THE IMPLEMENTATION OF GREEN BUILDING IN MALAYSIAN CONSTRUCTION INDUSTRY: DETERMINATION OF KEY SUCCESS FACTORS

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ABSTRACT

Green building has become increasingly on demand and important in Malaysia, however, still has not become the interest of all groups in the construction industry. Practically, green buildings should be designed and operated to reduce the overall impact of the built environment on its surroundings. Therefore the objectives of this research is to determine the key success factors of the green building implementation in Malaysia from the architect's perception. In order to achieve the objectives of the study, a comprehensive review of literatures and questionnaire survey were carried out. The architect was chosen as the respondents to gather relevant data and information for this research. The data was analysed and the results concluded that providing education and training to construction practitioners on green building concept and technology, increase clients awareness and government initiatives to enhance the understanding and implementation on the green building

construction are the key success factors to increase the implementation and involvement of Green Building amongst the architects.

Keyword: Awareness; Green Building; Architects; Key Success Factor.

1.0 INTRODUCTION

Green buildings are buildings or structures that have less impact on the environment compare to conventional buildings. Green Building is the efficiency of resources used which is energy, water, and materials-while reducing building impact on human health and environment during the building's lifecycle, through better sitting, design, construction, operation, maintenance, and removal (Greenbuildingindex.org). Referred to ASTM (2205), Green Building is defined as "a building that provides the specified building performance requirements while minimizing disturbance to and improving the functioning of local, regional, and global ecosystems both during and after its construction and specified service life".

Green building is also known as a sustainable or high performance building" (Fischer, 2010). In addition, Colliver (2007), Owens &Halfacre-Hitchcock (2006) and Richardson &Lynes (2007) indicates that the expected output of a green building is that it will use less energy, less water, produce less waste and create a more liveable environment for its habitants and surrounding community, throughout the building's lifetime. It is working towards zero fossil fuel use, zero greenhouse gas emissions, zero potable water use and zero sanitary waste entering municipal systems (Cole,

1999).While, as stated by Richardson &Lynes (2007), Green Building is described as a building that is more energy and resource efficient, releases less pollution into the air, soil and water, and is healthier for occupants than standard buildings. Green building is a type of development that seeks to increase the sustainability and efficiency of buildings and development (Retzlaff, 2009).

Principally, Malaysia is facing challenges in implementing green building in the construction sector. The main issue to slow progress and reluctance in getting involved in green buildings is due to lack of awareness from construction practitioners such as consultants, contractors and clients (Abidin, 2009). Elforgani & Rahmat (2012) agree that lack of previous knowledge of a design team may contribute to a significant risk and affect to the overall project performance. Stewart et al as cited in Elforgani & Rahmat (2012) found that the key barriers of applying green building features are team knowledge and understanding of green rating systems. Shari et al.(2008) argued that the Malaysian building industry players have "insignificant" knowledge on sustainability in general as well as on Green Building Rating Systems (GBRS). This is supported by Esa et al. (2011)in their research study that, lack of awareness from the consultants, and clients is the key issue to the slow progress and reluctance in getting involved in green buildings. It is proven by Said et al. (2009) in their research findingsstated that there will always be demand for sustainability, but due to lack of awareness among clients, consultants and contractors, the implementation is very poor. Therefore, awareness of the environmentally-friendly buildings and products must be heightened not only to the relevant parties in the building industries but also to the general public so that demand for green building can be increased. Hence, this research study is focused on the identification of the success factor from the perspective of architects toward green building construction.

2.0 LITERATURE REVIEW

2.1 Overview of Green Building

Construction is a multi-organization process, which includes the participation of client/owner, designer, contractor, supplier, and consultant. It is also a multi-stage process including conceptual, design, construction, maintenance, replacement, and decommission (Xue et al., 2007). To achieve sustainability within the building industry, a broader life cycle perspective should be used (from a structure's conception to the end of its service life, and from raw material extraction to a building's demolition or dismantling). According to Alwaera & Croomeb (2008) and Graham (2003), the design phase is the most important phase in determining the green performance of construction projects. This is due to more than half of construction mistakes were caused by design insufficiency. Elforgani & Rahmat (2012) in their study stated that the roles and responsibilities of design professionals must be clearly stated, described and classified to ensure that the green practices that they are responsible for are developed, refined and applied from the beginning of the project. Danielle study's (as cited in Elforgani & Rahmat, 2012) indicates that if roles and responsibilities are not assigned, green initiatives might potentially be mistaken or cut out.

Olga and Tyas (2003) said that if we simplify a project to be a design problem with technical and non-technical design issues, architect's roles and engineer's roles could be described as two different professionals working within a team. Architects hold the dominant position of authority in the design process. Architects are the professional people who are the natural leader of the process in the design of the building. Olga and Tyas (2003) see that architects are dealing with a humanism concept in the

building and provide creative imagination. That means, the architect comes up with the concept for the project which taking into consideration contextual, physical, social, political, and functional issues.

2.2 Key Success Factors of Green Building Implementation

Sustainable construction is seen as a way for the construction industry to contribute to the effort to achieve sustainable development (Abidin, 2009). The success factor in the green building implementation comes from the awareness of stakeholders, project teams, and various construction parties. According to Abidin (2009), the path of achieving the success of green building construction are awareness, interest knowledge, acceptance, demand, commitment, implementation, experience and improvement. It is essential to create awareness to the public because it is the pioneer to the achievement. When interest developed, knowledge on the green building construction will be gained and it can create new demand for the building. Knowledge is developed when the project's teams are aware and have interest in constructing the green building.

2.2.1 Growing Awareness

Awareness provides information to public, building design team, stakeholders and construction team about the operation and maintenance of the green features of the building (Zigenfus, 2008). With the help of green building certification programs from around the world, it can be the guidance to the public and the construction project team on the importance of green building. Many parties should also possess the awareness towards the healthy living and good environment condition. Yudelson (2012) states that awareness should be grown and pressured on design team and

companies to conduct sustainable operations. When the sustainable operations have been established, the impact on demand for green buildings will have an improvement. Besides that, growing awareness of the role played by buildings in carbon dioxide emissions potentially can give a huge impact on measures to reduce building energy use (Yudelson, 2012).

2.2.2 Government Initiatives

In Malaysia, according to Chua and Oh (2011), National Green Technology Policy (NGTP2009) is an important policy for "going green". NGTP was launched in 2009 which marked an important point at spurring the country's green development. The mission of NGTP 2009 is aimed at current progress and improvements made in major sectors such as energy, buildings, water and waste management, transportation and, Reseach and Development (R&D), innovation and commercialization through local and multi-national collaboration.

Referring to the Tenth Malaysia plan for year 2011 to 2015, NGTP2009 are in an effort to increase the public awareness and commitment to the adoption and application of green technology. It also aims on the widespread the availability and recognition of green technology in the local market. In addition, the foreign and domestic direct investments in green technology are to be expanded during these years. Sequentially, the effort in expansion of local research institutes and institutions of higher learning are done. The efforts from NGTP2009 are very helpful in the factor of the success of green building technology implementations. The successive efforts on eleventh and twelfth plan are also can drive the success of the green building project in Malaysia to be implemented and expanded. In addition, the government promised to cover the

loan's interest rate of 2% and providing 60% of the guarantee for the financing (EnvDev Malaysia, 2010). Other than that, the government has taken action by offering incentives of tax exemptions to development which adopts energy efficiency and integrate renewable energy which is in the form of income tax, import duty, sales tax, and investment tax allowance (KeTHA, 2010).

An important initiative called the Green Building Index (GBI) was launched three months beforeNGTP2009. GBI was launched by Malaysian Institute of Architects (PAM) and the Association of Consulting Engineers Malaysia (ACEM) on 2009. The purpose GBI is to enable green grading and certification of Malaysian buildings. GBI is a rating system providing a comprehensive framework for building assessment, which is similar to BREEAM (UK), LEED (USA), Green Star (Australia) and Green Mark (Singapore). Chua and Oh (2011) state that Malaysia's GBI focuses on indoor environmental quality, sustainable site planning and management, materials and resources, water efficiency and innovation. GBI has simplifies and standardized the green building concept in Malaysia so that there is no misunderstanding happen. GBI define green buildings by establishing a common language and standard of measurement. Other than that, it promotes integrated whole building designs that provide a better environment. In addition, they recognize and reward environmental leadership and transform the built environment to reduce its negative environmental impact. Lastly, GBI ensures new buildings remain relevant in the future and existing buildings are refurbished and upgraded to non-governmental and profession driven green rating tool developed for the tropical climate (Chua and Oh, 2011).

2.2.3 Training and Education

To gain success in the implementation of green building, Shafii & Othman (2007) and Isabel & Cyril (2007) studies' was recommended that education and training must include the green development concepts and to make it well known and acknowledged by all people. Therefore, providing education on the said success factors can lead to the success of green building implementation. Trainings for the design team on the understanding of green building also one of the initiatives that can contribute to the success of green building. According to Durmus-Pedini & Ashuri (2010), the possible remedies to increase the implementation of green building, are establishing and/or sponsoring education programs for the industry professionals, preparing a knowledge portal for historical data of performance and lessons learned in order to reach best practices, preparing database for green materials for their performance and test results, and establishing easy access education programs for the real estate, finance, insurance and related professionals.

In United States, Kibert (2008) found that industry professionals taking action to educate members and integrate best practices in green building technology. Therefore the Malaysian government together with *PertubuhanAkitek Malaysia* can bring in foreign experts and at the same time, provide training so we can have our own experts as *PertubuhanAkitek Malaysia* (PAM) and *JabatanKerja Raya* (JKR) can play a role in making it compulsory for all architects and engineers to understand green buildings basics by conducting compulsory training and classes.

3.0 METHODOLOGY

Data collection is the utmost important stage in this study in order to achieve the desired objectives within the scope of work. This studycollected data by hand distributed to the architect's firms in Klang Valley and through email. There is 125architect's firms were chosen from overall population of 255 for the study by using random sampling. The targeted respondents are the architects work at the company. The survey was conducted from March 2014 to January 2015. The numbers of returned questionnaires are 82 respondents. The respondents were asked to rate each variable for the construct of awareness and key success factor on a five-point Likert scale to indicate the level of awareness and success factor, ranging from "1" equal to "Strongly Disagree" to "5" equal to "Strongly Agree".The data were analysed using SPSS (Statistical Package for the Social Sciences) version 21 software to produce descriptive statistics. These results were presented in the form of tabulation. This research paper will guide the result obtain from the quantitative result to determine the research outcome to be parallel or not with the referred research paper. As the result is compared with the literature, the conclusion is made and the recommendation for the future research could be obtain.

4.0 RESULTS AND FINDINGS

4.1 Demographic Background

Based on Table 1, there are 125 respondents was selected and only 82returnedthe questionnaire given. Table 2 shows that, the lowest percentage is the company established for a period

less than 5 years, which represent 5% (4). About 33% (27) of the companies will be established within 5 to 10 years and the rest of the companies which represent 9% (7) have been establishing for more than 15 years. Overall of the companies were established within 10 to 15 years, which are resultingof54% (44). It shows that most of the companies have more experience in the construction industry for both building and civil works.

Table 1 also shows that, most of the companies have an experience and had involved in green building construction. There are about 45% (37) numbers of companies who involve in green building for the period within 10 to 15 years. There are no companies that involve in green building construction for more than 15 years and about 37% (30) companies involve in green building less than 5 years. From the results, it can be concluded that most of the respondents have an experience in the green building construction within 5 to 15 years. It is due to the facts that, green construction is newly introduced and promoted in Malaysia construction industry especially for the new designer firms.

Table 1: Demographic profile of the respondents

	Description	Architect (n=82)	
		Frequency	Percentage
Company Years of Establishment	< 5 years	4	5%
	5 - 10 years	27	32%
	10 - 15 years	44	54%
	> 15 years	7	9%
Numbers of years involve in green building construction	< 5 years	30	37%
	5 - 10 years	15	18%
	10 - 15 years	37	45%
	> 15 years	0	0%

4.2 Key Success Factor

This section will determine the key success factors of green building implementation in the Malaysian construction industry from the architect's perspective. Key success factors are those factors that might be critical but only to some variables and not all. Critical success factors and at that point there is no difference between key and Critical success factors in terms of importance. Finding of key success factors can be used as a benchmarking to the construction parties in implementing green building in the construction industry. Table 2 shows the result of the success factors towards green building implementation from the perspective of architects. From the result, the findings will be gained to achieve the objective to determine the key success factors of the green building implementation in Malaysia. In this section, there are 8 variables that indicate the key success factors of green building implementation. All the variables were allocated in the questionnaire based on the literature review on this subject. Table 2 shows that all of the respondents are agreed with all the variables of success factors towards green building implementation in Malaysia. The average score mean is 4.32, which indicated the agreement of the respondents on the statement of success factor.

Based on the table, providing education and training to the construction practitioners is one of the main factors contributed to the success of the green building implementation from the architect's view of point which resulting the highest score mean among other factors (score mean=4.60). It shows that education and training is very important to all stakeholders to enhance knowledge and level of understanding of the green building issue in Malaysia. Supporting and initiatives from the government also are among the other factor lead to the successful of the green building implementation. Most of the respondents have

agreed with the statement on the benefit gained from the government by implementing green building such as tax exemptions by the government (score mean=4.45), government promise to cover 2% of the interest rate under the Green Technology Financing Scheme (score mean=4.32) and exempts the stamp duty on instruments (score mean=4.18).

Table 2: Key success factors of green building implementation in the perspective of architects (n=82)

Item	Question	Mean	Rank
1	Increase clients' awareness on the benefits of green building can stimulate the construction of green building.	4.56	2
2	Consultants' company must have the commitment to offer affordable green building service to clients.	4.16	6
3	Make it convenient for developers to get loans from the financial institutions to embrace green building development.	4.16	7
4	Provide education and training to construction practitioners on green building concept and technology.	4.60	1
5	Tax exemptions given by the government	4.45	3
6	The government promise to guarantee 60% of the finance under the Green Technology Financing Scheme.	4.16	8
7	The government promise to cover 2% of the interest rate under the Green Technology Financing Scheme.	4.32	4
8	The government exempts the stamp duty on instruments of transfer of ownership to the house buyers who purchase buildings that come together with Green Building Index (GBI) Certificates.	4.18	5
	TOTAL (MEAN)	**4.32**	

A total of 8 variables that determine the success factor in implementing green building according to the architect's perspective, the top five variables that have been highlighted from the survey results are; (1) provide education and training to construction practitioners on green building concept and technology (score mean= 4.60), (2) increase clients' awareness on the benefits of green building can stimulate the construction of green building (score mean= 4.56), (3) tax exemptions given by the government (score mean= 4.45), (4) the government promise to cover 2% of the interest rate under the Green Technology Financing Scheme (score mean= 4.32), and (5) the government exempts the stamp duty on instruments of transfer of ownership to the house buyers who purchase buildings that come together with Green Building Index (GBI) Certificates (score mean= 4.18).

5.0 CONCLUSION

This paper concludes that most of the architects are aware with the green building technology in Malaysia and they also know their roles and responsibilities for this type of construction. This paper also anticipate to highlight the key success factor to assist all the architect firms in realizing and implementing the green concept in their design. Among key success factor determined from this study are provide education and training to all construction practitioners, increase clients' awareness on benefit of implementing green building and introduced incentive through tax exemptions. This research study hope could give some benefits and contributions to the construction participant especially to the designers in order to make green building implementation in Malaysia most successful.

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