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GREEN ASSESSMENT CRITERIA: PERCEPTION AMONG KEY INDUSTRIAL PLAYERS' TOWARDS STADIUM RETROFIT IN MALAYSIA

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Abstract:

In the current era, the term Green Building is widely known seemingly across the continent by vast organizations with the objective to preserve the world's resources. Organizations introduce the Green Rating Tools tallying and to be used to verify the applications of sustainable criteria towards a building or perhaps a township. Several categories were divided to indicate the types of building comprising new building or existing building, residential building or non-residential building, industrial building or township. The retrofit concept is often used towards heritage building to preserve and protect the history gazette for the future generations. The concept was also applicable for the stadium whilst European had already implemented the concept and received Green Building Certificate by the councils. On the contrary, the stadium in Malaysia was not yet ready to begin implementing the retrofitting concept. The understanding of the green assessment criteria is already being measured within the key industrial players. Consequently, the selection of the criteria by the key industrial players will determine the stadium retrofitting project will be a success achieving Green Building Certificate.

Keywords: Green Assessment Criteria, Stadium, Key Industrial Players', Green Building, Retrofit

1.0 INTRODUCTION

A Stadium is a venue for outdoor sports, concerts, or any events that allow spectators to sit and watch the event. Most stadiums consist of a field or maybe a stage either partly or completely surrounded by a tiered structure design that may vary according to the developer and most developers are the Government itself. The oldest known stadium is the Stadium at Olympia in Greece, where the Olympic Games of antiquity were held from 776 BC. Initially the Games consisted of a single event, a sprint along the length of the stadium. From the Olympic Games, sports began to evolve through the century and also the requirement of a stadium to organize such sports. Malaysia has 27 Stadium that can cater an average capacity of 30,000 spectators including the Bukit Jalil National Stadium located in Kuala Lumpur that has the most capacity of 87,411 spectators. China has issued the General Plan of Chinese Football Reform in 2015, an important agenda regarding the development and construction of football stadiums. As an outdoor sport, football games will be affected by the weather inevitably. This is because of the relationship between resistance and quality, the wind plays a great influence on the football trajectory and velocity.

The field wind environment plays an important impact on players' performance and game results (Shi & An, 2017). Meanwhile in Malaysia, we cannot compare our turf with others because Malaysia does not have heavy Monsoon. Rainwater utilization can overcome a shortage of water supply, and it is very effective for runoff control and restoration of the hydrological cycle in urban areas (Zaizen, 2000). Green assessment system basically refers to the processes that are environmentally responsible and resource-efficient throughout a building's life-cycle; from inception to the demolition stage (Zakaria, et al., 2017). The construction of stadium patterns in Malaysia does not have any key performance indicator (KPI) that requires certain criteria to be fulfilled in order to develop a green sustainability stadium. Other countries already started to execute elements of green in a stadium and Malaysia were left behind other countries. In Italy, the Dacia Arena in Udine has been retrofitted, becoming a more sustainable building to the environment (Manni, Coccia, Nicolini, Marseglia, & Pterozzi, 2018).

Manni *et al.*, (2018) describes there are several steps curated in the proposed workflow to minimise the increment of the operational emissions, caused by new heated areas in the stadium. Firstly, the energy consumption was estimated in dynamic state for Scenario 0 (current state) and Scenario 1 (refurbished state) to quantify the new plant's energy demand. The power for lighting, cooling and heating is supplied by a system that couples photovoltaic panels with heat pumps. Secondly, two hypothetical system layouts were proposed and evaluated. The same photovoltaic plant is integrated with a biomass plant and an absorption

chiller. The comparison highlights the suitability of those interventions and the environmental advantages deriving from their exploitation.

1.1 Problem Statement

Malaysia was still in the back seat regarding green building developments compared to other Asia Pacific countries such as Australia, Japan and Singapore. Malaysia has started to apply "Green Building" features, based on the concept of energy efficiency, (Esa, Marhani, Yaman, Rashid, & Adnan, 2011).

Green building index Sdn Bhd known as GBI Organisation incorporated in February 2009, a wholly-owned subsidized division of PAM and the Association of Consulting Engineers Malaysia (ACEM), to administrate GBI accreditation and training of GBI Facilitators and Certifiers and also classified all the buildings in Malaysia. Non-Residential New Construction (NRNC), Residential New Construction (RNC), Non-Residential Existing Building (NREB), Industrial New Construction (INC), and Industrial Existing Building (IEB) (Green Building Index Organisation, 2009).

The class is focussed on residential building, educational building, industrial building, mercantile building, and other types of building as they are vast in terms of construction but we cannot see any Stadiums being rated as green buildings in Malaysia. Manni et al., (2018) opined the increment of the arenas' energy demand is also due to extended opening hours of the facilities. Indeed, contemporary stadiums do not open only on match day, but also host museums dedicated to the home-team and its history; sports stores, which promote the home-team's brand; restaurants; supermarkets; and playgrounds for the youngest supporters. They examines the environmental impacts of sport events have been growing during the last decades, which has led to the organizing associations developing adequate countermeasures to both reduce carbon emissions due to construction and operational stages compensate for the emissions. For instance, the Dacia Arena in northern Italy has been recently refurbished and renovated. The same goes for Malaysia, the stadiums can also refurbish and renovate towards more energy consumption.

This research aims to propose stadium energy enhancement that includes strategies largely recognized as effective and applicable to several building typologies (residential, commercial, academic, etc.).

1.1 Aim

This study attempts to identify the perception towards Green Assessment Criteria among key industrial players for stadium retrofit to achieve Green Building Certificate in Malaysia.

1.2 Research objectives

- i. To identify the green assessment criteria applicable for stadium retrofitting in Malaysia.
- ii. To determine the strategy in achieving green building certification for stadiums in Malaysia.

1.3 Research questions

- i. What are the green assessment criteria applicable for retrofitting the stadium in Malaysia?
- ii. What strategy is to be determined in order to achieve a Green Building Certificate in Malaysia?

1.4 Scope of research

This research is narrowed down to the key players' in the construction industry. Involving the consultants and the contractors in Kedah. It is also involving the green rating tools that are available in Malaysia which is from the Green Building Index (GBI) as a basis for green assessment tools. Furthermore, aiming the experts that have the experience and familiar with the rating tools which also have awarded multiple green building certification may ease this research. In addition, this research also focused on the green rating tools covering the applicable assessment criteria to be determined for stadium retrofitting.

2.0 LITERATURE REVIEW

2.1 World Green Building Council

According to the World Green Building Council (2015), various countries have green building boards. These countries use their own ranking systems for green buildings or use the most standard and proven green building rating tools. The declared set of credit criteria identified by each rating tool such as Management, Water

efficiency, Energy etc. analyses how well or poorly a building performs and likely to perform. Therefore, the set of credit criteria identified by each green building rating tool has a critical impact on the evaluation of the building performance. Appropriate measurements are important for achieving sustainable development. In other words, the creation of key credit standards for evaluating green buildings is critical. Furthermore, the effort to design buildings in a more environmentally and socially conscious manner would be in vain if the defined credit standards did not represent the necessary performance of the construction (Lu, Geng, Liu, Cote, & Yu, 2017).

2.2 Union of European Football Associations (UEFA), towards sustainable stadium

The Union of European Football Associations (UEFA) as cited in Manni *et al.*, (2018) demonstrated to take particular care of environment related issues during the continental championship. During the last European Cup in France, innovative and sustainable arenas were constructed in Lyon, Lille, Bordeaux and Nice. The planners achieved the reduction of the stadiums' impact by increasing the events which could be hosted in addition to the football championship. The Pierre-Mauroy Stadium and the Allianz Riviera, in Lille and in Nice, respectively, can be turned into amphitheatres for concerts and similar events to improve the economical sustainability of the arenas.

2.3 Strategy is to be determined in order to achieve green building certificate in Malaysia

Professionals play an important role in the assessment and certification of building energy performance by providing green retrofit services to building owners (Jagarajan *et al.*, 2017). Alam *et al* (2019) stated that an effective approach to address obstacles to public energy efficiency refurbishment projects is to build a pre-qualified list of experts and provide them with preparation and training. In the United Arab Emirates, the Building Retrofit Training Program was launched to provide refurbishment training to professionals and aims to achieve a high degree of environmental sustainability.

The experiences from Germany, Switzerland, and France indicate that architects in building renovation projects need to acquire relevant building retrofit knowledge and should consider energy conservation in design. Similar problems exist in China, such as the shortage of qualified professionals in building retrofit, lack of education and training to professionals (de Feijter, van Vliet, & Chen, 2019). There is also a need to train contractors and craftsmen about the building retrofit process, and to enhance their technical skills and communication (Novikova *et al.*, 2011). In China, skilled construction retrofit contractors and professionals should be established through the training and training of professionals and staff, the certification of contractors and the availability of qualified professionals. In order to boost the energy efficiency of existing buildings, a range of related policies have been implemented in China (Liu, Li, Tan, & Zhang, 2020).

3.0 METHODOLOGY

This study included a method of quantitative analysis where data collection is carried out using Google Form tools. In Google Form, the questionnaire is prepared and then circulated online where respondents need to fill in the questionnaire through the provided link. Primary data is collected from a purposive sample which online questionnaire by using Google Form is distributed to among key industry players in Kedah. The questionnaire is prepared in order to obtain responses and findings on the perception among key industry players in regard to the Green Assessment Criteria for stadium retrofit in Malaysia in order to achieve the Green Building Certificate. In relation to the aim and objectives of this report, the questionnaire of survey questions is prepared and randomly distributed to industry key players through the Google Form online platform. The data will be tabulated automatically by the Google Form which will ease the analysis of the respondents.

4.0 ANALYSIS AND FINDINGS

This research concentrated on all the key players in the industry in Kedah. 206 respondents consisting of the staff from the consultants and contractors who have the experience regarding construction participate in the research. By distributing the questionnaire to the respondent, the sample is the target estimate of how much data needs to be gathered. The questionnaire consists of studies on the demographic background of key players in the sector, the green evaluation criteria applicable to the stadium retrofit in Malaysia and the strategy to be determined in order to achieve the Green Building Certificate in Malaysia.

4.1 Green Assessment Criteria applicable for retrofitting the stadium in Malaysia

In section B, the respondents were asked on the green assessment criteria that they think would be applicable in order to retrofit the stadium in Malaysia. There are five main points highlighted to be as green assessment criteria applicable for retrofitting stadium in Malaysia in this section which are as listed Energy Efficiency (EE), Indoor Environmental Quality (EQ), Sustainable Site Planning & Management (SM), Material & Resources (MR), Water Efficiency (WE).

4.2 Energy Efficiency

Energy efficiency consists of three points as in the table below. The data is highlighted only on the perception level of Strongly Agree. As shown in the diagram, Sustainable Maintenance marked the highest percentage agreed by respondents under Energy Efficiency with 40.29 percent followed by Minimum Energy Efficiency Performance with 36.41 percent making it as the second highest agreed by respondents. However, the third rank is lighting zoning with the percentage of 24.80 percent.

Table 1: The Percentage and level ranking regarding Energy Efficiency consisting Minimum Energy Efficiency Performance, Lighting Zoning, and Sustainable Maintenance.

CATEGORY	PERCENTAGE (%)	PERCEPTION LEVEL	RANK
Sustainable Maintenance	40.29	Strongly Agree	1
Minimum Energy Efficiency Performance	36.41	Strongly Agree	2
Lighting Zoning	24.80	Strongly Agree	3

4.3 Strategy to be determined in order to achieve a Green Building certificate in Malaysia.

There are six strategies listed in the questionnaire which are as similar in Section B where respondents were required to rank all six points according to their level of agreement of each point that they think might be the best strategy to be taken in order to achieve Green Building Certificate in Malaysia.

Six strategies mentioned are as stated in the bar chart and table down below. There are five options of strategy provided in the questionnaire for respondents to rank from one to four in regard to their level of agreement of each point. As shown in table above, ‘Encourage the Use of Renewable Energy and Materials That Are Sustainably Harvested’ marked as the highest percentage with 63.11 percent making it as the first rank. Next, ‘Minimize the Ecological Impact of Energy and Materials Used’ marked as the second rank strongly agreed by respondents with 53.88 percent followed by the third rank with 53.40 percent which is ‘Orient Buildings to Take Maximum Advantage of Sunlight and Microclimate’.

As mentioned, respondents were asked to select according to their level of agreement as provided in the Likert Scale. The Likert Scale prepared with 4 options which are as follows 1= Strongly Disagree, 2= Disagree, 3= Agree and 4= Strongly Agree

Table 2: The data analysis of Strategy to achieve Green Building for stadium in Malaysia

CATEGORY	PERCENTAGE (%)	PERCEPTION LEVEL	RANK
Encourage the use of renewable energy and materials that are sustainably harvested.	63.11	Strongly Agree	1
Minimize the ecological impact of energy and materials used.	53.88	Strongly Agree	2
Orient buildings to take maximum advantage of sunlight and microclimate	53.40	Strongly Agree	3
Ensure that water use is efficient and minimize wastewater and runoff.	50.97	Strongly Agree	4
Ensure maximum overall energy efficiency.	45.15	Strongly Agree	5
Encourage use of mass transit, occupant bicycle use, and other alternatives to fossil-fueled vehicles.	34.95	Strongly Agree	6

5.0 CONCLUSION

This study is made by focusing on finding the perception of industry key players towards stadium retrofitting in Malaysia. Not only that, but it is also made to define the green assessment criteria in order to achieve Green Building Certificate in Malaysia. In addition, this research is also made to discover the strategy that can be implemented for stadium retrofitting in order to achieve a Green Building Certificate. Based on the data analysis made in the previous chapter, it is defined that the best green assessment criteria for stadium retrofit is by implementing Water Recycling. Furthermore, to achieve a Green Building Certificate in Malaysia the best strategy to be determined is by Encouraging the use of renewable energy and materials that are sustainably harvested.

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