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Green Building in the midst of Pandemic

Fitria Kusuma Wardani S.Ars
University of Indonesia, fitria.kusuma91@ui.ac.id

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Green Building in the midst of Pandemic

Abstract.

The COVID-19 pandemic has highlighted the need for healthy buildings that can protect against the virus. The healthy building feature includes good air quality and ventilation, natural lighting, and green open space. The features are embedded in a green building design. The benefit of green building on the wellness of its occupants, combined with the unfavourable pandemic situation, should have had increased the green building's popularity. However, throughout the pandemic in Indonesia, the green building remains unpopular. This research attempts to uncover how the market demand for green building is shaped, how the situation is during the pandemic, and how this issue benefits the future development of the green building. The analysis found that the public's knowledge is the factor that can be further utilized in developing the green building.

Keywords: Green Building, Pandemic, Market Demand, Knowledge.

1. Introduction

The Covid-19 pandemic has changed many things in the public's everyday life. There are several activities we should do during the pandemic, such as avoid public activities, maintain social distancing, wearing masks and washing hands. As people spend most of their time at home, many have realized the importance of the quality of their home.

The pandemic has highlighted the need for healthy building (World Green Building Council, 2020a) as buildings impact the health and well-being of their occupants (Pinheiro and Luís, 2020). Issues of the air quality and used materials of a built environment are also important to health and well-being (BBC, no date). There were claims regarding natural ventilation (BBC, no date; REHVA, 2021; WHO, 2021) as a mean to prevent the concentration of the virus in the air. SGBC (The Singapore Green Building Council) even specifically compared green building with a giant US-standard N95 mask to effectiveness against viruses and toxin pollution in the air (Zengkun, 2020). Good air quality and circulation features of green building designs are a particular architectural response to the pandemic, thus increasing the projects marketability. However, the application of green buildings in Indonesia is currently still low the trend is only faintly heard, then it is quiet again (Rinaldi, 2019). This study, therefore, attempts to analyze how the marketability of green building real estate in Indonesia can be increased and subsequently benefit the people by creating a better-built environment.

2. Methods

This paper uses the qualitative research method of literature review. The collected literature utilized keywords including green building, willingness to pay, green apartment, green housing, sustainability, sustainable development, resilience, Covid-19, and pandemic.

Initially, there were 187 pieces of literature published from 1994 to 2021 involved in the preliminary study. However, only approximately fifty pieces of them were used to build a structured review of the factors affecting green building demand. The paper then proceeded with dissecting the factors affecting demand into the contextual analysis.

3. Results and Discussion

The literature review process initially used the “green building” and “willingness to pay” keywords to obtain information on factors affecting demand for green building and current market conditions. The keywords later expanded into “green apartment” and “green housing” to understand the application of the green concept in residential architecture, what makes customers choose them, and what differentiates them from other architecture concepts. Keywords such as “sustainability” and “sustainable development” provide an environmental context in the green building discourse. Lastly, literature with “Covid-19” and “pandemic” keywords offer insight on how the issues are related, mainly whether the green building can be used as a solution against the Covid-19 pandemic.

3.1 Green Building’s Supply and Demand

Through Regulation of the Governor of DKI Jakarta Number 38/2012, the government has stated that every commercial, residential, and mixed-use building project with more than 50 thousand sqm are obligated to incorporate green building principles into their design. However, despite the rules have been established for almost a decade, only 49 buildings in Indonesia are certified green by the Green Building Council (GBCI) in 2019 (Hamonangan, 2019). The low amount of green buildings might be related to the market’s low interest, while the market is a significant consideration for property developers (Jones, 2019). This statement is further supported by others who stated that the key to the success of the number and complexity of green buildings is market demand rather than enforced rules and regulations (Retzlaff, 2008; Hang, 2009; Chau, Tse and Chung, 2010; Abuamer and Boolaky, 2015; van der Grijp *et al.*, 2019; Fu *et al.*, 2020). Past research argued that the lack of knowledge is the main cause of this market’s low interest, for example, people often define green building as a building painted in green color (Pitoko, 2016). This misinformed statement illustrates the gap of architectural knowledge between the Indonesian public, potential buyers, and practitioners. The whole situation is not beneficial for property development.

Aside from the market’s low interest, the government’s regulation also lowers the supply of green building from the developers’ points of view. The regulation initially stated that any eligible project that does not adhere to the regulation would be sanctioned

administrative matters in the form of no-issuance IMB (Building Permit) and/or SLF (Certificate of Worthiness) (Governor of the Special Capital Region of Jakarta, 2012) . Despite this sanction system, there has not been any research on probable violation of law or how the system is enforced so far. In addition to that, the regulation was without a reward system, therefore, making the green building less lucrative for developers. This paper, however, will not dwell further into this topic as the main focus is the market in general.

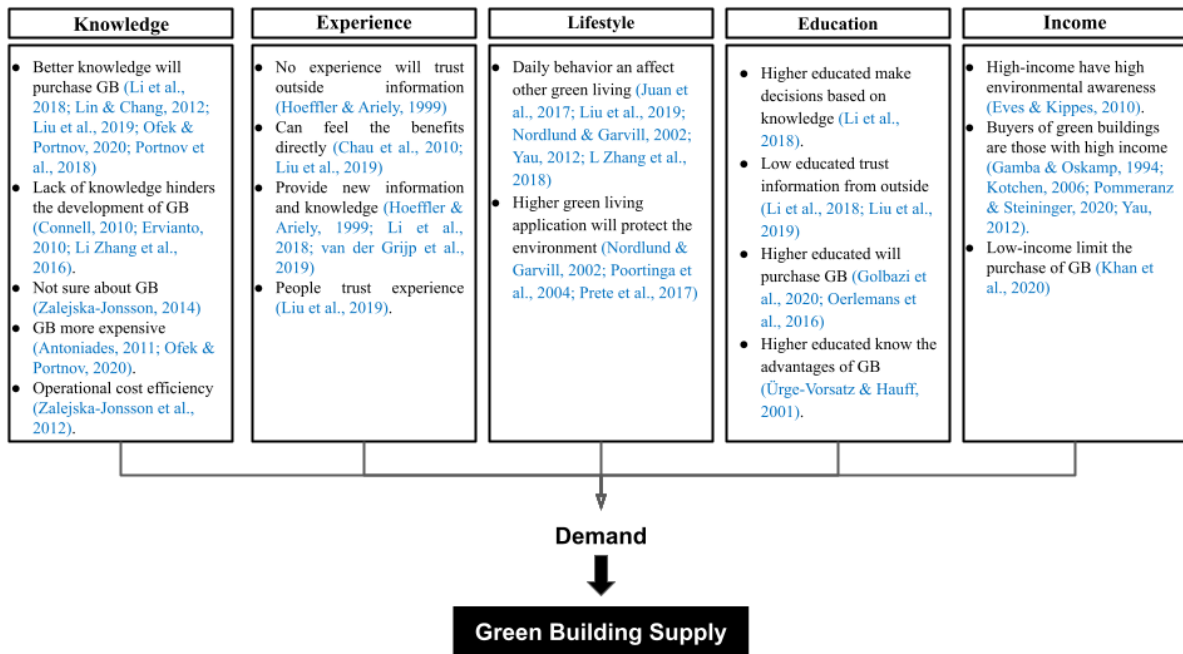
Generally, real estate developers must first understand what is needed, expected, and wanted by potential buyers (Prayogo, Kwanda and Rahardjo, 2018) and the priorities and preferences of the end-user (Paul and Taylor, 2008; Hu, Geertman and Hooimeijer, 2014). The end user, or people in general, are willing to pay more for a place that provides a better quality of life (Retzlaff, 2009). The better quality of life is what often advertised by real estate developers, including green building projects. Therefore, the market does exist and can be further developed. To do so, firstly, the public understanding regarding green building should be improved through various ways, including campaigns (Ofek and Portnov, 2020). The campaign may emphasize how green buildings can improve the inhabitants' living environment and benefit them. The knowledge sharing activity will increase the people's interest in purchasing one and subsequently increasing the market's demand (Hartmann and Apaolaza-Ibáñez, 2012).

3.2 Factors Affecting Demand (FAD)

Considering that this paper presents green building as a commercial product, a set of factors affecting demands for green building was built. Literature with keywords including: green building, green apartment, green housing, sustainability, and willingness to pay were reviewed to identify the factors affecting demand. The result is five factors: knowledge, experience, lifestyle, education, and income. A diagram illustrating the factors affecting demand and their key topics is presented in the following Figure 1.

Figure 1. Factors affecting demand.

Source: Author, 2021



3.2.1 Knowledge

Knowledge factor is the information that each member of society has about green building. There is no standard to measure how knowledgeable an individual is regarding this topic. However, the six aspects and benefits of green building: wise land use, pay attention to indoor air quality, save electricity, save water, use environmentally friendly materials, and reduce waste (Ofek and Portnov, 2020) can be a basic parameter. Research argued that knowledge is positively correlated to the willingness to buy: individuals who better understand green building properties are more likely to make a purchase. (Lin and Chang, 2012; Li, Long and Chen, 2018; Portnov *et al.*, 2018; Liu *et al.*, 2019; Ofek and Portnov, 2020; Abdelaal and Guo, 2021). Likewise, the lack of knowledge may hinder the green building property development (Connell, 2010; Ervianto, 2010; Zhang *et al.*, 2016). An example of how different the public's knowledge regarding green building with the reality is that the public is unsure whether green building property is better than conventional ones (Zalejska-Jonsson, 2014), while being more expensive (Antoniades, 2011; Ofek and Portnov, 2020). Although the price point comparison is mainly accurate (Kim *et al.*, 2020; Ofek and Portnov, 2020), it should be considered that the lifetime operational cost is 20-40% lower than a conventional building (Zalejska-Jonsson, Lind and Hintze, 2012).

3.2.2 Experience

Experience factor is the experiences of an individual who occupied or have personally experienced green building (Chau, Tse and Chung, 2010). This factor is essential in keeping the individual protected from being misinformed by external sources (Hoeffler and Ariely, 1999) because people tend to trust their experience more than the information contained in, for example, the product's marketing (Liu *et al.*, 2019). Individuals with experiences living in green buildings can feel the benefits (Chau, Tse and Chung, 2010; Liu *et al.*, 2019) and can provide user perspectives and knowledge for others (Hoeffler and Ariely, 1999; Li, Long and Chen, 2018; van der Grijp *et al.*, 2019).

3.2.3 Lifestyle

Lifestyle, in particular green living, is defined as the series of behaviors carried out for the purpose of protecting the environment, improving environmental quality (Xie, Lu and Gou, 2017). The application is measured from low-cost daily activities such as waste recycling, reducing single-use plastic bags, using environmentally friendly products, saving energy and resources, and reducing private cars usage (Nordlund and Garvill, 2002; Hu, Geertman and Hooimeijer, 2016). It was argued that the environmentally friendly lifestyle affects the tendency to purchase green building as well. This particularly applies to residential type green building (Nordlund and Garvill, 2002; Yau, 2012; Juan, Hsu and Xie, 2017; Zhang *et al.*, 2018; Liu *et al.*, 2019). The people who adopt the green living lifestyle feels obliged to take further step in protecting the environment (Nordlund and Garvill, 2002; Poortinga, Steg and Vlek, 2004; Prete *et al.*, 2017) and that is what makes them prefer green buildings compared to conventional buildings.

3.2.4 Education

Education is defined as the level of formal education a person has received that has led to their mastery of science and technology (Saputro, Rintayati and Supeni, 2016). Different educational backgrounds have different decision-making frameworks. Higher-educated individuals make purchase choices based on their knowledge of the product, while those with a lower education rely more on external facts (Li, Long and Chen, 2018) such as price, product descriptions, and other marketing data (Li, Long and Chen, 2018; Liu *et al.*, 2019). Individuals with higher levels of education tend to pay more for eco-friendly apartments (Oerlemans, Chan and Volschenk, 2016; He *et al.*, 2019; Golbazi, Danaf and Aktas, 2020; Khan, Thaheem and Ali, 2020). Many with a higher degree of schooling are better in comprehending the advantages

of green building over conventional ones (Ürge-Vorsatz and Hauff, 2001; Khan, Thaheem and Ali, 2020).

3.2.5 Income

Income factor is defined as the amount of money a person earns monthly, or monthly paycheck, that is used to pay for their daily needs (Suroto, 1992). Higher-income customers indicated considerable level of awareness of the environmental characteristics of the homes they were considering purchasing (Eves and Kippes, 2010) and green building residential apartments are usually bought by them (Gamba and Oskamp, 1994; Kotchen, 2006; Yau, 2012; He *et al.*, 2019; Pommeranz and Steininger, 2020).

Figure 2. Price comparison and salary to be able to buy a green apartment.

Source: Author, 2021

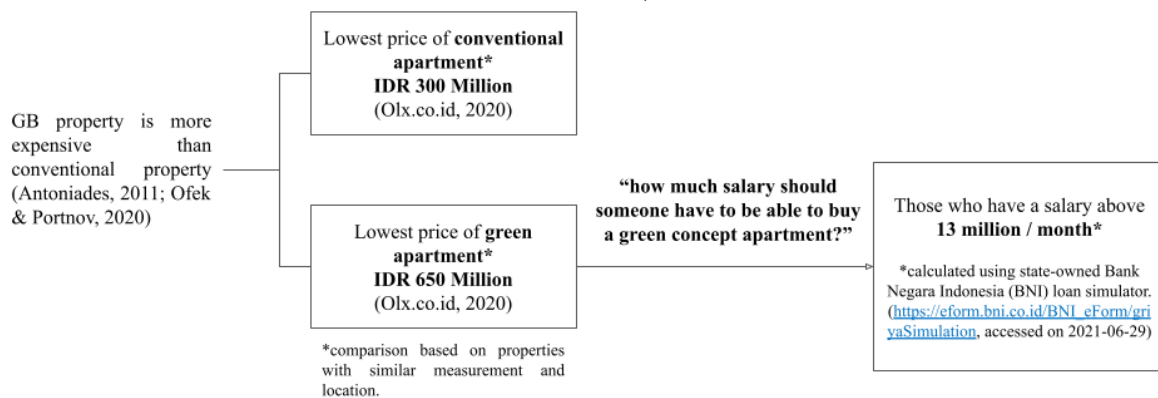


Figure 2 illustrate how income is related to green building market in Indonesia by calculating the minimum income should an Indonesian have to be able to purchase a green building residential apartment. The simulation data was obtained from available market pricing, credit facilities, and general interest rate. The pricing comparison is based on two different products with similar measurement and are at the same location. It is seen that the green building residential apartment is priced at over twice the rate of the conventional building. After a 10% down payment, the loan simulator calculated an IDR 585 million principal with a 10.25% interest rate p.a. and 15 years period of loan. The result is IDR 6.5 million in monthly instalment. Generally, the instalment's figure should not be more than fifty percent of the debtor's monthly income. Therefore, in this scenario, the debtor should have a monthly income of at least IDR 13 million to be eligible for this loan scheme. This figure is equivalent to 3 times the minimum pay rate in Jakarta.

The contextual simulation indicates that green building is indeed an expensive purchase for most people with minimum rate paycheck. Thus, despite public's faith in green building's

ability of reducing lifetime operational costs (Zalejska-Jonsson, 2012) their small financial resources constrain them (Khan, Thaheem and Ali, 2020).

3.3 Green Building Property in the Pandemic Context

It has been argued that healthy buildings provide the necessary tools to help fight the virus (Tan, 2020; World Green Building Council, 2020b). A healthy building design is embedded in the green building concept. Green building design mainly focuses on providing clean air, good air circulation, and good lighting. The design elements of a green building can provide a productive, comfortable, and healthy working environment at home (Jesus, 2020). Even before the pandemic, a green building is believed to increase productivity and reduce medical issues such as asthma, respiratory allergies, stress and depression of its residents (Singh *et al.*, 2010; Tleuken *et al.*, 2021).

The particular characteristic of green building that can help its occupant in fighting the pandemic is as follows: (Jesus, 2020; Kurniawan, 2020)

1. Good air circulation to prevent the virus from spreading. Ensuring the occupants to be well isolated when necessary without infecting others.
2. Environmentally friendly building materials to reduce toxic substance evaporation in the air.
3. Proper window opening and setting provide adequate sunlight as natural lighting as well as pro-vitamin D source.
4. Green open space that provides a tranquil environment to reduce stress.

The higher selling price and lower operational cost of the green building than a conventional building, are precisely related to the health benefit it can bring, especially in the pandemic context as illustrated in Figure 3.

Figure 3. The facts and advantages of green buildings in the midst of a pandemic.

Source: Author, 2021

Green Buildings Facts	Pandemic Context
<ul style="list-style-type: none"> • High price rates (Antoniades, 2011; Ofek and Portnov, 2020) 	<ul style="list-style-type: none"> • Environmentally friendly building materials. • Green open space to reduce stress. (Kurniawan, 2020)
<ul style="list-style-type: none"> • Lifetime operational cost efficiency (Zalejska-Jonsson, 2012). 	<ul style="list-style-type: none"> • Passive lighting and air circulation: prevent virus from spreading. (Jesus, 2020; Kurniawan, 2020).

Based on the literature review, the five factors affecting demand for green building in the general context are knowledge, experience, lifestyle, education, and income. The knowledge factor, in particular during the pandemic, is essential. The more people know about the health-beneficial properties of green buildings, the more demand they will have in the future. The lifestyle factor is related to the people with environmental issues' awareness and therefore have a mental obligation to contribute to the solution. One way to do so is to live in an environmentally cautious architecture such as a green building. Therefore, people will be encouraged to choose one over conventional architecture.

People who have experienced living in a green building will perceive the benefit of the architecture and its peculiarity amongst conventional buildings. This experience will further encourage them to own a green building that can give similar benefits and a sense of uniqueness in the future. The education factor is essential in the decision-making process. People who have higher education levels are usually made a decision based on available information. In the green building context, people will have it easier to receive scientific knowledge regarding the architecture and are expected to grow their interest in the product. The last factor is related to the price of green building real estate products. The low demand was often caused by the green buildings generally priced at higher points than conventional buildings with similar size and location.

4. Conclusion

Green Buildings and health-conscious design trends were present before the pandemic. However, the presence of a green build during the pandemic, as the current situation, can be used as a good alternative for housing. Amongst the five factors affecting the demand for green building, knowledge, experience, and lifestyle are the most substantial in the pandemic context. Therefore, it can be concluded that the demand for green can be formed through pandemic-related information sharing. At the same time, the public is made aware of the architectural features that can protect them from being infected by the disease.

The highlight of green building's beneficial features to prevent further infection can be prolonged as the end of the pandemic is still unknown. This momentum is certainly also the right thing to promote green building in terms of benefits for better health. For Government, architects, and practitioners can educate the public with valid information on how green building can help create a better and healthier living environment. The government can help by giving the correct stimulation for developers, such as tax incentives or additional buildable areas, for any green building projects. Developers can also widen the market by producing

small units at a more affordable price if they follow the government's policy building over 50 thousand square meters green building project. Therefore, the public knowledge, the market demand and supply, and the general healthy built environment will be increased and eventually benefit the whole society.

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