Green Initiatives in Kota Kinabalu Construction Industry

Awang Nasrizal Awang Ali a,*, Noor Azland Jainudin b, Rudy Tawie c, Ivy Jugah d

a, b, c Faculty of Civil Engineering, Universiti Teknologi MARA, Samarahan Campus 2, 94300 Kota Samarahan, Sarawak, Malaysia.

d Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA, Samarahan Campus 2, 94300 Kota Samarahan, Sarawak, Malaysia.

Abstract

Recently, there are mounting issues relating the climate change including global warming and deprivation of earth ecosystems which cannot sustain the current economic development activities. The high depletion rate of natural resources plus, the increasing consumption of non-renewable resources particularly in the construction industry has led to the environment deterioration. Also, with the growing social development, people nowadays have high standard of requirement for living especially in the urban area. With this, sustainable development has become more significant. Studies on green technology have been explored, but more visible results are still required especially in the rapid developing capital city of Kota Kinabalu in Sabah, where green areas are still being well maintained. The implementation of green technology in construction will support dynamic growth of economic development activities, while improving the environment. Hence, it is important to develop a strategic plan to promote the use of green technology while the areas are still developing. This paper presents the preliminary work on qualitative based research that will investigate the understandings and green initiatives in Kota Kinabalu from the perspective view of contractors, as they are one of the key players in construction industry.

© 2016 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Peer-review under responsibility of Universiti Teknologi MARA Sarawak

Keywords: sustainable development; green technology; construction industry; environment

* Corresponding author. Tel.: +6-082-678-275.
E-mail address: awang295@sarawak.uitm.edu.my
1. Introduction

A growing population and uncontrolled development rate is straining the non-renewable and finite resources available (Saffuan, Ariffin, & Amin, 2012). Due to rapidly increasing development and urbanization, environment at a glance has already shown noticeable signs of stress such as water shortage, air pollution and land degradation. However, still, the ASEAN countries will have to continue the development in order to help reduce poverty. The challenge will be on how these countries, including Malaysia can pursue economic growth without jeopardizing the existing environment, or at least with minimal impact while conserving the nature. This is where the term ‘sustainable development’ comes out and could play a vital role in our construction industry. Achieving sustainable development has become more urgent and inevitable for all sectors of society (Zhang et al., 2011). It has also been one of the attributes that is compelling to the investors. This should be a wake-up call for everyone to meet the needs of the present without compromising the ability of future generations to meet their own needs.

In a country’s development, sustainability seeks to balance the economic, social and environmental impacts, thus allowing the population growth to continue. The benefits are indefinite, considering what it can give particularly in the long run. Sustainable development brings a new evaluation of project design in construction industries, which have significant potential to reduce the negative impact of human activities on the environment. With this, there is a need for revaluing the construction industry especially in the rapid developing city of Kota Kinabalu, Sabah. It is imperative that the contribution made by integrating sustainable concept into construction project is actively promoted especially to the public to show what sustainable construction does is good, but this is not happening in the case study area. The industry is in fact dynamic, responsive and highly adapted to the diverse environment in which it has to operate. One way to encourage the improvement in construction is through a well-educated industry that dynamically develops sustainable solutions for the clients and users to choose and improvise within reasonable and professional frameworks. This would improve the environment over time.

The purpose of this study is to investigate the green initiatives in Kota Kinabalu from the contractors’ perspective view. The case study area was selected due to lack of visible information about green construction project. It is hoped that this study will be able to provide more information for local authorities and other related agencies as well as the public about green initiatives in construction industry. In addition, the study is also intended to add on useful knowledge to other case studies which are being carried out by researchers in similar field to promote green concept in the Malaysian construction industry.

2. Malaysian construction industry

2.1. Towards sustainable and green construction

Almost 40% of the world’s consumption of materials is exploited by the construction industry (Pulselli et al., 2008). If not controlled properly, it could be devastating especially for developing countries that are still lack of green technology or having currency depreciation. This should be prevented to avoid any unnecessary problem.

In Malaysia, one of the aims by the government is to counter the major sources of Carbon Dioxide (CO2) emission from the construction industry. As one of the main sectors which supports the dynamic economy growth of the country, the construction industry should be able to reuse the existing building assets, aim for lean construction, minimize energy usage in construction and for its operation, avoid creating pollution and also conserve the water sources.

Green construction is an integrated framework of design, construction, operations and maintenance, and demolition practices that encompass the environmental, economic, and social impacts of the construction projects (Li et al., 2014). It is also a construction practice that recognizes the interdependence of natural and built environment. These projects can be associated with renewable energy such as solar, wind, biomass, biodiesel, hydropower, geothermal and also installation of other energy efficiency products.

Any sustainable design must incorporate recycled or low emitting materials, reduce building construction waste and apply less environmentally destructive site development. Green concept itself has been identified as a major requirement to attain the “developed country” status where developers need to design and construct sustainable projects that can provide energy, water savings and healthier indoor environment in their projects for the contractors
to construct. This could be the start of a new era, where developers and contractors need to be more creative, innovative and also motivated to change from the conventional construction into a more beneficial but yet still profitable project with their own style and management.

2.2. Significance of green construction

In development, after the unlimited expansion of cities, the huge hidden danger may be buried in the future of mankind. The problem is not to enrich the city simply with technologies and development, but on how to regulate it. Since 1970’s oil crisis to the current ‘low carbon’ concept, we are gradually becoming more aware and learning to restrain ourselves in the development, or otherwise we would have to bear an unwanted counteraction from the nature (Feng, 2011). As a result, the idea of green construction began to sprout throughout the world and the theory and practice of green construction and sustainable development has now become a requirement in the industry.

In Malaysia, the urgency to build green is mandated by our Prime Minister to reduce the global greenhouse gas emission by 30% in the year 2020. This is also mainly driven by factors such as to fulfill the market demands, to provide comfort and health for the occupant, save more money and also to act as an environmental responsibility. There are already a few discussions on the viability for its implementation in Malaysia (Bakar et al., 2011; Huat & Akasah, 2011).

However, due to the restriction in decision-making, planning and management, green construction could face big challenge to be practiced especially when those in the industry are not exposed with suitable information at their organization level. This issue should be given immediate attention. It is the same in any type of management where the top management should ensure that the whole team understands what they should be working on.

2.3. Recent progression in Malaysia’s green construction

Currently there are two most recognized low energy buildings in Malaysia, namely Low Energy Office (LEO) in Putrajaya and Zero Energy Office (ZEO) in Cyberjaya. LEO demonstrates a glazing window installed facing North and South to minimize heat gained from sunlight before entering the building interior, thus reducing cooling load. As for ZEO, with two plane glasses, the building is able to filter more heat. This means only cold daylight could enter giving free lighting to buildings. This is very useful since Malaysia has more exposure to sunlight (Alias, Sin, & Aziz, 2010).

Green technology is still a relatively new concept in developing countries of South East Asia like Malaysia. Although Malaysia has adopted some of the aforementioned designs, most are still at voluntary stage and need further enforcements. All fractions of society, developers and the public must take actions to share the responsibilities. This is because construction projects have an enormous impact on environment, human health and economy and the conventional system cannot meet the demands of a multifunction building (Deng et al., 2011). Green technology is an opportunity to use energy efficiently while creating a better environment because it is feasible to provide an integrated and a flexible energy system to increase the energy-saving ratio. Other environmental benefits include the enhancement of protection to ecosystem and biodiversity, improve air and water quality, and reduce solid waste.

There are many development projects in Sabah and Sarawak particularly in the rapid developing Kota Kinabalu areas. What makes it interesting is to know whether construction players (including architects, engineers, designers, builders, developers and clients) are all aware of the green technology concept because it is believed that if all the construction practitioners are being well-groomed with the importance of implementing green concept, then their projects will also be integrated with green technology system.

For now, no study has been conducted to investigate the implementation of green concept in Kota Kinabalu construction industry. Ever since the implementation of green concept was announced by the state government, not much of a visible progress could be seen as there were only a few seminars or roadshows such as Green Technology Road Show organized by KeTTHA in January 2011, opening of Kota Kinabalu’s first recycling centre in Penampang on July 2012, several newspaper articles of urging to push for green technology including by the Chief Minister of Sabah and also newspaper articles about the proposal to upgrade existing taxi stand at Jalan Pantai in
Kampung Air in 2013 which is still unforeseen. There is also no direct evidence found on the involvement of industrial key players in supporting the implementation of green concept.

3. Methodology

In this study, qualitative-based approach is adopted to collect data. Such methods are widely used by various researchers in getting the required feedback and determining the perception of the samples in the selected area. The main instrument to be used will be a set of questionnaire. Data analysis requires a computer installed with SPSS program. Data to be used in this study will be collected only from the contractors registered under Contractor Services Centre (CSC) in Kota Kinabalu. The overall research framework is shown in Figure 1. This study comprises four phases, namely, Phase 1 for literature review, Phase 2 for data collection, Phase 3 for data analysis and Phase 4 for the completion of the final report.

Fig. 1. Research framework.

The questionnaire consists of 4 parts. Part A is the Respondent’s Demographic that will cover the company details. The purpose of this section is to describe the background of the respondents’ company. Part B is the Identification of Green Concept. This is to identify whether the respondents understand the key criteria such as Energy Efficiency, Indoor Environmental Quality, Sustainable Site Planning and Management, Materials and Resources, Water Efficiency and Innovation in Green Technology Concept. Next is Part C, for Problem Identification using Likert Scale. This part is divided into 4 sections, which are Free Hazardous Environment, Perception Of The Organization, Policy Of Green Technology and Cost Effectiveness. The section is to identify the difficulties or barriers and the potential to implement Green Technology in Kota Kinabalu. The final Part D is the Strategies For Implementation Section. This section will be used to find out ways to speed up implementation of Green Technology from the industries’ perspective view.

Questionnaires are used in this study as it is a good source of obtaining information and can cover a large number of respondents in a short time span. It is also prompt, effective and flexible to acquire information or data needed. However, one of the disadvantages of survey method is that there may be a lack of respondents’ honesty in answering the questions. Nonetheless, using questionnaire would enable researchers to collect data immediately from the respondents. These raw data will then be analyzed through statistical methods.

Before conducting the actual research, a pilot test will be conducted randomly in the chosen case study area, Kota Kinabalu. Ten respondents will be selected to answer the questionnaire. The objectives of this pilot study are to:
a) Find out the problems of understanding and interpreting every part in the questionnaires to avoid any misunderstanding and confusion in answering them.

b) Evaluate the responses towards the statements and questions of its validity and reliability.

c) Find out the time frame needed for the respondents to answer all of the items in the constructed questionnaire.

d) Obtain valuable feedback on improving any of the items and questions in the survey form.

After getting the pilot test result, the questionnaire will be modified accordingly based on the feedback or other constructive recommendation and then distributed among the respondents in Kota Kinabalu. In the questionnaire, the Likert Scale from 1 to 5 will be used in which the respondents need to respond by ticking in the box indicating 1 as Strongly Disagree (SD), 2 as Disagree (D), 3 as Neutral (N), 4 as Agree (A) and 5 as Strongly Agree (SA) as shown in Table 1. There will also be open-ended and close-ended questions.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

Table 1. Likert scale.

For this research, the sample size in Kota Kinabalu is approximately 400 contractors, where the data can be obtained from CSC. The questionnaire will be distributed by the appointed enumerators. Then, every data collected will be analyzed using the Statistical Package for Social Sciences (SPSS) program. Descriptive statistics such as frequency tables and percentage will be used to describe the respondents’ profile including class of contractors, years of company establishment and their perceptions towards the items contained in the questionnaire. The percentages will also be used to describe the factors that influence the respondents’ answer and also the importance and potential items from the contractors’ perspective view which should be taken into consideration to help promote the success of having a real green construction industry in Kota Kinabalu.

From the results, a strategic plan will be proposed to help achieve green construction industry in the future. The most important phase is to obtain information from the respondents. This questionnaire method is practical and the ideas from the respondents can be easily assessed.

4. Preliminary conclusion

The recent trend of sustainable development tends to focus on the relationship between construction and human development and marginalizing environmental aspects. The concept of 3R, which is Reuse, Reduce and Recycle has to be greatly expanded in the construction industry. Environmental consideration will not be appreciated if there is lack of knowledge, tools and skills to address the various issues to support sustainable development agenda.

The green technology itself is not sufficient in moving towards sustainable development. Awareness, education and also extensive training are also important to develop workforce in a clean energy industry. The lack of knowledge and know-how in sustainable and green construction can be the cause of failure of the implementation of the desired green systems and enforcements. Without proper training scheme and constant reinforcement of knowledge particularly for those involved directly with the construction project such as designer and contractor, the plans to achieve sustainability and most importantly to attract investments may not be achieved accordingly.

From this study, it is expected that, compared to the new and lower class of contractors, the higher class of construction companies should have better exposure on the green concept and also its implementation in various construction projects. However, the challenges could be varied for different class of contractors. The barriers can be in terms of codes or standards, education, cost, products availability and breaking the existing tradition. There are other related matters that should be taken into consideration such as lack of skill or capacity to carry out the work and too many agencies which have significant overlapping of work. The construction industry is also slow to follow through. Then, there is the cost versus benefit issue. The commercialization of Research and Design (R & D) sector
for products related to construction industry is also important, supported with political will from the government and also the owner, as a key driver of urbanization in implementing the green culture in construction (Gan et al., 2015).

In addition, the most important criteria that should be possessed by the modern contractors are productivity, innovation and also motivation, which will be competitive advantages for them to perform at the highest level. All this will decide the future of the next generation. We cannot afford to harm the environment anymore and if we want to succeed, there is no better time to start than now.

Acknowledgments

The authors wish to thank the Ministry of Education, Malaysia for funding the research project through the Research Acculturation Grant Scheme [Ref. No. 600-RMI/RA GS 5/3 (219/2014)] and, the Research Management Unit (RMU), Universiti Teknologi MARA (UiTM) for the administrative support. Grateful acknowledgment also goes to all who are involved directly and indirectly in this project for their kind support.

References


