GREEN BUILDING CONCEPT IMPLEMENTATION FOR RESIDENTIAL PROJECT: AN INSIGHT AMONG CONSTRUCTION PLAYERS IN SARAWAK

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Abstract: 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 extend of this conceptual study, this research develop to study towards Sarawak's builders perception. The data collections for the study its through structured questionnaire which send to 200 respondents which are housing developers and contractors. However, these study its limited to Sibu, Miri and Kuching areas only. Respondent's perception towards implementing green residential and the constraint factors make them refuse to implement this concept has been discussed further. The findings of the study will be useful for gibing 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.

Keywords: Perception, Housing Developers, Contractors, Green Residential.

I. INTRODUCTION

According to a report in United State of America, residential, commercial, and industrial buildings produce Carbon Dioxide (CO2) emissions more than 38% as compared to 10% of world's CO2 emissions (Ezanee et. al., 2015; Gregory, K.,2006). Therefore, the air pollution becomes a tremendous impact to all of us, especially our health, environment and property damage. As examples, an environmental degradation and extreme release of CO2 worldwide significantly impact human quality of life (Ezanee et. al, 2015).

In the U.S. alone the average output rate by using coal-fired electricity generation is about 954 grams of CO2 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 CO2 emissions. This indicates that the nation becomes the second biggest polluter at 863 grams of CO2 per kilowatt-hour (Ezanee et. al., 2015; Gregory, K., 2006). 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 the heavy development (Ezanee et. al, 2015).

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 to advanced countries, but also important to developing countries such as Malaysia (Ezanee et. al, 2015). According to Ezaneeet. al. (2015), as one of the major industries in Malaysia, the construction industry certainly can effectively achieve human living standard by developing the green residential. One of 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) (Nadzirah et. al., 2015). The government has implemented the green programs as stated in the government agendas since 2010 (Ezanee et. al, 2015). Several implementations included are improvement of living standards, promoting sustainable development system, preserving and conserving the environment, and green supply management (Nadzirah et. al., 2015). The entire agenda is based on the implementation of Agenda 21, Sustainable Development Program United Nations (UN) (Nadzirahet. Al., 2015; Ezaneeet. al, 2015; Zalina et. A;. 2013; Nazira, 2010).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 (Green Building Index, 2011; Ezanee et. Al, 2015; Nadzirahet. Al., 2012). 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 (Ezanee et. al, 2015; KeTTHA,2012), 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.

II. 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 (Nadzirah et. al., 2015). 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 (Ismail, 2002).

One of the main elements in sustainable development is to provide shelter for all (Ibrahim, 2015). The government has shown 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 (Ezanee et. al., 2015; Nadzirah et. al., 2015). Green residential can be define an applying the houses with a minimum energy, water and natural resources that provide good air quality and reduce wastes (Ezanee et. al., 2015). 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 extend of this conceptual study, this research develop to study towards Sarawak's builders perception. The data collections for the study its through structured questionnaire which send to 200 respondents which are housing developers and contractors. These study its limited to Sibu, Miri and Kuching areas only. The findings of the study will be useful for gibing 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.

III. RESULTS AND DISCUSSION

Both primary and secondary source has been use as research methodology in order to achieve clear picture and understanding of the results. The primary source consist a set of questionnaire survey while the secondary source obtain from the desk stop study. Literature review resources obtain from the form of journal, research paper and articles; relevant references books, newspaper and electronic data – also known as desktop study. Almost of the time in order to conducting 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 perceive barriers in time, cost and knowledge towards green building concepts. However, this research having 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 in this concept has be given a questionnaire so that the accuracy of data can be maximize. The respondents has been limited to those having at least 3 years experienced in construction field and the respondents from contractor side it's those selected company whom 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.

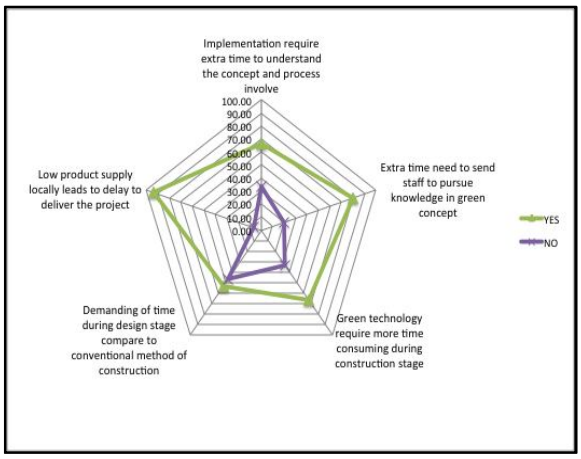


Fig.1. Perceived barriers in perspective of time.

Figure 1 stating on the results of perceived barriers of time. There are five elements or description has been tested to the respective respondents. The description include low product supply locally leads to delay to deliver the Project, implementation require extra time to understand the concept and process involve, extra time need to send staff to pursue knowledge in green concept, green technology require more time consuming during construction stage and demanding time during design stage compare to conventional method of construction. Out of five questions, the most score its on the description of low product supply locally leads to delay the deliver the project with 93% said 'yes'. Follow by 80% said 'yes' on the extra time needed to send staff to get a knowledge on green concept itself. 67% of respondents agree on implementation require extra time to understand the concept and process invvolve as well as the respondents also agree with the same percentage on green technology require more time consuming during construction stage. Furthermore, 53% said that demanding of time during design stage compare to conventional method of construction.

İn Sarawak, the mobilization of the said material especially for green building concept, at this point none of local supplier can produce or manufacturer the green materials by themself. All the relevant green materials must be importing from peninsular Malaysia or maybe outside. So, from the perception of Sarawak's construction players, the transportation and mobilization of the require materials still not in a good level and this issue will course a delay on delivering the project to the building's owenr as well as to the potential buyer. Other than that for time factors as well, the employers said, they are actually having a perception where by implementing green concept into their project they need expertise, where in other hands, they have to send their staff for training. Most of the training, seminar or workshop requires more time consuming. İts more than 2 days courses and travel time should have to count-in too. Where actually when they send those staff for training at the moment they have to completing their on-going project, they have to face for shortage of staff to handle the project.

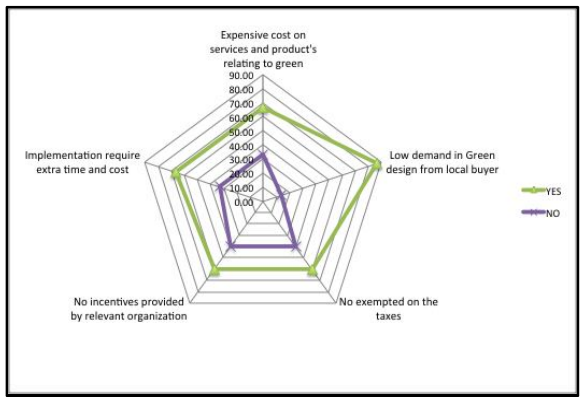


Fig.2. Perceived barriers in perspective of cost.

By referring to the Figure 2 stating the perceive barriers in perspective of cost. There are five question has been tested to the respondents and the question as follow: expensive cost on services and product's relating to green, low demand in green design from local buyer, no exempted on the taxes, no incentives provided by relevant organization and implementation require extra time and cost. Out of five questions has been tested among respondents, most of them agree with 87% said that low demand in green design from local buyer its a perceive barriers in perspective of cost to implementing the green building concept in their project. Others four description having almost the same percentage 60% to 67%. With 67% agree that expensive cost on services and product's relating to green and implementation require extra time and cost. With 60% agree that no exempted on the taxes and no incentives provided by relevant organization.

The demand from Sarawak's stakeholders an deven from buyer not in a good demand to requesting for green building implementation for their project or building. This is because of low exposure and also unclear of the green building concept itself from their angle of perspective. Other than that, they are actually having a perception where the green products as well as the expertise on the green concept cost more money compared to conventional method of construction. They are actually agree that by implementing this concept they have to invest more money and budget in order to produce a project with green concept implementing in that particular project.

İn addition, without incentives which construction's players count as benefits to them, this concept its hardly to be accepted among them. They still have to pay for the same taxes amount if they are implementing green concept rather than conventional that they are really used to it. With the extra

investment or budget allocation at early stage of implementation of this concept to be bear by them. Which these perception actually came into their mind due to lack of knowledge on green concpet and principles itself.

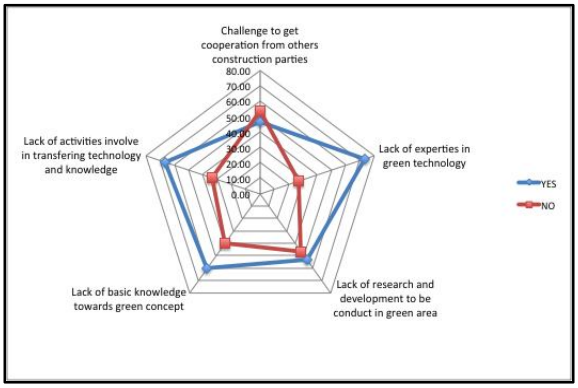


Fig.3. Perceived barriers in perspective of knowledge.

Figure 3 stating about perceive barriers in perspective of knowledge. There are five questions under these factors leads to the barriers in implementing green concept among Sarawak construction's players. The questions has been tested to the respondents as follow: challenge to get cooperation from others construction parties, lack of expertise in green technology, lack of research and development to be conduct in green area, lack of basic knowledge towards green concept, and lack of activities involve in transferring technology and knowledge. The highest percentage goes to lack of expertise in green technology with 74% follow by 67% for lack of activities involve in transferring technology and knowledge. 60% said that lack of basic knowledge towards green concept, 53% said lack of research and development to be conduct in green area. Unfortunately, 53% said 'no' to the statement of challenge to get cooperation from others construction parties.

From the data analyzed, in the scope of cooperation they do not facing any issues on that because they said that they may get cooperation even from their competitors to make project successfully deliver. But the major concern its on the expertise to practice this green concept. The problem raise due to lack of knowledge transfer among them especially to receive knowledge transfer from peninsular Malaysia expertise on this concept. They have to bring their staff to attending seminars or workshop to peninsular instead of to having those training in their state itself. This may linkage to the lack of knowledge on the basic principle of green building itself.

Furthermore, lack of research and development towards this concept it's one of the perceive barriers to implementing this concept. Most of the institution especially higher learning institution, the approach and the research still below average in conducting a research in sustainable construction and green building construction as well. This also one of the contribution's why this implementation still below average and still under par when comparing with those construction's players in peninsular Malaysia especially in Klang Valley.

With a better approach to overcome all the stated perceives barriers in time, cost and knowledge perspective, this concept can be successfully implementing to all project in Sarawak. The green building project especially in residential types of project still in minimum number, an awareness on the principle, criteria and benefits on green residential must be spread among all especially to the potential buyer.

CONCLUSIONS

Several recommendations that can be speed up to overcome the barriers; providing knowledge and training like organizing seminar, talk or workshop and conferences to educating the 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. Even green concept it's a slightly higher investment at initial stages, but then, it is still a good investment to be consider for long-term and by implementing this concept its bring different character and interpretation from conventional project.

The state government must ensure all the parties involves like 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 of 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 to promoting and to enforce to the public, the benefits can generating from this concept it's still valuable to accept and to be consider as well.

Finally, stakeholders' actions are influenced by the market situation and demand from the buyer. To increase buyers demand for 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 play in the design of the building so that can attract those potential buyer to consider on this green project. Based on 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 sustainably and greener project in the future. These are the point that should put into an account to make them ready to implementing 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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