Perceptions of Potential Homebuyers in Purchasing Green Home

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ABSTRACT

Reducing greenhouse gases emissions and embracing sustainable practices are vital to mitigating climate change. Malaysia's introduction of the Green Building Index had certified residential projects, but with limited number related to the landed residential properties. The limitations highlighted green home implementation and its contributions toward sustainability goals. This study aimed to examine potential homebuyers' perceptions of purchasing green home. A semi-structured interview was conducted with nine potential homebuyers who acknowledged their awareness of green homes. The findings suggested that energy-saving measures were the potential homebuyers' key focus. Interviewees stressed their interest in purchasing green homes, but the interest is subjected to their financial capacity and the quality of the green home. This study provides insight to developers on the preferred green home features to allow developers to meet the demand of potential homebuyers and profit enhancement.

Keywords: Green home features, Initiatives, Potential homebuyers, Residential properties

INTRODUCTION

The increasing scientific evidence on climate change alerted the world concerning policies advancement, stakeholder engagement, and people's adaptation to enhance sustainable development (Millward-Hopkins et al., 2020; Wong et al., 2018). It has been reported that around 900kgs of carbon dioxide (CO_2) be released into the atmosphere for every ten buildings (Min et al., 2022). Malaysia launched initiatives such as Low Carbon Cities 2030 for 45% CO_2 emission achievement (Khoo, 2019). However, Malaysians are building many homes, which contributes to CO_2 emissions and energy consumption, with residential and commercial sectors reported a 379% increment in the gross domestic energy consumption from 1990 to 2018 (Energy Commission, 2020). In 2024, 6,228,948 units of existing residential property and an incoming supply of 392,757 residential property units were recorded (National Property Information Centre, 2024). The continuous increase in housing supply will increase household activities and energy consumption and contribute to the dangers of climate change with inevitable devastation to society (Millward-Hopkins et al., 2020).

The Malaysian government has introduced strategies and initiatives to ensure effective monitoring and sustainable development. The National Green Technology Policy was launched to promote sustainable development in the key areas of buildings, energy, waste management, and transportation (Malaysian Investment Development Authority, 2021). A rating tool, the Green Building Index (GBI), was launched in 2009 to guide the construction industry stakeholders toward constructing environmentally responsible buildings (GBI Sdn Bhd, 2020). The certified residential projects claimed to achieve a certain sustainability level, such as cross-ventilation, energy-efficient appliances, and house orientation (Greenbuildingindex, 2013; Lee et al., 2018). Most of the certified NRC projects are strata housings, rather than landed properties (detached, semi-detached, and terrace house) (GBI Sdn Bhd, 2021).

Arguably, the limited supply of green homes resulted from low demand from homebuyers and higher initial investment costs (Leong et al., 2021; Nordin et al., 2017). On the other hand, homebuyers defended their awareness of green homes but were limited by supply and financial capacity (Lim et al., 2018; Shafiei et al., 2013). Erlwein and Pauleit (2021) stressed that going green requires a determined mindset and a strong commitment to emphasising the ideal vision of the future. A fundamental inquiry is required as to potential homebuyers' adaptive practices to allow sufficient demand and supply of green homes. Therefore, this study investigates potential homebuyers' perceptions of green home features, challenges for purchasing green homes, and strategies for improving the supply and demand of green homes. In a market without legislative requirements to incorporate green features in houses, this study may potentially provide an insightful strategy for developers to look into green homes. Besides, the study could benefit potential homebuyers to own a more comfortable, healthier, and safer living space.

LITERATURE REVIEW

Perceptions and Attitudes toward Green Home

Past studies have studied perceptions of end-users on green homes in different regions to explore the latest and new needs in the residential building sector. For example, Judge et al. (2019) and Shooshtarian et al. (2021) in Australia, Wijayaningtyas et al. (2019), Wijayaningtyas et al. (2020) and Wijayaningtyas and Nainggolan (2020) in Indonesia, Zuhaid et al. (2022) in European Unions countries studied the issue. The increasing environmental issues and the urge to own a comfortable home leading to the introduction and implementation of green homes to integrate sustainability into residential construction (Kamaruddin et al., 2020; Wijayaningtyas et al., 2019).

A green home is perceived to enhance energy efficiency and environmental conservation, which the government strives to promote (Kamaruddin et al., 2020; Rashid & Shaharudin, 2017; Wijayaningtyas et al., 2019). Bashari et al. (2021) suggested that housing privacy could enhance residents' satisfaction. A prevalent discourse in green homes focuses on building performance, compels green lifestyles, and appeals to urban concepts (Gomez & Yung, 2018; Hagbert & Bradley, 2017). Nonetheless, general perceptions indicate that green homes possess high market prices, limiting the percentage of green home construction in residential projects.

Bond (2015) stressed that developers are crucial stakeholders of behaviour change toward a low carbon future by communicating green measures to homebuyers. Mesthrige and Kwong (2018) revealed that the most significant challenges for incorporating green home features are cost and the lack of information. These findings stress the role of developers in assisting buyers by providing precise and significant information.

In Malaysia, shifting from traditional conventional construction methods to green home construction requires technological innovation, human aspects, financial and resource considerations (Kamaruddin et al., 2020; Rashid & Shaharudin, 2017; Zainordin et al., 2018). The transition necessitates changes from the homebuyers' willingness to pay (WTP) to developers' efforts in developing green homes (Kamaruddin et al., 2020). Previous research has shown that a certain level of demand from homebuyers prompts developers to build residential properties with green features. Studies showed that some homebuyers are willing to pay a premium price for green features (Hagbert & Bradley, 2017; Kamaruddin et al., 2020; Saleh & Alalouch, 2015; Zainordin et al., 2018).

Challenges to Adopting Green Home Features

The high initial construction cost, such as the installation of solar panels, associated with an uncertain rate of return on investment are the critical challenges of green home implementation (Goh et al., 2013; Ibrahim et al., 2014). Erlwein and Pauleit (2021) reported that large-size developers have more financial resources and a higher level of top management commitment and expertise to implement green practices. These developers are more conscious of green practices with proper planning, design, and budget allocation (Leong et al., 2021). However, green homebuyers may be hindered by the high initial payment, as the buyers perceive that using green materials and installing new and trending technologies would increase the cost (Bond, 2011; Joachim et

al., 2015).

The Malaysian housing industry appears to have limited local expertise and knowledge in green technology. The shortfall of experts limits developers from incorporating green concepts into housing projects due to the shortage of practical advice on green home design (Abidin, 2010; Goh et al., 2013). The lack of new knowledge on green technologies and materials among developers could pose a significant challenge to the housing industry (Alias et al., 2010; Ayedun & Oluwatobi, 2011; Windapo & Goulding, 2015). Jamaludin et al. (2018) purported that environmentally-friendly and energy-efficient building materials are difficult to obtain in the local market, prompting developers to obtain the materials overseas. Most developers in Malaysia refuse to adopt GBI as a project development guideline because government policies are constantly evolving, leaving them in the shadows about the nature of the green home concept with risks of uncertainty (Abidin, 2010; Aliagha et al., 2013; Tey et al., 2014), which possibly leads to the lack of green home supply in the market.

Strategies to Market Green Home Features

Possible strategies are required to market green homes features to meet the rapid growth of homebuyers. Highlighting the environmental and social benefits through green home marketing could attract potential buyers. Studies reported that a green home consumes less energy (Aroul & Rodriguez, 2017; Leong et al., 2021), reduces water scarcity by focusing on water-efficient measures (e.g. rainwater harvesting) (Dilotsotlhe, 2021; Wijayaningtyas & Nainggolan, 2020)), and enhances physical and emotional health (Aliagha et al., 2013; Alias et al., 2010).

Promoting financial opportunities, such as lower utility bills, higher resale value, and lower maintenance costs, could be strategies to attract homebuyers to purchase green homes (Erlwein & Pauleit, 2021; Hagbert & Bradley, 2017). The rising demand for green homes combined with today's limited but growing supply suggests that the green home purchaser will be able to resell their green home for significantly higher than the original price (Hagbert & Bradley, 2017). Green homes could potentially have lower long-term maintenance costs as the building materials are more durable than traditional building materials (Erlwein & Pauleit, 2021; Hagbert & Bradley, 2017; Joachim et al., 2015).

RESEARCH METHODOLOGY

This study identified Sibu (located in Sarawak, Malaysia) as a case study area as Sibu is one of the divisions currently under the Sarawak Corridor of Renewable Energy (SCORE) initiative to enhance energy efficiency and infrastructure development (Regional Corridor Development Authority, 2021) to incorporate green features into the residential property, as well as its unique soil condition (peat soil) which may potentially limit the housing quality (Sarawak Government, 1968).

This study examines perceptions of potential homebuyers toward green home features, challenges faced during green home searching and purchasing phase, and strategies to improve green home' supply and demand in Sibu. A semi-structured interview method was employed to gain in-depth information from interviewees, allow the opportunity for previously unknown information to emerge and ensure flexibility in exploring the opinions of interviewees on specific issues (O'Keeffe et al., 2016; Sekaran & Bougie, 2019).

Nine interviewees (four academicians, two construction industry stakeholders, one businessman, one financier and one housewife) from the medium-to-high household income group participated in this study. The medium household group's income ranges from RM4,850 to RM10,959, while the high household group's income is more than RM10,960 (DOSM, 2020). All interviewees had the intention to purchase a house in Sibu in the coming five years and indicated a certain level of understanding and awareness of green homes. The key interview questions were queried on the types of housing information, the potential influence of green features on house price, existing financial capacity to purchase a green home, challenges faced, and strategies to improve the supply and demand of green homes. The semi-structured interviews were conducted from July to September 2021 through phone calls or face-to-face approaches.

The semi-structured interview data were transcribed, coded, and a range of themes was constructed to meet the

research aim. To ensure validity of the study, the transcribed data were sent to respective interviewees for confirmation prior to the data analysis. Thematic analysis was used to identify, analyse, and interpret the themes obtained during the data analysis process until no new themes emerged. Previous researchers, such as Nordin et al. (2017) and Wong et al. (2018), had adopted a similar data analysis method. Four themes were developed, namely non-green home features, green home features, challenges for searching and purchasing a green home, and strategies to assist the supply and demand of green homes.

FINDINGS AND DISCUSSIONS

Non-green home features

Five interviewees (H2, H5, H7, H8 and H9) stated that they would seek information related to the house location. One of them (i.e. H5) further elaborated that the land subsidence situation urged them to consider location as their priority despite the small area within Sibu. The existing soil conditions in Sibu city center are mainly deep peat soil (Sarawak Government, 1968), which leads to the scenario where some homebuyers mainly focus on searching houses based on location and budget. After a few years of housing construction completion, land subsidence would lead to cracks in houses. Hence, the green features may not be a priority to potential homebuyers.

Four interviewees (H4, H5, H6 and H7) revealed that income is the crucial factor influencing searching and purchasing decisions. Lower-income households have less tendency to purchase green homes as they only look for a house to provide shelter to meet their basic needs. H5 mentioned that medium and higher-income households might have more financial power to bargain for green homes.

…middle or high-income group… these purchasers are willing to pay more for houses built on higher and harder ground, higher ceiling level, larger window and safe suburb [H5].

The interview findings showed that all interviewees perceived the green home as approximately 1% to 30% more expensive than conventional houses. These findings align with Goh et al.'s (2013) findings that the interviewees reckoned the construction cost of green homes could cost 40% higher than conventional houses.

Two interviewees (H7 and H8) acknowledged that they would be able to pay a premium price with their current income, but not all of them could pay the same. The findings imply that financial capacity is the primary concern of the potential homebuyers in Sibu, considering their income level and relatively low living expenses. Hence, this situation raises doubts in reality, such as does green homes cost more than conventional housing? Is this a myth or reality? Thus, people commonly consider the higher cost of purchasing a green home.

Greem home features

The interviewees were asked about the type of green home features they would ask when searching or inspecting a house. Four interviewees (H1, H2, H3 and H8) reckoned that if they had a chance to request green home features from relevant agents or developers, energy-efficient appliances would be their priority.

The first one shall be energy-saving lighting, followed by energy-efficient air conditioner and the security measures. Energy savings could help with the electricity bill. Maybe you add up (the savings on electricity bills) throughout your whole life (whole timing of staying in the house), the energy savings could cost over thousands [H8].

In contrast, two interviewees (H4 and H5) disagreed with the energy-efficient appliances as most houses do not provide such appliances and additional costs will be incurred for purchasing. An interviewee (H5) stated that the green home features, such as energy-efficient air conditioner, insulations, and materials to achieve acoustic comfort, would increase the price of houses.

Two interviewees (H3 and H8) stated that security measures are the feature they would be looking into,

possibly due to the increasing crime rate. Moreover, two interviewees (H6 and H7) pointed out that good quality public green space is crucial for better air quality and social activities.

…local residents purchasing houses mainly concerned air quality of airflow on its environment. They are more prefer houses which can accessibly reached to town and good public greenspace [H6].

The findings indicate that although the interviewees are aware of green home features (e.g. air quality, solar panel), their regular approach in house searching focused on locations, house price, and general property features rather than green home features. The findings indicate that green home features are not the main focus for potential homebuyers. They tend to view this alternative as a luxurious option if they have an additional budget. Soon and Tan (2019) reiterated the direct relationship between monthly income and the preferred house choice. The findings suggest that the current practices of the homebuyers when searching for a house may provide an impression to the real estate agents or developers that homebuyers are only searching for conventional houses but not green homes.

Nevertheless, purchasing a green home might lower the operational cost, including utility bills, and provide a more comfortable living environment in the future. Hyland et al. (2013) proved that residential single-family houses, which can reduce 1% of energy consumption in Stockholm, Sweden, had a marginal increment of 0.04% in selling price. Fuerst et al. (2015) supported that the residential property with Energy Performance Certificates (EPCs) in England had a 5% increment in selling price. The increase in selling price proves that houses with green features could have higher selling prices but may be limited to about 5%.

However, the findings indicate that potential homebuyers in Sibu are perceived to have lower income levels. The income level controls the attitude and behaviour of homebuyers who have the intention to purchase or search for green homes. Judge et al. (2019) reported that green consumer identity positively impacted homebuyers' WTP.

Challenges for searching and purchasing a green home

Lack of supply. Almost all the interviewees (except H5) mentioned that the challenge they faced while searching for a green home was the lack of supply in the current Sibu housing market. For instance, Interviewees 7 and 8 mentioned:

Sibu does not have supply of green homes. I think green home in Malaysia is relatively new…Maybe West Malaysia has (green homes), but I did not see it (in Sarawak) [H7].

I think the contractors (and) developers in Sibu, and the (state) government, have not really work into this green home yet. That is why I have not come across any green home yet in Sibu [H8].

The interviewees reckoned that the lack of green home supply might be due to the perceptions of developers on additional investment costs and lower profit margin when including green home features.

Sibu developers are keener to provide basic conventional house due to marketability, green features that need additional cost may not be popular [H1].

Developers and/or contractors prefer conventional way (of housing construction) to maximise profit [H2].

Developers are not motivated to build green homes as they are leaning toward conventional housing for profit margin enhancement. The uncertain market acceptance toward green homes hinders developers from venturing into this area. The interviewees pointed out that little-to-none green home supply exists in Sibu. The conservative nature of the developers and potential homebuyers seems to form a vicious circle of the blame for the lack of green home supply in the market. Cadman (2000) proposed this vicious circle to be never-ending if none of the stakeholders are willing to break this chain and take the lead to incorporate green features into a housing development.

Lack of technology. One interviewee mentioned that the lack of technology could contribute to the little-to-none green home supply in Sarawak.

The challenges…I thought was technology (and hence) many developers (made themselves) unavailable on green home projects [H6].

Such finding is tally with Simpeh et al. (2023) who found that technology as one of the factors affecting green home implementation in South Africa. Joseph and Mustaffa (2023) opined that the use of technology could increase the capital investment which hinder its adoption. These seems to indicate that the supply chain agents may be reluctant to adopt technology, leading towards the lack of supply of green home.

Lack of housing information. Three interviewees (H4, H7 and H9) stated that another challenge is the lack of housing information in the current market. The real estate agents did not disclose relevant housing information through the advertisement, such as orientation of the house and its surrounding environment.

The agents are not disclosing the information about green home. Even with photos, we did not know the direction and location of the house, (and) the surrounding environment. (These include) the control of natural light, (which) shall be part of housing design, but the agents did not inform us [H7].

Moreover, an interviewee (H7) pointed out that this lack of information is not only mainly related to the green home features but also the exact housing location. Such finding is tally with previous research which shown a flaw of housing information distribution from property practitioners to the end-user in Australian residential property, particularly in relation to the sustainability features (Warren-Myers & Monique, 2023; Wong et al., 2018).

Lack of awareness. Two interviewees (H3 and H5) reckoned that the lack of information and supply of green homes might be due to the low awareness level among the potential homebuyers. The findings also pointed out that uncertainties on the higher price hindered homebuyers from purchasing green homes. A low level of potential homebuyers' awareness adds a further constraint to the green home transition in Sibu. Most of the potential homebuyers in Sibu are not aware of the benefits of a green home and may not have a green consumer identity. Therefore, the lack of awareness may lead to the low WTP level among potential homebuyers in Sibu, particularly the low-to-medium income group household. In contrast, the medium-to-high income household may have better awareness, purchasing power, and a high level of WTP for a green home.

Strategies to improve the supply and demand of green homes

Government's incentives. Four of the interviewees (H1, H2, H5 and H7) suggested that the government should provide incentives to developers to increase the supply of green homes or provide subsidies to green homebuyers. The incentive and subsidy could indirectly increase the supply and demand of green homes.

Government to provide incentives or rebates to developers to cushion off the additional cost required for the green features [H1].

Government policy could impact the private sectors on their business direction. If government provided subsidies for the construction firms, or developers, or assessment deductions for green homeowners, this might reduce their financial burden. This could indirectly encourage people to purchase or develop green home. Green home normally is more expensive, and buyers cannot afford. If government (could) provide such incentives, these may attract buyers in purchasing green homes [H7].

Such finding is supported by Leong et al. (2021) and Tey et al. (2014) who suggested the government to offer incentives to developers who want to pursue green concepts in their housing projects. Moreover, Jiang et al. (2022) suggested government to provide appropriate subsidies for green home development yet mentioning that market mechanism has gradually replacing government in China residential property market for the update of green home.

Government's initiative. Interviewee 8 mentioned that the government could also take the initiative or implement specific enforcement levels on implementing green home features in Sibu.

I think the government shall play a role, whereby they have to introduce this green home program. I think because right now, even for those under government program housing, they are not really green homes, more like conventional housing. So if they take the initiative to build the first green home in Sibu, maybe this thing would start to take a turn [H8].

These initiatives could entice developers to explore the latest technology, knowledge, and systems related to green home features (Windapo & Goulding, 2015, Ibrahim et al., 2014, Alias et al., 2010). However, Zhang et al. (2024) argued that government regulatory requirement of incorporating certain green home standard in Singapore is lacking on evidence on its effectiveness. In Malaysia, there is no such mandatory requirement. This seems to indicate that the government is not focusing on enforcing green homes throughout Malaysia but instead on developed cities, such as Putrajaya (The Sun Daily, 2017).

Increasing level of awareness. Three interviewees (H1, H4 and H8) reckoned that introducing the awareness program related to green features could help to increase the demand for green homes. Rosner et al. (2021) supported that low environmental awareness could hinder the adoption of green as this group of people perceived 'green' as a wrong selection. As such, higher level of awareness among the supply chain agents and home buyers could ensure that green technology being explored and adopted with care (Yin & Yu, 2022).

Increasing the supply of green home materials. Two interviewees (H2 and H6) suggested increasing the supply of green home building materials. They suggested that the availability of green materials could help with the enforcement of green home development.

Improvement in green materials availability in Malaysia. Malaysian government shall increase in green campaign, improve their enforcement on regulation and guidelines on green homes development [H6].

Such finding is tally with Mojumder et al. (2022) who suggested that the construction industry is now shifting towards the purchase of sustainable materials to reduce carbon footprint. As such, green procurement is an essential area to ensure appropriate green home materials to be sourced, which in turn leading towards the development of green home. Tennakoon et al. (2024) supported that the quality of materials shall not be overlooked.

Involvement of well-known developers. One interviewee (H5) suggested that the well-known developers in Sibu take the lead in building green homes, as homebuyers would be more confident in their houses.

We are concerning on the developers... There are a few famous developers in Sibu, such as xxx, xxx, and xxx (three well-known developers in Sibu). Mostly before they (developers) start selling, homebuyers already pre-book (all the sales units), as they (homebuyers) are convinced on the construction quality [H5].

Such finding is in line with Mesthrige and Kwong (2018) who suggested that developers take the leading role in providing information related to green features to homebuyers and sellers. However, there is no legislation exists for developers or contractors to incorporate green technologies in the pre-construction and construction stages. Hence, cooperation between various housing parties inclusive government is essential to ensure the successful of green home implementation in Sibu.

CONCLUSION

This study examined the perceptions of potential homebuyers in purchasing green homes in Sibu. The findings showed that the interviewees were aware of the benefits of green home features, but the green home features may not be their top selection criteria when searching for houses. Financial capability and the quality of green homes are the crucial concerns of potential homebuyers. This study proved that potential homebuyers' green identity would influence their purchasing decision of green homes. Challenges these potential homebuyers face are the lack of green home supply and relevant information related to green features. This study also found that

government incentives and initiatives are the important strategies to promote the supply and demand of green homes in Sibu..

This study acknowledges research limitations. The selected interviewees have a certain level of knowledge and interest in green homes. The findings may not apply to all the states in Malaysia due to the unique land conditions and the income level in Sibu. Travel limitations due to the Covid-19 pandemic caused eight out of nine interviews to be conducted through phone calls. Hence, the authors acknowledge the unstable connection during phone call interviews. Nevertheless, the interview transcripts were verified by the interviewees, who experienced unstable connections during the interview, to ensure the validity and reliability of the transcripts.

This study contributes to the body of knowledge by exploring the unique soil nature in Sibu, with land subsisdence issue, on their preference of green home. Practically, this study could provide insight to local developers and the government to consider the challenges that met by Sibu residents and possible ways of moving forward. If the Sibu housing market could provide green homes, potential homebuyers could have a better chance of securing a more comfortable, safety and healthy living environment. Economically, green homes could facilitate foreign investment by attracting foreigners to purchase properties in Sarawak. Future studies could consider the involvement of supply chain agents, such as developers and contractors, as well as the government, the policy maker, to enhance the implementation of green home in Sibu. Furthermore, the scope of studies could be expanded to whole Sarawak, to provide comprehensive view on green home implemetation.

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