

The Acceptance of Buyer to the Greenhouse Residency Concept

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Abstract— The public nowadays has become more aware on the environmental issue. This is because they have understood the negative impact of pollution and wasting of natural resources to human being and also the Mother Nature. The conventional housing area that has been built to fulfil the basic needs of housing to the community in Malaysia was seen as a negative type of development to environment. This is because the abundance use of energy and thus high amount of carbon dioxide release to the atmosphere. In order to handle this problem, the greenhouse resident concept has been introduced. This concept can reduce utilization of energy, water, and natural resources but still can give good quality of air and importantly the comfort of the occupant. But, how much do the public especially house buyer knows and understands about the concept of greenhouse resident because it is relatively new trend in the home development in Malaysia. This research is done to evaluate the level of knowledge among the house buyers in the concept, components, and the challenges in developing green house residence in Malaysia.

Keywords— *greenhouse, housing, Malaysian construction industry, technology acceptance, environmental.*

1. Introduction

Residency aspect is an important element in government agenda and has always been emphasized as it is one of the government responsibilities to provide a good housing area to the citizen. This is also to ensure the best quality of life to the new and future generation by underlining the protection to environment and the resident's health itself [1].

In order to build good housing area that can protect the environment and resident's health, the developer has to apply the greenhouse concept in the house development. The greenhouse is basically the concept of putting the

natural element of environment into the account during every step of construction and maximise the efficiency of resources. This includes the design process, development, operational, management, repairing stage, and also when the housing area needs to be demolished [2, 13, 16].

But, this concept of greenhouse housing area mostly practiced only in Europe countries. The architects, developer and designers there have started to apply the design that utilise low electric energy consumption. However, in Malaysia, the awareness towards greenhouse housing area concept among the developers and house buyers are still low. It leads to the difficulty in the application of greenhouse concept in development of housing area in Malaysia[3]. This research is conducted to study the level of comprehension of house buyers about greenhouse residency concept and their acceptance towards it.

1.1 Objectives

The objectives of this research are to:

- Observe the level of understandings among the house buyers towards greenhouse residency concept.
- Observe the level of acceptance of house buyers towards greenhouse residency concept.

1.2 Hypothesis

To know the level of understandings and acceptance of house buyers towards greenhouse concept, few hypotheses are made:

Hypothesis 1:

Ho: There is no significant relationship between the level of understandings about the greenhouse residency concept and the level of acceptance to the greenhouse residency concept among the house buyers.

H₁: There is a significant relationship between the level of understandings about the greenhouse residency concept and the level of acceptance to the greenhouse residency concept among the house buyers.

Hypothesis 2:

Ho: There is no influence between the level of understandings of house buyers about the greenhouse residency concept and their level of acceptance.

H₁: There is influence between the level of understandings of house buyers about the greenhouse residency concept and their level of acceptance.

2. Literature Review

The global warming issue is not a new topic worldwide. This issue has been debated by many experts from various countries but none has reached a unanimous solution for the problem. Global warming is a phenomenon of increasing in global temperature from time to time. This is due to the greenhouse effect when poisonous gases such as carbon dioxide (CO₂), methane (CH₄), nitro oxide (N₂O), and CFC that leads to heat been trapped in the atmosphere[4].

The property development is also one of the contributing factors towards the greenhouse effect. It is estimated that about 35% of greenhouse gases (GHG) or most of the time been referred as carbon dioxide (CO₂ [e]) that been released coming from the facilities or buildings [5]. This matter had been supported by Riley [6] whom had stated that 54% of the energy usage in the United States of America (USA) came from the building or facilities and from the construction works. Furthermore, according to Roaf et al. (2004) the construction sectors were the main contributor for the emission of CO₂ [e] or as in the scope of this research, CO₂ in modern community. The estimation by Intergovernmental Panel on Climate Change (IPCC) in 2001, in the annual report regarding the percentages of buildings or facilities that released CO₂ are more solid (IPCC 2001). IPCC had estimated that the production of CO₂ by four (4) major sectors are as follow [5] :

- Industry: more than 40%
- Buildings or facilities (houses, offices etc): around 31%
- Transportations: around 22%
- Agriculture: 4%

It is believed that since the releasing report from the IPCC's, the percentage of the CO₂ emancipation had increased. The constructions of new building and house are the one to be blamed regarding this issue because these buildings use as much energy as the amount of CO₂

released. According to European Commission Directorate-General for Energy and Transport in 2006, it is estimated that 40% of the energy that had been used by the buildings in the European Union (EU) especially involving the usage of electricity and gases for the buildings operational [7]. The World Business Council for Sustainable Development (WBCSD) had came out with the same estimation number in which they had estimated that on the whole, buildings all around the world will produce 40% of the CO₂ and consumed as much as 40% of the electricity and gases that been produced [8, 14].

3. Methodology

Methodology is the techniques that are used in order to do any research. There are many types of techniques that are used to obtain the data for analysis. For example: questionnaire form, interview, observation, and others. All of these techniques can be used by the researcher according to the convenience of the research [9]. The objective of data collection for this research is to evaluate the level of understandings and acceptance of house buyers to the greenhouse residency concept.

3.1 Research Location

This research was done in Kampar region in Perak Darul Ridzuan state. Perak is a state located on the north of Peninsular Malaysia. Perak has the width of 21,035 km square feet with the population of 2,258,428 people in the year 2010. Kampar region has the width of 39,000 hectares with the population of 15,074 people including 216 non-citizens [10]. Kampar region can be further divided into 11 divisions of provision: Gopeng, Jeram, Kampar, Kopisan Baharu, Kota Baharu, Kuala Dipang, Lawan Kuda Baharu, Malim Nawar, Mambang Di-Awan, Sungai Siput Selatan, and Tronoh Mines. This research was focused only in the Kampar provision [11].

3.2 Research Sampling

Population for the society in the Kampar region is approximately 15,074 people and only 140 respondents are chosen for sample of the research[12]. All of them consist of the local residents that can be the potential house buyers.

4. Data Analysis

Next, the data that has been collected is analysed from the aspect of the level of understandings among the respondents to the house buying concept.

Table 1. Frequency Analysis of the Level of Understandings among House Buyers.

Level	Frequency (People)	Percentage(%)
Very not understand	0	0
Do not understand	0	0
Not Sure	3	2.10
Understand	104	74.30
Really Understand	33	23.60
Total	140	100.00

The table shows the analysis of frequency of understandings among house buyers on the greenhouse concept. Three (3) of the respondents (2.10%) are not sure about the greenhouse residency concept. While, 104 of the respondents (74.30%) understood about the greenhouse residency project. 33 of the respondents (23.60%) else admit to really understood about this concept.

Table 2. Analysis of Frequency of Acceptance Level among House Buyer about the Greenhouse Residency

Level	Frequency (People)	Percentage (%)
Really Not Agree	0	0
Not Agree	0	0
Not Sure	3	2.10
Agree	68	48.60
Really Agree	69	49.30
Total	140	100.00

The table shows that there are 3 respondents (2.10%) who are not sure about the greenhouse residency concept. 68 others (48.60%) agree about the greenhouse residency concept will give them good effect. 69 respondents (49.30%) really agree about the concept.

4.1 Hypothesis Testing

This hypothesis testing is to study the correlation between dependent and not dependent variables. Pearson correlation analysis is used to test the hypothesis. Data is analysed based on the significant data value. For value of $p < 0.05$ is considered as significant while the value of $p > 0.005$ is considered as not significant. The correlation test is conducted to observe the relationship between the level of understandings among house buyers about the greenhouse residency concept and their acceptance level of the concept.

Table 3. Pearson Correlation Test Buyer Understandings and Acceptance Level

		Buyer Acceptance	P
Level of Understandings	r	0.443	0.000

This Pearson Correlation Test shows the value of $r(138) = 0.443$, $p < 0.01$. It indicates that there is significant correlation between buyer understandings and acceptance

level on the greenhouse residency concept. With this, H_0 is rejected and H_1 is accepted for this research.

Table 4. Cross-tabulation between Level of Understandings and Job Status.

LEVEL OF UNDERSTANDINGS * JOB STATUS						
	JOB STATUS					
	GOVERNMENT SECTOR	PRIVATE SECTOR	FREELANCE	STUDENT	OTHERS	
LEVEL OF	0	1	1	0	1	3
	0.0%	3.2%	2.9%	0.0%	4.2%	2.1%
	19	20	29	17	19	104
	76.0%	64.5%	82.9%	68.0%	79.2%	74.3%
	6	10	5	8	4	33
T O T A L	24.0%	32.3%	14.3%	32.0%	16.7%	23.6%
	25	31	35	25	24	140
	100%	100%	100%	100%	100%	100%

The table shows that respondents from freelance status have a better understanding of greenhouse residency concept compare to others. Data shows as many as 29 respondents who are freelancers choose understand (4.00) and 5 of the respondents chose really understand (5.00) and only 1 choose not sure (3.00) in the questionnaire forms. This is due to the fact that most of the residents in Kampar district are living outside the urban area. So they might know regarding the issue of greenhouse concept by having conversations at the stalls among themselves, families or through media such as newspapers, television news or others. The freelancers also might know regarding this issue through their experience in buying or using the concept of greenhouse during their working time. Other jobs statuses are seen to have lower level of understandings. The data shows only 19 of the respondents choose understand (4.00), 4 people choose really understand (5.00) and 1 people choose not sure (3.00). This is due to their jobs not required them to know about the greenhouse concept previously.

Table 5. Cross-tabulation between Buyer Acceptance and Job Status

BUYER ACCEPTANCE * JOB STATUS						
	JOB STATUS					
	GOVERNMENT SECTOR	PRIVATE SECTOR	FREELANCE	STUDENT	OTHERS	
BUYER ACCEPTANCE	0	0	2	0	1	3
	0.0%	0.0%	5.7%	0.0%	4.2%	2.1%
	4	21	12	13	18	68
	16.0%	67.7%	34.3%	52.0%	75.0%	48.6%
	21	10	21	12	5	69
	84.0%	32.3%	60.0%	48.0%	20.8%	49.3%
TOTAL	25	31	35	25	24	140
	100%	100%	100%	100%	100%	100%

The above table shows that the respondent from the freelance status has more understandings on the greenhouse residency concept compare to others. Data shows that as many as 29 people whom are freelancers understand (4.00), 5 of them really understand (5.00) and only 1 people choose not sure in questionnaire forms.

This is because most of the community in Kampar are living outside the city area. So, they only know about the greenhouse concept through conversation in small stalls, with families or newspapers and television news. The freelancers might have experience in buying or using the concept of greenhouse in their working status.

Other job status is seen to have much lower understandings. Data shows only 19 of respondents choose understand (4.00), 4 people choose really understand (5.00), while 1 people choose not sure (3.00). The fact that they are not familiar with this concept and might not have even encounter with it in their working experience is really a big factor.

Table 6. Cross-tabulation between Level of Understandings and Education Status

LEVEL OF UNDERSTANDINGS * EDUCATION STATUS						
	EDUCATION STATUS					
	PRIMARY SCHOOL	SECONDARY SCHOOL	DIPLOMA	DEGREE	MASTER/PHD	
LEVEL OF UNDERSTANDINGS	2	1	0	0	0	3
	7.4%	2.1%	0.0%	0.0%	0.0%	2.1%
	21	40	13	27	3	104
	77.8%	85.1%	52.0%	75.0%	60.0%	74.3%
	4	6	12	9	2	33
	14.8%	12.8%	48.0%	25.0%	40.0%	23.6%
TOTAL	27	47	25	36	5	140
	100%	100%	100%	100%	100%	100%

The above table shows that the respondents from secondary school has better understandings of the greenhouse residency concept compare to other level of educations. We can see that the data shows as many as 40 respondents choose understand (4.00), 6 students choose really understand (5.00) and 1 student choose not sure (3.00) during questionnaire session. They are most probably aware of the greenhouse concept through conversation among friends, families or by reading newspapers as well as from television. The secondary school students might have encounter with greenhouse concept as their families might own it.

Table 7. Cross-tabulation between Level of Acceptance and Education Level

BUYER ACCEPTANCE * EDUCATION LEVEL						
	EDUCATION LEVEL					
	PRIMARY SCHOOL	SECONDARY SCHOOL	DIPLOMA	DEGREE	MASTER/PHD	
BUYER ACCEPTANCE	3	0	0	0	0	3
	11.1%	0.0%	0.0%	0.0%	0.0%	2.1%
	12	25	11	18	2	68
	44.4%	53.2%	44.0%	50.0%	40.0%	48.6%
	12	22	14	18	3	69

	44.4%	46.8%	56.0%	50.0%	60.0%	49.3%
TOTAL	27	47	25	36	5	140
	100%	100%	100%	100%	100%	100%

This table shows that the respondents from secondary school are more accepted to the concept of greenhouse resident area. The data indicates that 25 students from secondary school understand (4.00), 22 students really understand (5.00). They might be familiar with the greenhouse concept during learning process or in class projects. Students also have more interest in the latest issues globally and read about them from various resources.

5. Suggestion and Conclusion

The application of greenhouse residency concept really needs the involvement of public and also interested parties such as ministries, local authorities, developer, and also house owners. This practice of greenhouse residency concept can give tremendous impact to the environment and good energy usage [15].

As the demand for greenhouse concept residency area is low, the government especially Ministry of Urban Wellbeing, Housing and Local Government has to cooperate with any non-government agency to provide broad awareness about the greenhouse residency concept to the house buyers in Malaysia. Articles that providing stories regarding greenhouse residency concept and its advantages needs to be multiplied in local newspapers and also social media. This can lead to easily access information about this issue.

Other than that, the house buyer himself needs to realize the importance and feel responsible to protect and maintain our green environments. Small attempts to protect the environment are really important as when all the community unite, the effort can be very effective. This is very important for our future. Besides, in my opinion, a special agency needs to be established to control the price of greenhouse resident area as well as its building materials that have special characteristics to save energy. This can prevent uncontrolled price strike of the housing area that is not affordable to most of the buyers which occurs nowadays.

From the discussion, it is clear that the level of understandings and acceptance of house buyers in Kampar region is still in intermediate level and it still can

be improved to ensure that the greenhouse residency area concept is fully understood and embraced by the public.

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