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## **AWARENESS IMPROVEMENT AMONGST END USERS TOWARDS THE ECONOMIC SUSTAINABILITY IN GREEN HOMES: A RESEARCH PROPOSAL**

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### **Abstract**

*In recent years, people are more concerned about the environment since they know what the effects of pollution to the environment to human health would be, hence the emergence of the green home concept. This is a new concept whereby a home is created to use less energy, water and natural resources to provide good air quality and comfort to its occupants. It generates less wastage and therefore can be considered as sustainable developments that improve homeowner's lifestyle. The Malaysian government has been encouraging the development of green homes since year 2006. In the Ninth Malaysia Plan, the government has started to emphasis on sustainable development and in 2009, a new policy called the National Green Technology Policy has been introduced. This policy promotes the usage of green technology in developments which includes green homes. Green home can help to preserve the environment since they use renewable energy as their power source by allowing natural lighting through windows and openings. This research proposes to look into the level of perception and awareness of end users towards the economic and sustainability aspect in green home design. The objective of this research is to discover the awareness of end users as regards to sustainability in green home designs, to identify end users' requirements in green homes and to develop a comprehensive checklist of end users' requirements to be followed by developers. The data for this research will be collected via questionnaires and interviews which will be distributed to end users within Peninsular Malaysia. Descriptive statistics will be used to analyse the data. The findings of this research will be in the form of a comprehensive checklist as to what is required by green home end users.*

**Keywords:** Green Homes, Awareness, Sustainability, End Users

### **1. Problem Statement**

The factors that will jumpstart sustainable movement are awareness and knowledge. With that, comes interest and demand, and follows with implementation. Du Plessis (2007) stated that behaviour changes will only come about through personal commitment to it. To encourage a person or organisation to commit to something, their personal values must be satisfied. Aspects of social sustainability such as those concerns with the human feelings: security, satisfaction, safety and comfort need to be addressed too. Current green marketing literature suggests that consumers/users can be classified into different shades of green according to their inclination towards environmentally friendly products. It would be folly to assume that all green building occupants belong to the deepest green niche and would readily embrace green features. (Linda, 2011).

Sustainable construction consists of three pillars: environment, social and economic aspects. In a survey (Nazirah, 2009), respondents were required to select statements that best describe their understanding about the concepts of sustainable construction. Issues that are related to environmental aspects of sustainability received the highest percentage: effective protection of the environment (89%), effective environmental planning, management and control (80%) and prudent use of natural resources (69%). Issues that related to social aspects of sustainability received moderate percentages: enhanced quality of life and customers' satisfaction (71%) and social progress which recognize the need of everyone (43%). Lastly, the issues the related to economic aspects of sustainability received lowest percentage.

The economic sustainability emphasizes on financial issues of housing affordability, life cycle cost, building life span by incorporating building maintenance aspects as well as opportunity to optimize existing infrastructure. Still, most key players have a preference for the housing property to have larger space and more

facilities. On the contrary, sustainability in the housing context does not necessarily mean larger space and more facilities. This scenario reflects that they might not fully understand the total concept of this particular element in sustainable housing development. (Ilias, 2008)

The focus on sustainability (more than the minimum requirement set by the local authority) is possible when the clients demand it. For residential projects, the developers will follow market demands. Although medium and small-sized developers might be aware of sustainability, due to constraints such as cost, they preferred to produce a building which satisfied criteria set by the regulations. They mostly dealt with local buyers who were still not aware of sustainability and wanted cheap and affordable houses (Nazirah, 2009). It seems that buyers are still in the dark and therefore need to be well informed regarding the economic benefits of green home concept so that the aspiration towards achieving green construction in Malaysia can be realized.

## **2. Objectives**

The objectives of this research is to address issues associated with green homes in Malaysia particularly as regard to end users' lacks of understanding associated with the sustainability aspects. The objectives identified to be achieved are:

- i) To determine the level of end users' awareness as regard to the sustainability in green homes design.
- ii) To identify the end users' requirements towards green homes.
- iii) To develop a comprehensive checklist of end users' requirements to be followed by developers.

## **3. Research Questions**

In the attempt to achieve the above research objectives, the following questions are put forward:

- i) What is the level of end users' awareness in green homes design?
- ii) What are the expectations of end users' to the needs of comfort in their green home requirements?
- iii) Is there any comprehensive checklist produced by Local Authority to be complied by developers in fulfilling the end users' needs with regards to green home requirements?

## **4. Significance Of Research**

This research is hope to contribute the followings benefits/significance to the construction industry as a whole particularly those involved in the green projects residential development namely project consultants, developers and last but not least the end users. Hopefully, the findings of this research can be a useful reference for the benefits of improving this particular niche of the industry. The expected benefits of this research are to enhance the awareness of end users with regard to sustainability in green homes by identifying requirement of green homes design by end users'.

## **5. Scope of Research**

The research is confined to the study of end users awareness towards green homes. This research limits the scope to the following:

1. Medium cost housing residential amounting from RM100K to RM300K.
2. The research will be focussed on
  - i) Determining the level of end users' awareness as regard to the sustainability in green home design.
  - ii) Identifying the end users' requirements towards green homes.
  - iii) Developing a comprehensive checklist of end users' requirements to be complied by developers.
3. This research will be carried out in collaboration with the construction development players, end user's and construction professional consultants.

## **6. Definition of Terms/Concepts**

- i) Green Homes

Green homes should be energy efficient, healthy and use sustainable resources. Green homes take advantage of nature's processes in order to use less energy, consume less water and produce less waste. Insulations, orientation towards light, air circulation, energy efficient appliances and lighting are all considered.

Green building (also known as green construction or sustainable building) refers to a structure and using process that is environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition.

ii) Awareness

Awareness is the extent and level of common knowledge about green homes and sustainability in construction. Awareness also means that the information gathered from the public or the state or level of consciousness where sense data can be confirmed by an observer.

iii) Sustainability

Sustainable building / construction reflects the principals of sustainable development i.e environmental protection, economic development, and social development, in the sitting, design, building, maintenance and occupation of buildings.

Sustainable buildings are designed and constructed to high environmental standards and thereby: minimize energy requirements, reduce water consumption, and use materials which are of low environmental impact.

iv) End Users

An end user is the person who uses a product, i.e. the consumer or owner that is the final users of products and or services generated within a social system. A consumer may be a person or group, such as a household. "user" when referring to the people directly engaged with the product, sometimes called "end users".

## **7. Research Methodology**

The framework of this research consists of three main stages (refer flow chart of research activities). The research will be focus on identification of problem statement and research aim. The next stage is establishing the research objective. Data collected from second stage will be analyzed to produce findings and conclusions.

The data for this study will be collected via questionnaires and interviews which were distributed to the end user's for residential housing within Peninsular Malaysia. Descriptive statistic will be used to analyse the data. The proposed Comprehensive Checklist will be developing based on the analysis results from qualitative and quantitative research.

## **8. Literature Review**

The concept of "green homes", a relatively new home living concept to the local Malaysians, is beginning to make its way into the local housing scene (Jamaldin, 2008). Developers have also taken initiatives to improve sustainable technology of building as by introducing a concept of "Smart and Cool Homes" (2007) in housing projects. The concept of passive-design has also been incorporated in many buildings (Shafii et al., 2006).

The concept of sustainable construction governs three main pillars: environmental protection, social well-being and economic prosperity (Addis and Talbot, 2001 and Brownhill and Rao, 2002). Environmental protection concerns the built environment and the natural environment. The built environment refers to the activities within the construction project itself, which may, if not handled effectively, have a serious adverse impact on the environment. Environmental sustainability is concerned with the extraction of natural resources (Addis & Talbot, 2001). Social well-being concerns the human feelings: security, satisfaction, safety and comfort (Lombardi, 2001) and human contributions: skills, health, knowledge and motivation (Parkin, 2000). Finally, economic sustainability is concerned with the monetary gains from the project for the benefits of the clients, construction players, public and the government (Zainul Abidin, 2007b).

Many studies have been conducted on user satisfaction in housing. Large construction companies use satisfaction ratings to assess their products, improve future developments and get a sense of the market to keep up with tendencies, to stay competitive.

In UK, the Commission for Architecture and the Built Environment (CABE, 2009, p. 28) has undertaken many user satisfaction studies in parallel with building quality assessments based on observations, user perceptions, technical measurements and documentation analysis. Important results for design considerations are produced.

Client (user) evaluations are based on experience with a product or service and are influenced by psychological aspects of perception against expectation. Construction companies, interested in sales and profit, usually assess levels of satisfaction of end-users for future projects. On the other hand designers and public housing authorities should analyze conceptual reasons for satisfaction levels (Feciková, 2004). POE studies therefore must address perception and cognition of end-users in relation to the built environment. Studies of perception should include: analysis of evidence of behavior, such as wear and tear for instance; observations; mapping of behavior related to use and time; cognitive maps, as well as attribute lists measured on semantic scales (Turpin-Brooks & Viccars, 2006). Perception and satisfaction are concepts concerned with the relationship of end-users with a product. In building design, data of this nature should direct the design's development and the introduction of improvements in relation to previous projects. The architectural program, or brief, should discuss user needs, translated into design requirements. Attributes and value judgment should occur during this phase of a typical design process (Moreira & Kowaltowski, 2009).

User satisfaction has been studied extensively in housing and should revert to new designs and retrofits to avoid repetition of errors and stimulate the introduction of incremental improvements. In Brazil the impact of such ratings on basic social housing design criteria has not been marked. Most studies on progressive improvements of housing in developing countries focus on urban infrastructure and question the application across the board of global standards. These are seen as affecting costs and therefore affordability of homes (Choguill, 2007) and (Ferguson and Navarrete, 2003). On the other hand many studies, especially those coming from Europe, touch on improvements of the design model as a whole. Standards may also be questioned with strong recommendations to empower end-users (CABE, 2010a, p. 9; CABE, 2010b, p. 23). In recent years, the literature on building quality assessments has discussed complementary studies to the usual evaluation of satisfaction rates as part of post-occupancy evaluations (POE). The assessment of values that families attach to elements of the home, are seen as an important contribution to understand end-user needs, preferences and views related to the built environment (Benedikt, 2008, Preiser and Vischer, 2005 and Spencer and Winch, 2002).

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