The Descriptive Study on Green Building Implementation in Malaysia Construction Project: Industry Perspective

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ABSTRACT

Green building is the foundation of the sustainable construction development. Construction industry with the high contributes with gross domestic product, has undeniable impacts on the economy. Although Green buildings provide a wide range of benefits for the society, green building development suffers from different kinds of market barriers in developing countries including Malaysia. In order to meet green building implementation in Malaysia, this study aims to identify the barriers of implementation green building in in Malaysia construction project. In this research, the respondents were stratified random sampling selected from the professionals of Malaysian construction industry across the country and the method applied for collecting data is questionnaire survey. All the questionnaires were sent out to the respondents manually. A total of 159 sets of questionnaires were sent out and 118 (74.21%) questionnaires were received. The quantitative method was used for analyzing data through SPSS version 21. The results concluded that procurement issues of higher investment cost and drive innovation are main barriers and strategies in achieving green building.

INTRODUCTION

The construction industry is regarded as an essential and highly visible contributor to the process of growth of one country. Nevertheless, the adverse impacts to the environment lead to a growing realization and acceptance throughout the world that there is a need for a more responsible approach to the environment. A strategy for sustainable construction is a significant milestone on the road to a more socially and environmentally responsible. It creates a framework within which the industry can make a strong contribution to the better future. Building sustainably has many merits but applying this concept is not easy as it requires changes to the old ways. Delivering sustainable construction requires action from all engaged in constructing and maintaining the structure or building including those providing design, consulting and construction services [1]. To increase the consideration to sustainability, the construction practitioners must be willing to change their behavior in exploring new territory and willing to adopt new products, ideas, and practices [2]. Because of the merits and the growing interest on building sustainably, the race is now on for researchers and construction practitioners worldwide to put their best foot forward and initiate actions to reduce the negative impacts of development and sharpen their competitive edge. As global interest on sustainability has steadily blooming, Malaysia should not fell short in its attitude on sustainability and sustainable construction. Malaysia needs to demonstrate that it can abide by this new interest and can compete in the global market. The establishment of green buildings is not only from the aspects of energy efficiency, water, material, and land use but also comfort, health, environmental sustainability aspects, and the benefits of building owners (see Table 1.1).

Table 1 Barriers of The Green Building Concept Implementation in Some Countries [3]

Rating tools name	BREEAM 2013	LEED	CASBEE	Green Star	Green Mark 4.1	Green Building Index	DGNB 2011	Greenship ver 1.2
Found year	1990	1993	2001	2003	2005	2009	2009	2009
Country	UK	USA	Japan	Australia	Singapore	Malaysia	Germany	Indonesia
a. Site development	5%	24%	17%	7%	22%		23%	17%
b. Transport	8%			9%				
c. Energy conservation	27%	32%	17%	25%	61%	35%		26%
d. Water efficiency	8%	9%	8%	14%	9%	10%		21%
e. Material resources	11%	13%	8%	13%		11%		14%
f. Indoor health & comfort	9%	14%	17%	15%	4%	21%	23%	10%
g. Building management	20%		17%	9%		16%	10%	13%
h. Pollution	5%		17%	8%				
j. Waste	6%							
j. Innovation (green features)	2%	6%			4%	7%	23%	
k. Regional priority		4%						
l. Economic							23%	

Table 1 shows that the concept of green building starts to implement from developed countries then experience adaptation and adoption by developing countries in the world. Therefore, in general green building rating tools accommodate the building's achievement in sustainable concepts such as economic aspects, environmental development, level of knowledge [4], and regional policies. They will test towards aspects of sustainability, efficiency, comfort, and manageability [5]. Therefore, an assessment of the key success factors in implementing the green building concept is an effort to count the number of buildings in each country to know the growing number of the users' concept. Based on data showing that of all countries with ownership of green building rating tools, Indonesia is the country with the lowest growth of three buildings annually compared to several countries in Asia such as Hong Kong, Singapore, and Malaysia, shows 48, 170, and 35 buildings annually from 2009 to 2013 [3].

Objectives

The objectives of this study are as follow: to identify the barriers of implementation green building in Malaysia construction project, and to suggest the strategy to improve the implementation of Green Building in Malaysia construction project.

METHODOLOGY

This study employed the questionnaire survey method. The collection of primary data was carried out by using a structural questionnaire form. The later for this study consisted of a few different types of question namely opened as well as closed ended question. Majority of the question comprised of closed ended question, whereby the respondent was asked with question which required them to answer by selecting the answer given. The survey is measured using likers-scale technique, where five answer choice are given to each of the questions: strongly disagree (1 point), disagree (2 point), neutral (3 point), agree (4 point) and strongly agree (5

point). Prior to data analysis, all the data collected were first processed. Data processing includes checking, verifying, coding, and cleaning data. Basically, descriptive statistics were used to analyze the frequency, percentage and mean for each of question according to their suitability. The questionnaire surveys were distributed to 159 relevant respondents were returned forms. After the cleaning process, eventually 118 (74.21%) forms were found suitable for further analysis. The data collected was later analyzed using SPSS version 21. Some relevant findings are deliberated in the following sections.

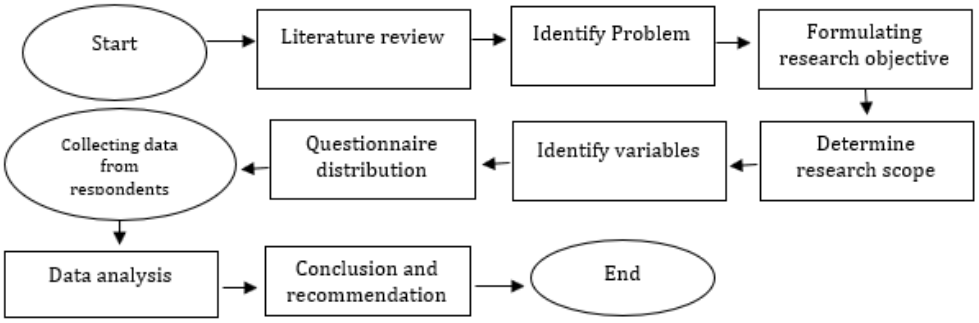

Figure 1. Research process for barriers of the green building concept implementation.

DATA ANALYSIS AND FINDING

Demographic Information

The importance of demographic information cannot be undermined for a meaningful quantitative analysis. During the empirical survey, background and general information from the respondents were also sought. In term of type of race involved, table 2 exhibited that majority (78.8%) of the respondents were from the Malay. Seconds, (18.6%) of the respondents were from the Chinese and (2.5%) of the respondents were from the Indian. For the nature business shows the highest number of respondents from contractors (66.9%), followed by consultants (11.0%) and the next was developer / client (17.8%) and lastly others (4.2%). Other than that, type of working experience also involved, it is shows among of them had experience less than 5 years (34.7%), 5-10 years (35.6%) and the lastly more than 10 years (29.7%). The result shows for position in the project are (19.5%) from project manager, (11.9%) from engineer, (27.1%) from company director and lastly others (41.5%). Form the survey conducted, (35.6%) respondents that have Diploma, followed by (31.4%) respondents that have Degree, next (10.2%) respondents that have Bachelor, (6.8%) respondents have PhD and lastly others have (16.1%) for academic qualification.

Table 2 Respondents by Race

Demographic Features		Frequency	Percent (%)
Race	Malay	93	78.8
	Chinese	22	18.6
	Indian	3	2.5
Role	Contractor	79	66.9
	Consultant	13	11.0
	Developer/Client	21	17.8
	Others	5	4.2
	x<5 years	41	34.7

Experience in construction industry	5≤ x <10 years	42	35.6
	x ≥ 10 years	35	29.7
Position in the project	Project Manager	23	19.5
	Engineer	14	11.9
	Company Director	32	27.1
	Others	49	41.5
Educational Qualifications	Diploma	42	35.6
	Degree	37	31.4
	Bachelor	12	10.2
	PhD	8	6.8
	Others	19	16.1

Based on Master Plan and 10th Malaysia Plan, government has to develop green building concept in order to preserve natural resources and enhance urban life quality for the residents. To explore which barriers to green building are most the important compared to other ones in construction industry in Malaysia, respondents were asked to rate their importance in different levels of each item. Data were analyzed based on the Mean and standard deviation (Table 3).

Table 3 Barriers of implementation Green Building in Malaysia

Barriers Implementation Green Building in Malaysia	Mean value	Std. Deviation	Rank
Procurement issues of higher investment cost	3.93	0.958	1
Higher final price	3.91	0.906	2
Lack of professional knowledge	3.77	0.973	3
Lack of database and information	3.77	0.999	4
Lack of public awareness	3.70	1.024	5
Lack of credit resources to cover up front	3.70	1.007	6
Failure to achieve economic scale	3.70	0.909	7
Lack of strategy to promote green building	3.61	1.078	8
Lack of design and construction team	3.61	1.078	9
Lack of government enforcement	3.60	1.071	10
Lack of technology	3.53	0.949	11
Risk and investment	3.53	0.931	12
Lack of incentive	3.52	1.044	13
Lack of green building resources	3.47	0.967	14
Lack of demand	3.46	1.018	15
Lack of professional competencies like engineer/ project manager/ construction personnel	3.41	0.972	16
High carbon emission and energy usage of green building	3.39	1.005	17
Lack of government support	3.34	1.048	18
Lack of building codes and regulation	3.23	0.937	19

The major barriers are procurement issues of investment cost. Second, higher final price and third lack of professional knowledge. While the minor barriers are lack of building codes and regulation. Second, lack of government support and third high carbon emissions and energy usage of green building. Procurement is the most important part in green construction as it incorporated all activities in the construction project such as knowledge, manpower, equipment,

and materials sourced for management services required in the accomplished of project objectives [6]. According to green procurement practices, the environmental criteria should be considered from the early stage of planning [7] and tender assessment where the evaluation will be conducted during the progress of procurement.

Table 4 Strategies for achieving Green Building

Strategy	Mean value	Std. Deviation	Rank
Drive innovation	4.08	0.892	1
Promote and raise	4.06	0.909	2
Irresponsible waste via regulations	3.92	0.839	3
Drive compliance to green building requirement	3.73	0.903	4
Awareness of professional about green building	3.73	0.921	5

It has been observed that are five strategies considered importance to achieving green building (see Table 4). The major strategy is drive innovation in drive innovation in green building. Second, promote and raise green building practice and third reduce irresponsible waste via regulations such as build recycling centre for construction and demolition waste in priority areas. There are various strategies for achieving green building and practices adoption that have been addressed in previous studies. For example, government's co-funding and incentives, policies and regulations for green development, and collaboration with research institutes and firms to study the benefits of green business parks have been identified as the most feasible solutions for overcoming the significant barriers to the adoption of green business parks, thus promoting green business parks adoption [8].

In addition, widening the coverage of government incentives to include the usage of green products and technologies, developing a project management framework for green construction, educating owners on the future benefits of green buildings, organizing construction tours to educate the public about the benefits of green building, and subsidy from government for research and development (R&D) in green building systems and management have been identified strategies to promote the adoption of green building [8].

CONCLUSION AND RECOMMENDATION

This paper reports the results of a survey conducted in Malaysia on the barriers and strategies for achieving green building. The level of green building development from procurement issues of higher investment cost and drive innovation are most important barriers and strategies have been identified. The findings suggested that to improve the barriers and strategies on implementing green building, the government roles especially on incentive instruments such as structural incentives, subsidy and rebate program, tax incentive scheme, low interest mortgage loan, voluntary rating system and market and technology assistance are the significant drives for eliminating barriers to green building development. Other than that, professionals' knowledge also the barriers of implementing green building in their development. Besides that, some strategies can be suggested such as;

Enforcement by the Government

- Enforcement by the Government should play an important role in implementing green building in every construction project [9]. The government also needs to emphasize any contractor in applying green buildings.

Professional Knowledge

- The government should expose the concept of green building to contractors such as holding a seminar on green building [10].

Irresponsible Waste via Regulation

- Government should build recycling center for the residual construction and demolition in the area of priority.
- Government also have strengthened enforcement of illegal dumping and introducing taxation mechanisms on excessive waste.

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