READINESS IN IMPLEMENTING GREEN RESIDENTIAL: A STUDY AMONG SARAWAK CONSTRUCTION'S PRACTITIONERS

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ABSTRACT: *The objective of this research is to explore the level of readiness among construction practitioners in Sarawak in implementing and adopting green residential concept in their project. The respondents have been limited to the stakeholders and contractor only. The sample of respondents set by 200, within the location of the Sarawak itself limited to Sibu, Miri, and Kuching districts only. The qualitative and quantitative methodology has been chosen to gather the best possible data to identify the objective set for this research. Working with both methods provides the researcher with a powerful tool; answers are likely to be precise, measurable and easy to understand. The outcomes from this research study it's to put the result of this research for the service of this sector to promoting the importance of this study in green residential concept and to work together with Sarawak's relevant bodies on promoting and implementing this concept among construction's practitioners. The benefits by implementing this concept have also been discussed further in this study so that the construction's entire player clear on the benefits and principles of green residential which advantages that they may get if implementing this concept on their future project.*

Keywords: *green residential, green concept, green benefit, practitioners*

1. INTRODUCTION

According to a report in the United State of America, residential, commercial, and industrial buildings produce Carbon Dioxide (CO_2) emissions more than 38% as compared to 10% of world's CO_2 emissions [2,3]. Therefore, air pollution becomes a tremendous impact on all of us, especially our health, environment, and property damage. As examples, an environmental degradation and extreme release of CO_2 worldwide significantly impact the human quality of life [2].

In the U.S. alone the average output rate by using coal-fired electricity generation is about 954 grams of CO_2 per kilowatt-hour. And recently, the petroleum consumption to produce electricity, as much as 119 billion kilowatt hours of the nation, has produced 106 million of metric tons of CO_2 emissions. This indicates that the nation becomes the second biggest polluter at 863 grams of CO_2 per kilowatt-[2,3]. Thus, green development becomes the world new agenda to ensure that the human standard of living can be sustained. At the same time, the surrounding nature must be preserved from any damages caused by the pursuit of economic growth through heavy development [2].

Various countries in the world such as European countries, America, and Australia now have developed green development. Besides, Asian countries such as Singapore, China, and Japan also have applied it appropriately to the needs and development of their society. Green development is not only important to the extent of advanced countries, but also important to developing countries such as Malaysia [2].

As one of the major industries in Malaysia, the construction industry certainly can effectively achieve human living standard by developing the green residential [2]. One of the green residential criteria is that the house can achieve long-lasting, sustainable through the efficiency of energy use. It can be achieved through green technology applications like photovoltaic systems, rainwater collection, and recycled materials.

As a developing country, Malaysia also adopts the green programs (green buildings and green technologies [6]. The government has implemented the green programs as stated in the government agendas since 2010 [2]. Several implementations included are an improvement in living standards, promoting sustainable development system, preserving and conserving the environment, and green supply management [6]. The entire agenda is based on the implementation of Agenda 21, Sustainable Development Program United Nations (UN) [2,6].Throughout the agenda, Malaysia was interested to follow the footsteps of developed countries in developing foresight in-line with the consensus with other countries as included in the World Summit on Sustainable Development (WSSD) on the planning and direction of green development in the new millennium.

In order to promote and to flourish the construction industry with green building technologies; GBI is the first green building program where the environmental rating system becomes one of its standards and also the first comprehensive system in Malaysia to evaluate the environmental design and building performance [2,4,7] . Since the agenda is novel, it has created a lot of misperceptions and problems, not only for potential buyers, but also for the construction industry players such as developers, architects, engineers, town planners, and contractors.

According to the Ministry of Energy, Green Technology and Water [2,4], the construction industry faces troubles in order to extend the green building technologies in Malaysia as follows: a very low demand towards green's products and services as well as expensive costs; a very tough challenge to get cooperation from construction industry players in the application of the green technology; a lack of local expertise in green technology; a lack of R&D activities, transfer technology and knowledge in green technology fields, and a lack of awareness, understanding and acceptance of green technology among the construction industry players and citizen as the whole.

2. RESEARCH BACKGROUND

Malaysia has made great strides in meeting the requirements of its citizens in relation to housing. Under various five-year plans, the government has implemented numerous housing programs, in both rural and urban areas, with the aim of making Malaysia a 'home-owning society'. The public sector has concentrated mainly on low-cost housing programs, while the private sector has focused on medium- and high-cost housing programs. The house-building industry in Malaysia is in line with the goals of the Habitat Agenda as well as the principles of Agenda 21 [6]. This is the blueprint for sustainable development in the 21st Century, adopted by 179 nations, including Malaysia, at the 1992 summit in Rio de Janeiro [4].

One of the main elements in sustainable development is to provide shelter for all [4]. The government has shown a keen interest in providing housing, in particular for low- income groups. However, the government could not provide sufficient housing to meet sustainability and green concept where all over the world starting to implement this concept in their country.

The agenda of green buildings is to preserve all natures from the destruction by human activities [2,6]. Green residential can define an applying the houses with a minimum energy, water, and natural resources that provide good air quality and reduce wastes [2]. The objectives to be highlighted in this study are: to identify the constraint factors to build green residential in Sarawak and to study the level of knowledge in green residential concept among Sarawak's builders.

This quantitative study aims to explore the perceptions of housing builders towards green residential development. Presently, the demand for green residential is very low because buyers hesitate to pay 30% more costs for a green residential than a conventional house. Where this statement applicable to Peninsular Malaysia, to extent of this conceptual study, this research develops to study towards Sarawak's builder's perception. The data collections for the study it's through a structured questionnaire which sends to 200 respondents which are housing developers and contractors. These study's limited to Sibu, Miri and Kuching areas only. The findings of the study will be useful for giving a new idea in green residential concept to Sarawak's builders. Therefore, they may consider constructing their own residential project by following implementing this concept.

3. RESULTS AND DISCUSSION

Both primary and secondary source has been used as a research methodology in order to achieve a clear picture and understanding of the results. The primary source consists of a set of questionnaire survey while the secondary source obtains from the desk stop study. Literature review resources obtained from the form of a journal, research paper, and articles; relevant references books, newspaper, and electronic data – also known as a desktop study. Most of the time, in order to conduct this research, it's to do the desktop study in order to obtain the sources in order to support the literature review for this research.

The questionnaire has been designed to achieve the finding of results for the objectives such as to capture the construction's practitioner perception towards implementing green building concept in Malaysia particularly in Sarawak. Its limited to test the perceived barriers in time, cost and knowledge towards green building concepts. However, this research has its limitation where the research area coverage only at Sibu, Kuching, and Miri only. About 200 numbers of respondents responded to the questionnaire. Only those who have knowledge of this concept has been given a questionnaire so that the accuracy of data can be maximized. The respondents have been limited to those having at least 3 years experienced in the construction field and the respondents from contractor side it's those selected company who hold G5 certification from Construction Industry Development Board (CIDB) onwards.

The structured questionnaire scale on answer limited to 'yes' and 'no' answer expecting from the respondents. Furthermore, the analyzing of the data it's based on the frequency or by percentage analysis. The highest percentage indicates the higher indicator or momentum to the point of description tested to the respective respondents.

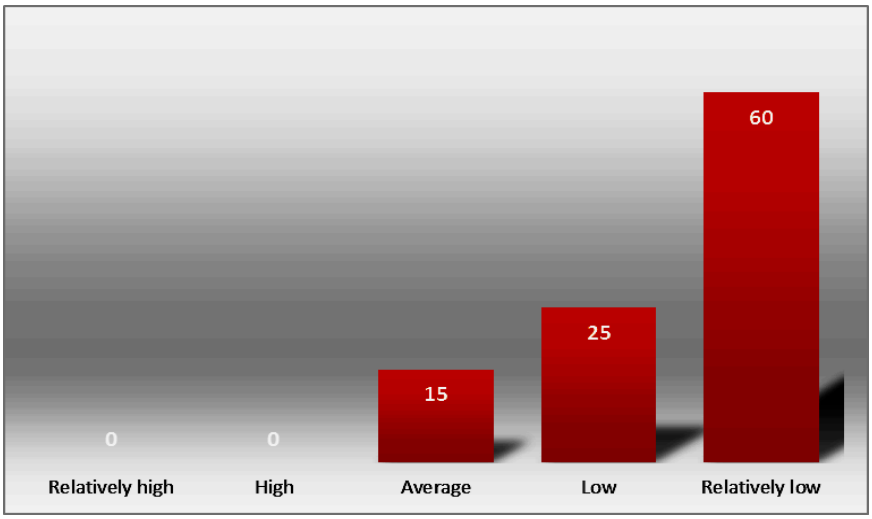

Figure 1: Percentage of demand for Green Building Project in Sarawak

By referring to the Figure 1 above, the percentage of demand for a green building project in Sarawak, the respondents said that 60% agree on the demand still low due to lack of awareness on green building benefit especially to the stakeholders and potential buyer perspective.

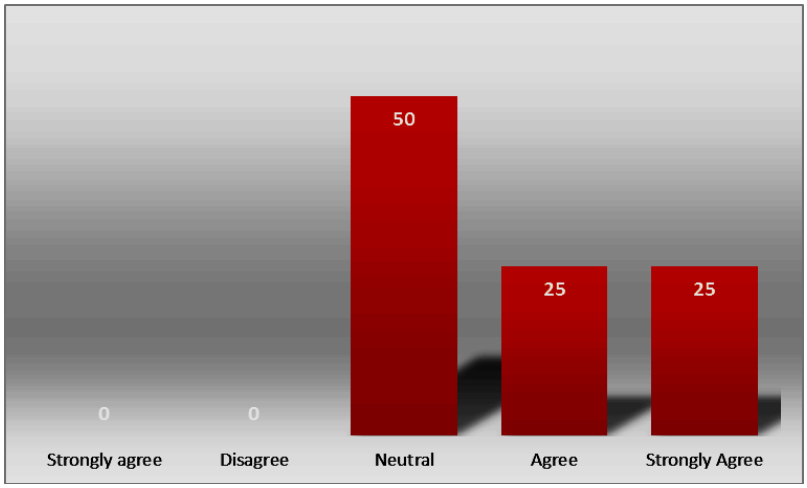

Figure 2: Percentage of respondent's perception of the momentum of the Green Building to be implementing in Sarawak

Percentage of the momentum of the project implementing green building concept in Sarawak, most of the respondents agree that they decided to stand in neutral shoes with 50% (See Figure 2). This due to the lack of information regarding the flow of green building implementation in Sarawak among construction's practitioners itself.

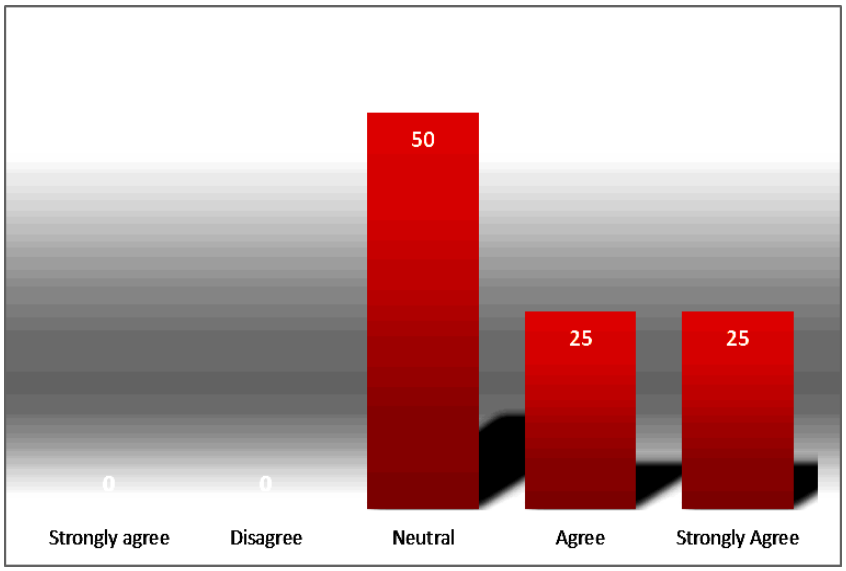

Figure 3: Percentage of respondent's perception of the potential of Sarawak well-developed with the implementation of the Green Building concept

Most of the respondents responded to the neutral with 50% (See Figure 3) when it comes to be asking on the potential of Sarawak can be well-developed with the implementation of green building concept in their future project. There are some barriers that they need to be faced to get this concept can be well-implementing.

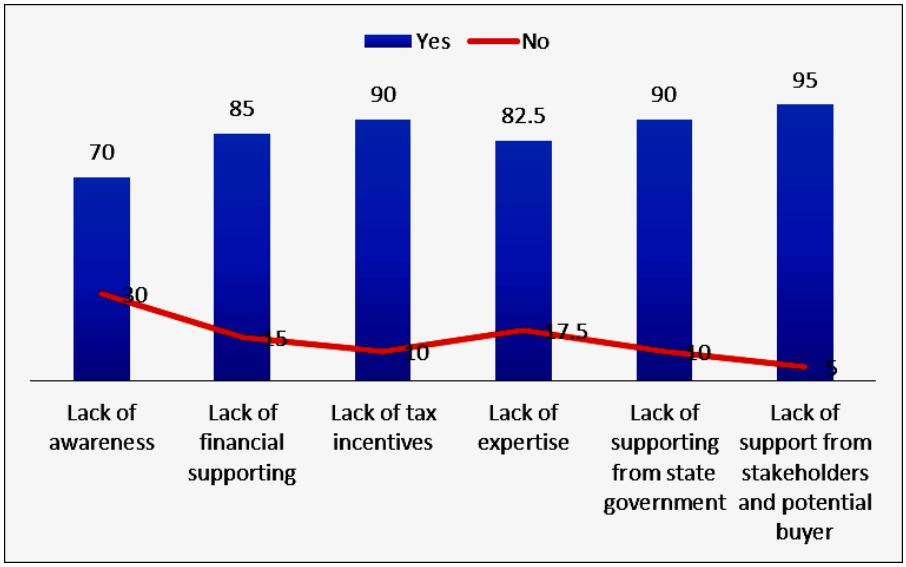

Figure 4: Respondent's opinion in contributing the 'slow' development of Green Building in Sarawak.

According to Figure 4, stated the percentage of respondent's opinion in contributing the slow development and implementing in green building concept. 70% agrees that lack of awareness in promoting green building concept to the construction's practitioner in Sarawak. 85% agrees due to lack of supporting in financial matters especially during the early stage before the project start. 90% agrees on the lack of incentives on tax exemption from the government side. 82.5% agrees that lack of expertise to lead and to run the concept of green building in their project. 90% saying that lack of support from the state government on this matters. Most of the respondents agree that lack of support from stakeholders and potential buyers leads to slow movement in adopting green building concept in their building project construction.

4. CONCLUSIONS

Several recommendations that can speed up to overcome the barriers; providing knowledge and training like organizing a seminar, talk or workshop and conferences to educating them and offering to the public and potential buyer for green principles on the concept and the benefits can be generated from implementing this concept in their project. Actions must be initiated to enable this concept to be applied efficiently in future construction projects. Provide as assistant to stakeholders, contractors, and consultants in incorporating the sustainable issues at the project conceptual stage and planning stage. The even green concept it's a slightly higher investment at initial stages, but then, it is still a good investment to be considered for long-term and by implementing this concept its bring different character and interpretation from the conventional project.

The state government must ensure all the parties involve stakeholders, consultant, contractor, and the local authority as well must play their own role to ensure the successful implementation of this concept. To encourage all parties to get involves, the state government can provide the standards or introduce the proper guidelines for green building or introduce new regulations to the Sarawak construction's industry in regards to this matter. The enforcement, as well as the promotion, start from top management to the public and potential buyer and building owners. Even it's a little bit harder at the beginning of promoting and to enforce to the public, the benefits can generate from this concept it's still valuable to accept and to be considered as well.

inally, stakeholders' actions are influenced by the market situation and demand from the buyer. To increase buyers demand green project, a little bit of pushing factors must be acting upon to the housing developers and also contractors to improve the specification of their houses which include certain green buildings elements to attract buyers. The modern and modest design must be consistent with the design of the building so that it can attract the potential buyer to consider on this green project. Based on the survey as well, the first perception on the design always affecting and give a higher percentage impact towards the decision to buy or not to buy that property.

In summary, more efforts are necessary to enhance the level of environmental awareness and civic consciousness among the Sarawak's people to build a sustainable and greener project in the future. These are the point that should put into an account to make them ready to implement this concept. It's should start from the most important people in that particular state so that this concept can be successfully implementing in their area.

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