

Barriers to implementation of Sustainable Construction in Penang Construction Industry

M.F Omar^{1,*}, F.A Ibrahim¹

¹Faculty of Civil Engineering Technology, University Malaysia Perlis, Kampus UniCITI Alam Sungai Chuchuh, Padang Besar 02100 Perlis

*Corresponding author's email: mardhiah@unimap.edu.my

ABSTRACT: Penang sustainable construction industry will lead to a better construction method hence reducing the waste in construction for an instant unnecessary number of raw materials. This study was performed to determine the rank of the barriers in the construction industry. Penang construction industry had been chosen in this study because this area is consisting of a major and rapid development of the construction projects. A total of 196 questionnaires were distributed to the respondents located in mainland and island areas of Penang to the sample of 393 population companies. Data are collected through questionnaires. Based on the results, the highest mean score values are political, followed by technical, financial, management and knowledge and awareness. Sustainable construction is an item that they are aware of however insufficient action due to some barriers. Therefore, this study will help the industry to mitigate or eliminate those barriers that had been identified in this research.

Keywords: *barriers; sustainability; construction industry*

1. INTRODUCTION

According to Section (2) of the Construction Industry Development Board Act, a contractor means a person who, or a firm that, carries out construction works in the construction industry and including a foreign contractor. Modern construction methods involve proper planning and design to reduce construction time, cost and maintain overall sustainability of each project. Towards approaching the modernism of the current lifestyle, the contractor providing a building as the main purpose are too mainstream. Such as housing for shelter and office as a workplace, is not satisfied enough because the building itself only plays their main role without having any other green features. The implementation of green features in a building comes from sustainable construction. By applying this sustainable construction in the construction industry, the green building features can be achieved [1]. Sustainable construction bringing the same meaning with the green building is a practice of creating and using greener and another alternative way of construction, operation, renovation, maintenance and demolition [2]. Earth is receiving an environmental loading [3] produced by the construction industry as the major contributor. Conducting an effective construction process and improving sustainable efficiency lead to reduce the burden for the earth. Positive chance related to the

construction industry in site construction from view of the organized and convenient working environment [4] results in a sustainable industry that maintaining the environment of our earth. Therefore, Conventional building method is defined as components of the building that are pre-fabricated on site through the processes or timber or plywood formwork installation, steel reinforcement and cast in-situ.

2. METHODOLOGY

2.1 Sources of Data

CIDB is a medium of obtaining the number of registered contractors that are involved in the Penang contraction industry. The judgment and opinion are best evaluated from a grade of G7 contractor who involved in civil engineering construction only.

2.2 Research Instrumentation

This study is plotted based on the quantitative method. Therefore, a set of five-point Likert scale questionnaires had been used as a medium to achieve the related objective. A set of a questionnaire designed as the tool and evaluated by adopting a five-point Likert scale.

2.3 Pilot Study

The number of 20 participants for the pilot study is determined by using a 10% sample size need. There are total of three person who was involved in this validity test. A reliability test was performed to prove that the item in the questionnaire design is consistent with the purpose of research and the topic for each item is within the limitation of the discussed matter.

2.5 Population and Sample Size

In this study, a simple random method technique is used to determine the sample of the contractors. Therefore, a sample size of 196 practitioners was determined using the following formula recommended for such studies [5].

2.6 Collection of Data

A total of 196 questionnaires had been distributed to the sample from the population of 393 companies and only 163 responses received back, where the rate of responding was determined as 83%. At least 70% of the respond rate must be achieved [6] for considering data collected are strong enough to make an analysis. The survey research conducted by distributing a set of the questionnaire by adopting a Likert scale and collected with self-administration method.

3. RESULT AND DISCUSSION

3.1 Rank of Barriers

From the data analysis, a result was presented in Table 1 where the dimension is rank by using the mean scores values from highest to the lowest value. As the highest score of the mean value of 3.31, the dimension is represented by the political. This results in making a prediction that a politician is an important dimension related to the barriers maybe because the building codes need to be provided from our own government parties such as Public Works Department (PWD), Malaysia.

The main approached by the government parties is a compulsory element that needs to be fulfilled by the contractor who involves in construction so then the turning point is based on the government parties. If the legislation was created, then a construction industry needs to follow those rules to gain their income toward the company besides they will be compounded for not following the legislation that had been provided earlier in the project.

The second rank of the dimension is represented by the mean value score of 3.11 with the dimension element are technical. This element involving the expertise and machinery that are not fully provided in our construction industry. The multiple barriers in the element itself making the mean score value increase such as insufficient tools and machinery, a lot of non-expertise people to conduct or lead the construction activities.

In line with the topic discussed in dimension four, dimension one with the third-highest mean score value of 3.08 shows that financial problems come after the technical problems. As researcher view, both of this dimension are related each other's where the technical item needs money to perform, a small budget of the construction cost in a certain project may not helping the problems of technical to be settled down hence to gain sustainable construction is an impossible thing that can be occurred.

The rank is followed by dimension three with the mean score's numbers of 3.04 where the items are management. This can be concluded that in the current construction industry there is less issue of management in providing a sustainable construction where most of the result obtained stated that workers can take their own responsibilities towards the sustainable concept even their person in charge is not around and they even do not need a leader to supervise on them.

Finally, the bottom position of the rank goes to dimension five with the mean scores value of 3.02 and the item description is knowledge and awareness. With the scores of the lowest mean value, this situation can be stated that almost all of the respondents in the study are knowledgeable and aware of sustainable construction. This phenomenon might be happening since a sustainable construction is not really new in Penang but just need to focus more on the issues.

Technical	3.11	0.71
Financial	3.08	0.70
Management	3.04	0.66
Knowledge and Awareness	3.02	0.79

4. CONCLUSION

Referring to the five-element that had been analysed, most of the contractors in the Penang construction industry is not yet satisfied with the current level of sustainable construction. Where it can be said as sustainable construction is an item that they are aware of but insufficient action had been taken based on some barriers that had been studying for. The output of the research then will help the industry to mitigate or eliminate those barriers that had been studied in this research paper.

In order to identify the sustainable construction, the targeted respondents might be changed to variety groups of respondents, involving other grades of contractors, positions and area of the study. As the researcher already compute a study based on five major barriers, the next research can be conduct by including more than five major factors that had been consider in the study.

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Table 2: Dimension Ranking Result

Dimension	Mean	Std. Deviation
Political	3.31	0.91