

A Study on the Challenges for Sustainable Construction Management Among Contractors in Malaysia

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Abstract: The development of the construction industry has led to environmental issues. The negative environmental implications led to an increase that there is a need for sustainable and accountable approach especially to construction players in addressing environmental issues. Limited number of sustainable project in Malaysia show that building industry is at primarily at the early stage of adopting the notion of sustainability. This research objectives is to identify the challenges for the implementation of sustainable construction at construction sites and to identify the most critical challenges for the implementation of sustainable construction at construction sites specifically among contractor grade G1 to G7 in Selangor state. The technique of identifying elements was gathered through extensive literature research. The research conducted via questionnaire. The questionnaire were evaluated by expert review to fit the unique industrial context. Changes are made to the questionnaire based on comments from an expert review. Questionnaires was then distributed to industry player in construction industry. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) software. The Cronbach's Alpha approach were used as the internal consistency in reliability analysis. The result from that Cronbach's Alpha value is 0.903 was exceeded 0.7 which made it very reliable and the most critical challenges for the implementation of sustainable construction at construction sites is sustainable construction require longer construction execution duration and specialized manpower traits. As a conclusion the two objectives of this study are achieved by analyzing the data from the questionnaire. Therefore, it is hope that this study will helps to identify the challenges for sustainable construction implementation at construction site and would benefit other academics and that the outcome would assist construction industry operators in planning and improving sustainable construction management.

Keywords: Challenges, Contractor, Construction player, Sustainable Construction

1. Introduction

Malaysia has recognized the importance of the construction sector not only in economic growth but also in improving the quality of life and living standards of Malaysians and development of the construction industry has led to environmental issues. Many of the country's environmental problems are caused by a lack of environmental concerns in resource extraction, development, and management, as well as pollution control [1]. The construction industry is one of the most major contributors to pollution, waste, and the acceleration of global warming [2]. Malaysian construction has resulted in an increase in construction waste [3]. The negative environmental implications especially in the building industry have led to an increase that there is a need for a more sustainable and accountable approach especially to all industry players in addressing environmental issues. Limited number of sustainable project in Malaysia show that building industry is at primarily at the early stage of adopting the notion of sustainability[4]. Lack of talent and ability, overlapping responsibilities among government agencies, delayed industry implementation of government initiatives, a lack of research and innovation, and cost versus advantages in terms of green technology implementation are some of the obstacles to adoption of the sustainable construction [1].

This research objectives is to identify the challenges for sustainable construction management implementation at construction site in Malaysia and to identify the most critical challenges for sustainable construction management implementation at construction site in Malaysia. The scope of this study is about the awareness of sustainable construction management among contractors in the state of Selangor, Malaysia. The awareness of the sustainable construction management will covers contractor grade G1 until G7 in Malaysia construction.

2. Literature review

2.1 Construction industry

Construction is characterized as the creation cycle of the assembled climate, which incorporates an assortment of exercises going from thought to plan and execution [2].The construction industry has continually played an essential role in national economies, adding considerably to nations' socioeconomic circumstances, GDP, and employment ratios [5]. The construction industry consumes a substantial amount of nonrenewable resources [6]. Malaysia's development growth has substantially improved as a result of the globalization drive. Malaysia's construction sector is expanding, supporting the country's economy and supplying critical infrastructure[7]. Malaysia's building industry is separated into four basic categories: office, retail, residential, and infrastructure[8]. With a registered workforce of 1.2 million, Malaysia's construction industry offers considerable job prospects for experts such as engineers, architects, planners, and surveyors, as well as skilled and unskilled construction laborers [5]. To meet the rapidly expanding demand for housing, the construction industry has moved its focus to mass manufacturing and prefabrication construction technologies [9].

2.2 Sustainability effort and incentives

Incentives are defined as anything that motivates or inspires someone to do something. The government is taking initiatives to encourage customers, developers, and contractors to use green and sustainable building practices. In the country, there are various sustainability and incentive programmed. The first one is Industrialized Building System (IBS). IBS refers to a construction system in which components are made in on-site or off-site factories, transported, and then built into a structure with minimal labor. IBS assistance provides little waste, fewer site materials, a cleaner and neater environment, controlled quality, and cheaper total building costs [10]. Next, the government provides incentives such as corporate tax breaks for companies that generate renewable energy for their own consumption, corporate tax breaks for companies that provide efficient energy conservation services, and income tax/stamp duty breaks for buildings that obtain a GBI certificate [11]. Other than that is, Site Waste Management Plant (SWMP). SWMP help to protect the environment by reducing waste and sending less material to landfill. Lastly is, lean construction. The lean construction design strategy prioritizes ecologically friendly, long-term building procedures that enable green corporate operations.

2.3 Sustainability in construction

The concept of sustainability in building and construction focused on issues of limited resources, particularly energy, and how to reduce impacts on the natural environment, with an emphasis on technical issues such as materials, building components, construction technologies, and energy-related design concept [12]. The sustainable construction idea aims to bring physical progress to society while also preserving the nature [13]. The construction industry has long been associated with negative environmental consequences [4]. The primary goal of sustainable building is to reduce the environmental impact of the sector. Sustainable development will enable economic progress and natural quality to accomplish the aims of long-term human well-being [14]. The requirement for sustainable building in Malaysia will result in less resource utilization, lower manufacturing costs, and waste management that is holistic [15]. To achieve sustainability, all operations necessary in a building project must be handled in an integrated manner [16]. Despite the fact that sustainable construction is becoming more popular, there are still challenges to putting it into practise. A study in 2013 [13] stated that the challenges to practice sustainable construction are lack of incentives, lack of building codes and regulation, higher investment cost, lack of strategy to promote green building, lack of public awareness, lack of design and construction team, lack of expertise, lack of professional knowledge, lake of database and information, lack of government support and lack of technology.

3. Methodology

3.1 Research design

This research applies a descriptive research types in quantitative survey methodology. A descriptive survey is conduct by distribute survey questionnaires to collect data from a sample of contractor grade G1 to G7 in Selangor quantitative approach.

3.2 Quantitative approach

For this research, data collection will be based on quantitative data. The quantitative data will be collected using survey research method and the survey scale is using Likert rating scale in order to identify the challenges for sustainable construction management among contractors in Malaysia.

3.3 Questionnaire design

A questionnaire is a type of research instrument that consists of a series of questions that may be used to gather information from respondents. The questionnaire consists of two parts, which is demographic profile and the next part discusses about the challenges to practice sustainable construction. For demographic profile, the characteristics to be assessed in this research are general information about the respondent such as gender, age, education level, occupation, and work experience also contractor grade. Next, part two of the questions which are the challenges to practices sustainable construction, a set of Likert scales rating questionnaire will be distributed to the selected contractor grade G1 up to G7 to measure the challenges for sustainable construction management among contractors in Malaysia. In this section, respondent were asked to answer the questions related contractor challenges towards sustainable construction using Likert Scale rating. The respondent will specify their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements. The Likert scale question that will be use is a 5 point scale. Scale response categories ranged from 1 (strongly disagree) to 5 (strongly agree).

3.4 Opinion on the questionnaire design

The expert reviewer will be chosen from among the industry participants. An expert reviewer will evaluate the topic and provide recommendations based on the substance and language of the question,

altering the scale item to fit the unique industrial context. The expert reviewer will submit his findings on paper forms given to him. Changes to the questionnaire will be made based on comments from an expert review before it is completed and used in the survey.

3.5 Data analysis

The survey data will be analyzed using the Statistical Package for Social Science (SPSS) software in this research. The data obtained from the questionnaire responses will be analyzed using descriptive analysis. The reliability research will be conducted to test the reliability of the gathered data in order to reinforce the data gained from the questionnaire.

4. Results and Discussion

4.1 Demographic profile

The demographic profile is included in Section A of the questionnaire. Demography is the study of the characteristics of a population. The results of this study shown in Table 1 are the summary of demographic profile in section A of the questionnaire.

Table 1: Summary of demographic profile

Characteristic	Frequency (n)	Percentage (%)
Total (overall)	110	100
Gender		
Male	59	53.64
Female	51	46.63
Age		
20-29 years	69	62.73
30-39 years	33	30.00
40-49 years	8	7.27
More than 50 years	0	0
Education level		
SPM	8	7.27
Diploma	48	43.64
Degree	41	37.27
Master	10	9.09
Phd	3	2.73
Occupation		
Architect	5	4.55
Assistant Engineer	22	20
Engineer	22	20
General manager	1	0.91
Project manager	17	15.45
QAQC inspector	1	0.91
Quantity control	1	0.91
Quantity surveyor	6	5.45
Site supervisor	35	31.82
Work experiences		

1-5 years	77	70
6-10 years	28	32.27
11-15 years	4	3.64
More than 15 years	1	0.91
Contractor grade		
G1	1	0.91
G2	2	1.82
G3	6	5.45
G4	0	0
G5	26	23.64
G6	1	0.91
G7	74	67.27

4.2 Challenges to practice sustainable construction in Malaysia

Section B of the questionnaire comprises the challenges to practice sustainable construction in Malaysia. The aim of this section is to know the factor of challenges to practice sustainable construction in Malaysia. In this section, the respondent required to answer the question based on Likert scale to determine the challenges to practice sustainable construction in Malaysia. The Likert scale question that be use is a 5 point scale. The answers in this section are according to the scale provided to show the level of contractor awareness towards sustainable construction in Malaysia. Scale response categories ranged from 1 (strongly disagree) to 5 (strongly agree). The results of this study shown in Table 2 are the summary of the challenges to practice sustainable construction in Malaysia in section B of the questionnaire.

Table 2: Summary of the challenges to practice sustainable construction in Malaysia

No	Challenges to practice sustainable construction in Malaysia	Level of agreement					Total of respondents
		1	2	3	4	5	
1	Lack of skillful knowledge on sustainable construction	2	5	16	73	14	110
2	Sustainable construction involves high maintenance cost	0	3	16	69	22	110
3	Lack of technology on sustainable construction	0	1	20	70	19	110
4	Lack of building codes and regulation	1	3	16	69	21	110
5	Lack of promotion on sustainable construction by	0	3	23	67	17	110

	the Government and CIDB							
6	Lack of research and innovation on sustainable construction.	0	2	17	75	16	110	
7	Sustainable construction involve high construction cost	0	1	15	73	21	110	
8	Lack of environmental awareness in resource utilization, development and management as well as pollution control	0	3	16	71	20	110	
9	Lack of database and information about sustainable construction	0	3	19	76	12	110	
10	Lack of incentives on sustainable construction by the Government	0	4	17	73	161	110	
11	Sustainable construction require longer construction execution duration and specialized manpower traits	0	2	14	79	15	110	
12	Lack of vendors in supplying project materials	0	0	13	75	22	110	
	Total	3	20	202	870	215	1320	
	Percentages	0.2	2.3	15.3	65.9	16.3	100%	

The number of respondents based on their assessment of the challenges to practice sustainable construction in Malaysia is shown in Table 2. The results indicate that the majority of respondents chose scales three to five for the majority of parameters. Only a small percentage of respondents chose scales one and two for the level of agreement for challenges to practice sustainable construction in Malaysia

4.3 Reliability analysis

Reliability analysis is a measuring approach that allows researchers to evaluate the consistency of measurements. It is most often used when there are numerous Likert questions in a questionnaire that create a scale and to determine if the scale is reliable. The results of this study shown in Table 3 which is Cronbach's Alpha value for the challenges to practice sustainable construction in Malaysia

Table 3: Cronbach's Alpha value for the challenges to practice sustainable construction in Malaysia

No	Challenges to practice sustainable construction in Malaysia	Mean	Standard Deviation	Cronbach's Alpha
1	Lack of skillful knowledge on sustainable construction	3.836	0.591	0.903
2	Sustainable construction involves high maintenance cost	4.000	0.453	
3	Lack of technology on sustainable construction	3.973	0.390	
4	Lack of building codes and regulation	3.964	0.526	
5	Lack of promotion on sustainable construction by the Government and CIDB	3.891	0.461	
6	Lack of research and innovation on sustainable construction.	3.955	0.371	
7	Sustainable construction involve high construction cost	4.036	0.362	
8	Lack of environmental awareness in resource utilization, development and management as well as pollution control	3.982	0.436	
9	Lack of database and information about sustainable construction	3.882	0.377	
10	Lack of incentives on sustainable construction by the Government	3.918	0.439	
11	Sustainable construction require longer construction execution duration and specialized manpower traits	3.973	0.336	
12	Lack of vendors in supplying project materials	4.082	0.311	

The sample size required for this survey was 100 respondents, according to the sample size calculation algorithm. The reliability analysis used are Cronbach's Alpha test. From Reliability Analysis using Alpha Cronbach's method through SPSS software can be seen based on Table 3. From Table 3, the

value of Cronbach's Alpha is 0.903. The outcome proved that the reliability and consistency of parameters by Cronbach's Alpha value generated was exceeded 0.7. Overall the challenges to practice sustainable construction in Malaysia reliable and acceptable results using the method of Reliability Analysis.

Conclusion

Based on the overall findings, the results of this study are summarized based on the identified objectives and the analysis of the data. Overall, the two objectives of this study are achieved by analyzing the data from the questionnaire. Based on first objective which is to identify the challenges for sustainable construction management implementation at construction site in Malaysia obtained that majority of respondents chose scales three (moderate) to five (strongly agree) for the majority of parameters about their level on agreement on the challenges for sustainable construction management implementation at construction site in Malaysia. The challenges identified are lack of skillful knowledge on sustainable construction, sustainable construction involves high maintenance cost, lack of technology on sustainable construction, lack of building codes and regulation, lack of promotion on sustainable construction by the Government and CIDB, lack of research and innovation on sustainable construction, sustainable construction involve high construction cost, lack of environmental awareness in resource utilization, development and management as well as pollution control, lack of database and information about sustainable construction, lack of incentives on sustainable construction by the Government, sustainable construction require longer construction execution duration and specialized manpower traits and lack of vendors in supplying project materials The Cronbach's Alpha method used in Reliability analysis showed that the Cronbach's Alpha value is 0.903 which is very reliable and acceptable as it exceeded 0.7. Next, based on the second objectives, the result shows that from 12 challenges to practice sustainable construction in Malaysia listed on the questionnaire, the sustainable construction require longer construction execution duration and specialized manpower traits got higher level of agreement which are 65.9% from scale 4 (agree) as the most critical challenges for the implementation of sustainable construction at construction sites. In a nutshell, the challenges towards sustainable construction should not be a concern for only construction players. As a reason, the respondent group should be broadened so that the all industrial player may participate in the survey and express their opinions on the challenges towards sustainable construction in Malaysia. Therefore, it is hope that this study will helps to identify the challenges for sustainable construction implementation at construction site and would benefit other academics and that the outcome would assist construction industry operators in planning and improving sustainable construction management

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