

# Critical Success Factors for Sustainable Building in Malaysia

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**Abstract.** This paper is inspired by a study conducted to establish a theoretical framework for project management success factors in sustainable housing development in Malaysia. The aim of this paper is to identify critical success factors for sustainable building in Malaysia. The identification thus helps to develop an empirical framework for depicting the success factors for sustainable building. The information related to critical success factors is gathered via survey. A total of 76 out of 200 questionnaires returned for analysis. The analysis shows that five factors; effective monitoring and control, realistic schedule, ability to solve problem, understanding project objective and well allocation of resources are crucial in ensuring the success of sustainable building construction in Malaysia. These factors should be taken into consideration in developing a framework for critical success factor for sustainable building in Malaysia.

**Keywords:** Sustainable Building, Critical Success Factors and Malaysia

## 1. Introduction

The construction industry is one of the most important industries that have been underpinning the economic development of any nations. Because the nature of construction activities that change the natural landscape, it is now impossible to perform a construction activity without assessing their impact on the environment. This is largely the reason why sustainable building comes into sight. As a case in point, the Japanese construction industry is focused on reducing environmental impact through extending infrastructure service life by enhancing durability and considering life-cycle cost [1]. Despite the significance of sustainable building were widely acknowledged, there are comparably little researches have been conducted in this specific area particularly in respect to the developing countries like Malaysia. Moreover, the concept of sustainability with respect to buildings is still poorly defined [2]. The rationale of this paper is inevitably built on the ground that sustainable building is the only way for a more sustainable future.

Abu Bakar [3] conducted a comprehensive literature review and established a theoretical framework for project management success factors in sustainable housing development in Malaysia. Despite the fact that the research represents a theoretical work, it represents one of the pioneer works in the context of sustainable building in Malaysia. However, the study fails to prioritize the relative importance of the factors. Therefore, this paper aims to bridge the research gap. The ranking of critical success factors thus helps to develop a more robust empirical framework for depicting the success factors for sustainable building.

## 2. Literature Review

### 2.1. Sustainable Building

Before proceeding to a discussion of sustainable building, it is worth to note that there is a difference between green building and sustainable building. As the name implies, green building is the concept that similar to the one “back to nature” in the design of houses in the 1960s. Meanwhile, in 1970s, the concept was then developed to “energy conserving” office building [2]. In the subsequent development, Guy [4] identified five competing discourses of green building namely aesthetic, ecological, smart, comfort and community. The concept of green building is emphasized upon the building per se. The term was found insufficient in terms of its definition and application. Consequently, the paradigm has gradually shifted to sustainable building. Sustainable building has gradually captured the headline since its introduction by the World Commission on Environment and Development (WCED) in 1987. The notion then develops rapidly over the last decade. The development is not limited to the building itself. For example, sustainable development was defined as a concern of attitudes and judgements in securing long term ecological, social and economic growth in society [5]. Furthermore, the construction industry was not the innovative pioneer

towards sustainable development, the increased awareness of sustainability has led it to consider its practices and move toward a practical interpretation targeted at construction activities [6]. For the construction management practices in particular, it has no exception but comply with the dominant trend by placing greater emphasis on evaluating environmental impact. In the context of Malaysia construction industry, there are six fundamental criteria to assess the sustainability of building including energy efficiency, sustainable site planning and management, indoor environmental quality, material and resources, water efficiency and innovation.

## 2.2. Critical Success Factors (CSFs)

The concept of project success factors or more famously known as Critical Success Factors (CSFs) was first introduced in 1976 [7]. In the subsequent study, Rockart [8] defined CSFs as those few key factors absolutely necessary to reach goals. In the modern perspective, CSFs were perceived vital for managers to improve their organization in the sense that it will indicate the progress is being made in particular areas [9].

In the context of construction projects, Sanvido [10] suggested another four CSFs namely a comprehensive facility team, teamwork boosting policy, sufficient of experience in handling various aspects of facilities, and information optimization in the planning and design stage. In addition, Chua [11] identified specific CSFs for different construction project objectives of budget, schedule and quality for appropriate allocation of limited resources. Meanwhile, in the context of construction projects across geographical location, project success factors may be grouped into four COMs namely comfort, competence, commitment, and communication in large construction projects in Vietnam [12]. Similarly, comprehensive, competence, commitment and communication were perceived as critical in large-scale construction project in the Thailand construction industry [13]. In addition, employing modelling of CSFs, strategically, project control, technically, commercially, organization, and people were the CSFs identified as crucial in construction project management in South African construction industry [14]. Furthermore, eleven critical success factors: project organization; contract strategy; project planning and controlling; stable framework and conditions; stakeholder management; technical factors; nature and market conditions; objective management; top management support; interface towards surrounding projects and management of design were vital for large public projects in Norway [15].

TABLE 1: Project success factors

<b>Project related factors</b> Understanding of project objectives Size and value of project Complexity of project Effective allocation of manpower	<b>Project participant related factors</b> Competence Commitment Ability to solve problems Communication among project stakeholders Capability to adopt change
<b>Project related factors</b> Selection of effective procurement method Transparency in procurement process Competitive procurement and tendering method Shared authority and responsibility between project parties Selection of competent contractor	<b>Project management related factors</b> Effective monitoring and control Realistic schedule Well allocation of resources Adequacy design detail and specification Effective communication among project team Effective risk management Top management support
<b>Project related factors</b> Financial capability Ability to brief the project objectives clearly Client involvement Excessive demand and variation during construction Delay of progress payment to consultant and contractors	<b>External environment related factors</b> Political stability Economic stability Weather factors Social factors (Public acceptance toward project) Advancement of construction technology

Having reviewed the literature on project success factors for sustainable building, the factors can be broadly categorized into six groups namely project related factors, procurement related factors, client related factors, project participant related factors, project management related factors and external environment

related factors as shown in Table 1. The factors formed the backbone of the survey instrument, which was discussed in details in subsequent sections.

### **3. Research Methodology**

The methodological background of this study was built on the quantitative research adopting questionnaire. The idea of ranking variables is not new. Many studies have been conducted in the same vein such as in [16] and [17]. This paper followed the same research methodology. The data collection exercise was conducted from December 2011 until mid of March 2012. The targeted respondents were randomly drawn from the construction profession who have or had participated in an undertaking or completed sustainable building project. The respondents were invited to rate each critical success factors on a five-point Likert scale of 1 (no effect at all) to 5 (extremely important). To facilitate the response rate, snowball sampling was adopted, where the approached respondents were asked to distribute the questionnaire to their colleagues and partners. In addition, online survey was also used. A total of 200 questionnaires was distributed and 76 completed questionnaires were received, representing a response rate of 38%. The response rate was accepted as the normal ranges between 20-30% were found in most of the construction industry related research [18]. Prior to distribution, the questionnaire was pre-tested for comprehensibility by consulting three academics at two universities. A number of changes were suggested and implemented.

### **4. Data Analysis and Result Discussion**

The completed questionnaires were first tested for reliability and internal consistency using Cronbach's Alpha. The Cronbach's value accounted for 0.923, which is above the threshold value of 0.7 [19]. Having satisfied the reliability test, the relative important index of the variable was calculated. The process was performed using the Statistical Package for the Social Science (SPSS), version 16. From the analysis, the top five of success factors from various categories were effective monitoring and control (0.8868), realistic schedule (0.8842), well allocation of resources (0.8842), understanding of project objectives (0.8711) and ability to solve problem (0.8711). It was worth a note that the factors were the project management related factors, project related factors and project participant related factors. Out of 31 success factors, only the top five ranked factors were used in establishing the empirical framework. As for the effective monitoring and control of the project, many studies such as in [12], [20] and [21] supported the factor greatly influence the success of a construction project. Meanwhile, realistic schedule of work is a necessity to ensure productivity on site. This is due to the fact that the construction industry is surrounded by uncertainties. As such, the unrealistic schedule possesses more pressure to construction personnel and is definitely not helping in terms of productivity. Likewise, effective allocation of resources is also prominent in making sure the project is in line especially those activities fall in the critical path. In short, there are many factors affecting the outcome of a project. In fact, the factors are inherently interrelated to each other. Moreover, most frameworks of previous and existing studies tend to be exhaustive which included as many success factors as possible. As a result, the framework may become so complex that it cannot be validated [22]. To avoid this, the proposed framework in this paper is designed in a simple manner where it already covers sufficient elements if not all. The framework is shown in Figure 1.

### **5. Conclusion and Recommendation**

Given the significance of sustainable building, a list of success factors obtained from various literature sources have incorporated into a survey instrument. Construction stakeholders who involved in undertaking or completed sustainable building project were invited to rank the 31 success factors based on a five point Likert scale. Next, the top five ranked success factors were selected for developing a framework as shown in Figure 1. The framework could be helping project managers in making a decision in the sense that the factors are crucial and should be gained more focus. As this paper covers only success factors of sustainable building, it is a logical step that success factor should come in pair with success criteria as well. In a sense, the success factors help to develop good measures or more popularly known as criteria or performance indicators. The limitation of this paper lies in the rather small sample size. It is generally agreed that a sample size of more than 100 is needed to obtain a robust result. However, this should not be overlooking the

contribution of this paper given the reliability of variables still attainable. Moreover, this paper serves only as an exploratory research. More empirical research should be conducted to obtain a reliable framework. Given the limitations, future research should be focused on several issues such as sample size, research method (more robust method like principal component analysis and confirmatory factor analysis) and examined success factors from case studies to achieve methodological pluralism.

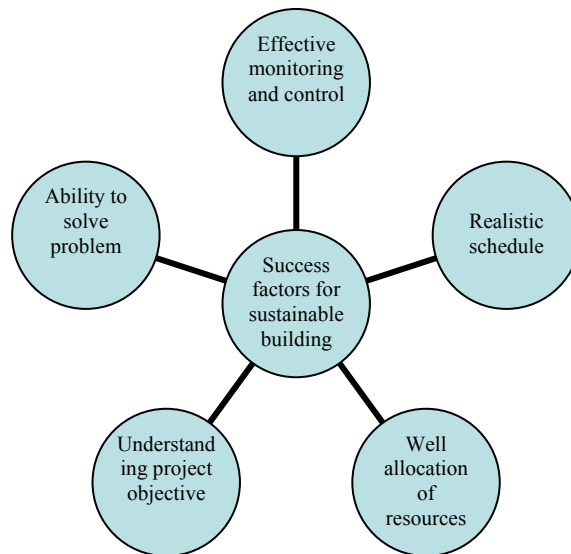


Fig. 1: Critical Success factors for sustainable building in Malaysia

## 6. Acknowledgements

The paper is financed by the Grant for Research University (GUP) of the University of Technology Malaysia, Johor for research funding under Cost Centre No. Q.K130000.7140.00H47. The authors thank Ministry of Higher Education (MOHE), University of Technology Malaysia (UTM), Research Management Center (RMC) and Innovative Construction Research Alliance (ICON) for the support given to carry out this study.

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