Predicting & Explaining Intention to Adopt Green Concepts among Housing Developers

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Abstract:

This study aimed to determine the factors that predict the behavioral intentions to adopt green concepts among housing developers using the TPB model. This study adopted quantitative approach with a complementary qualitative data collection procedure. A total of 87 cases were collected from questionnaire survey. Correlation analysis showed that intention to adopt green concept was correlated most strongly with PBC ($r = .713$, $p < .01$) and subjective norm ($r = .606$, $p < .01$) and less strongly with attitude ($r = .584$, $p < .01$). Regression model was statistically significant, $F(3, 83) = 57.11$, $p < .001$, and accounted for approximately 67% of the variance of intention to adopt green concepts ($R^2 = .67$). PBC was found to be the best predictor ($\beta = .45$, $p < .001$), followed by subjective norm ($\beta = .34$, $p < .001$) and attitudes ($\beta = .25$, $p < .01$). Conclusion and limitation of this study were also discussed.

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1. Introduction

Housing industry plays a vital role in providing sanctuary,
employment and infrastructure to the nation. Apart from
fulfilling shelter demand, it also serves as a major impetus in
stimulating economic growth of the country. Nonetheless,
construction activities have its own share to various negative
impacts on physical landscape such as soil erosion and
sedimentation, flash floods, dust pollution and depletion of
natural resources (CIDB, 2007). In addition, the construction
industry is the largest greenhouse contributor that is
approximately 40% of total greenhouse gas emissions (Wahida,
2013), hence giving rise to an outcry for a more environmentally
responsible approach. Responding to the call, Malaysia's
homegrown green building rating named Green Building Index
(GBI) was launched on 21 May 2009 to provide green grading
and certification of local buildings. GBI is based on six criteria
namely energy efficiency, water efficiency, indoor environment
quality, sustainable site planning and management, materials
and resources as well as innovation. Recently in April 2013, the
Real Estate and Housing Developers Association of Malaysia
(REHDA) has launched its own version of green building and
carbon rating tool named Green Real Estate or GreenRE, which
gives industry players an alternative green tool in terms of
more affordable rates and flexible assessment criteria. At
present, these green building assessment tools are voluntary
rather than mandatory to allow organisation to have more
flexibility in their business operations. Although developers are
showing interest in sustainable construction, the number of
green projects is still small. Abidin (2010) found that generally
construction developers are aware about sustainable concept.
However, the awareness did not translate into an industry wide

implementation. In order to increase the uptake of sustainable construction, identification of the variables most likely to predict intention to adopt green concepts is needed. In specific, this study attempted to determine the predictability of TPB constructs on the intention to adopt green concepts.

According to TPB (Ajzen, 1985, 1991), intention is the immediate antecedent of behaviour. As people formulate their intentions, they tend to take into account three factors namely attiude toward the behaviour, subjective norms and perceived behavoural control (PBC). Attitude refers to the overall favourable or unfavourable appraisal of the expected outcomes of performing the behaviour. Subjective norm represents to the extent of perceived social pressure to perform the behaviour. PBC is defined as the perceived ease or difficulty of performing the behaviour. Behavioural intention refers to an individual's motivation and readiness to perform a behaviour. TPB postulates that more favourable attitude and subjective norm as well as the greater the PBC, the stronger an individual's intention to perform the behaviour under consideration. The TPB model has widely been used in predicting pro-environmental behaviour (Bamberg, 2003; Chen & Tung, 2014; De Groot & Steg, 2008; Gardner & Abraham, 2010) and received strong empirical support in explaining intention and actual behaviour. Several meta-analyses between years 2003 to 2011 indicated that the TPB explained approximately 40-52% and 19-36% of the variance in intention and behaviour respectively.

2. Methods

This study adopted quantitative approach with a complementary qualitative data collection procedure. As priority is devoted to the former, all design phases such as introduction, literature review, purpose statement and research methods are presented from the framework and language of

quantitative approach. Specifically, this study consists of two phases, beginning with collection and analysis of quantitative data. This is then followed by collection and analysis of qualitative data, which aims to refine and explain those statistical results by exploring participants' views in more depth (Tashakkori & Teddlie, 1998). Finally, the quantitative and qualitative portions of this study were integrated during the data interpretation phase.

For quantitative phase, the cross-sectional survey design was used where data was collected via self-administered questionnaires. Samples were drawn from members of Real Estate and Housing Developers' Association Malaysia (REDHA) in Klang Valley, Malaysia. The unit of analysis was project managers who worked at the 355 developer organisations. A total of 87 cases were collected, yielding a response rate of 24.5 percent. Low response rate is a norm for questionnaire survey conducted among construction professionals in Malaysia with 5-15 percent deemed as the typical range (Idrus, Hashim & Farah, 2008). Participants ranged in age from 24 to 67 years with most of them in the age bracket of 31-40 (39.1 percent) and 53.5 percent had a Bachelor degree qualification. In terms of tenure status, approximately 41 percent of the participates were attached to their resent organisation between 2 to 5 years and about 53 percent were in current position between 2 to 5 years.

The design of the questionnaire was based on the guidelines suggested by Ajzen (2006), Fishbein & Ajzen (2010) and Francis et al. (2004). *Attitudes* was assessed using the stem Overall, my organisation think that adopting green concepts in future housing projects is ….." followed by nine bipolar adjectives with a response scale ranging from 1 to 7 with the following endpoints: *bad idea-good idea, not important-very important, useless-useful, worthless-valuable, unnecessary-necessary, unexciting-exiting, foolish-wise, unproductive-productive* and *detrimental-constructive* (α = .95). *Subjective*

norm was assessed by means of seven items with responses ranging from 1 to 7. Example of items are 'Most people who are important ot my organisation think that my organisation should adopt green concepts in future housing projects' (*1 – strongly disagree, 7 – strongly agree*) and 'Most organisations like us are going to adopt green concepts in future housing projects' (*1 – extremely likely, 7 – extremely unlikely*). The Cronbach's alpha for this construct was 0.76. *Perceived behavioural control* (PBC) was measured using means of seven items with responses ranging from 1 to 7. Example of items include 'My organisation is confident that it could adopt green concepts in future housing projects if it wanted to' (*1 – strongly disagree*, *7 – strongly agree*) and 'My organisation believes that it has the ability to adopt green concepts in future housing projects' (*1 – strongly disagree, 7 – strongly agree*). This measure had an internal consistency of $\alpha = 0.74$. Finally, *intention to adopt green concepts* was captured using four items with internal consistency of $\alpha = 0.97$. Example of item is 'In my opinion, my organisation plans to adopt green concepts in future housing projects' (*1 – strongly disagree, 7 – strongly agree*).

As for the qualitative phase, respondents were identified through the last question in the survey questionnaire that solicited their willingness to participate in the second phase of the study. From the respondents that returned the questionnaire, only 8 of them were willing to participate in the qualitative phase. The final interviewees were 5 with 3 withdrawn from the study due to busy work schedules. Semi-structured interview was used as it allows respondents some degree of freedom to discuss issues of interest or important to them despite being guided by a list of a general set of questions (Hesse-Biber & Leavy, 2011). A list of predetermined questions has been devised to gain respondents views and opinions regarding the issue of green housing. The design of the interview protocol was based on research framework that

surrounds the research questions as well as the outcome of quantitative analyses. All interviews were conducted under face-to-face conditions and each session generally ranged from thirty to forty minutes.

3. Results

3.1   Survey Findings

Table 1 Correlations Among Variables

	1	2	3	4	Mean	SD
1. SN	-				4.41	.64
2. PBC	.412**	-			4.91	.87
3. Attitude	.321**	.494**	-		5.27	.95
4. Intention	.606**	.713**	.584**	-	5.03	1.23

Notes: SN = Subjective Norm; PBC = Perceived Behavioural Control; SD = Standard Deviation

** $p < .01$ (2-tailed)

Table 2 Prediction of Intention to Adopt Green Concepts

Predictors	B	SEB	β
(Constant)	-2.699	2.470	
Attitude	.331	.042	.254*
Subjective Norm	.652	.076	.340**
PBC	.633	.061	.448**

Note: n = 87. R^2 = .674; F(3, 83) = 57.114, * $p < .01$, ** $p < .001$.

From Table 1, it is shown that intention was strongly correlated with attitudes, subjective norm, BC. Intention to adopt green concept was correlated most strongly with PBC ($r = .713$, $p < .01$) and subjective norm ($r = .606$, $p < .01$) and less strongly with attitude ($r = .584$, $p < .01$). Intention to adopt green concepts was then regressed on attitude, subjective norm and PBC toward the adoption of green concepts. The prediction model was statistically significant, $F(3, 83) = 57.114$, $p < .001$, and accounted for approximately 67% of the variance of intention to adopt green concepts ($R^2 = .674$). The percentage obtained is slightly higher than 52 percent reported by

Bamberg & Moses (2007) in their meta-analyses and 60 percent limit predicted by Fishbein & Ajzen (2010). Based on the guideline suggested by Nuijs (2004), the regression model strongly fits the data and all three variables contributed significantly to the explanation of intention to adopt green concepts. The beta values suggested that PBC was the best predictor (β = .448, p < .001), followed by subjective norm (β = .340, p < .001) and attitudes (β = .254, p < .01). In other words, higher level of PBC, higher level of subjective norm and more positive attitude toward green concepts tend to increase organisations' intention to adopt green concepts in future housing projects. The model can be defined as the equation below:

Intention to adopt green concepts = -2.699 + .331(Attitude) +.652(SN) + .633(PBC)

3.2   Interviews

Qualitative method was used to gain more insight on the underlying beliefs and processes that play an important role in behavioural intention towards green concept. In-depth interviews reviewed that informants unanimously agreed that green was a good idea and useful idea. However, not all green concept features are suitable across different residential projects. A couple of project managers raised their concern about the ability of consumers to maintain green properties. In housing industry, the final product is sold to the buyers and not operated by the developers. As the ownership is transferred after completion of projects, maintenance is difficult to be carried out by developers. Therefore, residents these property owners ought to be equipped with knowledge on green maintenance. However, this concern did not apply to properties with strata title as developers are able to have control over the management of the entity.

"Education…..It's up to them to maintain it.....If they tear down certain things and you know, modify the house that it's no longer green then it's their--it's up to them. It's awareness la, you know." (R3)

"It doesn't make sense in the sense that we can only do certain things. For example, I can use paint which give out less toxic, no problem. I can install an energy saving light, no problem. I can also do a solar, a hot water at the top, no problem. But to do recycling of water, there is a certain limit I can do…..You are strata title, so the water tank can be situated at the common property. Just like I need to maintain lift, so for me to maintain the water tank ok."   (R5)

Subjective norms, the second predictor to intentions are the perceived social pressure to perform or not to perform a given behaviour (Fishbein & Ajzen, 2010). Based on the in-depth interviews, three normative referents important to decisions to adopt green concepts had been identified namely the authority (government), competitors and top management. All informants indicated that they did not sense the pressure and urgency of adopting sustainable concepts in their projects. Developers had a relatively conservative attitude when asked regarding the implementation of green in their projects where it was mainly for fulfilling mandatory statutory requirements. Merely a few were willing to go beyond the minimum requirement set. As in the case of rainwater harvesting system, even though it was being made mandatory in all new developments municipal councils were enforcing the rule at a different pace. Thus, informants explained that the pressure was more from complying with the different green regulations from various municipal councils. This is illustrated by the following verbatim responses:

"…..this is under authority requirement......Unless it's a requirement from the authority, then we need to implement it. Extra would be later." (R1)

"Not yet, not yet [pressure from government]. If you are in DBKL or you are in PJ, I think you will feel it because they use that [green regulations] to negotiate for higher density or provincial development." (R2)

"...certain local council has started, say, for new town planning you must follow the green guideline. Otherwise, you won't get approval. So, we have no choice. We like it or not we have to follow." (R5)

In the similar vein, inclination to move towards sustainability was muted by a lack of competitive pressure. According to the informants, they believed that there are very few companies that have started to include some of the sustainability principles in their projects. The uptake of sustainable concept is business driven for top-tier large developers while for small and medium counterparts who are not striving for it, the market remains profitable. For them, including sustainable concept in their projects does not help in differentiating themselves from other competitors. The relevant responses are as follows:

"Yes. Big player need to do this [green concept].....Our mid-range one.....Not yet. We don't feel the pressure yet."   (R4)

"Say if I'm MS [big player] and my competitors are doing it. You are MS, you want to be also in their league.....For us, no need [green concept to stand out among competitors]." (R5)

Apart from external factor, organisation internal actions are also crucial in encouraging sustainable buildings. Commitment by individuals or parties involved leads to crucial decisions and ultimately actions that will expedite the move towards sustainable direction. The outcomes from the interviews held shown that majority of the project managers had received support from top management and superior even though the implementation may be a bit lagging behind, because of the lack of pressure from the authority and competitors.

Perceived behavioural control (PBC) is the perception regarding the presence or absence of factors that facilitate or impede performance of the behaviour (Ajzen, 2005). Among the three predictors, informants shared a stronger sentiment regarding PBC, which explained its strongest impact on intention in the regression analysis. Incentives and rebates are seen as powerful tools that could be used by the government to motivate developers to take up sustainable projects. Informants agreed that these financial instruments would encourage the practice of sustainability in the housing industry. Current tax incentives are targeted at the owners of green properties and those who construct and own green buildings. Developers who develop but did not own the building were totally left out. Most informants claimed that they were unaware of available incentives or rebates and were looking forward for more attractive measures from the government. Their views are reflected by the following excerpts:

> "We don't see it [incentive]. Those are for property owners. For developers, we don't see it."   (R2)

> "No, they have incentive but give it to the tax--save stamp duty. Stamp duty is not me. Developer, I don't save anything what. It's the purchaser. I don't get any tax break....If I'm the user, I'll save money." (R5)

In terms of barrier to implementing green concepts in housing projects, all informants cited cost as the main factor that inhibited their organisation interest and commitment to embark on sustainable housing projects. The main difference between green and conventionally constructed housing is the technical aspects such as designs and materials used. Informants predicted an additional of 5-10 per cent increase in cost for the green projects mainly due usage of equipment and materials as well as payment for green design, certification and consultation. In general, organisations tend to maintain a more 'environmentally-ambivalent' stance as they foresee that going

green may affect their profit margin and prolong the
investment payback period. Some of the informants believed
that sustainable housing development is more economically
viable for high end projects rather than for the medium and low
cost ones.

> "Let's say for the rain water harvesting, there is not much
> contractor doing that. That's why they are controlling the
> price. We didn't get the best price, for us.....For one unit,
> actually let's say the price is 100k. Then we need to add
> another RM6k to RM8k for the rain water harvesting per
> unit.....At least 5 to 6% cost".   (R1)

> "If anyone is against it [green concept], it's budget. Because
> the economy is not doing great. Price is very sensitive. We
> can't go very large and spend on all the expensive
> windows.....Affordable housing very hard to implement this
> because I think our Rakyat is still struggling with cost of
> living and then you want them to pay for low e-glass that will
> cost three times more than normal glass".   (R2)

> "More expensive.....5 to 10%.....It depends on the product. So,
> if I do a link house it costs me 5%. Maybe not worthwhile. I
> think it's more towards high end product." (R5)

Homeowners play a crucial role in the demand of green homes
as this provides motivation for developers to produce
sustainable housing. According to the informants, current
challenges faced by them are the lack of market demand. Low
awareness on the benefits of green and emphasis placed on
factors such as location and price have caused buyers unwilling
to pay for sustainable homes. Informants revealed that green
concepts were more applicable to high end projects due to the
cost and profit factor. Developers generally targeted the higher
income group for green homes as this allowed them to brand
the properties to portray a higher quality or luxurious style of
living. Most developers in the market dealt with buyers ranging
from low, medium low to medium high income earners. These

categories of consumers were rather sensitive to the price of properties and this led to low enthusiasm among developers to invest in green technologies.

> "It's depend on the market. Whether the—our, our—depend on demand, the people.....I don't think so [the market demand is there]."　　(R1)

> "Yeah. If the customers are willing to pay for it [green housing]. So, if we are doing high-end, we definitely doing it already. In this case, price is quite sensitive. So, we don't have that kind of luxury."　　(R2)

> "They [buyers] don't care. It is not an important factor. So, in the double storey link house, four-storey apartment, green or not green is not important to the customer. So, as a developer why should I do green?.....So, if I say that double storey link house is RM 400,000. Now, it's green it's going to cost you 5% more. You'll say, forget it man."　　(R5)

4. Conclusion

This research attempts to determine the predictability of TPB constructs on the intention to adopt green concepts. Regression analysis was used to measure the influence of attitude, subjective norm and perceived behavioural control on behavioural intention. Result revealed that perceived behavioural control was the best predictor of intention to adopt green concept. In other words, the higher the perceived behavioural control, the greater will be their intention to perform the act. This is supported by interviews with informants where they shared a strong sentiment regarding perceived behavioural control. The findings of this study suggested that there is a need for government to plan policies and regulations that facilitate the uptake of green concepts in the housing industries. Currently, government's commitment toward sustainability is still in the early stage where green

concepts are rarely being incorporated into public project. Apart from this, incentives and rebates were also lacking and developers felt unmotivated to take up sustainable projects.

There were several limitations to this study. The sample for this study was restricted to housing developers in Klang Valley, thus the theoretical measures may be limited to that population. Some cautions are warranted when generalising the results of this study to developers in other states due to differences in statutory requirements and organisational culture. In addition, this study examined developers' intention to adopt green concepts instead of their actual behaviour. Reason being, actual behaviour is not always equivalent to intention even though previous studies (e.g. Armitage & Conner, 2001; Boldero, 1995; Taylor & Todd, 1997) indicated that the behavioural intention models are robust in predicting behaviour.

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