RESEARCH

DETERMINANTS OF INTENTION TO INHABIT ECO-FRIENDLY HOMES IN MALAYSIA

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ABSTRACT

Malaysian housing developers are weighing the costs and benefits of building environmentally-sensitive homes out of concern that the market may not be receptive to such homes. This study aims to examine the determinants of inhabiting intentions of potential homebuyers toward eco-friendly homes. Using a case study of Nusajaya Iskandar Malaysia, a series of quantitative analysis was used to examine homebuyers' intentions to inhabit eco-friendly homes. The results for the survey revealed that a favorable attitude toward eco-friendly homes, high control in the ability to purchase eco-friendly homes, and the self-identification of green consumerism were statistically significant determinants of intention to inhabit such homes. Social referents' opinion relating to eco-friendly homes, however, was not significantly related to inhabiting intentions. Additionally, households of gated-guarded and detached dwellings, higher income and educational attainment, and housing costs were significantly related to the intention of acquiring eco-friendly homes.

KEYWORDS

eco-friendly homes, inhabiting intentions, determinants, Malaysia

1. INTRODUCTION

The Malaysian government has announced a goal of reducing carbon emissions by up to 40 percent of the 2005 levels in terms of emission intensity of GDP by the year 2020 at the United Nations Conference on climate change. In response to this aspiration, the government has taken measures to reduce Malaysia's carbon footprint while enhancing sustainability through the launch of the National Green Technology Policy (Economic Planning Unit, 2010). The issues of sustainability have become more significant in today's building sector because residential and commercial building is one of the largest consumers of energy in Malaysia at about 13% during the period of 2000–2005 (Economic Planning Unit, 2006).

Improving energy efficiency of buildings has been shown to be one of the most effective ways of reducing greenhouse gas emissions (Bond, 2010). Therefore, Malaysian house builders are urged to design houses for sustainable living, aligning with the government's efforts to go green. The building of green homes is one of the key areas of sustainable housing development

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that minimizes degradation to the environment through the use of renewable resources (Tan, 2011a; Halim, 2012).

Houses are considered 'green' when they use environmentally-friendly materials for construction, such as recyclable timber products, recyclable roof systems, recyclable kitchen cabinets, certified energy-efficient appliances, compact fluorescent lamps, and light-emitting diode (LED) lighting systems. Also, green homes aim for zero carbon emissions by using passive design principles and maximizing the use of water saving strategies through the reduction of main water consumption, rainwater harvesting, and greywater recycling (Priemus, 2005; Toowoomba Regional Coucil, 2010)

While eco-friendly homes have been constructed by housing developers in the United States, Europe, and Australia, it is still at an early stage in Malaysia. Even before sustainable housing development became the trend in Malaysia, there were some housing developers who took the bold step forward to build eco-friendly homes. In 2007, Ken Holding (a private housing developer) constructed the country's first green residential property and achieved the Green Mark Gold standard certification from the Building and Construction Authority, Singapore.

Realizing that the country needed its own certification to suit local conditions, the Malaysian government, together with the Association of Architects Malaysia (PAM) and the Association of Consulting Engineers, Malaysia (ACEM) launched the Green Building Index (GBI) in 2009 to help housing builders plan and develop more sustainable buildings (Green Building Index, 2011).

Malaysian housing developers are aware of the changing trends happening around the world, but they generally think the Malaysian market may not be receptive to such homes. There are only a few high-end green housing development projects. Most of these homes cater to the more affluent house buyers who are well acquainted with green development. The greatest challenge in green housing development is that sufficient attention has not yet been given to the mass market. Housing developers generally think that they have a long way to go before they see the construction of such homes on a wider scale. Additionally, they are still weighing the costs and benefits of building environmentally-sensitive homes because many think that homebuyers still prefer to buy conventional homes.

In spite of the potential in the housing market for eco-friendly homes, very little is known about the willingness to own eco-friendly homes in the Malaysian context. Because of the early stage of green housing development in the country, there are not many actual purchasers of eco-friendly homes; therefore, this study only focused on the revealed preference of potential homebuyers to determine the readiness to inhabit eco-friendly homes. In explaining the inhabiting intention of homebuyers, this paper is based on a case study in Nusajaya, Iskandar Malaysia.

This study makes several additional contributions. First, most studies in green building are concentrated in developed countries. Results derived in other cultures and economies may not be transferable; therefore, a detailed analysis of Malaysian homebuyers is required to determine how they differ in perception, opinions, and preferences for eco-friendly homes. Second, this study expands the theory's behavioral intention paradigm by incorporating not just behavioral predictors, but housing and demographic predictors into empirical models. In other words, this paper assesses whether behavioral, housing, and demographic factors show a statistically significant relationship with the intention of inhabiting eco-friendly homes in Malaysia.

2. LITERATURE REVIEW

Sustainable Neighborhood—Nusajaya, Iskandar Malaysia

A universal definition of sustainable development is development that meets the needs of present without compromising the ability of future generation to meet their own needs (World Commission on Environment and Development, 1987). Based on this broad definition, the concept of sustainable housing development has become central not just in environmental protection, but in the consideration of the qualities of neighborhood development that allow households to live contentedly by providing safe and sound neighborhoods with minimum resource exhaustion, environment degradation, cultural interruption and social instability (Choguill, 2008). Nowadays, neighborhoods are actively making changes to become more sustainable, often aiming to promote development that is in line with the principles of economic, social, and environmental sustainability. These three pillars of sustainability play a key role in formulation, implementation, and evaluation of housing and urban policies, housing programs, and development projects. In this respect, all buildings in a sustainable neighborhood should be able to minimize building impact on individual health and the environment during the building's life cycle, through better site location, design, production, operation, preservation, and deconstruction.

The adoption of the low-carbon cities concept has been incorporated in the development plans of many newly planned cities around the world (Feliciano and Prosperi, 2011; Seelig, 2011). In the case of Malaysia, several townships such as Putrajaya, Cyberjaya, and Iskandar are recognized as pioneer townships in green development. The planning of low-carbon Malaysian cities is one of the pro-active sustainable development policies and measures for the voluntary reduction of greenhouse gas emissions, as these cities generally promote the use of renewable energy and advanced green technology.

Nusajaya, one of five development zones within Iskandar Malaysia (Rizzo and Glasson, 2011) is an example of a sustainable neighborhood in Malaysia. Nusajaya, or 'World in One City,' is Malaysia's new low-carbon city spanning almost 24,000 acres of contiguous land (see Figure 1). This socioeconomically- and environmentally-sustainable neighborhood is manifested in diverse signature developments in seven key sectors: Government (*Kota Iskandar*); residential (*Nusajaya Residence*); commercial (*Puteri Harbor*); industrial (*Southern Industrial Logistic Clusters SILC*); leisure (*Medini*); health and wellness (*Afiat Healthpark*); and education (*EduCity*) (see Figure 2).

Inhabiting Intentions

In order to determine the readiness of homebuyers to inhabit eco-friendly homes, it is appropriate to focus on the fundamental mechanism of intent to own eco-friendly homes. Among the behavioral decision-making models used to explain intentions, the theory of planned behavior has been shown to provide an excellent framework for identifying predictors of intention (Ajzen, 1991). This study adopts the Ajzen's behavioral intentions model in the context of purchasing eco-friendly homes. As noted by Ajzen and Fishbein (1980), behavioral intentions are the immediate precursors to behavior that could lead to a particular outcome, and are therefore seen as the predictor of behavior. The strength of intention as a surrogate measure of future behavior was demonstrated in previous studies. Furthermore, purchase intention and actual purchase are positively correlated, particularly for durable goods (Morwitz et al., 2007). In this aspect, measuring intentions to inhabit green homes could be the best predictor

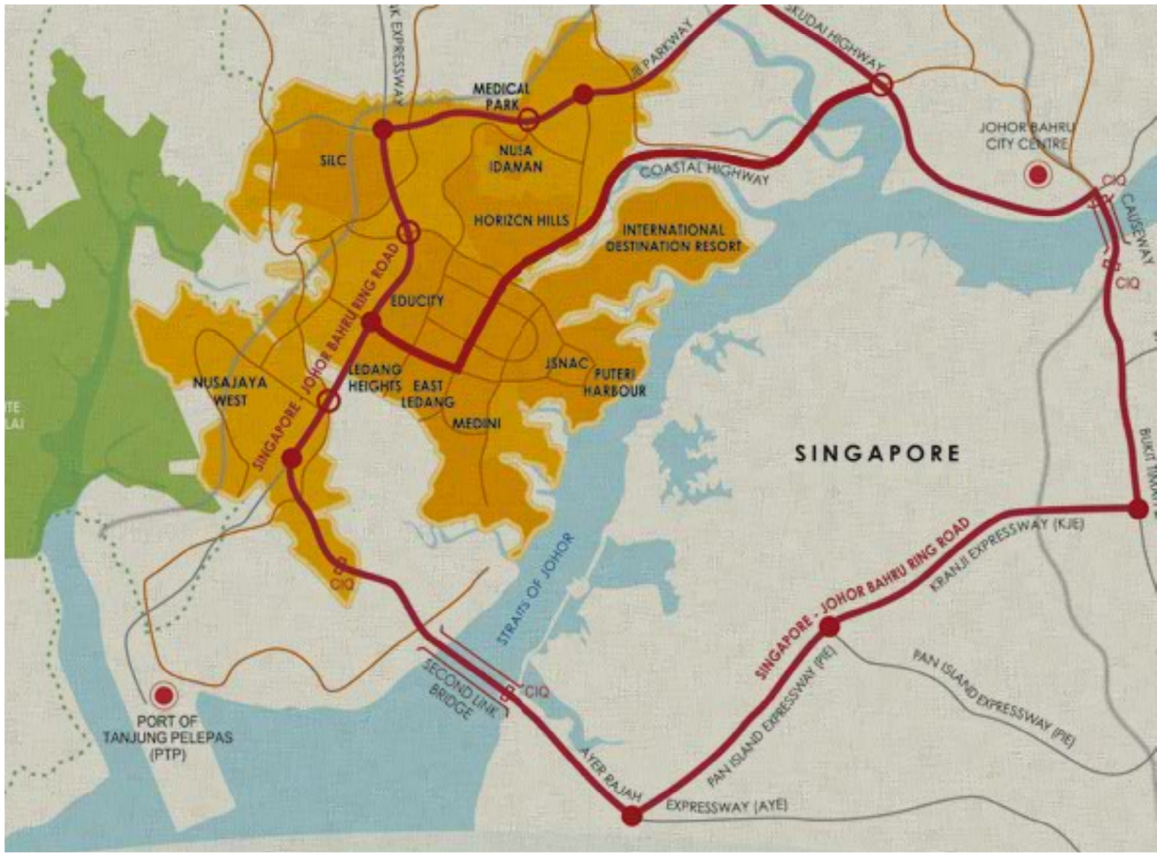
FIGURE 1. Map of Nusajaya, Iskandar Malaysia. Source: http://www.horizonhills.com.my/

in explaining an individual's home choice behavior. Determinants related to intentions to buy frequently help to elucidate why some homebuyers are more likely to live in eco-friendly homes as compared to others. Given the notion that the government wants to actively encourage the construction of green homes, in-depth knowledge of inhabiting intention factors is needed for the efficient promotion of green homes.

Behavioral Determinants

The most common behavioral factor of behavioral intentions is attitude toward behavior, which refers to "the extent to which an individual has a favorable or unfavorable evaluation of the given behavior" (Ajzen, 1991). Attitudes are a function of significant beliefs about the possibility of carrying out a particular behavior. If individuals believe the performance of a particular behavior will direct to a positive outcome, then they will develop a favorable attitude toward the behavior (Ajzen and Fishbein, 1980). In the case of green product purchases, environmental attitudes do play a role on purchase intentions toward environmentally-sound products (Alwitt and Pitts, 1996). Squires et al. (2001) further supported the point that individuals who hold environmental attitudes tend to purchase more green products than those without environmental attitudes. It is therefore reasonable to believe that potential homebuyers of eco-friendly homes who hold favorable attitudes towards eco-friendly homes are more likely to acquire because these homes are designed and constructed by using an environmentally-responsible process that covers the entire life cycle of a building.

FIGURE 2. Seven key development sectors in Nusajaya, Iskandar Malaysia.
Source: http://www.horizonhills.com.my/



An individual might have a favorable attitude toward buying eco-friendly homes; however, intent to inhabit may be affected by the person's belief about social referents' perception and opinion related to green homes. According to Ajzen (1991), the social pressure to perform or not to perform the given behavior is based on the perception of others. The individual's belief about performing the behavior is influenced by whether social referents such as the individual's partner, family, or associates agree or disagree with performing a given behavior. As Oliver and Bearden (1985) explained, behavioral intentions are based on the preferences of the individual's referents and also the individual's desires to act in accordance with these preferences. Thus, the intention of inhabiting eco-friendly homes may depend on the influence of social referents.

The next behavioral factor that is examined is the extent of perceived behavioral control. Perceived behavior control refers to an individual's perception of the simplicity or complexity of performing the given behavior. Perceived behavioral control is dependent on control beliefs that deal with the availability or lack of requisite resources and opportunities for performing a given behavior (Ajzen, 2002). When homebuyers believe that they have little control over purchasing eco-friendly homes owing to a lack of requisite resources and opportunities, then their intentions to acquire these homes may not be strong even though they have favorable attitudes and social referents' support. The significant relationship between perceived behavior control and purchase intent suggests that if the behavior is not completely determined by the

individual's will, then that person will need requisite resources and opportunities to carry over the behavior.

Many recent researchers have proposed an extension of the theory of planned behavior by incorporating the notion of perceived self-identify as a determinant of behavioral intentions (Sparks and Shepherd, 1992; Fielding et al. 2008). Perceived self-identity refers to the significant aspects of a person's self-concept toward executing a given behavior (Rise, et al., 2010; Cook et al., 2002). Sparks and Shepherd (1992) stated that individuals' self-identify is defined in terms of the societal roles that they identify with. Individuals acquire the products that are congruent with their self-identity. When the particular product can satisfy their needs, the preference of that product will mirror their self-identity (Koklic et al., 2009). In the case of green product purchases, the variable of perceived self-identify is related to how individuals consider themselves as environmentally-conscious consumers. According to Grunert and Juhl (1995), environmentally-concerned consumers are concerned with the production, distribution, use, and disposal of products. As a result, environmentally conscious and concerned consumers generally have higher intentions as compared to individuals who do not identify themselves with these characteristics (Davies et al., 1995).

Housing Determinant

There are tenure choice literatures to study determinants relating to the propensity to own. Although there are no specific studies in the Malaysia context that examined housing determinants of the intention to own eco-friendly homes, these determinants may cause differences in how potential homeowners view the intention of inhabiting eco-friendly homes. We address this gap in the literature by assessing whether housing determinants, as defined by types of housing structure and property types, exhibit statistically significant relationships for owning eco-friendly homes.

According to Tan (2008), the physical structure of the house could be important in explaining the motivations of home owners. The common types of houses in Malaysia are link houses, semi-detached, detached houses, and apartment and condominium. Generally built-up areas of terrace, semi-detached and detached houses are larger than high-rise apartments. It is interesting to examine the influence of types of housing structure on inhabiting intentions, especially since the Malaysian government has recently taken further steps by requiring owners of semi-detached and detached residential units must put in place a sustainable living features system, such as a system for harvesting rainwater.

When planning for sustainable housing development projects, housing developers need to ascertain the housing needs of the target groups. Providing a house that suits homebuyers' preferences is a great challenge to housing developers because their preferences are constantly changing. Nowadays, homebuyers in Malaysia prefer gated-guarded neighborhoods when it comes to the matter of living in a safe and secure condition. The most major underlying reason why homebuyers want the added security features of gated-guarded homes is probably because they would like to secure peace of mind in dealing with the rampant break-ins in Malaysia's urban area (Tan, 2011b). Achieving sustainability goes beyond merely greening the environment in the neighborhood, it incorporates efforts to create a place for quality living. Being free from crime is necessary to improve the quality of life for homebuyers; therefore, personal safety issues become one of the main priorities for homebuyers when looking for a new home. A house is no longer just a dwelling. It is now described as a lifestyle or space to reflect the owner's personality, self-image, and character (Tan, 2010). Since living in the gated

and guarded communities has become more and more popular, it is highly recommended that housing developers should consider gated and guarded eco-friendly homes in their housing development plans. As pointed by Tan (2011b), homeowners are willing to pay 18.1% more to live in a gated and guarded neighborhood. It is interesting to examine whether homeowners who like to enjoy a good quality of life without worrying about their safety are more likely to own eco-friendly homes marketed under the concept of gated and guarded community.

Socio-Demographic Determinants

There is no longer a mass housing market or even several large housing markets. Instead, the housing market is sectioned into various segments that reflect different economic and demographic characteristics. There are well-established literatures to study socio-demographic determinants relating to the propensity of owing a house. Many researchers found that homeownership decisions are related with household income, education, the age of the head of household, marital status, and gender (Bramley and Karley, 2007; Santiago et al., 2010; Baskerville, 2001; Tan, 2012a; 2012b). Although there is no work being performed to examine socio-demographic determinants relating to the intention of inhabiting eco-friendly homes, hypotheses are developed to assess whether these socio-demographic descriptors appear to be significant determinants of intentions to inhabit eco-friendly homes.

Owner-occupied housing is often of better quality and more expensive than rented housing. As a result, the preference for homeownership is more prevalent among homeowners than among renters. As such, it could be hypothesized that homeowners are more likely to acquire eco-friendly homes.

Household income is also appropriate when estimating the intention of owning eco-friendly homes. It is reasonable to believe that a higher income may raise the likelihood of owning an eco-friendly home, based on the assumption that an increase in earning capacity raised the demand for housing. Furthermore, higher income signals the homebuyer's ability to purchase a property (Santiago et al., 2010). In addition to household income, the probability of owning eco-friendly homes is affected by the education level of potential homeowners. It is because more highly educated homebuyers may be willing to pay more for greater quantities and qualities of housing (Bramley and Karley, 2007; Tan, 2012b).

Most tenure choice literatures showed how the changes in the probability of home owning are affected by the age of households. The homeownership rate goes up systematically when age of the head of household increases. In fact, age decides the differences in life-cycle pattern of housing consumption because households who are at the beginning of their life cycle have different housing preferences and consumption patterns as compared to those who are older. Numerous studies have indicated that households between the ages of 35 to 45 are more likely to have higher housing consumption (Crabb, 2002). In the case of environmentally-sound products, it is expected that higher age groups are more likely to buy eco-friendly homes. According to Robinson and Smith (2002), the core purchasers of environmentally-sound products are somewhat older than the general population.

Additionally, numerous studies have showed that married households may be more likely to own a home (Grinstein-Weiss et al. 2011; Baskerville, 2001). Although there is no empirical work being conducted to investigate the relationship between the intention of buying eco-friendly homes and marital status, it is assumed that households who are married are more likely to acquire an eco-friendly home, based on the belief that married households exhibit a strong dedication to environmental issues (Robinson and Smith, 2002).

In addition to family life cycle variables, males are expected to have a positive relationship with the propensity to own eco-friendly homes. It is normally expected that male heads of household tend to have higher ownership rates based on the notion that males have a higher and more stable source of disposable income (Haurin and Kamara, 1992). Previous studies also showed that housing costs influence the decisions of households to become homeowners (Bourassa, 1995; Yamashita, 2007) because high housing costs prevent homebuyers from purchasing the optimal amount of housing. According to Kim (2012), some of the lowest homeownership rates are in the richer countries, partly because of the higher costs of homeownership in these countries. In this study, the percentage of monthly household income spent on the consumption of housing, as a measure of housing costs, is used to test whether the significant effect is present for variations in the inhabiting intention of eco-friendly homes.

Hypotheses

Giving the preceding discussion, the following hypotheses and relationships were developed:

H1: Behavioral determinants, as defined by a favorable attitude towards eco-friendly (EA), social referents' influence (SP), perceived behavioural control (PBC), and perceived self-identity (PSI), are significant predictors of intentions to inhabit eco-friendly homes.

H2: Housing determinants, as defined by types of housing structure and property types, exhibit statistically significant relationships for inhabiting intentions of eco-friendly homes.

H3: Socio-demographic determinants (tenure choice, household income, age, education attainment, marital status, gender, and housing costs) appear to be significant determinants of intentions to inhabit eco-friendly homes.

3. METHODOLOGY

Data Collection Method

This survey was designed to measure the perception of respondents in terms of intention to inhabit eco-friendly homes. The respondents who are qualified to take part in the survey are potential homebuyers who are interested in new residential housing projects in Horizon Hills, one of the residential enclaves in Nusajaya. As pointed out earlier, Nusajaya Iskandar has been identified by the Government of Malaysia as a low-carbon city. Horizon Hills was selected because this residential neighborhood offers various types of environmentally-sustainable homes including terrace, semi-detached, and detached housing developments. The findings of this study could present a good case study to other low-carbon cities in the country.

In this study, respondents were invited to view the show house units by one of the leading real estate agencies specializing in marketing residential properties on the secondary market in Horizon Hills, Nusajaya. These display units at several locations are heavily promoted in the media to attract a large number of potential buyers. This marketing strategy is commonly designed and used by real estate agencies to sell their residential properties in Malaysia.

In an effort to create reliable and valid responses from respondents who do not have adequate understanding about eco-friendly homes, an introductory cover letter was attached to explain the features of environmentally-sustainable homes. Some Malaysians might have heard of eco-friendly homes but do not know that eco-friendly homes could lead to energy and water efficiency and better indoor environment.

Sample

In this study, surveys were sent to 450 potential homebuyers. Only 250 returned completed survey, a response rate of 56%. The socioeconomic profile of the respondents that participated in the study accorded with those of Nusajaya, Iskandar residents.

Variables Used in the Study

The measures of behavioral variables were adapted and modified from measures contained in Ajzen (1991), Ajzen (2002), Sparks and Shepherd (1992), Fielding et al. (2008) and Khalil et al. (2008) using a 7-point Likert scale: 1 for 'strongly disagree'; 2 for 'disagree'; 3 for 'somewhat disagree'; 4 for 'neutral'; 5 for 'somewhat agree'; 6 for 'agree'; and 7 for 'strongly agree'. The attitude variable was developed to provide an overall measure of attitude about acquiring environmentally-sensitive homes. Social influence questions were asked to determine how significant the role of others was in relation to owning eco-friendly homes. Perceived behavior control was measured by asking households how confident and easy they felt about their ability to acquire eco-friendly homes. The variable of perceived self-identify was also constructed to gauge the identification of environmental consumerism. Finally, intention items were developed by determining the intention of potential homebuyers to own eco-friendly homes in the future.

As indicated earlier, green home inhabiting intentions may tend to vary by socio-economic status of homebuyers and housing characteristics. Table 1 shows a summary of demographic and housing variables used in the study.

TABLE 1. Definition of Housing and Socio-Demographic Descriptors.

Variables	Descriptive
Home	The respondent is the homeowner
Males	The respondent is male
Age < 30	The age of the respondent is less than 30 (ref group)
Age 30–45	The age of the respondent is between 30 and 45
Age > 45	The age of the respondent is above 45
Primary	The education attainment of the respondent is primary (ref group)
Secondary	The education attainment is secondary
Tertiary	The education attainment is tertiary
Married	The respondent is married
3000	The monthly income is less than RM 3000 (ref group)
3000–8000	The monthly income is between RM 3000 and RM 8000
8000	The monthly income is more than RM 8000
Housing cost	Percentage of household income on the monthly housing expenditure
G & G	The respondent lives in gated-guarded community
Apartment	The respondent lives in apartment (ref group)
Terrace	The respondent lives in terrace house
Semi-detach	The respondent lives in semi-detached house
Detached	The respondent lives in detached house

Statistical Methods

A series of statistical techniques were performed to measure homebuyers' intentions to inhabit eco-friendly homes. Confirmatory factor analysis (CFA) was conducted to manifest a construct with multiple indicator variables by determining reliability and validity of the items used. Later, all the items which had been identified as having the same underlying pattern were grouped together to create the composite-mean values of constructs. In this study, the composite indices of behavioural and intention variables together with housing and social-demographic variables (mostly measured in a dichotomous code) were used to perform regression analysis to estimate the coefficients of behavioural, housing, and households' socio-demographic determinants on the intention of inhabiting eco-friendly homes.

4. RESULTS AND DISCUSSION

Confirmatory Factor Analysis

In this paper, construct reliability (CR) and convergent validity (VE) were used for the measurement quality. As revealed in Table 2, the CR and VE for each construct were more than 0.7 and 0.5 respectively, signifying sufficient reliability and validity of the measurement used. Referring to the results from VE, discriminant validity could be measured. According to Fornell and Larcker (1981), the average variance expected (AVE) of the selected two constructs must be more than the square of the correlations between these two constructs. In this study, all AVEs were more than the respective square of correlations. Therefore, the constructs proposed had discriminant validity, indicating that all constructs were distinctive but correlated with one another. There was a clear suggestion that the latent variables of respective hypothetical items were converged in their respective factors.

As shown in Table 2, the environmental attitude construct was composed of five questions. Of the five questions, the question "sustainable living features of eco-friendly homes are useful" was the most significant statement with a loading of 0.901. The next highest statement was "eco-friendly homes that meet Green Building Index (GBI) standards are favourable" with a factor loading of 0.861. This was then followed by "eco-friendly homes are beneficial because these homes may enhance our quality of life without sacrificing the internal comfort of the occupants," "eco-friendly homes are valuable because these homes are developed and constructed using environmentally friendly processes," and "eco-friendly homes are sensible because these homes may not have a negative impact on the environment" with factor loadings of 0.857, 0.825 and 0.822, respectively.

The second construct of behavioral determinant was referred to as "social referent" and consisted of "I intend to follow the advice of my friends that I should own eco-friendly home," "my friends would recommend that I should own eco-friendly home," and "most members of my family would expect me to own eco-friendly home," with factor loadings of 0.901, 0.893, and 0.822, respectively.

The perceived behaviour control construct comprised survey items relating to potential homebuyers' confidence in their ability to acquire green housing. Questions like "I feel a great deal of confidence about my ability to own eco-friendly home," "I have a great deal of control in terms of resources and opportunities over whether I can own eco-friendly home," and "It is very easy to own eco-friendly home" were associated with the ability to own an eco-friendly home and had factor loadings of 0.778, 0.768, and 0.761, respectively.

TABLE 2. Psychosocial Variables after Confirmatory Factor Analysis.

	Construct	L	VE	CR
	Environmental Attitudes (EA)		**0.729**	**0.931**
B4	Eco-friendly homes are valuable because these homes are developed and constructed using environmentally friendly processes	0.825		
B5	Eco-friendly homes are sensible because these homes may not have a negative impact on the environment	0.822		
B6	Eco-friendly homes that meet Green Building Index (GBI) standards are favourable	0.861		
B7	Sustainable living features of eco-friendly homes are useful	0.901		
B8	Eco-friendly homes are beneficial because these homes may enhance our quality of life without sacrificing the internal comfort of the occupants	0.857		
	Social Referents (SP)		**0.762**	**0.905**
C1	Most members of my family would expect me to own eco-friendly home	0.822		
C2	I intend to follow the advice of my friends that I should own eco-friendly home	0.901		
C3	My friends would recommend that I should own eco-friendly home	0.893		
	Perceived Behaviour Control (PBC)		**0.591**	**0.813**
D2	I have a great deal of control in terms of resources and opportunities over whether I can own eco-friendly home	0.768		
D3	It is very easy to own eco-friendly home	0.761		
D5	I felt a great deal of confidence about my ability to own eco-friendly home	0.778		
	Perceived Self-Identity (PSI)		**0.711**	**0.881**
E1	I think I will engage in environmentally friendly and ethical behaviors owing to moral concerns	0.819		
E2	Engaging in environmental activities is an important part of who I am	0.884		
E3	I think of myself as someone who is very concerned with environmental issues	0.826		
	Intention (I)		**0.728**	**0.889**
F2	I am planning to inhabit eco-friendly home in future	0.821		
F4	I will try to acquire eco-friendly home in future	0.880		
F5	I will make an effort to own eco-friendly home in future	0.858		

Three measures of perceived self-identity were constructed. The first consisted of the statement "engaging in environmental activities is an important part of who I am," with a loading of 0.884; the second consisted of the statement "I think of myself as someone who is very concerned with green issues," with a loading of 0.829; and the last statement was "I think I will engage in environmentally friendly and ethical behaviour owing to moral concerns," with a loading of 0.819.

The construct of inhabiting intention was measured by using the questions "I will try to acquire eco-friendly home in the future," "I will make an effort to own eco-friendly home in future," and "I am planning to inhabit eco-friendly home in future," with factor loadings of 0.880, 0.858, and 0.821, respectively.

Behavioral constructs that were attained from confirmatory factor analysis later led to the creation of various mean-composite indices. All these indices were used as proxies for the construct of environmental attitudes, social referents, perceived behavior control, perceived self-identify, and inhabiting intention.

Regression Analysis

In order to assess whether regression equations suffer from the violation of normality assumption, residual scatterplots were examined. From the scatterplot of residuals, the normality assumption of regression estimates was satisfied. The following table (Table 3) presents results of three regression models. The first model was to determine the intention of inhabiting eco-friendly home solely based on the effect of housing and socio-demographic determinants, while the second model only examined the effect of behavioral determinants on the intention.

TABLE 3. Regression results.

	Model 1		Model 2		Model 3	
	B	t	B	t	B	t
Constant	4.560	12.545	0.186	0.515	1.222	2.564
Males	0.068	0.547			0.153	1.429
Homeowners	0.430**	3.201			0.144	1.186
Age 30–45	0.439**	3.008			0.206	1.393
Age > 45	0.615**	3.739			0.207	1.616
Married	–0.053	–0.413			–0.005	–0.043
Secondary	0.090	0.501			0.096	0.627
Tertiary	0.406*	2.430			0.339*	2.350
3000–8000	0.271	1.420			0.383*	2.232
> 8000	0.530**	2.639			0.387*	2.338
Housing cost	–0.052**	–6.390			–0.041**	–5.738
Terrace	0.092	0.588			0.016	0.119
Semi-detach	0.212	1.218			0.051	0.343
Detached	0.471*	2.575			0.342*	2.165
G & G	0.483**	3.961			0.349**	3.295
EA			0.384**	6.478	0.270**	4.525
SP			0.026	0.465	0.021	0.415
PBC			0.235**	4.406	0.189**	3.864
PSI			0.294**	5.057	0.242**	4.517
Adjusted R^2	0.363		0.402		0.533	
Std error est	0.91686		0.88879		0.78493	
F	11.148		42.788		16.810	

*p < 0.05; ** p < 0.01; Dependent variable: Inhabiting Intentions of Eco-Friendly Homes (PI)

The last model included both housing and social-demographic and behavioral determinants as exogenous variables for the prediction of behavioral intentions. The results revealed that the explanatory power of the third model was 53.3 percent of the variance in intention as compared to the first and second models with 36.3 percent and 40.2 percent, respectively. Most of the signs of the effects of determinants are consistent and expected.

The Effects of Behavioral Determinants on the Inhabiting Intention

As expected, environmental attitude toward eco-friendly homes was a statistically significant determinant of intention of inhabiting eco-friendly homes at the 0.01 level with and without taking housing and socio-demographic characteristics into consideration. This finding reinforced the proposition that respondents with favorable attitudes toward green features such as resource efficiency and environmental conservation, are likely to intend to acquire green homes. In line with the work of Alwitt and Pitts (1996), this finding has supported the relationship between attitude and behavioral intentions, showing that environmental attitudes may play an important role on the purchase intention of environmentally-sensitive products. Additionally, Squires et al. (2001) reinforced that consumers who hold favorable environmental attitudes purchase more environmentally-sound products than those without favorable attitudes.

However, the relationship between social pressure from others and intentions in both model 2 and model 3 was not supported. Social referents' influence was not a significant determinant of behavioral intentions, suggesting the family and friends' opinions may not have a great impact on the prediction of intention to reside in green homes. In this study, the willingness to live in green and sustainable homes may not be encouraged even if potential buyers perceive that their family and friends support the behavior. This finding is similar to the study of Raisbeck and Wardlaw (2009). They showed that other people's opinions are not a major motivating factor to encourage homebuilders to build a sustainable home in Australia.

In line with the findings of Fielding et al. (2008) and Nigbur (2010), individuals are more likely to enact behaviors where they have full control of the behavior. In the case of eco-friendly homes, if respondents think they possess resources and opportunities, they are more likely to have a higher degree of intent even though they may not have the intention to acquire a green home. The perception about how difficult it is to perform the given behavior is subject to price of that particular product (Ajzen, 1991). Like most things, efforts toward sustainable development come at a cost. It is reasonable to believe that price may have the potential to limit or even prevent homebuyers from acquiring eco-friendly homes.

Nevertheless, it is a common misconception that green buildings are expensive. According to Bond (2010), the additional cost of building a green building was only 1–2% more compared to a non-green building. It is only expensive if designers and architects ignore the climatic and environmental factors which require greater consideration of artificial lighting, cooling, and high-performance facades. As mentioned earlier, the interviewers were able to offer a full clarification about any doubts that arose concerning eco-friendly homes. Therefore, the respondents of this survey understood that eco-friendly homes do not always require high-tech gadgetry. The emphasis of eco-friendly homes is placed on passive solutions such as insulation, shading, and glass, which maximize natural lighting and cross ventilation of the building. In fact, green cost as a perceived barrier is slowly being reduced as the needed technology, materials, knowledge, and skills of constructing eco-friendly homes become more readily available and price-competitive; therefore, owning green and sustainable homes does not necessarily have to be expensive.

As shown in both model 2 and 3, individuals who are environmentally-conscious consumers had more intentions compared to those who did not identify with these characteristics, suggesting that respondents' environmental concerns have an impact on behavioral intentions toward eco-friendly homes. The expression of perceived self-identity might embody moral and ethical concerns. Environmentally-conscious consumers are likely to have adopted an ethical lifestyle by consuming environmentally-friendly, ethical, fairly-traded, and pro-environmental products. Previous research has found that buyers of environmentally-sound products are more likely to undertake environmentally-friendly and ethical behaviors (Honkanen et al. 2006; Carrigan et al. 2004).

The Effect of Housing and Socio-Demographic Determinants on the Inhabiting Intention

The estimation results for model 1 and 3 showed that there was a positive relationship between the intention of inhabiting eco-friendly homes and households who live in gated-guarded housing schemes, indicating respondents who live in gated communities are more likely to have a higher degree of purchase intent. It seems that respondents of gated-guarded communities still consider the security situation when looking for eco-friendly homes to buy.

In relation to the determinant associated with the housing type, households of detached houses in the survey are statistically significant related to the intention of inhabiting eco-friendly homes. The recent announcement by the government to install sustainable living features in the houses seems to be accepted by respondents who live in detached houses. However, the willingness to acquire was not observed for households of terrace and semi-detached houses, suggesting the government should generate more awareness of sustainability of green homes among them.

As shown in model 3, the influence of socio-demographic determinants on the intention of inhabiting eco-friendly homes was limited. Of family life cycle variables, only monthly household income and households with tertiary education background were statistically significant in this study. In the present study, intended purchase of eco-friendly homes was not significantly related to marital status, tenure status, age, low educational attainment, and gender.

The previous studies revealed that income appears to be a significant determinant in explaining the decision to own a house. In this study, the monthly income of the household head had significant and positive coefficients on the inclination to inhabit eco-friendly homes, all other factors being constant. The results for model 3 showed that the coefficient of respondents who earned above RM 8,000 was higher than the coefficient of the household income between RM 3,000 and RM 8,000, which reinforces the economic aspect of consumption of durable goods. As far as model 1 is concerned, only the income coefficient for households who earned more than RM 8,000 per month was significantly related to the intention of inhabiting eco-friendly homes. Both models appeared to support the notion that higher income yields higher likelihoods of going green.

In addition to household income, the influence of the increase in educational attainment of the respondent was an important determinant of buying intentions of eco-friendly homes. In this survey, respondents with tertiary education had a stronger intention to purchase eco-friendly homes, as many studies confirmed the principle that more highly-educated households might be more likely to pay for environmentally-sensitive products.

With regard to male household, it is interesting to notice that the changes in the probability of inhabiting eco-friendly homes are not affected by gender. In the present study, the likelihood of buying eco-friendly homes did not differ for the change in tenure status, all other things being equal. However, the coefficient was significant in the model without controlling for behavioural determinants. Contrary to the finding of Robinson and Smith (2002), marital status and older households were not significant to add to the prediction of intention of environmentally-sound product in model 3.

The estimation results in Table 3 revealed that, holding all other factors constant, housing cost appeared to be the most significant determinant of inhabiting intention in the eco-friendly homes context. Recently, the Central Bank of Malaysia introduced stricter lending guidelines that substantially reduced the quantum of loan an individual could apply for. The implication of the guideline is that households may need to spend more on housing consumption in terms of the percentage of monthly income as the amount of loans households can obtain from financial institutions will be much lower.

5. CONCLUSIONS AND RECOMMENDATIONS

One might possibly be enticed to raise the question on why accentuation is being placed on eco-friendly homes. This is because there will come a point where it becomes completely unsustainable to live the way we are all living now. Furthermore, there are some challenges involved in developing a green residential project in the country even though the Malaysian Green Building Index (GBI) was established three years ago. One of challenges is to promote the knowledge and understanding of green building amongst industry players. The motivation of this study is to present an invaluable insight into other green residential development in the country. Additionally, housing developers may benefit from this study as they may have a clearer understanding of inhabiting intentions of eco-friendly homes.

Eco-friendly homes are not just about the physical house being green. The concept of green homes requires a fundamental shift in attitudes and change in our habits. As shown in the results, a favorable attitude toward eco-friendly homes is a significant predictor of green home buying intentions. Attitudes put people into a particular frame of mind—liking or disliking things, and moving toward or away from them. The more positive or favorable attitude toward green homes, the more likely the person will be to inhabit these homes.

The results also showed that respondents are more likely to purchase eco-friendly homes when they have resources and opportunities. In order to increase the accessibility of green and sustainable homes in the market, the government should provide subsidies for some green products and technologies so that the cost of building green housing will be reduced, and this in turn will reduce the price of green and sustainable homes. Furthermore, incentives such as tax exemptions on interest paid on mortgages should be given to house buyers who purchase green and sustainable homes. Malaysia still faces hurdles because some housing developers have concerns that going green is expensive. In response to high green-development costs, developers should put efforts into fine-tuning the basic design or passive design to reduce reliance on high-technology products. For example, passive design reduces heat gain by incorporating high roofs, thinner rooms for better cross-ventilation, low-emission glass, and larger eaves to prevent excessive exposure to sun and rain. Additionally, a house that has the green features of insulated walls, good noise insulation blocks, and aerated bricks can help prolong and extend the life of sustainable homes.

Perceived self-identity is another significant determinant of behavioral intentions of purchasing eco-friendly homes. It is advisable for housing developers to use a promotional concept that is related to the expression of self-identity among house buyers. These actions not only build a positive attitude toward green and sustainable homes, but also create the need to reflect their identities by owning them. The government and housing developers need to get house buyers to think about and feel good about their purchases, in the hope that green homes will be so healthy and exciting that every house buyer will not want to purchase any other type of housing. Answering the green and sustainable call requires a collaborative effort from the different parties (Tan, 2011a). Housing builders should contribute to the efforts by creating awareness through information and education. They should take the lead in raising awareness about the attributes of green and sustainable homes. It is vital to raise awareness among potential homeowners by increasing the visibility of green homes and this in turn would push house buyers to go green.

The findings also indicated that households of gated-guarded and detached dwellings, higher income and educational attainment, and housing costs were significantly related to the intention of acquiring eco-friendly homes. It is reasonable to believe that potential homebuyers will become more and more conscious of what they are buying, especially since there are house buyers who do not just demand a typical house to stay in, but also a comfortable dwelling that does not compromise the environment.

Although there are many initiatives and programs to promote greater green awareness and practices locally, there is still a need for more practical solutions to be adopted among house builders. The government should look into promoting green practices by providing guidelines, frameworks, and clear policies. Additionally, incorporating certain green requirements into housing development projects should be made mandatory by law and other building legislation.

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