THE ROLE OF CON ... GREEN BUILDING PRACTICE IN RESPONSE TO THE CLIMATE CHANGE

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ABSTRACT

The construction and operation of building contribute to environmental impacts. There are existent and emerging options to improve our environment performance which are called as green building practices. Green building significantly can reduce environmental impact. The main organization promoting building techniques and green practices in Malaysia is the Standards and Industrial Research Institute of Malaysia (SIRIM). However, they are now put in a new rating system called Green Building Index (GBI). The GBI rating system provides a huge number of opportunities for developers to construct and design sustainable building. Green building brings advantages to social, economic and environmental aspect. However, one of the challenges in widespread Green Building practices is finding person that are knowledgeable to implement green design in the project. Thus, there is important for consultants that have a great knowledge to play their role in widespread Green Building practice. Objectives in this research are to determine the responsibilities and the role of consultant in increasing the use of Green Building, to determine the consultant's primary barriers in increasing green building practice and to suggest strategies in lowering those barriers in order to encourage consultant to adopt more environmentally responsible practices. The data presented in this thesis are derived from both interviewer and responses to a questionnaire that completed by consultant. The role as Green Building consultant only can be play if there is need from the client. Hence, the consultants have to take chance to always advice or suggest client to implement GBI in their project. The major barriers are Green Building design is too expensive, the lack of expressed interest from client and the lack of training and education in Green Building design. Hence, a few suggestions had been discussed in order to lower the barriers which are educate our community about the important of Green Building practices, expand the opportunities of professional training and education in sustainable practices and government should provide economic incentives for sustainable building project.

ABSTRAK

Pembinaan dan operasi bangunan memberi impak kepada alam sekitar. Bagi meningkatkan prestasi alam sekitar, terdapat satu pilihan baru yang dipanggil amalan Bangunan Hijau. Bangunan Hijau boleh mengurangkan impak kepada alam sekitar. Organisasi utama dalam mempromosikan teknik binaan dan amalan hijau di Malaysia adalah Institut Piawaian dan Penyelidikan Perindustrian Malaysia (SIRIM). Walaubagaimanapun, mereka kini diiktiraf ke dalam satu system penarafan baru yang kini dikenali sebagai Indeks Bangunan Hijau (GBI). GBI merupakan satu system penarafan yang menyediakan sejumlah besar peluang bagi pemaju untuk membina dan merekabentuk bangunan mampan. Bangunan Hijau memberi kelebihan dari spek social, ekonomi dan alam sekitar. Akan tetapi, salah satu cabaran dalam meluaskan penggunaan amalan Bangunan Hijau adalah mencari orang yang mempunyai pengetahuan untuk melaksanakan reka bentuk hijau di dalam projek tersebut. Oleh itu, penting bagi seorang perunding yang mempunyai pengetahuan yang luas dalam menyebarkan penggunaan Bangunan Hijau. Objektif kajian ini adalah untuk menentukan tanggungjawab dan peranan perunding dalam meningkatkan penggunaan Bangunan Hijau, untuk menentukan halangan utama perunding dalam meningkatkan amalan bangunan hijau dan seterusnya mencadangkan strategi dalam meningkatkan pengguna bagi menggalakkan perunding untuk bertanggungjawab dalam menerima pakai amalan yang lebih mesra alam. Data yang dibentangkan di dalam tesis ini diperolehi daripada kedua-dua cara iaitu hasil temuduga dan maklum balas oleh perunding. Peranan sebagai pakar runding Bangunan Hijau hanya boleh dilakukan jika ada permintaan dari pengguna. Oleh itu, perunding perlu mengambil peluang untuk sentiasa menasihatkan atau mencadangkan pelanggan mereka untuk mengaplikasikan GBI dalam projek mereka. Halangan utama dalam penggunaan Bangunan Hijau adalah reka bentuk Bangunan hijau adalah terlalu mahal, kurangnya minat pengguna Bangunan Hijau dan kekurangan latihan dan pendidikan dalam reka bentuk Bangunan Hijau. Oleh itu, beberapa cadangan telah dibincangkan bagi mengurangkan halangan-halangan tersebut termasukalah mendidik masyarakat kita mengenai kepentingan amalan Bangunan Hijau, meluaskan peluang latihan professional dan pendidikan dalam amalan mampan dan kerajaan perlu menyediakan insentif ekonomi bagi projek bangunan mampan

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LIST OF ABBREVIATIONS

ACEM	Association of Consulting Engineer Malaysia
AHU	Air Handling Units
BREEAM	Building Research Establishment Environmental Assessment Method
CASBEE	Comprehensive Assessment System For Building Environmental Efficiency
EE	Energy Efficiency
EPI	Environmental Performance Index
EQ	Environment quality
GBI	Green building index
IN	Innovation
LEED	Leadership in Energy and Environmental Design
MR	Material and Resources
NABERS	National Australian Built Environment Rating System
PAM	Pertubuhan Arkitek Malaysia
ROI	Return of Investment
SIRIM	Standards and Industrial Research Institute of Malaysia
SM	Sustainable Site Planning and Management
UIM	Universiti Islam Malaysia
VRV	Variable Refrigerant Volume
WE	Water Efficiency

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The main organization promoting green practices and building techniques is the Standards and Industrial Research Institute of Malaysia (SIRIM). However, SIRIM has now put in place a new rating system called Green Building Index (GBI) for commercial and residential properties. The GBI was developed by Pertubuhan Arkitek Malaysia (PAM) and the Association of Consulting Engineers Malaysia (ACEM).

It is profession-driven initiative to lead the Malaysian property industry toward becoming more environmentally friendly. The GBI rating system provides an opportunity for developers to design and construct sustainable building that can provide increased energy savings, water savings, a healthier indoor environment, better connectivity to public transport and the adoption of material recycling and greenery for their project.

The green building index (GBI) has six key criteria, which are: energy efficiency, indoor environmental quality, sustainable site and management, materials, resources and water efficiency.

Based on the scores achieved, commercial building will be rated and the certified as silver, gold or platinum. The final award is presented one year after the building is first occupied. Buildings are also required to be re-assessed every three years in order to maintain their GBI ranting by ensuring that the buildings are well maintained.

Internationally there are other green rating systems such as LEED (the United States and Canada), Energy Star (U.S), BREAM (Britain), CASBEE (Japan), Green Star and NABERS (Australia).

1.2 PROBLEM STATEMENT

Green building brings advantages to environmental, economic and social aspect. Lack of sustainable design information is not an issue as many resources are exists.

One of the main challenges in develop green building is finding person that have a knowledge in implementation of green design in the project. Thus, it is important for consultant with the great knowledge of green building industries to consult client in managing green building in order to widespread the adoption of Green Building in our communities.

Building will be award the Green Building Index (GBI) rating based on energy efficiency, indoor environmental quality, sustainable site planning & management, material and resources, water efficiency and innovation.

However, in order to have green community, there are several barriers that influence the increasing of Green Building user. It is important to study first which are the primary barriers do consultant see in increasing of sustainable building practices. As

consultants, there are important for them to know the barrier that they will be facing in order to increase the use of Green Building in the industry. Due to lack of information in lowering those barriers, a few strategies or program in lowering those barriers in order to encourage consultant to consult environmentally adoption must be suggested

1.3 OBJECTIVES

The objectives of this study are as follows:

1. To determine responsibilities and role of consultant.
2. To determine the consultant's major barriers in increasing green building practice.
3. To suggest strategies in lowering major barriers in order to encourage consultant to adopt more environmentally responsible practices.

1.4 SCOPE OF STUDY

The information related to GBI and consultants were study. This research includes the role building consultant in Green Building implementation. Participants were drawn from identified consultant works in building project. Kuala Lumpur was the study area for this research. The respondent helped to have better understanding the role of consultant in adoption environmentally practices.

This research also focused on finding on consultant's primary barrier to the increased use of green building practices in their professions. Lowering major barrier will encourage consultant to adopt more environmentally practices. The respondent helped to identify which factors is most influence in adopting green building practices in response to climate change. As the result, the strategies in lowering those barriers are suggested.

1.5 SIGNIFICANT OF STUDY

This research is significant in order to increase the number of GBI user in Malaysia. It is important for us to get a paradigm shift and start an environment friendly practice. The role of consultant have to use in the maximum to ensure our building industry adopt this approach.

GBI rating tool supposedly help Malaysia's building construction industry in adoption of Green Building in respond to the climate change. Hence, this study highlight the role of consultant in widespread the Green Building approach, the problem and recommendation to overcome the challenge of widespread the implementation of GBI in our community.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The construction and operation of building contribute to environmental impacts. There are existent and emerging options to improve our environment performance which are called as green building practices. Green building significantly can reduce environmental impact throughout six criteria that must be consider which are Energy Efficiency (EE), Indoor Environmental Quality (EQ), Sustainable Site Planning & Management (SM), Material and Resources (MR), Water Efficiency (WE) and Innovation (IN).

2.2 CLIMATE CHANGE

The Earth's climate is changing, largely due to greenhouse emissions as the result of human activities especially the burning of fossil fuels since the Industrial Revolution had been started. The buildings like all manufacturing and construction industries contribute to greenhouse effect and lead to climate changes. The greenhouse effect occurs when infrared radiation that is emitted was unable to escape.

The atmospheric system is a system of organized circulation, chaotic motions and random turbulence which forms the most variable and rapidly changing part of the climate system (Karl and Trenberth, 2003).

Over the past 30 years, the rate of warming across the globe has been approximately three times greater than the rate over the last 100 years (Hansen et al., 2006). Further change of the atmospheric system was significantly affected by the change in temperature. Increased temperatures results in increased exposed surfaces area that will absorb UV radiation. The significant loss of sand and sea ice was caused by the increase of atmospheric and surface temperatures (Van den Broeke et al, 2009).

2.2.1 Greenhouse Gases

Greenhouse gases are gaseous that contain chemical compounds in the atmosphere by reflecting infrared radiation from the earth's surface that contribute to the warming of the earth (EIA, 2008). Increasing of the concentration of Greenhouse gaseous to the atmospheric means increasing the heat to be trap and increase the temperature.

2.2.2 Global Warming

Global Warming is refers to the impact on global climate patterns that is affected by increasing in atmospheric temperature (Houghton, 2005). The current rate of global warming has been approximately greater within the past year than the rate over the last 100 years (EPA, 2010).

2.3 GREEN BUILDING

Green House gases and ozone depletion become a topic around the world. Since 1990s, some green building rating being develop as people start realized that building environment is one of the main contribute of the Green House effect. Thus, the negative impact of building environment during its life-cycle must be reduced.

A green building focuses on increasing the efficiency of resource use while reduce building impact on human health and environment during the building's lifecycle. Green building should be designed and operated to reduce overall impact of the built environment on its surrounding. Green buildings are designed to save energy and resources, recycle materials and minimize the emission of toxic substances throughout its life cycle.

There are many benefits in using green building. First of all, Green buildings harmonize with the local climate, traditions, culture and the surrounding environment. Green buildings also are able to sustain and improve the quality of human life while maintaining the capacity of the ecosystem at local and global levels.

2.4 GREEN BUILDING INDEX (GBI)

According to Environmental Performance Index (EPI) that are conducted by Columbia University and Yale University, it is showed Malaysia was ranked 9 in year 2006 (EPI, 2006) Unfortunately, when it came 2008, Malaysia was drop 18 places in 2 years which was 27 with score 84 (EPI, 2008). This show our environmental awareness was less compared to other developed countries.

2.4.1 History of Development of GBI in Malaysia

GBI Malaysia was launched on 21st May 2009 by Datuk Shaziman Abu Mansor, the Minister of Public Work. The launching of GBI marked our responsibilities and awareness toward environmental issues. This system was introduced to lead Malaysia building industry to become more environment practices.

Table 2.1: The development of GBI in Malaysia

(Source: Tan LokeMun, The development of GBI Malaysia, 2009)

Date	Remark
August 2008	PAM council approved to form a new sustainability committee.
	The presentation of the proposal to all stakeholders of the building industry had been made. As the result of the discussion and the presentation to the members of the Building Industry Presidents Council (BIPC) this step was getting a full support from the members
	ACEM was invited to join committee as green building designs not only effort of architect, it also need cooperation from engineer
September 2008	Comparative studies on other green rating models such as BREEAM, LEED, GREENMARK and GREENSTAR. These 4 rating system being choose is because they was ahead us much more earlier and stable in publish
October 2008	Visited Singapore to study GREENMARK that recently used by Singapore.
November 2008	Study visit to Green Building Council of Australia's GREENSTAR
December 2008	Final drafting of both the Residential and Non-Residential rating tools.
3rd January 2009	The Green Building Index Malaysia was launched and this is the first announcement on GBI to public.
16th January 2009	The setting up of GBI Malaysia assessment and accreditation framework including the terms of reference for the GBI Accreditation Panel (GBIAP) was approved by PAM Council.
6th February 2009	GBIAP held its inaugural meeting discuss and confirmed the

	terms of reference for GBI Certifiers and Facilitators.
14th February 2009	PAM commenced one-day training session for Engineers and Engineers. This is to ensure the professional well understands the code because it was the baseline benchmark of GBI rating tool.
23rd February 2009	ACEM confirmed to join PAM as shareholders of GreenbuildingindexSdn. Bhd.
2nd March 2009	The Malaysia Construction Development Board (CIDB) was confirmed their support for GBI Malaysia. CIDB offered their assistance to document the GBI to form part of their series of Construction Industry Standards (CIS).
18th March 2009	KementerianTenaga, Air danKomunikasi (KTAK) confirmed their support and requested to join overall Energy Efficiency Master Plan.
19th March 2009	Malaysian Industrial Development Authority (MIDA) would like to work with PAM/ACEM as their support for GBI Malaysia.
23rd March 2009	MajlisPerbandaranPetaling Jaya (MBPJ) confirmed their support for GBI and requested to form working group to see the implementation of GBI in the project.
24th March 2009	DewanBandaraya Kuala Lumpur (DBKL) proposed to work together to promote green and sustainable development for Kuala Lumpur.
7th May 2009	The first intake for the GBI Facilitator's Course started a target of 100 participants.
21st May 2009	GBI Malaysia is scheduled to be officially launched on.

Table 2.1 showed the progress of GBI Malaysia development. The support from Local Authorities and government body shows their awareness towards environmental issues.

2.4.2 Classification in GBI rating

The building will be ranting in 4 categories based on 6 categories which are Energy Efficiency, Indoor Environmental Quality, Sustainable Site Planning & Management, Material & Resources, Water Efficiency and Innovation.

Table2.2: Table of GBI classification rating

(Source: Greenbuildingindex.org, 2009)

Points	Rating
86+ points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

2.5 CONSULTANT

The growth of consultant is a result of trends in industry. These trends include the development of new technologies, human resource availability and underdeveloped skill sets. The opportunities for qualified consultants are the result of each trend (Gilley & Steven, 1989).

There are many reasons to hire consultants. According to Franks (1992), the first and most obvious reason is when a project teams encounters a problem or task that the current staff is not familiar or have direct experiences with; in this case one would hire a consultant for their knowledge and technical expertise.

Harrigan (2004) also state that another possible reason to hire a consultant is that companies and business when work load is too excessive, it may not be possible to produce the quality and quantity of work required, therefore client often hired

consultants in overcome project during busy period. The ability to acquire new knowledge is capability needed by organization. Knowledge has emerged as the most strategically-significant resource of organizations (Grant, 1996).

The consultants also play a role as third party viewer. As client, they must be concerned about the quality of the project. Assuming the quality of the project required advices from the expert

2.5.1 Purpose of Consulting

Turner (1988) stated that eight purpose of the consulting. There are listed beginning the highest to the lowest as sequent order below:

1. Improve the effectiveness
   Client can gain ability to adapt future changes to more environmental changes through their consultant.

2. Facilitating Client Learning
   For facilitate client's learning, it is suggested that allow the client to participate in the consulting process.

3. Building Consensus and Commitment
   Any useful change will depend on the members of the organization or team working together, the consultant must provide convincing recommendation and present them persuasively.

4. Implementing changes
   In addition to making recommendation, consultants are often asked to implement them. In implement something new, special knowledge, skill, understanding on future impact might be required.

5. Providing Recommendations

The consultant must recommend based on the diagnosis and the client demand.

6. Conducting an Effective Diagnosis

   The consultant identify problem and collect appropriate information and analyse it.

7. Identifying Problems

   Consultant identifies the issues and ensures that the problems are solved.

8. Providing information to a client

   The most common reason of consulting is client may desire special expertise on the new knowledge. The consultant may be utilized because they possess specialized information.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter discussing about the methodology and the step that had been taken in order to completed this research. The method should be effectively and systematically to achieve the objectives.

There are 3 main steps in this research methodology, literature review, data collection and data analysis was presented in **Figure 3.1.** At first, the literature study was done focused on role of consultant, GBI Malaysia information and the application of GBI. Second step was conducted a questionnaire based on the literature review and utilize it for questionnaire survey and data collection. Participants were drawn from consultants identified as building consultants in Kuala Lumpur were selected to participate. Question sought to confirm two qualifications.

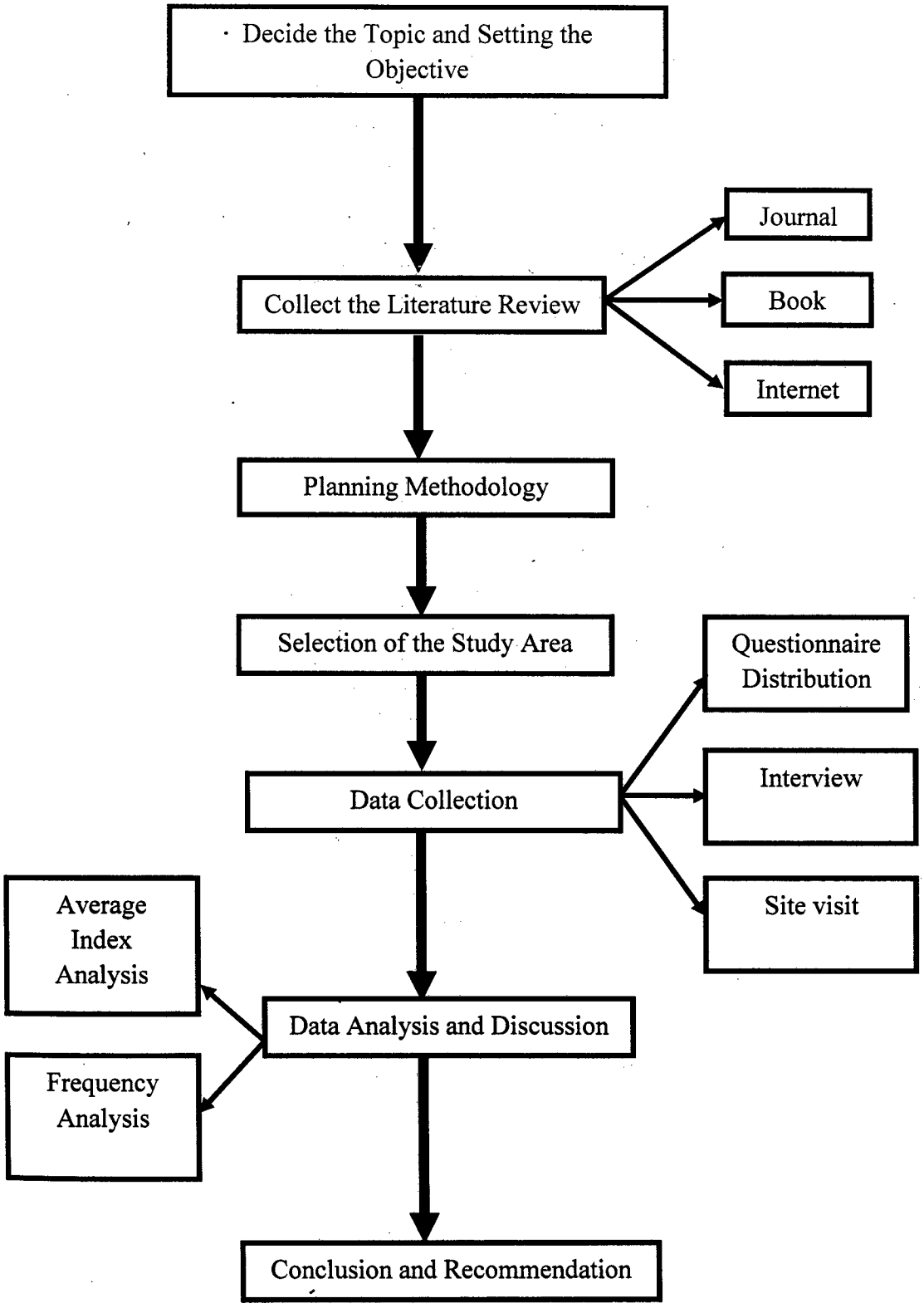

Figure 3.1 Methodology flow