castro-Gomes, J. (2014). Green wall systems: A review of their characteristics. *Renewable and Sustainable Energy Reviews, 41,* 863-871. doi:10.1016/j.rser.2014.07.203.

McSorley, J. (n.d.). *An Interview With Architect Patrick Blanc.* Twenty6 Magazine. Retrieved from http://www.twenty6magazine.com/issuem/lifestyle/interview-architect-patrick-blanc.

Mir, M.A. (2011). Green facades and Building Structures. Materials and Environment.

Nawi, M. N., Baharum, F., Ibrahim, S. H., & Riazi, S. R. (2017). A review study of maintenance and management issues in Malaysian commercial building towards sustainable future practice. *AIP Conference Proceedings 1897,* 020100 doi:10.1063/1.5005433.

Othman, J., Azhar, I., & Azlan, A. (2018). Assessing plant selections for vertical greenery system on commercial buildings in an urban setting. *Journal of Architecture, Planning and Construction Management, 8(2).*

Palermo, S. A., & Turco, M. (2020). Green wall systems: Where do we stand?. *IOP Conference Series: Earth and Environmental Science, 410,* 012013. doi:10.1088/1755-1315/410/1/012013.

Peck, S W, Callaghan, C, Bass, B, & Kuhn, M. (1999). *Greenbacks from green roofs: forging a new industry in Canada.* Status report on benefits, barriers and opportunities for green roof and vertical garden technology diffusion.

Peng, K. (2013). The application of vertical greening to urban rehabilitation and maintenance. *International Review for Spatial Planning and Sustainable Development, 1(3),* 41-52. doi:10.14246/irspsd.1.3_41.

Pérez, G., Coma, J., Martorell, I., & Cabeza, L. F. (2014). Vertical Greenery Systems (VGS) for energy saving in buildings: A review. *Renewable and Sustainable Energy Reviews, 39,* 139-165. doi:10.1016/j.rser.2014.07.055.

Rakhshandehroo, M., Yusof, M. J., & Arabi, R. (2015). Living wall (vertical greening): benefits and threats. *Applied mechanics and materials, 747,* 16-19. doi:10.4028/www.scientific.net/amm.747.16.

Sari, A. A. (2017). *Thermal performance of vertical greening system on the building façade: A review.* doi:10.1063/1.5003537.

Singh, P. K., Jain, S., Mathur, A., & Kumar, Y. (2017). *An analysis on the potentials of Vertical Greenery System (VGS) in context to the application viewpoint.* 2017 4th International Conference on Signal Processing, Computing and Control (ISPCC). doi:10.1109/ispcc.2017.8269754.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research, 104*, 333-339. doi:10.1016/j.jbusres.2019.07.039.

Wood, A., Bahrami, P. & Safarik, D. (2014), Green walls in high-rise buildings: An output of the CTBUH sustainability working group, Council on Tall buildings and Urban Habitat, Chicago.

Zachariah, N. A. (2016, September 24). *Patrick Blanc, creator of vertical gardens, says many get it wrong.* The Straits Times.

THE STIGMA IMPACT ON PROPERTY VALUE: A STUDY OF SELECT CITIES IN INDIA

Ramakrishna Nallathiga, Snehil Bindal*, Ajay Chaurasia*and Mayur Talodhikar***

** Associate Professor, School of Projects, Real Estate and Infrastructure Management, National Institute of Construction Management and Research, Pune

* PGP REUIM Students, National Institute of Construction Management and Research, Pune

ABSTRACT

Real properties are frequently subject to purchase/ rent with money as consideration for such exchange. Conventionally, the monetary value of real properties is governed by physical, economic and financial factors concerning the property, while assuming ceteris paribus competitive market condition prevalent in the real estate market. However, other factors like information, belief, trust and psychological/ behavioural factors can also affect the value of property to a good extent, which is not studied much. 'Stigma' refers to one such psycho-behavioural factor attached to property that affects property value; different types of stigma may be associated with properties. This paper reports an assessment of the impact of 'stigma' on property value in terms of a 'reduction/loss' of value. Based on the primary data collected from the various parts of the sample Indian cities, the paper assesses the impact of 'stigma' on property value through regression analysis and also evaluates the value loss associated with it. The results show that the stigma associated with property does affect its value adversely by reducing its value; the stigma categories of 'Phenomenon Stigma' and 'Murder/Suicide Stigma' have statistically significant impact on the property value.

Key words: *Property value, stigma, value impact, regression analysis and Indian cities*

1. INTRODUCTION

Real properties are frequently subject to purchase/ rent with money as consideration for such exchange. However, arriving at the consideration value of property requires its valuation. Valuation of real properties is an important process that aids the real estate/ property market transactions and agents in finding the transaction price of property. Valuation has often been defined as the art and/ or science of estimating the values of real/physical assets (Datta, 2004). In technical terms, 'Valuation' means the provision of a written opinion as to capital price or value, or rental price or value, on any given basis in respect of an interest in property, with or without associated information, assumptions or qualifications (Rangwala & Dalal, 2010). However, it does not include a forecast of value. Valuation is simply a model to try to determine property price/ value. Value is the end result; it gets influenced by a variety of factors i.e., understanding of the market, property characteristics, the legal environment, the physical constraints, the planning regime, the availability of finance, the demand for product and the general condition of economy (Datta, 2004). Thus, in the property market, what is often called a 'valuation' is the best estimate of the trading or spot price of a building/ land (Lyon 2005).There are three major approaches taken towards 'valuation' which are shown in Figure 1. Not only exclusive of each other, all these three approaches involve comparisons of various legal, physical, social and economic factors in order to arrive at the value based on the framework that they adopt.

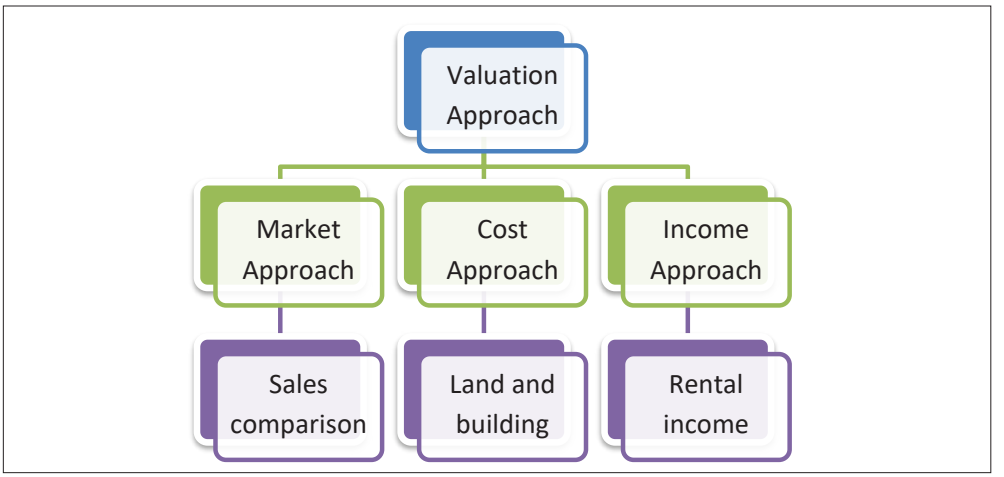

Figure 1: Approaches to the Valuation of Property
Source: Datta (2004)

Conventionally, the monetary value of real properties is governed by physical, economic and financial factors concerning the property, while assuming ceteris paribus competitive market condition prevalent in the real estate market. This formulation of property value is also known as 'Hedonic Valuation', which takes into consideration all the property characteristics into consideration of determining the property value. However, other factors like information, belief, trust and psychological/ behavioural factors can also affect the value of property to a good extent, which is not studied much. Therefore, this research is aimed at understanding and assessing the value impact of such factors on real estate/property values in Indian cities. The traditional valuation approaches – markets, cost and income approaches – cannot be fully used for eliciting the value of properties with some peculiar features like 'Stigma'.

1.1 Stigma Property

'Stigma' refers to one such psycho-behavioural factor attached to a property that affects the property value; different types of stigma may be associated with properties. Stigma is a value loss to property due to the presence of risk perception-driven market resistance (Mundy 1992a). In Real Estate, Stigmatised Property is property which buyers or tenants may shun for reasons that are unrelated to its physical condition or features. Certain events may cause a property to be described as a "stigmatised property". This term is sometimes applied to a property that has had some circumstance occur in or near it, but which does not specifically affect the appearance or function of the property itself (Mundy, 1992a). Examples of these might include: (i) A death occurred in the property (ii) The property was robbed or vandalized (iii) Reports that the property is haunted. There are six major types of 'Stigma' that are associated with real properties, which are described in Table 1.

Table 1: Stigma Types and Characteristics

TYPE OF STIGMA	STIGMA CHARACTERISTICS
Public Stigma	It refers to the attitudes and beliefs of the general public towards real properties, in simple words public stigma is known by a large number of people. These attitudes tend to affect the value, as demanders do consider such stigma associated with property in their purchase offers.
Criminal Stigma	Properties known to be used for the purpose of crime are considered to have Criminal Stigma. An occurrence of such criminal activity inhibits demanders from placing their demand quantity/ price for such property.
Murder or Suicide Stigma	It is a type of stigma where death of some person has been occurred due to either murder or suicide. It leads to a dread that such property is not safe. Therefore, acquirers will avoid such property or ask steep discount.
Debtors Stigma	It is a stigma where an entity that owns a debt to another entity and is not able to repay to that entity. In other words, the owner is unable to meet the financial obligations. It is construed that it is due to/ case of property.
Phenomena or Haunting Stigma	Stigma associated with a house that is thought to be haunted or such phenomenon e.g. the existence of ghosts/ evil spirits. Though not verifiable, even the knowledge of such presence either prevents demand for it or asks for a steep discount on the property price/value.
Minimal Stigma	It is a stigma that is only known by a small group of people, and is usually only taken seriously by locals. It is only due to the local belief that such property does not give rise to auspiciousness to the occupants.

Source: Prepared by Authors

Even though the "stigmatising event" does not directly affect the appearance or use of the property, it has such a negative psychological effect on the potential buyer that they decide not to purchase the property. The property becomes known as a "stigmatised property" potentially making it much more difficult to sell and ultimately adversely affecting its market value. There is also no standard platform available for the valuation of stigma property. The framework for the contaminated properties in the case of environmental damages can be extended to stigma properties (Mundy, 1992b). Apart from affecting a contaminated or potentially contaminated

property, stigma also affects the value of properties that are not contaminated but are in close proximity to a source of contamination (Chalmers & Roehr, 1993). Assessing the impact of stigma on property values is important to understand its extent of impact on value reduction/ loss of property and thereby to inform the potential clients and those interested in the industry.

1.2 Value Impact

Market value of property is widely used to make the purchase and sale decisions on property. International Valuation Standards defines market value as "the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently, and without compulsion. Market value of the property therefore refers to the value that it would fetch when all competitive conditions are prevalent, including complete information or the lack of information asymmetry. Market value is established by the demand and supply conditions prevalent in property market in an area/ neighbourhood and is devoid of any reference to property unit characteristics.

Actual Value of the property is the defined as that price of property at which the property or asset has been sold/ sellable price to the other party. Actual value can be more than, less than or same as that of market value, depending upon the characteristics of property and other attributes. In our case the value of property is depreciated because of stigma attached to it, therefore, the actual value of the stigmatised property will be less than that of market value. In other terms, actual value is the depreciated or appreciated value of the properties due to property characteristics, including any stigma associated. Stigma associated with property will therefore impact on it in terms of reducing the value that it can fetch, when it is put up for either sale or rent.

2. APPROACHES TO STIGMA IMPACT ASSESSMENT

The 'stigma' associated with property can affect its price/value is implicit in the way such properties are transacted. However, the impact of such stigma is not explicitly known to the property assessors/ valuers using conventional valuation approaches. Two major approaches are found towards valuation of stigmatized properties depending upon the particular situation: (i) where data are available (ii) where data are not available. When the data are available, market approach is taken towards valuing the stigmatized property, whereas when there is no such data available it is approached by constructing markets through questionnaire surveys.

2.1 Market Data Approach

When market data of all properties are available, the 'value differential' approach can be used for the assessment of stigma in money terms while considering the stigmatized property as a 'contaminated property'. In a survey in 1998, it was found that the majority of Australian valuers had used the impaired value approach to value contaminated land. The impaired value approach can be represented by equation below (Chan 2000):

Vc = Vu – L – Cr – S .....
where:

Vc = contaminated value,
Vu = uncontaminated value,
L = loss due to reduced income/productivity and/or legal liabilities,
Cr = investigation, remediation and monitoring costs,
S = stigma impacts

Figure 2 shows the approach graphically. The impaired value approach outlined earlier is a logical model for valuing contaminated land (Guntermann, 1995). However, it requires valuers to explicitly consider the stigma impact. It is this requirement that causes problem.

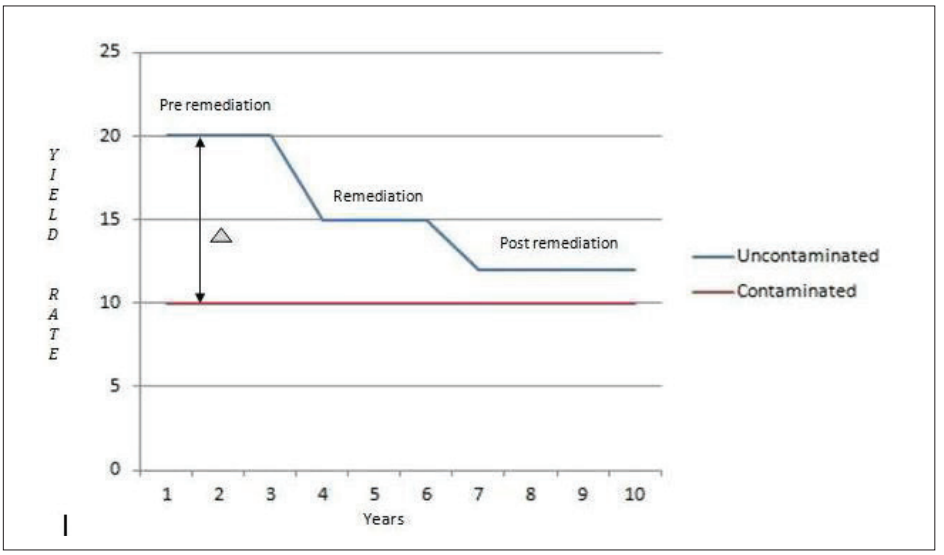

Figure 2: Stigma Property Valuation Using Market Data
Source: Rodderweigg (1998)

Patchin (1994) also shows that stigma may be assessed with the direct comparison method. He suggested that the unimpaired and impaired values of the property are to be assessed using the direct capital/ sales comparison method. The indicated stigma was estimated by subtracting the impaired value from the unimpaired value. He also suggested estimating the indicated stigma by subtracting the actual selling price from the unimpaired value. This value differential offers insight of value loss/ reduction attributable to stigma. Man & Wong (2012) apply this framework to estimate the value loss due to stigmatized properties.

2.2. Constructed Market Approach

An alternate method when data not readily available is the 'survey method', in which such data is generated from questionnaire survey for the purpose of valuation of stigma properties. Using experimental method consisting of trial (stigmatised) properties and control group of properties without any such, the value differentials offer an insight of property value impact associated with

stigmatised properties. For example, Chan (2000) found, in a survey of Australian valuers on their attitude towards stigma, that a large number of respondents claimed they had considered stigma when performing valuation of contaminated property. Of the sample, 48% of the less experienced respondents claimed that their clients had concern for this value impact, with 56% of the experienced respondents shared the same view. It appears that stigma has already caused a significant concern, if not an alarm, among clients in the three states where the survey was done. Likewise, a survey of realtors or real estate brokers is also done to distinguish between stigmatised and non-stigmatised properties and they can also be questioned on the 'market value' that a non-stigmatised property can/does fetch and the 'actual value' a stigmatised property will fetch.

3. CURRENT STUDY METHODOLOGY AND APPROACH

3.1 Methodology

Broadly, we use the 'market and constructed approaches' towards the valuation of properties, while adopting both the approaches outlined above – existing market data and data generated from formatted questionnaires. Since the topic Valuation and Negotiation of Stigma property is very nascent in India and there is no standard platform available, so we have considered property from all over India so that we can have a standard model which can be used by everyone. The methodology that we adopted for the current study is shown in Figure 3.

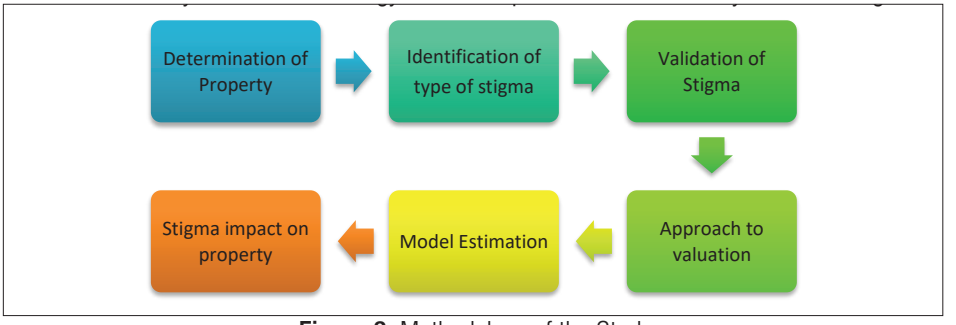

Figure 3: Methodology of the Study

Property values at the area/ jurisdictional level are influenced by the demand and supply factors prevalent. Once property values are established at the area/jurisdictional levels, the property values of individual properties in an area/ jurisdiction are governed by the local factors. These local factors can be broadly divided into – (i) internal factors/ attributes concerning the subject property (also, termed as property characteristics) (ii) external factors/ attributes that are related to the neighbourhood (also termed as neighbourhood characteristics). Table 2 shows some of the internal and external factors/ attributes that can affect property value. Different parameters/ attributes will have different impact on the property value. Conventionally, studies attempt to establish the link between the market value of a real estate/ property and the property attributes through parametric modelling. We also use the same framework using the data on market value of properties and property characteristics data. However, we also include 'stigma attributes of the property' in to the parametric modelling in order to assess the impact of the stigma on the property values.

Table 2: Internal and External Factors/ Attributes of Properties

INTERNAL ATTRIBUTES	EXTERNAL ATTRIBUTES
Size of the property	Distance from bus stop
Orientation of the property	Distance from railway station
Age of building	Distance from CBD
Units of service available	Distance from school
Parking facility	Distance from healthcare unit
Recreation club	Distance from main road
Swimming pool	Distance from mall/ entertainment area
Interiors/ exteriors	Distance from employment centre
Escalator/ elevator	Social class/ mix of population

3.2 Study Approach

The approach taken to the current study is shown in Figure 4. The identification of stigma types was already shown in Table 1. The presence of different types of stigma in different identified properties has been done with the help of real estate brokers and other network in their network. The subsequent steps are explained in the following sub-sections.

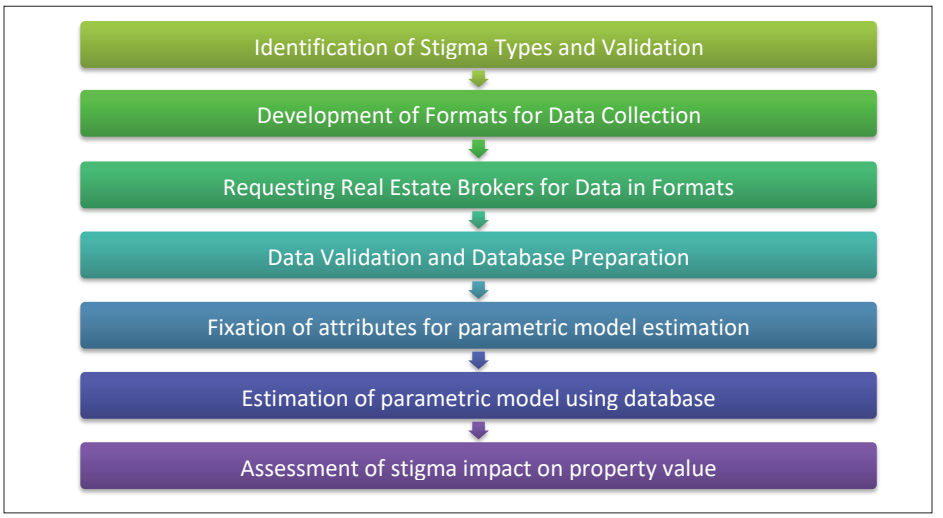

Figure 4: Approach to the Study

3.2.1 Data Collection

Most of the data on property values available with property web portals/ research units is average area/ jurisdictional property prices, which cannot be used in the current analysis. As there is not much of market data available on property values in a centralised manner, it wasa tough task to collect data from all over India. Travelling to various cities all over India to get data was practically impossible for us; therefore, in order to get data from

the properties in sample cities, we contacted the local brokers of those particular cities. Local brokers were clearly explained about our research and were encouraged to give genuine responses.

In order to get the information we required for our analysis, we prepared a data sheet in which all the details were mentioned to our requirement. This data sheet was sent to various brokers located in the study cities country; with their help, we were able to collect the data on property details from study cities of India. The local brokers were thus the source of getting properties details as well as values. In our research study, we confine to residential properties.

3.2.2 Validation of Data

Validation means cross checking the information provided. This is one of the most important aspects of data collection, in which the authenticity of the data provided by the brokers is verified, as there could have been chances of incorrect information provided by them. Validation of property is one of the most cumbersome and time consuming process.

In order to validate property details and its value, multiple strategies were used e.g., contacting more than one broker of a particular city, obtaining responses in standard data formats, getting information about stigma affected areas and stigmatised property with details, contacting other local brokers of that city and asking to give information about a particular area, finally, cross checking the information provided by them with known people i.e., friends and relatives. These led to more authentic data from the property brokers.

3.2.3 Spatial Spread of Data

As India is a diversified country with different cultures and religions and every culture, religion or people have different perspective on particular type of stigma, so in order to get overall impact of stigma at national level we have collected data from all over the India i.e. North, South, East, West and Central parts of India. In order to have a standard platform, we focused on properties located in three major types/ categories of cities i.e,

- Tier-I cities such as Mumbai, Delhi, Kolkata etc,
- Tier-II cities like Bhopal, Lucknow etc.,
- Tier-III cities like Ratlam, Jabalpur, Patna etc.

Getting information from brokers was most time consuming. But, persistent follow-up and request has led to data on a sizeable number of properties. In total brokers provided us 113 properties from all over India, the distribution of which is shown in Figure 5. All these properties are located in the various city classes/ tiers mentioned above.

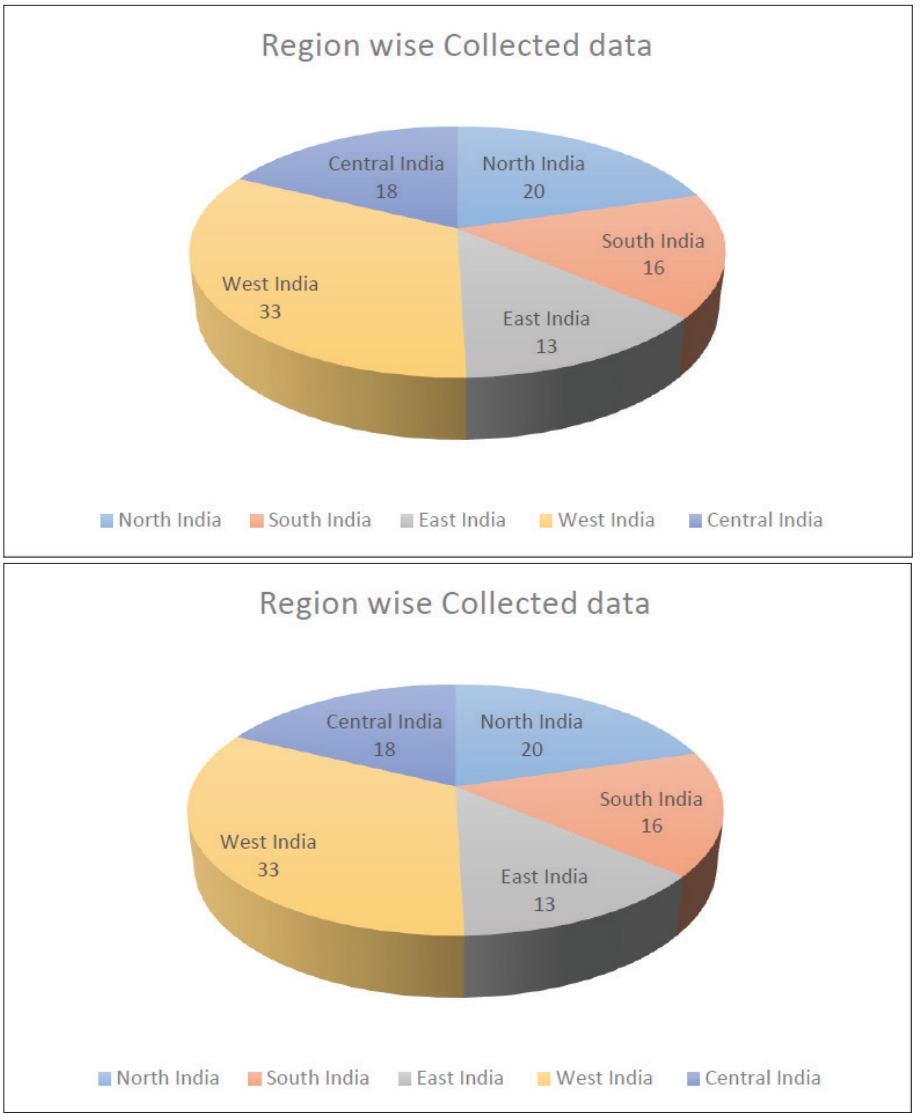

Figure 5: Regional Distribution of Sample Data

4. DATA ANALYSIS AND RESULTS

4.1 Stigma Impact Assessment

Following the market approach to property value, we use the parametric model estimation for assessing the impact of stigma on property values, while following the 'Hedonic Valuation Approach'. Hedonic valuation approach considers both explicit and implicit factors/ attributes of property that can affect the property value into the valuation model. We use the conventional model of value of properties attributable to the internal and external factors by extending it to include the stigma attributes that can affect property value. Therefore, like in any hedonic valuation model, the property value can be a function of these attributes, or

V = f (IA, EA, SA).

where,

IA refers to Internal Attributes
EA refers to External Attributes
SA refers to Stigma Attributes

Table 3 shows the factor parameters/ attributes in the broad category of factor groups – internal, external and stigma attributes. The measurement units of these variables and their nature are also shown in the table. While quantitative variables can be measured in terms of the measurement units provided, the qualitative variables are measured in terms of their presence or not (or, as dummy variable). Dummy variable takes the value of 1 when the stigma type is present and 0 when it is not present for the observation units i.e., sample properties. These parameters/ attributes enter the linear model described as under:

$$V = \alpha + \sum \beta i * IAi + \sum \beta j * EAj + \sum \beta k * SAk$$

wherein,

V is the value of real property measured in Rs Lakhs

IA_i is the set of internal attributes of property with i= 1..5

EA_j is the set of external attributes of property with j = 1..5

SA_k is the set of stigma attributes of property with k = 1..4

α is the constant of the model to be estimated

β_i, β_j and β_k are co-efficients of model parameters respectively to be estimated.

Table 3: Factor Parameters/ Attributes and Measures

Factor/ Attribute Group	Factor Variable/Parameter	Measurement unit	Nature of Variable/ Parameter
Internal Attributes	Size of property	Sq ft	Quantitative
	Age of building	Years	Quantitative
	Units of service	No. of rooms	Quantitative
	Parking	Available or not	Qualitative (dummy)
	Recreation club	Available or not	Qualitative (dummy)
External Attributes	Distance from bus stop	Km	Quantitative
	Distance from CBD	Km	Quantitative
	Distance from school	Km	Quantitative
	Distance from healthcare unit	Km	Quantitative
	Distance from mall/ entertainment unit	Km	Quantitative

Factor/ Attribute Group	Factor Variable/Parameter	Measurement unit	Nature of Variable/ Parameter
Stigma Attributes	Phenomenon Stigma	Existing or not	Qualitative (dummy)
	Criminal Stigma	Existing or not	Qualitative (dummy)
	Murder/ Suicide Stigma	Existing or not	Qualitative (dummy)
	Minimal Stigma	Existing or not	Qualitative (dummy)
	Debtor Stigma	Existing or not	Qualitative (dummy)
	Public Stigma	Existing or not	Qualitative (dummy)

We first perform the correlation analysis to remove the independent variables/ parameters with significant amount of correlation in order to avoid multi-collinearity issues. We then perform regression analysis using Ordinary Least Squares (OLS) method in order to estimate the above specified model using the SPSS software. Table 4 shows the results of estimated model of property values and their determinant attributes/ parameters. The regression analysis implies that the value of property is not only affected by internal and external attributes that are present but also by the stigma attributes. The presence of stigma reduces the property value as implied by the negative coefficients of stigma attributes/ parameters. It can be seen in the results that only the phenomenon stigma and murder/ suicide stigma are statistically significant in their impact on property value. Further, the model also implies that the size of property affects the value significantly; also, distance away from school, entertainment centre and CBD or SBD also reduces the property value. The model has a reasonable degree of fit, as implied by the R-square value of 62.4%.

Table 4: Results of Model Estimation

Factor/ Variable	Coefficient (B)	Standard Error	t-ratio	Significance of t
Constant	56.571	38.418	1.473	0.150
Size of the property	0.047**	0.011	4.159	0.000
Age of the building	-0.388	0.311	-1.249	0.220
Unit of services	-4.392	8.219	-0.534	0.596
Parking available	6.110	12.037	0.506	0.615
Recreational club facility	6.627	11.079	0.598	0.553
Distance from bus stop	-5.655	7.233	-0.720	0.439
Distance from CBD and SBD	0.187	2.209	0.092	0.927
Distance from school	-7.779	11.854	-0.656	0.516
Distance from health care	1.244	17.236	0.072	0.943

Factor/ Variable	Coefficient (B)	Standard Error	t-ratio	Significance of t
Distance from entertainment	-5.063	4.452	-1.137	0.263
Phenomena Stigma	-33.743*	17.374	-1.942	0.060
Public Stigma	-33.291	23.071	-1.470	0.150
Criminal Stigma	-22.770	18.634	-1.222	0.230
Murder or Suicide Stigma	-26.306*	15.610	-1.685	0.101
Minimal Stigma	-7.068	16.857	-0.419	0.677
R Square of Model Fit	0.624	Adjusted R Square		0.467
S.E. of the Estimate	35.504			

N = 113 * significant at 10% significance level** significant at below 5% significance level

4.2 Stigma Impact Evaluation

Stigma associated with the property will be reflected in the differential of 'market' and 'actual value' of the property. The market value and actual value play very important role in the analysis, which is dependent on these two aspects of the property. Hence almost care has to been taken while considering or collecting data for market and actual value of property. The market value of the subject property was identified using online portals such as www.magicbricks.com, www.99acres.com etc. It was easy to get market value using online portals, but the difficulty comes with collection of actual value of the contaminated property. So, the actual value of property was obtained by contacting valuers and asking potential buyers on what price they would place to buy the property.

We took the average of the responses we got from the potential buyers. In some cases where we were not able to make communication with potential buyers, we got the market value from a Renowned Valuers. The output of stigma impact evaluation in terms of property value depreciation/ loss is shown in Figure 7.The presence of different types of stigma affects the property value loss/ depreciation differently. It is clear from it that the phenomena stigma has the highest impact on property value in terms of depreciation (27%) while minimal stigma has lower impact of value depreciation (12%).

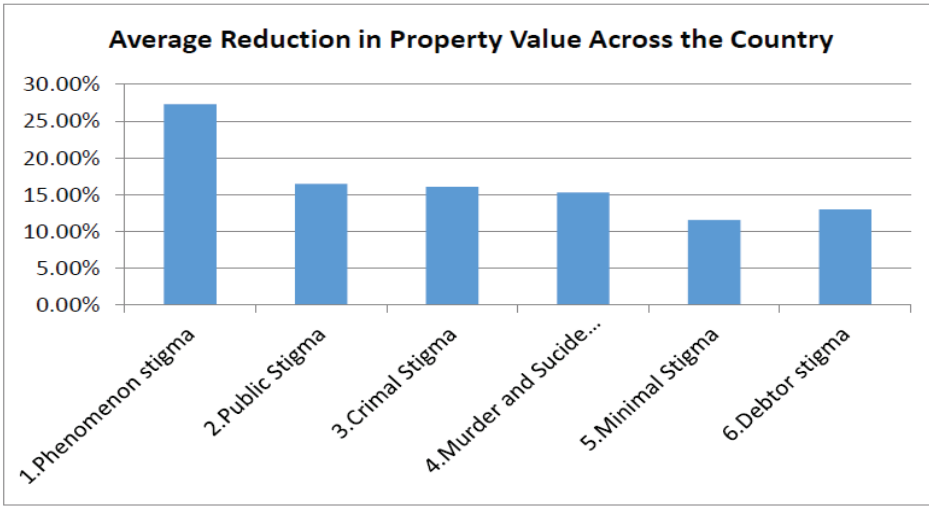

Figure 7: Stigma-wise Depreciation of Property Value

Further, the reduction in the value of the property is highly impacted due to the association of phenomena or haunting stigma with the subject property. The impact of any stigma is dependent on the area covered by the news of the event occurred in that particular property. So, in the cases of public stigma, criminal stigma and murder and suicide stigma, the information of the event occurred in the subject property is widely spread and, hence, the value affected is more in such cases. In the cases of minimal stigma and debtor stigma, the information is generally with the owner or seller of the property and third party (i.e. channel partner) may or may not know the occurrence of the event and hence the change in property value resides with the knowledge of the owner or seller and buyer as well as channel partner.

5. CONCLUSION

The results from the study on the impact of stigma on real properties clearly show that the stigma has a good amount of impact in terms of depreciation of value. The model estimation of property values also implied that the stigma attributes have a statistically significant impact on property value in terms of reducing it due to their presence. The results would be more robust, if there are more number of samples from all type of cities and similar number of sample from each category. The results also imply that the stigma impact can be minimised when the property owners are made aware of the following actions:

- Change of Property use/ activity can reduce the stigma associated with property
- Neighbourhood development also can reduce the stigma due to proximate properties
- Education/ awareness also reduces impact, as some of it is only due to wrong beliefs
- Longer tenure of lease/ rent can also lead to tenant occupation and reduces stigma risk

Coming to negotiation aspects we conclude that the impact of stigma will reduce to great extent if the stigma of subjected property is reduced which we saw in case studies i.e. the value of surrounding property is also affected by the property available in close proximity to the stigmatised property. Hence

if those stigmatised property are used effectively and efficiently as we saw in case study the impact of stigma can be reduced. Stigma clauses such as the one shown below can also reduce the impact of stigma due to indemnity offered by it.

STIGMA CLAUSE

"The Seller warrants that, to the best of their knowledge, belief and understanding that this property has not been stigmatized by any act or occurrence which would be considered traumatic or horrific to the buyer."

"The Seller warrants to the Buyer that to the best of their knowledge, this property has not been stigmatized by the following acts or occurrences _____ that the buyer considers traumatic or horrific. The Buyer must indicate a specific act or occurrence, or this clause will be considered deleted.

REFERENCES

Chalmers, J.A. & Roehr, S.A. (1993).'Issues in the Valuation of Contaminated Property', *The Appraisal Journal, LXI (1):* pp. 28 – 41.

Chan, N. (2000). 'How Australian Appraisal assess Contaminated Land'. *The Appraisal Journal LXVIII:* pp. 432-440

Datta, S. (2004). Valuation of Real Properties. *Kolkata: Eastern Law House Publishing.*

Lyon, Susanne (2005). An Introduction to Valuations. *Real Estate Salesman Notes.*

Man, K. F. & Wong, V. (2012). 'Haunted flats: Quantifying the value of stigmatisation in an apartment market'. *Appraisal Journal LXX:* pp. 44-58

Mundy, B. (1992a). 'Stigma and Value'. *The Appraisal Journal: LX (2),* pp 7-13

Mundy, B. (1992b). 'The Impact of Hazardous Materials on Property Value'. *The Appraisal Journal: LX (2)*, pp 155-162

Patchin, P.J. (1994). 'Contaminated Property and the Sales Comparison Approach'. *The Appraisal Journal LXII,* pp 402-409

Rangwala, S.C. & Dalal, K.B. (2010). Valuation of Real Properties. *Anand: Charotar Publishing House Pvt Ltd.*

VALUATION PRACTICES IN THE TOWN AND COUNTRY PLANNING ACT 1976: VALUATION MODEL FOR DEVELOPMENT CHARGE AND TREE PRESERVATION ORDER PURPOSES

Mohd Hasrol Haffiz Aliasak, Mohd Farid Sa'ad & Najma Azman

Centre of Estate Management Studies
Department of Built Environment and Technology
Faculty of Architecture, Planning and Surveying
Universiti Teknologi Mara Perak Branch
Seri Iskandar Campus
32610, Seri Iskandar
Perak Darul Ridzuan
hasrol170777@gmail.com

ABSTRACT

Valuation practices is an important profession to provide services to the society in order to give professional advice on the real estate value for specified purposes. There are two main purposes of valuation namely statutory and non-statutory valuations. The valuation practices are related to various requirements and one of these is valuation related to the Town and Country Planning Act 1976. According to the Town and Country Planning Act 1976 which applicable in the states in Peninsular Malaysia, there are two provisions that required valuation services from professional valuers known as Development Charge under Part V and Tree Preservation Order under Part VA of the Act. Each of the provisions requires the professional valuers in determining the value of land and the amount of compensation which related under Section 19 of Valuers, Appraisers, Estate Agents and Property Managers Act 1981. In carrying out of both valuation purposes, the valuers shall follow the provisions under the Town and Country Planning Act 1976 and they may apply appropriate valuation methodology to determine the adequate value of land for such purposes. Both of valuation purposes under the Town and Country Planning Act 1976, the valuer will apply before and after approach then the differences both before and after value will be considered as the amount of compensation or charge to be imposed. In summary, this topic tries to relate the importance role and functions of valuers in the town planning and landscaping disciplines in Peninsular Malaysia.

Keywords: *Development Charge, Tree Preservation Order, Town and Country Planning Act 1976 and valuation practice.*

1. INTRODUCTION

The Town and Country Planning Act 1976 (Act 172) is a parliament act which was came into force in 1976 after replacing the colonial legislation approved by the British government during British administration in Malaya. Originally, this act came from the various legislations namely municipality enactments and ordinances enacted in the Straits Settlements such as the states of Penang and Melaka, the Federated Malay States (FMS) comprising the States of Perak, Selangor, Negeri Sembilan and Pahang, and the Unfederated Malay States (UFMS) such as the States of Perlis, Kedah, Kelantan, Terengganu and Johor. From single municipality enactments and ordinances, the legislations that related to local authority administration, urban services, building and planning legislations are separated into two parliament acts namely the Local Government Act 1976 (Act 171) and the Town and Country Planning Act 1976 (Act 172). Both acts were enacted according to the provisions under Article 76, Federal Constitutions. These acts are only applicable to the States of Peninsular Malaysia. For the states of Sabah and Sarawak and the Federal Territories of Kuala Lumpur, Labuan and Putrajaya, these states had their own legislation related to the town and country planning.

The Town and Country Planning Act 1976 contains various provisions related to the planning regulations which can use and applies to the states of Peninsular Malaysia. The purposed of this paper focused on the legislations related to the Development Charge and Tree Preservation Orders which were provided in Part V and Part VA respectively. This paper tries to relate the role and functions of valuation professions with the provisions for both Development Charge and Tree Preservation Order where both regulations required the role of the valuer to determine the amount of charge and compensation that can be made under such provisions. In the Valuers, Appraisers, Estate Agents and Property Managers Act 1981 (Act 242), the provision under Section 19 had stated any matters related to the valuation of any interests of real property are vested to the valuers who have conferred the Authority of Practice as a Valuers according to the terms and conditions as stated in the Valuers, Appraisers, Estate Agents and Property Managers Act 1981.

2. AN OVERVIEW OF THE TOWN AND COUNTRY PLANNING ACT 1976

The Town and Country Planning Act 1976 is a parliament act that was gazette and enacted according to the provisions under Articles 76 and 80(2), the Federal Constitutions. The act aims to establish proper control and regulate all matters related to the town and country planning to all states in Peninsular Malaysia. This act is comprising of 12 parts with 82 sections that provide all the guidelines and regulation on town and country planning matters as to be complied by the town planning authorities with the guidance by the State Governments.

Part I of the act stated the preliminary parts of the town and country planning act and all interpretations have been used in this act. Part II describes the policy and administration of planning authorities and agencies to provide any relevant policies and programs subject to the town and country planning practices in Peninsular Malaysia. Part IIA provides the process to set up and establish the Regional Planning Committee while Part IIB stated all matters related to issue the National Physical Plan. Part III of the act stated the detailed development process from the preliminary stages until completion of the development plans.

Part IV focuses on the planning control and regulations to be followed by the local planning authorities as a part of the local government offices. This authority plays its functions to ensure that all development processes are aligned to development plans and national objectives. Part V elaborates the matters regarding the development charge to the public and interested parties if they want to amend the existing regulations related to the development of individual alienated lands. Part VA is a regulation related to the requirement to preserve the trees available around the local authority administrative area. This part is purposely used to ensure sustainability and balance between development and nature can emerge. Part VI provides the platform to establish the Appeal Board if any disputes related to the Town and Country Planning Act 1976 to hearing and may need to make any relevant inquiry. Part VII is a provision related to the purchasing notice and acquisition of lands for special cases, while Part VIII provides the provisions regarding development areas. And the last part of this act known as Part IX provides all matters regarding the miscellaneous matters and more to the administration and management of the act.

Indirectly, two parts of the act required the role of valuers to provide their professional advice on the land valuation such as Part V and VA. Both parts will discuss in the following parts in this paper.

3. ROLE AND FUNCTIONS OF VALUERS

A valuer is referred to a professional member of the surveying discipline with the expertise to give professional advice regarding the value of real property based on his/ her knowledge and understanding of property market trends. A valuer must have at least minimum academic knowledge acquired from formal higher education institutions that provide them with multiple knowledge related to real estate. The combination of economy, laws, built environment and other general subjects' disciplines are able to produce a trained valuation surveyor in order to assist the public on real estate trends. In Malaysia, the Valuers, Appraisers, Estate Agents and Property Managers Act 1981 clearly stated the main role of valuation surveyors by referring to the valuers who are conferring authority of practice as a valuer after he/ she passed all examinations conducted and monitored by a board namely the Board of Valuers, Appraisers, Estate Agents and Property Managers, Malaysia which was established under the Act. The main role and functions of valuers are stated in Section 19 of the Valuers, Appraisers, Estate Agents and Property Managers Act 1981 as follow:

Valuation practice

19. Subject to the provisions of this Act, a registered valuer or appraiser who has been issued with an authority to practice by the Board shall be entitled to practice his profession and shall be authorized to undertake –

(a) Valuation of all lands and buildings and all interest therein including trees, crops, furniture, fixtures, trade stocks, plant, machinery, equipment and other effects; and

(b) Valuation of all lands and buildings and all interest therein required for feasibility studies, project management, court proceedings, arbitration or other purposes.

This paper has purposely overlooked the functions of the valuer to involve in the process determining development charge according to the provisions as stated in Section 19(b) by referring to "valuation of all lands and buildings and all interest therein" which refers to the object, while for the Development Charge and Tree Preservation Order purposes, the valuer will assist the local authorities to determine the amount of charge to be imposed to the landowner under the provision of "arbitration" which known as the subject. Based on both the Town and Country Planning Act 1976 and Valuers, Appraisers, Estate Agents and Property Managers Act 1981 had shown the interrelation between the needs of valuers to assists the local authorities and public to value "lands and buildings and all interest therein" as per required under arbitration proceeding. The valuer's advice is necessary to ensure all interested parties involving in the proceeding could find the solution to any disputations. The valuer's assistance is required to ensure that no better-off and worse-off among the interested parties involving these proceedings. The author will show how the valuer can assist the interested parties in order to solve the issues that may arise from the situation as stipulated in the Town and Country Planning Act 1976. Therefore, the application of relevant valuation approaches and methodologies will use in order to give a picture of how the valuer can assist the interested parties. The valuation methodologies in the valuation process are based on the types and conditions of affected land and area in both Development Charge and Tree Preservation Order carrying out in the Town and Country Planning Act 1976.

In valuation practice, the purposes of valuation involving both Development Charge and Trees Preservation Orders conditions are commonly for internal management purposes. The valuers required to prepare a full report and valuation according to the format as stipulated in the Malaysian Valuation Standards issued by the Board of Valuers, Appraisers, Estate Agents and Property Managers, Malaysia. In these scenarios, the market value is used as a basis of valuation as stated in the MVS 4 as follows:

> *"Market Value is the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's-length transaction after proper marketing where the parties had each acted knowledgeably, prudently and without compulsion."*

In the other situations, for the purposes of Development Charge and Tree Preservation Order, the valuers apply the Highest and Best Use (HBU) principles in arriving at the value as required for both scenarios. The Highest and Best Use has been defined in Paragraph 5.3.3 (d), MVS 5 as follows:

> *"Highest and Best Use (see General Valuation Concepts and Principles) is the use that would produce the highest value for an asset, liability or a group of assets and/or liabilities, regardless of the actual current use. The Highest and Best Use must be physically possible, financially feasible, legally allowed and result in the highest value."*

The report and valuation prepared by the valuers will follow the contents and requirements as provided in the MVS 8. The valuers are also required to conduct a site inspection and referencing according to the proceeding as stipulated in the MVS 6 to collect and gather all relevant data on-site. All of these data and information were collected and gathered during the inspection and the referencing procedure will be able to help and support the valuer's judgement and justification during

the valuation exercise carried out. This procedure is in line with the definition of valuation which required the valuer to combine both art and science characteristics in arriving at the best value for both Development Charge and Tree Preservation Order purposes.

4. LAW PROVISIONS OF THE DEVELOPMENT CHARGE AND TREE PRESERVATION ORDER IN THE TOWN AND COUNTRY PLANNING ACT 1976

4.1 Development Charge

According to Section 32(1), Town and Country Planning Act 1976, development charge is defined as follows:

> *"Where a local plan or an alteration of a local plan effects a change of use, density, or floor area in respect of any land so as to enhance the value of the land, a development charge shall be levied in respect of any development of the land commenced, undertaken, or carried out in accordance with the change".*

Based on the above provisions, any intention to alter or amend the local plan been gazetted by the local planning authorities, the owner or interested persons shall be levied a sum of amount namely development charge by the respective local authority where the land is located within the administrative area. The rate and method of determining the development charge are subject to the rules provided by the State Authority where the respective local authority under the state government administrative power as specified in Section 32(b) and (c) of the Town and Country Planning Act 1976. As we know, according to Schedule Nine of the Federal Constitution, the local authorities are under the state jurisdictions as specified in the State List. The State Authority has the power to set the rules as stipulated in Section 35 of the Town and Country Planning Act 1976. Table 1 shows the development charge rules has been gazetted and came into force by the state authorities in Peninsular Malaysia as of 2020.

Table 1: Development Charge Rules in the Peninsular Malaysia as at year 2020

STATES	RULES	YEAR
Selangor	The Development Charge Rules (State of Selangor) 2010	2010
Perak	The Development Charge Rules (State of Perak) 2014	2014
Johor	The Development Charge Rules (State of Johor) 2015	2015
Kedah	The Development Charge Rules (State of Kedah) 2015	2015
Kelantan	The Development Charge Rules (State of Kelantan) 2015	2015
Pahang	The Development Charge Rules (State of Pahang) 2019	2019
Perlis	The Development Charge Rules (State of Perlis) 2020	2020

Source : Jabatan Perancangan Bandar dan Desa Semenanjung Malaysia, (2021)

Section 33 of the Town and Country Planning Act. 1976 provides the provision in regard to the process of determination of development charge. Section 33(1) stated that, before the

planning permission being approved by the local planning authority, the applicant or interested parties if they decide to make amendment or alteration of the existing land use and planning provisions as gazetted in the local plan, they are required to make an application through a notice to demanding payment of development charge. Section 33(2) described that the amount of development charge determined by the local authority to be levied to the applicant is final and conclusive. This provision also states that the applicant cannot make any appeals or reviews in any court.

Mode of development charge payment is also stipulated in this part where Section 34 provides the procedure on such payment. Section 34(1) stated that the amount of development charge can be made whether in a lump sum or specified number of installments. Section 34(2) provides, if the due installment of service charge is not paid, the local planning authority shall give to the person to whom planning permission has been granted a notice informing him of the default and demanding that payment be made within a reasonable time to be specified in the notice. Section 34(3) had described, if the amount due remains unpaid after the time allowed has lapsed, the whole balance of the development charge shall become due and payable and may be recovered in the manner in which rates are recovered under any written law relating to local government. And the last provisions in this section had stated that all sums received on account of the development charge shall be paid into the fund of the appropriate local authority. That means the local planning authorities are required to open a special fund account for this purpose.

According to the Jabatan Perancangan Bandar dan Desa Semenanjung Malaysia, the development charge is crucial to the local planning authorities for the following purposes:

1. Collection of development charges can be a revenue source to the local planning authorities other than taxes can be collected,
2. Structure plan can be used as an important control tool to influence the land value other than to control and design the development area in local planning authority's administrative area,
3. As capital financial sources could be re-invested to return the benefits to the public, and
4. To be used by the local planning authorities to develop a town and provides the public facilities maintenance works.

4.2 Tree Preservation Order

Tree Preservation Order is another provision as stated in the Town and Country Planning Act 1976 which is known as Part VA. Originally, this provision has been inserted in this act after the reviews and amendment in the year 1995 with concurrently the government policy to implement sustainable development in all town and development areas in Malaysia. This part also taking into account the government initiative to provide a compulsory requirement to the open spaces if the developers apply the planning permission to the local planning authorities. Therefore, the provision on Tree Preservation Order looks to ratify the existing developed area or town area which were developed before 1995.

The Part VA of Town and Country Planning Act 1976 which is referring to the Tree Preservation Order had provided eight sections that stated all matters regarding this provision. Section 35A

provides the power to the local planning authorities to issue the tree preservation orders to endangered or special values of the tree. This section also stated the legal actions to be made for those who contravene any provision in the tree preservation order commits an offense and is liable, on conviction, to a fine not exceeding RM100,000.00 or to imprisonment for a term not exceeding six months or to both. Section 35B provides the exemption to be given to a tree that has or trees or group of trees which have already been subjected to conditions imposed under Section 22(5)(f) and (g) which stated as follows:

> *"prohibiting the felling of trees of a certain size, age, type or species at any particular location, unless it is to comply with any written law"*

Section 35C refers to the right of land owner or interested parties to make appeals against tree preservation order to the Appeal Board which has been formed under the Part VI of Town and Country Planning Act 1976. Section 35D states the compensation can be made by the land owner or interested parties under a tree preservation order. Section 35E describes the provisions to the person who is found guilty under subsection 35A(4) for felling any tree in respect of which a tree preservation order is for the time being in force, in contravention of the tree preservation order, to replace such tree by planting another tree. Section 35F stipulated the duty of the Local planning authority to replace tree if the person whose duty it is to replace fails to do so. This provision as follows:

> *"In the event of a failure to replace a tree under subsection 35E(1), the local planning authority may proceed to replace the tree and, not with standing payment of a fine under subsection 35E(5), all costs and expenses reasonably incurred thereby by it shall be reimbursed by the person in default of such replacement."*

Section 35C refers to the right of the landowner or interested parties to make appeals against tree preservation order to the Appeal Board which has been formed under the Part VI of the Town and Country Planning Act 1976. Section 35D states the Compensation can be made by the landowner or interested parties under a tree preservation order. Section 35E describes the provisions to the person who is found guilty under subsection 35A(4) for felling any tree in respect of which a tree preservation order is for the time being in force, in contravention of the tree preservation order, to replace such tree by planting another tree. Section 35F stipulated the duty of the local planning authority to replace the tree if the person whose duty it is to replace fails to do so. This provision as follows:

> *"After taking into consideration the matters specified in subsection (2), the local planning authority may, subject to subsection (4), grant planning permission either absolutely or subject to such conditions as it thinks fit to impose, or refuse to grant planning permission."*

And the last provision under Part VA is the Section 35H of the Town and Country Planning Act 1976 provides the requirement to preserve a tree with a girth exceeding 0.8 meters and, the local planning authority is given the power to any person who commits an offense and is liable, on conviction, to a fine not exceeding ten thousand ringgit or to imprisonment for a term not exceeding three months or to both.

In summary, the importance of the Tree Preservation Order as provided in the Town and Country Planning Act 1976 is to ensure that the natural resources would be conserved and secure for our next generation and to balance the development and the ecology.

4.3 The Role of Valuation Surveyors for both Development Charge and Tree Preservation Order

Both the development charge and tree preservation order have not stated directly the need for a valuation surveyor in these provisions. But indirectly, both parts have required the expert to determine the land value in the form of compensation and the market value. As we discussed before, the valuers are qualified persons as stated in Section 19 of Valuers, Appraisers, Estate Agents and Property Managers Act 1981 to carry out valuation exercises in determining the market value of land, buildings and interests therein. Provision regarding development charge has stated the role of valuers in valuing the land value can be found in the development charge rules enforced by the states as tabulated in Table 1. The following sample of valuation and calculation format by referring to the First Schedule of Development Charge Rules (State of Selangor) 2010 as follow:

[Subrule 4(1)]

RATE OF DEVELOPMENT CHARGE

1. Change in use of land

(a) The rate is as follows:

City Council	Town Council	District Council
30% x increase in value of land	30% x increase in value of land	20% x increase in value of land

(b) Illustration of calculation:

Change of use of land with local plan

Matter	City Council	Town Council	District Council
(a) Value of land based on use of land as stated in the issue document of title	RM *w*		
(b) Value of land based on development plan in the local plan	RM *x*		
(c) Increase in value of land	RM *x* – RM *w* = RM *y*		
(d) Amount of development charge payable	30 % x RM *y* = RM *z*	30 % x RM *y* = RM *z*	20 % x RM *y* = RM *z*
i. Lump sum payment	RM *z*	RM *z*	RM *z*
ii. In instalments	RM *z* + interest*	RM *z* + interest *	RM *z* + interest *

Note: * In accordance with the rate as provided under subsection 34(1) Act 172.

City Council	Town Council	District Council
30% x increase in value of land	30% x increase in value of land	20% x increase in value of land

(b) Illustration of calculation:

Change in density with amendment to local plan

Matter	City Council	Town Council	District Council
(a) Value of land based on the density of the development plan approved in the original local plan	RM *w*		
(b) Value of land based on the density of the development plan approved in the new local plan	RM *x*		

Matter	City Council	Town Council	District Council
(c) Increase in value of land	RM *x* –RM *w* = RM *y*		
(d) Amount of development charge payable	30 % x RM *y* = RM *z*	30 % x RM y = RM *z*	20 % x RM y = RM *z*
i. Lump sum payment	RM *z*	RM *z*	RM *z*
ii. In instalments	RM *z* + interest*	RM *z* + interest *	RM *z* + interest *

Note: * In accordance with the rate as provided under subsection 34(1) Act 172.

3. Change in floor area

(a) The rate is as follows:

City Council	Town Council	District Council
30% x increase in value of land	30% x increase in value of land	20% x increase in value of land

(b) Illustration of calculation:

Change in floor area with amendment to local plan

Matter	City Council	Town Council	District Council
(a) Value of land based on the floor area of the development plan approved in the original local plan	RM *w*		
(b) Value of land based on the floor area of the development plan approved in the new local plan	RM *x*		
(c) Increase in value of land	RM *x* –RM *w* = RM *y*		
(d) Amount of development charge payable	30 % x RM *y* = RM *z*	30 % x RM *y* = RM *z*	20 % x RM *y* = RM *z*
i. Lump sum payment	RM *z*	RM *z*	RM *z*
ii. In instalments	RM *z* + interest*	RM *z* + interest *	RM *z* + interest *

Note: * In accordance with the rate as provided under subsection 34(1) Act 172.

However, only two states had the Tree Preservation Orders such as Selangor (1995) and Perak (2015). These rules have no valuation format provided in the Tree Preservation Order. However, the valuation practice in the Tree Preservation Order can be found indirectly in the following provision:

Section 35D. Compensation under a tree preservation order

(1) If the owner of the land to which a tree preservation order relates proves that he has, in complying with paragraphs 35C(a) to (d), suffered damages in the form of **depreciation in the value of the land**, he may claim compensation from the local planning authority.

(2) A claim for compensation under subsection (1) shall be served on the local planning authority—

(a) within six months from the date on which—
(i) the tree preservation order;

(ii) the refusal of a written permission or the imposition of conditions under paragraph 35A(2)(a); or

(iii) the order to replace a tree under paragraph 35A(2)(b), was communicated to the owner of the land; or

(b) where an appeal is made under subsection 35C(1), within six months from the date of the decision of the Appeal Board confirming the order, refusal or imposition of conditions appealed against.

(3) If the owner of such land is dissatisfied with the amount of compensation awarded, he may, within one month from the date of such award, appeal to the Appeal Board which shall have the power to confirm or vary the amount of compensation awarded.

The word "depreciation in the value of the land" refers to the decreasing in the land value. This depreciation refers to the conditions before and after the tree preservation order issued by the local planning authority. In the land acquisition practice under the Land Acquisition Act 1960, the valuer will determine the amount of compensation by the following approach:

Before Acquisition
Less: After Acquisition
Amount of Compensation

This part also stated the word "compensation" clearly on the main title of Section 35D of the Town and Country Planning Act 1976. When anything matters related to the land value, the valuers are the expert to advise the land value as stated in the Valuers, Appraisers, Estate Agents and Property Managers Act 1981 as discussed in the previous topic.

5. VALUATION APPROACHES AND METHODOLOGIES

Property valuation is defined as a process to combine both art and science characteristics in valuing property interest for specified purposes by taking into account the features of real estate including the market and investment values. Art characteristics referred to the observation and the collection of qualitative data during valuation exercises. The science characteristics covered the concept and otherwise, the fundamentals of quantitative approaches applied to the application of mathematical formulas and approaches. A combination of both art and science characteristics will be analysed and the valuer may use his/ her discretion to select the best valuation approaches and methodologies that suit to the interest of the real estate to be valued.

5.1 Valuation Approaches

Valuation approaches refer to the three main approaches namely market (or comparison), income, and cost to be used in the valuation exercises. The application of valuation approaches depends on several factors such as type of property and data availability. According to the Malaysian Valuation Standard 6th Edition (2019), the market approach means an approach that indicates value by comparing the subject asset with identical or similar assets for which price information is available. The income approach refers to an approach that indicates value by converting future cash flows to a single current capital value. And the cost approach is an approach that provides an indication of the value using the economic principle that a buyer will pay no more for an asset than the cost to obtain an asset of equal utility, whether by purchase or construction.

5.2 Methods of Valuation

From the three main valuation approaches, there are five methods namely Comparison Method, Investment Method, Residual Method, Cost Method, and Profit Method. By reference to the Malaysian Valuation Standards 6th Edition (2019), the Comparison Method refers to provides an indication of value by comparing the asset/ property with market pieces of evidence of identical or comparable (that is similar) assets/ properties for which price information is available, such as a comparison with market transactions in the same, or closely similar, type of asset/ property within an appropriate time horizon. The valuation model by using comparison method as follows:

Land Value
(+) Building Value
Market Value

Investment Method refers to the method by which the gross rent, outgoings, and capitalization rates for the term and reversionary interests must be established by reference to current rental passing or contractual rents for the term interest and the market rent based on the similar properties for the reversionary interest. The model of investment valuation method as follows:

Rental Income per annum
(x) Years Purchase
Market Value

The Residual Method comprises four main components of the valuation model namely gross development value (GDV), development Cost (DC), development period, and discounted rate. The gross development value of the saleable content for the property must be established by reference to prevailing sale values for similar properties. The development cost used in arriving at the net development value of the property must be actual or estimated costs, fees, etc. which are likely to be incurred and they must be supported by evidences of such costs that are available for the property itself or comparable properties or by data compiled, verified, analysed and kept by the Valuer. The development period, including the phasing of the development, the absorption/ take-up rates must be reasonable and supported by data compiled, verified, analysed, and kept by the Valuer. And, the discount rates used in the valuation must be market derived and supported by adequate reasoning. The basic conventional residual valuation method model as follows:

Gross Development Value
(-) Development Cost
Residue Value/ Net Development Value
(x) Present Value of RM1.00
Site Value
(-) Acquisition Cost
Market Value

The Cost Method is a method which takes into account three main component namely land value, building, structures and improvements, and the depreciation/ obsolesces allowance. The land value shall be determined by using the Market/ Comparison Approach. The building, structures, and improvements referred to the actual construction/ tender cost and comparable cost data as are available to estimate the current replacement cost new of a similar simple modern substitute of the buildings, structures, and improvements on the site must be compiled, verified, analysed and kept by the Valuer. And, the depreciation/ obsolesces allowance is reflecting of the current condition of the buildings, structures, and improvements by way of depreciation in terms of physical deterioration, functional obsolescence, and economic obsolescence and the amount deducted for the depreciation should be stated. The valuation model as follows:

Land Value
(+) Depreciated Building Value
Market Value

And the last but not least Valuation Method is the Profit Or Account Method where the valuation model is formulated by four main components such as gross earnings per annum, operating cost, tenant/ operator share, and the capitalisation factor. The estimated gross earnings from the business for which the property is used must be established by reference to the past records of such earnings obtained for the property, and/ or comparable properties. The projected earnings must be reasonable and supportable. The operating costs of the property as a trading entity must be established by reference to current and projected rates as can reasonably be supported and crosschecked with past records of such costs for the subject property itself or similar properties. The tenant/ operator's remunerative interest which includes the return on the operator's capital,

risk, and entrepreneurship must be supported by adequate reasoning. And, the rate used to capitalise the annual rent (as a function of profit) to ascertain the value of the property should be market derived and supported by such rates for comparable properties or by data compiled, verified, analysed, and kept by the Valuer. The model as follows:

Gross Revenue per annum
(-) Operating Cost per annum
Net Profit/ Divisible Balance
(-) Tenant/ Operator Share
Gross Rental per annum
(-) Property Outgoings
Net Rental/ Market Rental per annum
(x) Years Purchase
Market Value

6. SAMPLE OF VALUATION WORKINGS

This topic will show the valuation workings to be applied by valuers to determine the land value of the property for both development charge and Tree Preservation Order. Basically, there are two methods of valuation that can be used for these purposes. The methods are Comparison and Residual Value. The application of these methods is taking several considerations in terms of the availability of data and sources. From both comparison and residual methods, the comparison method is more preferred compared to the residual method because the comparison method mainly uses the comparable data that can be acquired from the Valuation and Property Services Department. However, the residual method looks more reliable because this method is taking all requirements and considerations when the land has the potential to be developed.

6.1 Development Charge

6.1.1 Change in use of land

Sample 1

A piece of development land having 200,000 square feet located in a town area is zoned for residential use. The owner plans to apply to the local authority to change land use to commercial use. From the market observation made, comparable data for residential and commercial development as follow:

Comparable	1	2	3	4	5
Date	8 June, 2018	28 August, 2018	22 January, 2020	14 October, 2019	29 November, 2017
Land Area (sf)	93,947	30,673	63,615	43,562	43,562
Consideration (RM)	2,000,000.00	680,000.00	1,750,000.00	1,030,000.00	871,200.00
Tenure	Leasehold for 99 years	Freehold	Freehold	Freehold	Freehold
Remaining Lease (years)	96	-	-	-	-
Land Use	Building	Building	Building	Building	Building
Zoning	Residential	Residential	Residential	Residential	Residential
Existing use	Vacant Land	Vacant Land	Vacant Land	Vacant Land	Vacant Land

Comparable	1	2	3	4	5
Date	8 June, 2018	28 August, 2018	22 January, 2020	14 October, 2019	29 November, 2017
Land Area (sf)	95,780	32,457	67,892	47,878	40,562
Consideration (RM)	3,200,000.00	1,000,000.00	2,650,000.00	1,630,000.00	1,301,200.00
Tenure	Leasehold for 99 years	Freehold	Freehold	Freehold	Freehold
Remaining Lease (years)	96	-	-	-	-
Land Use	Building	Building	Building	Building	Building
Zoning	Commercial	Commercial	Commercial	Commercial	Commercial
Existing use	Vacant Land	Vacant Land	Vacant Land	Vacant Land	Vacant Land

Compute the amount of development charge to be levied to the land owner.

Analysis

Comparable	1	2	3	4	5
Date	8 June, 2018	28 August, 2018	22 January, 2020	14 October, 2019	29 November, 2017
Land Area (sf)	93,947	30,673	63,615	43,562	43,562
Consideration (RM)	2,000,000.00	680,000.00	1,750,000.00	1,030,000.00	871,200.00
Tenure	Leasehold for 99 years	Freehold	Freehold	Freehold	Freehold
Remaining Lease (years)	96	-	-	-	-
Land Use	Building	Building	Building	Building	Building
Zoning	Residential	Residential	Residential	Residential	Residential
Existing use	Vacant Land	Vacant Land	Vacant Land	Vacant Land	Vacant Land
(+) Time Factors					
2017	0%	0%	0%	0%	5%
2018	5%	5%	0%	0%	5%
2019	5%	5%	0%	5%	5%
2020	5%	5%	5%	5%	5%
Total Adj. Time Factors	**15%**	**15%**	**5%**	**10%**	**20%**
Adj. Consideration (RM)	**2,300,000.00**	**782,000.00**	**1,837,500.00**	**1,133,000.00**	**1,045,440.00**
Value psf (RM)	**24.48**	**25.49**	**28.88**	**26.01**	**24.00**
(+) Other Adjustments					
Locality	0%	0%	0%	0%	0%
Situation	0%	0%	0%	0%	0%
Size	-10%	0%	-5%	0%	0%
Land Tenure	0%	-10%	-10%	-10%	-10%
Total Other Adj. Factors	**-10%**	**-10%**	**-15%**	**-10%**	**-10%**
Adj. Value psf (RM)	**22.03**	**22.95**	**24.55**	**23.41**	**21.60**

Comparable	1	2	3	4	5
Date	8 June, 2018	28 August, 2018	22 January, 2020	14 October, 2019	29 November, 2017
Land Area (sf)	95,780	32,457	67,892	47,878	40,562
Consideration (RM)	3,200,000.00	1,000,000.00	2,650,000.00	1,630,000.00	1,301,200.00
Tenure	Leasehold for 99 years	Freehold	Freehold	Freehold	Freehold
Remaining Lease (years)	96	-	-	-	-
Land Use	Building	Building	Building	Building	Building
Zoning	Commercial	Commercial	Commercial	Commercial	Commercial
Existing use	Vacant Land	Vacant Land	Vacant Land	Vacant Land	Vacant Land
(+) Time Factors					
2017	0%	0%	0%	0%	5%
2018	5%	5%	0%	0%	5%
2019	5%	5%	0%	5%	5%
2020	5%	5%	5%	5%	5%
Total Adj. Time Factors	**15%**	**15%**	**5%**	**10%**	**20%**
Adj. Consideration (RM)	**3,680,000.00**	**1,150,000.00**	**2,782,500.00**	**1,793,000.00**	**1,561,440.00**
Value psf (RM)	**38.42**	**35.43**	**40.98**	**37.45**	**38.50**
(+) Other Adjustments					
Locality	0%	0%	0%	0%	0%
Situation	0%	0%	0%	0%	0%
Size	-10%	0%	-5%	0%	0%
Land Tenure	0%	-10%	-10%	-10%	-10%
Total Other Adj. Factors	**-10%**	**-10%**	**-15%**	**-10%**	**-10%**
Adj. Value psf (RM)	**34.58**	**31.89**	**34.84**	**33.70**	**34.65**

Computation the Amount of Development Charge

Before						
Residential Use	:	200,000 sf x RM	12.00	psf =	RM	2,400,000.00
After						
Commercial Use	:	200,000 sf x RM	25.00	psf =	RM	5,000,000.00
				Incremental Land Value =	RM	2,600,000.00
X Amount of Charge to be levied @ 30%					**RM**	**780,000.00**

Sample 2

A developer seeks your advice regarding his proposal to develop a piece of development land having 3 acres a town centre with mixed commercial development. Currently, the land is zoned for residential development. In order to approve his development proposal, he was required to make an application to the local authority to change the zoning status and the local authority had informed him that he was required to pay the development charge.

Mixed Residential Development

Gross Development Value										
Single Storey Low Cost Terrace	:	37 units	X RM	42,000.00	per unit	= RM	1,554,000.00			
Single Storey Terrace	:	15 units	X RM	200,000.00	per unit	= RM	3,000,000.00			
Double Storey Terrace	:	11 units	X RM	280,000.00	per unit	= RM	3,080,000.00			
Single Storey Detached House	:	2 units	X RM	320,000.00	per unit	= RM	640,000.00			
Double Storey Shop Office	:	6 units	X RM	480,000.00	per unit	= RM	2,880,000.00	RM	11,154,000.00	
Less : Development Cost										
Preliminary Cost	:					= RM	50,000.00			
Site Clearing and Preparation	:	RM 20,000.00	per acre		X 3 acres	= RM	60,000.00			
Survey and Subdivision	:	RM 500.00	per unit		X 71 units	= RM	35,500.00			
Registration of Title	:	RM 250.00	per unit		X 71 units	= RM	17,750.00			
Building Construction Cost	:	40%	X RM	11,154,000.00		= RM	4,461,600.00			
Infrastructure Cost	:	RM 1,000.00	per unit		X 71 units	= RM	71,000.00			
Contribution to Authority	:					RM	100,000.00			
Professional Fees	:	5%	X RM	4,532,600.00		= RM	226,630.00			
Promotion and Legal Fees	:	1.5%	X RM	11,154,000.00		= RM	167,310.00			
Landscaping Cost	:	RM 200.00	per unit		X 71 units	= RM	14,200.00			
Project Management	:	RM 50,000.00	per month		X 24 months	= RM	1,200,000.00			
Finance Interest	:	7.5%	X RM	3,201,995.00	X 2 years	= RM	240,149.63			
Contigency Cost	:	10%	X RM	4,532,600.00		= RM	453,260.00			
Developer's Risk and Profit	:	15%	X RM	11,154,000.00		= RM	1,673,100.00	RM	8,770,499.63	
								Residue Value RM	2,383,500.38	
					X PV for	2 years @	7.5%		0.8653	
								Current Site Value RM	2,062,520.61	
								Say	**RM**	**2,063,000.00**

Mixed Commercial Development

Gross Development Value										
Single Storey shop	:	37 units	X RM	200,000.00	per unit	= RM	7,400,000.00			
Double storey shopoffice	:	20 units	X RM	480,000.00	per unit	= RM	9,600,000.00			
Three Storey shopoffice	:	11 units	X RM	680,000.00	per unit	= RM	7,480,000.00			
Four Storey Shopoffice	:	2 units	X RM	800,000.00	per unit	= RM	1,600,000.00	RM	26,080,000.00	
Less : Development Cost										
Preliminary Cost	:					= RM	50,000.00			
Site Clearing and Preparation	:	RM 50,000.00	per acre		X 3 acres	= RM	150,000.00			
Survey and Subdivision	:	RM 500.00	per unit		X 70 units	= RM	35,000.00			
Registration of Title	:	RM 250.00	per unit		X 70 units	= RM	17,500.00			
Building Construction Cost	:	40%	X RM	26,080,000.00		= RM	10,432,000.00			
Infrastructure Cost	:	RM 5,000.00	per unit		X 70 units	= RM	350,000.00			
Contribution to Authority	:					RM	100,000.00			
Professional Fees	:	5%	X RM	10,782,000.00		= RM	539,100.00			
Promotion and Legal Fees	:	1.5%	X RM	26,080,000.00		= RM	391,200.00			
Landscaping Cost	:	RM 500.00	per month		X 70 units	= RM	35,000.00			
Project Management	:	RM 100,000.00	per unit		X 24 months	= RM	2,400,000.00			
Finance Interest	:	7.5%	X RM	7,249,900.00	X 2 years	= RM	543,742.50			
Contigency Cost	:	10%	X RM	10,782,000.00		= RM	1,078,200.00			
Developer's Risk and Profit	:	15%	X RM	26,080,000.00		= RM	3,912,000.00	RM	20,033,742.50	
								Residue Value RM	6,046,257.50	
					X PV for	2 years @	7.5%		0.8653	
								Current Site Value RM	5,232,023.80	
								Say	**RM**	**5,232,000.00**

Computation the Amount of Development Charge

Before			
Residential Use	:	= RM	2,063,000.00
After			
Commercial Use	:	= RM	5,232,000.00
	Incremental Land Value	= RM	3,169,000.00
X Amount of Charge to be levied @ 30%		**RM**	**950,700.00**

6.1.2 Change in density

Sample 3

A developer plans to apply development permission of a piece of development land having a land area of 3 acres in a town centre. The land will develop with a mixed housing development. However, the limitation of density that makes him unable to maximise the use of land and he plans to make an application to amend the planning provisions of his land. As a result, he will be levied with a development charge by the local planning authority. Advise him of the amount of development charge that may be imposed on him.

Existing Density

Gross Development Value											
Single Storey Low Cost Terrace	:	14	units	X RM	42,000.00	per unit	= RM	567,000.00			
Single Storey Terrace	:	14	units	X RM	200,000.00	per unit	= RM	2,700,000.00			
Double Storey Terrace	:	9	units	X RM	280,000.00	per unit	= RM	2,520,000.00			
Single Storey Detached House	:	4.5	units	X RM	320,000.00	per unit	= RM	1,440,000.00			
Double Storey Shop Office	:	4.5	units	X RM	480,000.00	per unit	= RM	2,160,000.00	RM	9,387,000.00	
Less : Development Cost											
Preliminary Cost	:						= RM	50,000.00			
Site Clearing and Preparation	:	RM	20,000.00	per acre		X 3 acres	= RM	60,000.00			
Survey and Subdivision	:	RM	500.00	per unit		X 45 units	= RM	22,500.00			
Registration of Title	:	RM	250.00	per unit		X 45 units	= RM	11,250.00			
Building Construction Cost	:		40%	X RM	9,387,000.00		= RM	3,754,800.00			
Infrastructure Cost	:	RM	1,000.00	per unit		X 45 units	= RM	45,000.00			
Contribution to Authority	:						RM	100,000.00			
Professional Fees	:		5%	X RM	3,799,800.00		= RM	189,990.00			
Promotion and Legal Fees	:		1.5%	X RM	9,387,000.00		= RM	140,805.00			
Landscaping Cost	:	RM	200.00	per unit		X 45 units	= RM	9,000.00			
Project Management	:	RM	50,000.00	per month		X 24 months	= RM	1,200,000.00			
Finance Interest	:		7.5%	X RM	2,791,672.50	X 2 years	= RM	209,375.44			
Contigency Cost	:		10%	X RM	3,799,800.00		= RM	379,980.00			
Developer's Risk and Profit	:		15%	X RM	9,387,000.00		= RM	1,408,050.00	RM	7,580,750.44	
								Residue Value	RM	1,806,249.56	
						X PV for	2 years @	7.5%		0.8653	
								Current Site Value	RM	1,563,006.65	
								Say	**RM**	**1,563,000.00**	

Amended Density

Gross Development Value										
Single Storey Low Cost Terrace	: 37	units	X RM	42,000.00	per unit	= RM	1,554,000.00			
Single Storey Terrace	: 15	units	X RM	200,000.00	per unit	= RM	3,000,000.00			
Double Storey Terrace	: 11	units	X RM	280,000.00	per unit	= RM	3,080,000.00			
Single Storey Detached House	: 2	units	X RM	320,000.00	per unit	= RM	640,000.00			
Double Storey Shop Office	: 6	units	X RM	480,000.00	per unit	= RM	2,880,000.00		RM	11,154,000.00
Less : Development Cost										
Preliminary Cost	:					= RM	50,000.00			
Site Clearing and Preparation	: RM	20,000.00	per acre		X 3 acres	= RM	60,000.00			
Survey and Subdivision	: RM	500.00	per unit		X 71 units	= RM	35,500.00			
Registration of Title	: RM	250.00	per unit		X 71 units	= RM	17,750.00			
Building Construction Cost	:	40%	X RM	11,154,000.00		= RM	4,461,600.00			
Infrastructure Cost	: RM	1,000.00	per unit		X 71 units	= RM	71,000.00			
Contribution to Authority	:					RM	100,000.00			
Professional Fees	:	5%	X RM	4,532,600.00		= RM	226,630.00			
Promotion and Legal Fees	:	1.5%	X RM	11,154,000.00		= RM	167,310.00			
Landscaping Cost	: RM	200.00	per unit		X 71 units	= RM	14,200.00			
Project Management	: RM	50,000.00	per month		X 24 months	= RM	1,200,000.00			
Finance Interest	:	7.5%	X RM	3,201,995.00	X 2 years	= RM	240,149.63			
Contigency Cost	:	10%	X RM	4,532,600.00		= RM	453,260.00			
Developer's Risk and Profit	:	15%	X RM	11,154,000.00		= RM	1,673,100.00		RM	8,770,499.63
								Residue Value	RM	2,383,500.38
					X PV for	2 years @	7.5%			0.8653
								Current Site Value	RM	2,062,520.61
								Say	**RM**	**2,063,000.00**

Computation the Amount of Development Charge

Before				
Existing Density	:	=	RM	1,563,000.00
After				
Amended Density	:	=	RM	2,063,000.00
	Incremental Land Value	=	RM	500,000.00
X Amount of Charge to be levied @	**30%**		**RM**	**150,000.00**

6.1.3 Change in floor area

Sample 4

The local planning authority in a town area recently gazettes a new plot ratio of a commercial building in its administrative area. The plot ratio is 1:5 with a height limit of up to 5 storeys. An owner of a freehold interest of a piece of development land which has an area of 15,000 square feet plans to develop his land with a mixed retail and office building. According to the initial site analysis and investigation, his land is able to develop such a building with having gross floor area more than the plot ratio as gazetted by the local authority. He decided to pay the development charge in order to develop the with the maximum total gross floor area which is exceeding the plot ratio. Advise him of the amount of charge that can be levied to him.

Analysis of the total gross floor area

Determine the Gross Floor Area

Plot Ratio	=	1 / 5	X	Land Area	=	Land Area	
			X	Land Area	=	GFA	
	=	1 / 5	X	15,000 sf	=	15,000 sf	
			X	15,000 sf	=	75,000 sf	
GFA	**=**			**75,000 sf**			

Determine the Plinth Area

Plinth Area	=	60% X	15,000	sf
	=		**9,000**	**sf**

Determine the Nos. of Building Storey

$$\text{Nos. of storey} = \frac{\text{GFA}}{\text{Plinth Area}} = \frac{75{,}000 \text{ sf}}{9{,}000 \text{ sf}} = \mathbf{8 \text{ storey}}$$

Determine the GFA for each floor

$$\text{GFA (each floor)} = \frac{\text{Total GFA}}{\text{Nos. of Storey}} = \frac{75{,}000 \text{ sf}}{8 \text{ storey}} = \mathbf{9{,}375 \text{ sf}}$$

Determine the Net Lettable Area for each floor

NLA (each floor)	=	80% X	9,375 sf
	=		**7,500 sf**

Existing Floor Area

Valuation by using the Residual Method of Valuation

Gross Development Value

GF	:	7,500 sf	X	RM 5.00	psf/pm	=	RM	37,500.00	per month			
1F	:	7,500 sf	X	RM 4.80	psf/pm	=	RM	36,000.00	per month			
2F	:	7,500 sf	X	RM 4.50	psf/pm	=	RM	33,750.00	per month			
3F	:	7,500 sf	X	RM 4.20	psf/pm	=	RM	31,500.00	per month			
4F	:	7,500 sf	X	RM 4.00	psf/pm	=	RM	30,000.00	per month			
							RM	168,750.00	per month			
							X	12	months			
							RM	2,025,000.00	per annum (incl. Service Charge)			
Less : Service Charge												
		37,500 sf	X	RM 12.00	psf/pa		RM	450,000.00	per annum			
							RM	1,575,000.00	per annum (net)			
X YP in-perp. @		9%						11.1111			RM	17,500,000.00

Less : Development Cost

Initial Cost	:								= RM	100,000.00		
Site Clearing	:	RM	50,000.00	per acre	X	0.3444	acres		= RM	17,217.63		
Building Cost	:	RM	1,000.00	psm	X	6,967.73	sm		= RM	6,967,728.27		
Infrastructure Cost	:								= RM	500,000.00		
Cont. to Authority	:								= RM	300,000.00		
Project Mgmt.	:	RM	100,000.00	pm	X	18	months		= RM	1,800,000.00		
Finance Cost	:	RM	4,842,472.95		X	1.5	year @	8%	= RM	592,568.20		
Contigency Cost	:	RM	10,277,514.10		X	10%			= RM	1,027,751.41		
Developer's Profit	:	RM	17,500,000.00		X	15%			= RM	2,625,000.00	RM	13,930,265.51
										Residue Value	RM	3,569,734.49
									X PV for 1.5 year @ 8%			0.8910
										Current Site Value	RM	3,180,535.75
											Say RM	**3,181,000.00**

Amended Floor Area

Valuation by using the Residual Method of Valuation

Gross Development Value

GF	:	7,500	sf X RM	5.00	psf/pm	=	RM	37,500.00	per month		
1F	:	7,500	sf X RM	4.80	psf/pm	=	RM	36,000.00	per month		
2F	:	7,500	sf X RM	4.50	psf/pm	=	RM	33,750.00	per month		
3F	:	7,500	sf X RM	4.20	psf/pm	=	RM	31,500.00	per month		
4F	:	7,500	sf X RM	4.00	psf/pm	=	RM	30,000.00	per month		
5F	:	7,500	sf X RM	3.80	psf/pm	=	RM	28,500.00	per month		
6F	:	7,500	sf X RM	3.50	psf/pm	=	RM	26,250.00	per month		
7F	:	7,500	sf X RM	3.00	psf/pm	=	RM	22,500.00	per month		
							RM	246,000.00	per month		
							X	12	months		
							RM	2,952,000.00	per annum (incl. Service Charge)		
Less : Service Charge											
		60,000	sf X RM	12.00	psf/pa		RM	720,000.00	per annum		
							RM	2,232,000.00	per annum (net)		
X YP in-perp. @		9%						11.1111		RM	24,800,000.00

Less : Development Cost

Initial Cost	:						= RM	100,000.00		
Site Clearing	:	RM	50,000.00	per acre	X	0.3444 acres	= RM	17,217.63		
Building Cost	:	RM	1,000.00	psm	X	6,967.73 sm	= RM	6,967,728.27		
Infrastructure Cost	:						= RM	500,000.00		
Cont. to Authority	:						= RM	300,000.00		
Project Mgmt.	:	RM	100,000.00	pm	X	18 months	= RM	1,800,000.00		
Finance Cost	:	RM	4,842,472.95		X	1.5 year @ 8%	= RM	592,568.20		
Contigency Cost	:	RM	10,277,514.10		X	10%	= RM	1,027,751.41		
Developer's Profit	:	RM	24,800,000.00		X	15%	= RM	3,720,000.00	RM	15,025,265.51
								Residue Value	RM	9,774,734.49
							X PV for 1.5 year @ 8%			0.8910
								Current Site Value	RM	8,709,020.97
								Say	**RM**	**8,709,000.00**

Computation the Amount of Development Charge

Before

Existing Floor Area	:	= RM	3,181,000.00

After

Amended Floor Area	:	= RM	8,709,000.00
Incremental Land Value		= RM	5,528,000.00
X Amount of Charge to be levied @ 30%		**RM**	**1,658,400.00**

6.2 Tree Preservation Order

The following workings show the valuation model for compensation under Section 35D of the Town and Country Planning Act related to the provision of Tree Preservation Order:

Sample 5

An owner of a freehold interest of a piece of vacant building land with 50,000 square feet recently receives a notification gazette from the local planning authority. It notifies that a part of his land measuring 500 square feet has been issued with a gazette of the Tree Preservation Order under the provision of Section 35A of the Town and Country Planning Act 1976. The owner seeks your advice regarding the amount of compensation that he can claim as given under this Act.

The following tables show the comparable data of vacant building land and development potential agriculture land in a vicinity:

Comparable 1: Vacant Building Land

Comparable	1	2	3	4	5
Date	8 June, 2018	28 August, 2018	22 January, 2020	14 October, 2019	29 November, 2017
Land Area (sf)	69,394	30,068	63,602	40,352	45,611
Consideration (RM)	6,500,000.00	3,080,000.00	6,810,000.00	4,100,000.00	4,312,000.00
Tenure	Leasehold for 99 years	Freehold	Freehold	Freehold	Freehold
Remaining Lease (years)	96	-	-	-	-
Land Use	Building	Building	Building	Building	Building
Zoning	Residential	Residential	Residential	Residential	Residential
Existing use	Vacant Land	Vacant Land	Vacant Land	Vacant Land	Vacant Land

Comparable 2: Vacant Agriculture Land with Development Potential

Comparable	1	2	3	4	5
Date	8 March, 2018	28 June, 2018	22 March, 2020	14 April, 2019	29 January, 2018
Land Area (sf)	80,780	44,507	68,092	47,880	40,520
Consideration (RM)	7,550,000.00	4,200,000.00	6,980,000.00	4,650,000.00	3,662,000.00
Tenure	Freehold	Freehold	Freehold	Freehold	Freehold
Remaining Lease (years)	86	-	-	-	-
Land Use	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Zoning	Residential	Residential	Residential	Residential	Residential
Existing use	Vacant Land	Vacant Land	Vacant Land	Vacant Land	Vacant Land

Before the Tree Preservation Order Gazette Issued

Comparable	1	2	3	4	5
Date	8 June, 2018	28 August, 2018	22 January, 2020	14 October, 2019	29 November, 2017
Land Area (sf)	69,394	30,068	63,602	40,352	45,611
Consideration (RM)	6,500,000.00	3,080,000.00	6,810,000.00	4,100,000.00	4,312,000.00
Tenure	Leasehold for 99 years	Freehold	Freehold	Freehold	Freehold
Remaining Lease (years)	96	-	-	-	-
Land Use	Building	Building	Building	Building	Building
Zoning	Residential	Residential	Residential	Residential	Residential
Existing use	Vacant Land	Vacant Land	Vacant Land	Vacant Land	Vacant Land
(+) Time Factors					
2017	0%	0%	0%	0%	5%
2018	5%	5%	0%	0%	5%
2019	5%	5%	0%	5%	5%
2020	5%	5%	5%	5%	5%
Total Adj. Time Factors	**15%**	**15%**	**5%**	**10%**	**20%**
Adj. Consideration (RM)	**7,475,000.00**	**3,542,000.00**	**7,150,500.00**	**4,510,000.00**	**5,174,400.00**
Value psf (RM)	**107.72**	**117.80**	**112.43**	**111.77**	**113.45**
(+) Other Adjustments					
Locality	0%	0%	0%	0%	0%
Situation	0%	0%	0%	0%	0%
Size	-5%	-10%	-5%	-5%	-5%
Land Tenure	5%	0%	0%	0%	0%
Total Other Adj. Factors	**0%**	**-10%**	**-5%**	**-5%**	**-5%**
Adj. Value psf (RM)	**107.72**	**106.02**	**106.80**	**106.18**	**107.78**

After the Tree Preservation Order Gazette Issued

Comparable	1	2	3	4	5
Date	8 March, 2018	28 June, 2018	22 March, 2020	14 April, 2019	29 January, 2018
Land Area (sf)	80,780	44,507	68,092	47,880	40,520
Consideration (RM)	7,550,000.00	4,200,000.00	6,980,000.00	4,650,000.00	3,662,000.00
Tenure	Freehold	Freehold	Freehold	Freehold	Freehold
Remaining Lease (years)	86	-	-	-	-
Land Use	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Zoning	Residential	Residential	Residential	Residential	Residential
Existing use	Vacant Land	Vacant Land	Vacant Land	Vacant Land	Vacant Land
(+) Time Factors					
2017	0%	0%	0%	0%	0%
2018	5%	5%	0%	0%	5%
2019	5%	5%	0%	5%	5%
2020	5%	5%	5%	5%	5%
Total Adj. Time Factors	**15%**	**15%**	**5%**	**10%**	**15%**
Adj. Consideration (RM)	**8,682,500.00**	**4,830,000.00**	**7,329,000.00**	**5,115,000.00**	**4,211,300.00**
Value psf (RM)	**107.48**	**108.52**	**107.63**	**106.83**	**103.93**
(+) Other Adjustments					
Locality	0%	0%	0%	0%	0%
Situation	0%	0%	0%	0%	0%
Size	-10%	0%	-5%	0%	0%
Land Tenure	0%	-10%	-10%	-10%	-10%
Total Other Adj. Factors	**-10%**	**-10%**	**-15%**	**-10%**	**-10%**
Adj. Value psf (RM)	**96.73**	**97.67**	**91.49**	**96.15**	**93.54**

Computation the Amount of Compensation

Before						
Residential Use	:	50,000 sf x RM	107.00 psf	= RM	5,350,000.00	
After						
Agriculture with Development Potential	:	50,000 sf x RM	95.00 psf	= RM	4,750,000.00	
			Amount of Compensation	**=**	**RM**	**600,000.00**

Sample 6

An investor seeks your advice on the amount of compensation to be claimed from the local planning authority. His land with measuring 3 hectares recently has been issued a gazette of the Tree Preservation Order under Section 35A of the Town and Country Planning Act 1976. The affected area is about 35,000 square feet. The valuation of the amount of compensation as follows:

Before the Tree Preservation Order Gazette Issued

Gross Development Value										
Single Storey Low Cost Terrace	: 92 units	X RM	42,000.00	per unit		= RM	3,864,000.00			
Single Storey Terrace	: 38 units	X RM	200,000.00	per unit		= RM	7,600,000.00			
Double Storey Terrace	: 28 units	X RM	280,000.00	per unit		= RM	7,840,000.00			
Single Storey Detached House	: 6 units	X RM	320,000.00	per unit		= RM	1,920,000.00			
Double Storey Shop Office	: 15 units	X RM	480,000.00	per unit		= RM	7,200,000.00	RM	28,424,000.00	
Less : Development Cost										
Preliminary Cost	:					= RM	50,000.00			
Site Clearing and Preparation	: RM 20,000.00	per acre		X 7.4 acres		= RM	148,260.00			
Survey and Subdivision	: RM 500.00	per unit		X 179 units		= RM	89,500.00			
Registration of Title	: RM 250.00	per unit		X 179 units		= RM	44,750.00			
Building Construction Cost	: 40%	X RM	28,424,000.00			= RM	11,369,600.00			
Infrastructure Cost	: RM 1,000.00	per unit		X 179 units		= RM	179,000.00			
Contribution to Authority	:					RM	100,000.00			
Professional Fees	: 5%	X RM	11,548,600.00			= RM	577,430.00			
Promotion and Legal Fees	: 1.5%	X RM	28,424,000.00			= RM	426,360.00			
Landscaping Cost	: RM 200.00	per unit		X 179 units		= RM	35,800.00			
Project Management	: RM 50,000.00	per month		X 24 months		= RM	1,200,000.00			
Finance Interest	: 7.5%	X RM	7,110,350.00	X 2 years		= RM	533,276.25			
Contigency Cost	: 10%	X RM	11,548,600.00			= RM	1,154,860.00			
Developer's Risk and Profit	: 15%	X RM	28,424,000.00			= RM	4,263,600.00	RM	20,172,436.25	
							Residue Value	RM	8,251,563.75	
					X PV for	2 years @	7.5%		0.8653	
							Current Site Value	RM	7,140,347.21	
							Say	**RM**	**7,140,000.00**	

After the Tree Preservation Order Gazette Issued

Gross Development Value											
Single Storey Low Cost Terrace	:	82	units	X RM	42,000.00	per unit	= RM	3,444,000.00			
Single Storey Terrace	:	34	units	X RM	200,000.00	per unit	= RM	6,800,000.00			
Double Storey Terrace	:	25	units	X RM	280,000.00	per unit	= RM	7,000,000.00			
Single Storey Detached House	:	5	units	X RM	320,000.00	per unit	= RM	1,600,000.00			
Double Storey Shop Office	:	14	units	X RM	480,000.00	per unit	= RM	6,720,000.00	RM	25,564,000.00	
Less : Development Cost											
Preliminary Cost	:						= RM	50,000.00			
Site Clearing and Preparation	:	RM	20,000.00	per acre		X 6.6 acres	= RM	132,190.21			
Survey and Subdivision	:	RM	500.00	per unit		X 160 units	= RM	80,000.00			
Registration of Title	:	RM	250.00	per unit		X 160 units	= RM	40,000.00			
Building Construction Cost	:		40%	X RM	25,564,000.00		= RM	10,225,600.00			
Infrastructure Cost	:	RM	1,000.00	per unit		X 160 units	= RM	160,000.00			
Contribution to Authority	:						RM	100,000.00			
Professional Fees	:		5%	X RM	10,385,600.00		= RM	519,280.00			
Promotion and Legal Fees	:		1.5%	X RM	25,564,000.00		= RM	383,460.00			
Landscaping Cost	:	RM	200.00	per unit		X 160 units	= RM	32,000.00			
Project Management	:	RM	50,000.00	per month		X 24 months	= RM	1,200,000.00			
Finance Interest	:		8%	X RM	6,461,265.11	X 2 years	= RM	484,594.88			
Contigency Cost	:		10%	X RM	10,385,600.00		= RM	1,038,560.00			
Developer's Risk and Profit	:		15%	X RM	25,564,000.00		= RM	3,834,600.00	RM	18,280,285.09	
								Residue Value	RM	7,283,714.91	
						X PV for	2 years @	7.5%		0.8653	
								Current Site Value	RM	6,302,836.05	
									Say	**RM**	**6,303,000.00**

Computation the Amount of Compensation

Before					
Development land	:	322,910	sf =	RM	7,140,000.00
After					
Remaining land can be develop	:	287,910	sf =	RM	6,303,000.00
Amount of Compensation =				**RM**	**837,000.00**

7. CONCLUSION

In conclusion, the role and functions of valuers are very important in order to assist and advise the peoples and organizations on the fair amount of development charge and compensation as provided in the Town and Country Planning Act 1976. Even though the requirement of valuers' expertise under this act is not stated directly but the provision regarding the land value is clearly stated in the both development charge and tree preservation order provisions in the Act. According to the provision in Section 19 of Valuers, Appraisers, Estate Agents and Property Managers 1981 has stated that the valuer is the right person to determine the value of the land. As a professional, the valuers had equipped with knowledge and experience regarding the real estate value and how to determine its interest.

Both development charge and tree preservation order had their own role and functions but subjected to the circumstances where the development charge is a local authority revenue. The development charge is also used as a platform for local authorities to improve and to provide more services to the people in their administrative area. Besides that, the tree preservation order is to provide the rights of the landowner and interest parties to claim the compensation and it's also considered as an expense to the local authority where they need to compensate the amount of compensation to the owner and the interested parties who are considering the order that made under the act has to contribute the depreciation of land value. The other effect of tree preservation order to the landowner and interested parties is, they had restrictions to touch or made any alterations toward the tree which were preserved by the local authority. If they made any alterations such as to cut down the trees which were preserved, they will be charged under the provisions of the Tree Preservation Order. It reflects that the land has legal restrictions and limitations to develop land.

This paper recommends that the parliament should insert the meaning and functions of the valuers in the Town and Country Planning Act 1976 to make publicity to the public particularly to the landowners and the interested parties as they can seek professional advice from a qualified valuer on the land value matters.

REFERENCES

Board of Valuers, Appraisers, Estate Agents and Property Managers, Malaysia (2019). *Malaysian Valuation Standards 6th Edition 2019.*

Jabatan Perancangan Bandar dan Desa Semenanjung Malaysia (2021). Official Website. Retrieved from *https://www.planmalaysia.gov.my* [5 May 2021]

Laws of Malaysia (2016). *Town and Country Planning Act 1976.* Percetakan Nasional Berhad.

Laws of Malaysia (2018). *Valuers, Appraisers, Estate Agents and Property Managers Act 1981.* Percetakan Nasional Berhad.

Mohd Hasrol Haffiz Aliasak & Mohd Farid Sa'ad. (2011). *Juruukur Penilaian dan Proses Pembangunan Hartanah. Shah Alam:* UPENA.

Mohd Hasrol Haffiz Aliasak & Mohd Farid Sa'ad (2020). *Kerjaya Penilaian dan Perundingan Harta Tanah di Malaysia. Kuala Lumpur:* Dewan Bahasa dan Pustaka.

ANNOUNCEMENT

Do You Have A Paper You Would Like to Share with Other Real Estate Professionals?

The Journal of Valuation and Property Services (JVPS) is a major publication by the Valuation and Property Services Department (JPPH), Ministry of Finance Malaysia. JVPS is an international journal that provides a forum for critical appraisals of fundamental issues affecting the real estate industry. It is specially intended for real estate professionals to keep abreast with developments in the real estate industry as well as the real estate profession.

The Publication Board of this journal invites original papers from real estate professionals on any of the following areas:

- Areas of major interest and practical relevance to the real estate profession;
- New techniques, applications, theories as well as related concept relevant to the real estate profession;
- Policy issues and regulations and their impact on the real estate market.

The journal focuses on Asia, with particular emphasis on Malaysia, but papers that promote cross-national learning on the real estate industry worldwide are welcomed. Each issue will also present practice notes relevant to the practice of valuation and property services written by senior professionals.
Further details on the journal are available from:

The Editor
Journal of Valuation and Property Services (JVPS)
National Institute of Valuation (INSPEN)
Persiaran INSPEN
43000 Kajang
Selangor Darul Ehsan
Malaysia

Telephone : +603-8911 8888
Telefax : +603-8925 0640
Email : research@inspen.gov.my
Website : http://www.inspen.gov.my

NOTES TO CONTRIBUTORS

Editorial Policy and Submission Guidelines

1. Submission

Contributors can submit their papers before the 31st July of each year to:

The Editor
Journal of Valuation and Property Services (JVPS)
National Institute of Valuation (INSPEN)
Persiaran INSPEN
43000 Kajang
Selangor Darul Ehsan
Malaysia

Telephone : +603-8911 8888
Telefax : +603-8925 0640
Email : research@inspen.gov.my

A prospective contributor may submit a summary of a proposed paper to the Editor for preliminary consideration as to it suitability for publication in the journal. The receipt of each paper submitted will be acknowledged. The Editor reserves the right to accept, modify or decline any paper.

2. Reviewing Process

All papers will be reviewed by one or more referees. Contributors will be informed about the acceptance (or otherwise) of their papers after the comments of referees have been received. The entire reviewing process will be conducted in complete confidentiality. For this purpose, the name, address and affiliation of the contributor should not be on the first page of the paper, but only on the accompanying letter.

3. Style

Papers should be the original, unpublished work of the contributors. They should not be under consideration for publication elsewhere. Papers should be written in a clear and simple style, and should have a carefully considered structure. Contributors are encouraged to adopt the most effective way of communicating their information to the reader. Illustrations may be used to elucidate the issues raised.

4. Language

Language used in all papers submitted shall be in English.

5. Contents

Papers should preferably be in the range of 4,000 to 6,000 words, excluding illustrations. A brief (maxima 60 words) profile of the contributor should accompany each article.

All manuscripts for publishing are to be typed in Arial font size 11 with 1.15-spacing on a A4 size document with normal margin of 1 inch on each side. The pages should be numbered consecutively.

a) First Page

The full title of the paper must be shown on the first page of the manuscript. Also to be included on the first page is an abstract of not more than 300 words and up to 5 keywords to facilitate indexing. The abstract should summaries the objectives, main finding and conclusions of the paper.

b) References

Only references that are cited in the text should be included in the reference list. The APA Style reference system is adopted in the Journal. References within the text will be shown in bracket, by quoting first, the author's name followed by a comma and year of publication all in round brackets, e.g. (Agus, 1994).

References should appear at the end of the article, arranged in alphabetical order by the first author's surname as follows:

For books: surname, initials, (year) "title", publisher, place of publication.
For journal: surname, initials, (year) "title", journal, volume, number, pages.

Example:

Book: Lim, K.K.(1990), *Valuation Methods*, Pelandok, Kuala Lumpur.
Journal: Zaharudin A. (1994), "The New Economic Policy and the Integrated Housing Model", *Ilmu Alam*, Vol. 2 No. 7, pp 23-35.

c) Illustrations

Illustrations such as diagrams, tables, graphs, photos and similar materials should be part of the text.

Table of values used to generate graphs must be included to ensure accurate representation. All illustrations should be identified correctly in the order in which they are referred to in the text, e.g. "Figure or Table 1., etc".

Acknowledgements, footnotes and endnotes (if necessary) are to be listed at the end of the article.

6. Editorial Scope

The editor reserves the right to edit /format the manuscript to maintain a consistent style.

7. Copyrights

Contributors shall undertake to ensure that articles submitted for publication do not infringe any copyright law. Relevant acknowledgements should be included in tables, figures or wherever necessary.

All contributions become the legal copyright of the publisher unless otherwise agreed. This covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproduction, microfilm or any reproduction of a similar nature and translation.

8. Disclaimer

Although the Valuation and Property Services Department Malaysia (JPPH) is the publisher of the Journal of Valuation and Property Services (JVPS), the views presented in the Journal are entirely those of the contributors and do not reflect the official stand of the department. JPPH does not hold itself responsible for the accuracy of any article published. The role of the publisher is merely to provide a platform for discussion and exchange of ideas.

9. Honorarium

Every article published in the Journal of Valuation and Property Services shall be paid an honorarium of an amount approved by Treasury of Malaysia.