

# A Conceptual Framework of Green Certification Impact On Property Price

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**Abstract.** Green building is one of the sustainability dimensions in built environment. The issues of green building and its impact to the society have been increasingly discussed. Green certification is one of the components in measuring sustainable development and plays an important role as an assessment system to an individual building's performance. The question arises whether the market understand and recognized the green certification. The objectives of this research are to discuss the issue pertaining to green value and the relationship between green certification and property price. The research emphasized on the understanding of property attributes focusing on green certification and the impact to the property price. Among the attributes identified are structural characteristics, location and neighborhood, and time attributes. Thus, this paper will discuss the review of literature on green development and the significance impact on property market in term of price and value. The green building development across the country could be classified as another sector in property markets that give significant impact to the real estate industry. As a result, a conceptual framework in assessing the impact of green certification is suggested to provide a significant input in developing the model of hedonic pricing for green building. This research may contribute to extend the body of knowledge in the area of green development and a suggested significant input will give much emphasize on the new valuation technique in valuing green building properties.

## 1 Introduction

Over the past decades, significant efforts have been made to promote sustainability in property development. The introduction of National Green Technology Policy (NGTP) in 2009 indicated the government's concern on global issues of sustaining environment and resources. The green building certification embarked the initiative of sustainable development with the introduction of Green Building Index (GBI) in 2009 as first green building assessment in Malaysia property market.

Other rating systems also have been accepted internationally to assess the sustainability building in Malaysia for example LEED, Green Mark, BREAM, Green Star. One of the most effective ways in encouraging sustainable building development is by rating system which provides a means for building owner or occupier in comparing building's greenness [6]. Launched in 2009, in line with NGTP, GBI was the first green certification established as rating building system in Malaysia. The system provides systematic assessment on how to evaluate building performance with regard to sustainable criteria.

According to Brundtland Report [23], the acceptable meaning of sustainable development is development that satisfies the needs of the present without compromising the ability of future generations to satisfy theirs. This definition is referring to three

domains, namely the economy, environmental and social perception also known as The Triple Bottom Line Concept as illustrate in Figure 1. Sustainable development could only being achieved if all of these three domains integrated and treated in equal measures. Thus, the development of green building plays an important role to achieve the sustainability objectives.

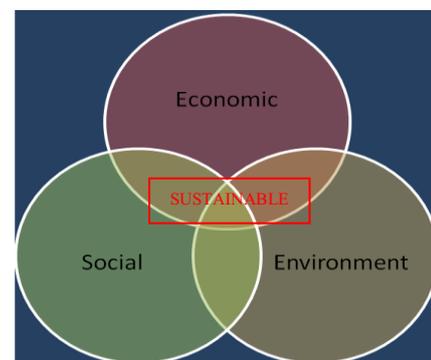


Figure 1. The Triple Bottom Line Concept.

Green building benefits have been debated tremendously in most literature. The beneficial parties include owners, occupants, community, appraisers and lenders. One of the most significance benefit discussed is on the cost-saving benefit in green building [5,10, 20].

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This is to encourage the owner to grasp the sustainable impact on value of property.

As a result of growing interest in green building development, an amount of research has been done to prove the benefit of going green in the economic context. The economics of green building are being argued and amount of studies in real estate have attempted to answer the question increase. Many researches reveal the significance result especially in a matured market like United States, Australia and United Kingdom. However, little study has been done on property market in Malaysia as it is an emerging market for green building. Thus it seems crucial to identify the impact of green certification on property market price. Apart from that, the researcher will suggest a conceptual framework of the impact of green certification to the property price.

## 2 Issue on green certification

The introduction of green certification and its impact are an important issue that should be addressed. The sensitivity of green label is uncertain, unpredictable, and result may vary according to the local market [7]. In fact, much of the studies on the impact of green labeling, certification or rating focusing on commercial property [3, 14, 25]. Consequently, lack of significance studies done in residential property market due to the slow value implications.

From the previous research which addresses the impact of greenness to the value of property, the literature identified three arguments of on the need to evaluate the impact of green certification on property price:

- a) Sustainable buildings and property risks and financials are often misleading, resulted to a situation where individual property assets are mispriced, which lead to the investment opportunities for “enlightened” investors [17]. The statement supported with the term introduced in report of APB Valuation Advisory ‘overlooking green features’ where most appraisers and valuers fail to note green in assessing property market [7].
- b) A building’s value may vary and market sales information is based on standard approaches to building appraisal with regardless of performance-based cost savings [9]. For most consumers and some homebuilders, the relationship between quality home construction and sustainability is always misunderstood and lead to the misinterpretation by the market player [9].
- c) In valuing low-energy houses, the expected price or rate of returns becoming challenges to the appraiser because lack of reliable modelling tools, historical statistical and case specific data [11].

Mostly, researches towards the green certification impact are involving both either a mandatory program or a voluntary program [2, 3, 7, 8, 9, 24]. However, limited studies have been done on green residential properties

and this is leading to the research on the greenness effect in residential market.

Even though few researches have been done, the question arised whether in Malaysia green residential properties are facing the situation of ‘underpriced or overpriced’? The argument is whether the green building development in Malaysia is recognized in well manner, or the establishment of green building rating system is giving a tremendous effect in promoting sustainability. Thus, the interest of this research is to investigate the impact of green certification on residential market and green features as another importance variable in determining the property price. By recognizing the green as another factor in assessing the property market, a model to be developed is to help property market player understand the role of green. The research will utilize comparative study to compare the price between green residential building and conventional residential building.

## 3 Literature review

### 3.1 Sustainable and green building

One of the important aims of sustainable development is to reduce the impacts of built environment on the natural environment. Hence, this goal has lead to the introduction of the term ‘green building’ in real estate. Green building is also known as the foundation of the sustainable construction development [22]. The issue of sustainability is controversial and much disputed subject within the field of construction.

RICS [20] defined sustainable building as green building rated by rating assessment tools. Green building also known as “sustainable building” - as building design and construction using methods and materials that are resource efficient and that will not compromise the health of the environment or the associated health and well-being of the building’s occupants, construction workers, the general public, or future generations [16]. Thus, green building is a mechanism to achieve the sustainable development objectives.

The three pillars of sustainable development according to the Triple Bottom Line Concept are characterized as follows [17]:

- Ecological sustainability: dependent on material, energy, noise emission, amount of waste products, amount of traffic, old building material separation and disposal, land use/pollution, climate change and biodiversity and means reduction of area used, conserving resources and avoidance of deleterious materials and emissions.
- Social sustainability: based on the social aspects such as feeling of wellbeing, aesthetics, health & comfort, security and user satisfaction, appropriate living environment and social integration.
- Economic sustainability: the minimizing life-cycle costs and value retention (material, goods and capital). Functional-aesthetic aspects such as the

maximising functionality, adaptability, serviceability and design should also be considered.

According to Bell & Morse [4] the degree of sustainability are sustainable equal to a situation where quality remains the same or increases whereas if quality declines, the system can be regarded as unsustainable. Therefore, the existence of assessment tools is to provide better understanding of sustainability measure.

Among green building assessment tools are LEED, BREEM, GBCA, Green Star, CASBEE, Green Mark, GBI and GreenRE. Since the introduction of LEED in US, other countries have started developing their very own green rating tools. There are few amount of research in evaluating the performance and comparison between tools. So far, there are amount of researches have been discussed on green rating tools, comparing international tools between LEED, BREEAM, Green Star and CASBEE, as well as the characteristic of each tool.

The purpose of green rating systems or certifications are intended to offer market participants an understanding of label that express a building's sustainability attributes [7]. The green certification indirectly assists the market player in assessing the benefits of green building compared to non certified buildings. Any potential improvement should be assessed to determine if it could create a differential to the operational, overall performance and/or risk characteristics of the property and whether this differential constitutes a market advantage or disadvantage [7].

As we know, the purpose of green building rating tool is to promote and increase the awareness among industry player towards sustainable development. Various green building rating tools mean that the effort to build more green structure that reduce the impact on environment, increase the social benefits and optimizing the economics return would be crucial challenges for green rating service provider. Thus, with multiple option and alternatives rating tools offered in green property development, either by local or international, the agendas of United Nation for preserving the world from environment threats can be accomplished.

### 3.2 Value and price

Value can be distinguished in two term; value-in-use and value-in-exchange. Defining the value-in-exchange is most likely the price of property during the process of

purchasing between seller and buyer. Therefore, value and price of property are closely related. When assessing the value, sale transaction or price is used to determine the market value, as described by the definition of property market value - 'estimated amount of which the property should exchange...'. As such, in determining a price, an appraiser or valuer should also take into consideration the micro and macro factors that may affect the property value.

Recently, researchers have shown an increased interest in green value concept – the integration of building's greenness and value. RICS [20] defined green value for office building as a beneficial outcome to the building that practice sustainability. The concept are explained in twofold, first the building fulfill the sustainable development term and second market value i.e. the sale value and rental value increased [5].

The importance of value in green development has been described through various researches. The Vicious Circle of Blame introduced by Cadman [28] outlined the relationship between the stakeholders in property development that cause issues in sustainable development implementation. The stakeholders include the owner, the investor, the developers and the designers. However, [12] modified the figure by adding the appraiser and valuer as another important roles in determining the sustainable development (as illustrate in Figure 2). The existences of valuers or appraisers are significant in determining the green value for leading the future direction of green development. Thus, to understand the market of green building, green attributes should be one of the factors to consider in valuation process.

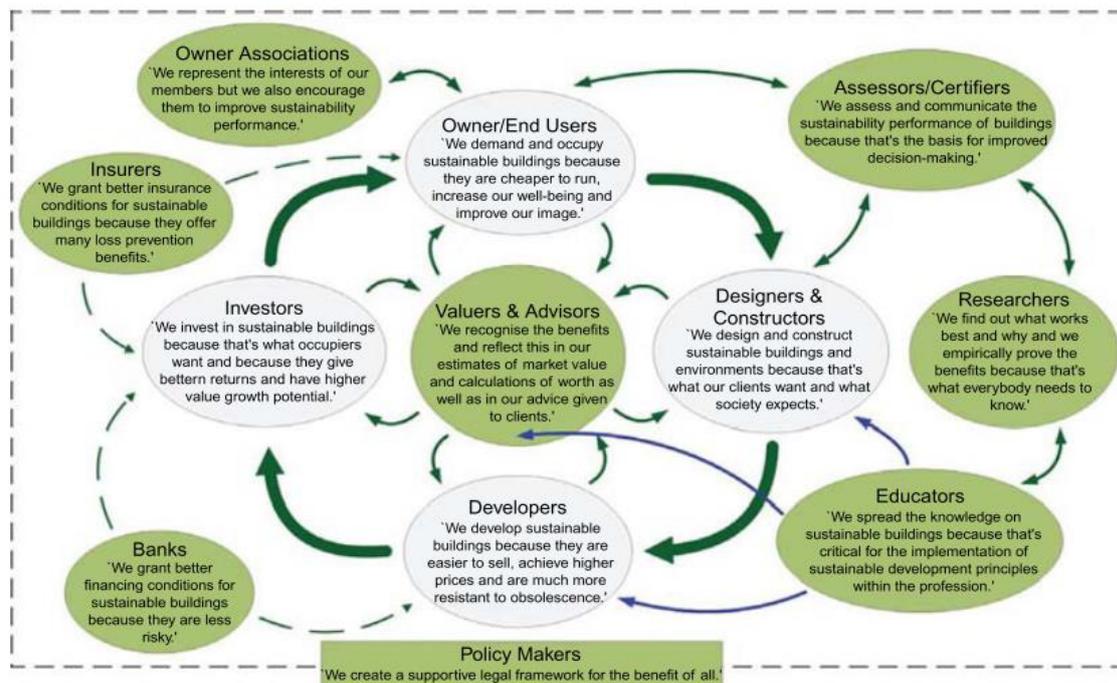


Figure 2. Breaking the Vicious Circle of Blame (Lorenz, 2008).

The value of the houses is affected by various factors include controlled variables or uncontrolled variables such as the characteristics of the house itself. To foresee the price effect, the marginal price effect of a single hedonic characteristic (green-certification) and aggregate market outcomes in a partial equilibrium framework can be demonstrated.

A large and growing body of literature has established the relationship between green and property market. Most of the studies highlight green certification and utilize the hedonic model to assess the effect on property price. Surveys conducted by several researchers [2, 3, 8, 14, 24] using hedonic model focus on their local green rating such as Green Mark, LEED, Energy Star and property transaction price.

### 3.3 Hedonic price theory

Rosen, [21] started the role of housing attributes consumer decision making process. Based on Rosen's analytical framework, which started with the assumption that any good or service consists of a variety of utility-bearing characteristics (as example  $z_1, z_2, \dots, z_n$ ) making up the hedonic price function. In the context of office rent determination, these characteristics consist of various structural, locational and lease characteristics that enter into the empirical model as independent variables. The empirically determined hedonic prices are indicative of an implicit market so that demand and supply functions can be derived for both short-run and long-run competitive equilibria [8].

Statically –based comparison method used to identify the most possible prices for proposed development, thus it can compare property prices within existing housing area across selected geographical [29]. It can be done

by using hedonic approach to determine the hedonic prices of selected property attributes. The hedonic model is use to understand the possible relationship between the properties attributes and property price. Hedonic modeling can be used by developers, corporate real estate groups, owners, and operators to determine which building characteristics add significant value to the potential transaction price. The results produced by hedonic model can provide important information for future decisions and help each party involve in property development better understand the economics surrounding each asset, thus improving asset underwriting [30].

Hedonic pricing is considered to be a willingness to pay technique and it tries to capture the fraction of property prices that are derived from the specific housing attributes [3]. Among of the structural characteristics like square footage, lot size, age, and bedrooms have a positive effect on selling price although the magnitudes may vary across different regions in the country [3]. However, internal features like the number of bathrooms, fireplace and air conditioning are always referring to add premium to the housing prices. One of the advantage using hedonic approach is it can fine-tune the quality changes of an individual properties, thus it can be used to measure the greenness price.

### 4 Conceptualising the framework of green certification impact

In regard to the issue of determining the impact of green certification on the residential property market, it appears that green and property price may have a significant relationship. Green or sustainability is a quality measure of a building and these criteria can be a property attributes in assessing the market price.

In assessing sustainability, difference features established by green rating tools due to factor such as law and regulations, climate, types of property, geographical factors and etc [1]. GBI was developed by PAM (The Association of Architects Malaysia) with six assessment criteria for certification inclusive of energy efficiency, indoor environment quality, sustainable site planning and management, material and resources, water efficiency and innovation (Table 1) and also 4 categories of certification according to total point scoring (Table 2).

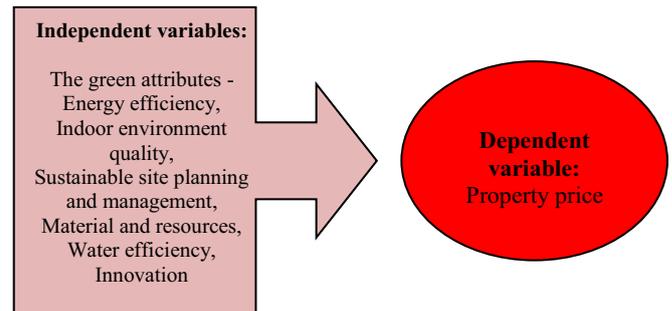
**Table 1.** Assessment Criteria for GBI and Scoring (GBI, 2009).

Criteria	Maximum Point
Energy efficiency (EE)	35
Indoor environment quality (EQ)	21
Sustainable site planning and management (SM)	16
Material and resources (MR)	11
Water efficiency (WE)	10
Innovation (IN)	7

**Table 2.** GBI Index Classification (GBI, 2009)

Points	GBI Rating
86+ points	Platinum
76 – 85 points	Gold
66 – 75 points	Silver
50 – 65 points	Certified

The abovementioned criteria represent the green features of green building as well as the green attributes. Thus, variables are identified as illustrate in Figure 3.



**Figure 3.** The independent and dependent variables (Author’s Research, 2016).

The variables of independent and dependent represent the cause and effect of a phenomenon. Therefore, from the above illustration the green attributes can affect the price of property. A further investigation should be made whether the green attributes alone affect the price or other property attributes also recognized as a factor affecting the price. One question that needs to be asked, is whether in Malaysia GBI does have the significant impact to the property market or otherwise.

In neo-classical theory, price of houses is a resulting from demand and supply of the housing market. Factors influence prices and value mainly is property-specific factors and market-related factors [27]. Wyatt further explained property-specific factors are the main physical characteristics of the property such as size, age, condition, appearance, legal and location whilst the market-related factors referring to the property market as a whole. Such market-related factors are difficult to control include household income, employment rate, consumer spending cost and finance, contrary to property-specific factors.

Some recent studies began to use dummy attributes for assessing green property price effect. Based on the ideas of few research, structural attributes are size of building /floor, stories of building and age [2, 3, 13, 14, 18, 24]. Another attributes that are mostly used are location and neighborhood for instance, view and facilities [2, 8,25] and time attributes such as year of transaction price take place [2, 3, 8,13, 24].

In order to explore the idea of green certified property’s price, abovementioned property attributes is suggest to control the differences that may exist between the samples and to reduce the inconsistency in result.



**Figure 4.** A Conceptual Framework of Green Certification Impact on Property Price (Author’s Research, 2016).

A conceptual framework (Figure 4) was introduced to answer the question. Further research to conduct will be applied on the case study approach in order to explore in depth the green certification and the effect to the price. The approach used in this research is referred to as the formulation of empirical questions to valuers and appraisers which requires this research to analyze and investigate the emerging market of green building. This research is necessary when various questions arise and there is an inability for clear explanation without the implementation of a research utilizing various sources [31]. Green buildings will be selected in few states as a case study and compare with noncertified buildings in order to generalize the research area in relation to Malaysia as a whole.

## 5 Summary

The research is significant because it addresses the issues as outlined above for comprehensive study into green certification. Presently, the impact of green development focuses primarily on the cost benefit. This study is to investigate the price differentials between GBI certified and noncertified properties in Malaysia. However, the need to highlight the property price, specific on residential market. To put it in a nutshell, the primary objective of this research is to develop a pricing model to analyse the impact of green certification in property market by using hedonic approach. Summing it up, it would be highly beneficial to property market player as the finding will lead to the success of green building

implementation. People will perceive the value of green in better way as well as promote sustainable in built environment.

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