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The Perception of Green Building Index Facilitator towards the Traditional Malay House Sustainability

Wan Mohd Fakhzan Wan Zakaria[1], Mawar Ahmad[2], and Mohd Zulkarnain Salehudin[2]

1. Alfa International College, Malaysia

2. Politeknik Sultan Haji Ahmad Shah, Malaysia

Abstract: Malaysia initiated the Green Building Index (GBI) evaluation tools to assess sustainability in construction industry. However, this evaluation only considers new construction for residential and non-residential regardless heritage buildings, particularly the Traditional Malay House (TMH). Therefore, this research was conducted to study the relationship of TMH sustainability components with GBI criteria. The aim of the discussions in this study is to investigate the perception of Green Building Index Facilitator (GBIF) towards TMH sustainability and to establish TMH sustainability assessment tool with reference to GBI criteria. In-depth literature was conducted to identify the key sustainability components of TMH. The data for this study was gathered through an online survey. Thus, self-administered questionnaires were employed as the primary data collection method. The questionnaires are distributed among GBIF which comprises of the architect, engineer, quantity surveyor and others. 31 samples were obtained in this study. From the finding, it can be concluded that the problem statement outline in this study, which suggest that the TMH also comply with recent GBI criteria were proven.

Key words: traditional Malay house, green building index, green building index facilitator

1. Introduction

Sustainability has been a major issue nowadays in this 21st century. Many developing countries try to promote this approach regarding the adverse effect of development and activities done by human being throughout many years on earth. Fortunately in Malaysia, this concept of sustainability had been already applied long time ago in the design of Malaysian vernacular house which designed and constructed with a deep understanding and respect for nature and it surroundings. The vernacular house of Malays known as Traditional Malay house evolved along different lines in the various regions and states of Malaysia. Traditional Malay House is designed and constructed with magnificent adaptation to Malaysia's natural surroundings and hot tropical climate. The traditional Malay house is influenced by various factors such as climate, culture, the owner's economic status, the surroundings, available building materials and religion of the Malays. These houses are well adapted to the hot tropical climate in which they are found and provide an excellent example of appropriate technology of that time to attune with the natural environment where it's settled [1].

Corresponding author: Wan Mohd Fakhzan Wan Zakaria, Msc., Lecturer; research areas/interests: heritage and conservation management. E-mail: wmfakhzan@gmail.com.

2. Literature Review

2.1 Green Building Index

In Malaysia there is an increasing public awareness and interest in how buildings affect the environment, worker productivity and public health. As a result, both the public and private sectors are beginning to demand buildings that optimize energy use, promote resource efficiency and improve indoor environmental quality. Developers, owners, operators, insurers, and the public as a whole are beginning to value and market the

benefits of sustainable building. Malaysia's commitment towards sustainable development was announced by the former Prime Minister of Malaysia; Tun Dr. Mahathir Mohamad, from his speech "The Way Forward" in 1991. His speech excerpts; "we must also ensure that our valuable resources are not wasted. Our land must remain productive and fertile, our water unpolluted, our forest resources capable of regeneration and able to yield the needs of our national development. The beauty of our land should not be desecrated; for its own sake and for our own economic advancement". Later on, those words translated as an immense national policy toward creating sustainable nation in 2020.

Green building rating tool enhances the environmental awareness of building practices and provides fundamental direction for the building industry to move towards environmental protection and the achievement of sustainability [2]. Green building rating tool was developed to measure the improvement of the building environment quality related to basic needs. Green rating tools by its nature and role is thus very dependent upon location and environment and thus climate. GBI Malaysia should be like-wise customized to suit both to our climate and also the current state of our country's development and existing resources [3]. The green building concept in Malaysia is built on five main components which are the building plan and materials, site management, water conservation, energy efficiency and healthy living [4].

Green building is designed to produce healthier and more productive work as well as living and learning environment. These will be accomplished through the use of more natural light and improved indoor environmental quality. From the financial perspective, green buildings are also cost effective and facilitate the owner to increase their profit by reducing the costs of operations and maintenance [5]. Thus, with this GBI rating system, there will be more initiatives by the key player of built environment industry to build green building design towards sustainable development in Malaysia.

2.2 Traditional Malay House

The TMH can say to be designed ecologically to balance with the local climate as what we call it today as sustainable designed [6]. Ahmad [7] also came out with the same agreement where he stated that traditional architecture cleverly appreciate climate which in turn become part of the cultural understanding in creating built form. According to Nasir & Teh [8], the TMH has satisfied the basic needs of the Malays adjusted to suit to the warm and humid climate. The architecture of TMH is so unique, "It created near-perfect solutions to the control of climate, multi-functional use of space, flexibility in design and a sophisticated prefabricated system which can extend the house with the growing needs of the family" [9].

3. Data Analysis and Finding

From the findings it shows that the relationship between the professions with the statement of TMH is a sophisticated prefabricated building and initiates the use of rainwater harvesting to infer that there was a tendency for most of the respondents to consider not sure or disagree for that sustainability statement of TMH.

Factors such as energy and water efficiency, indoor air quality, sustainable site planning and etc. are accounted as criteria. Even TMH is not designed using modern method and knowledge; it has already manifested the sustainability in many aspects. According to Talib & Sulieman [10], the traditional way of TMH designed is to produce a sensitive structure that in-tune with the environment where the green impact play an important role. In addition, Talib & Sulieman also stated that the TMH is designed ecologically to balance with the local climate as what we call it today as sustainable designed. Thus, those statements of TMH sustainability became acquiescent for most of the respondents.

The relationship between TMH sustainability components with GBI criteria were next to be analyzed. Twenty-two components were identified to discover the relationship of TMH sustainability components with reference to GBI criteria based on respondents' experience in GBI assessment project. From the analysis, results which imply the relationship of TMH sustainability components with GBI criteria are derived.

Based on the survey, most of the respondents are familiar or involved in GBI assessment project. From the survey, more than half of the respondents (based on percentage) either who are involved or not involved in GBI assessment project suggest that every identified TMH sustainability components have a significance relationship with the GBI assessment criteria. Indoor environmental quality (EQ) becomes the most commonly selected criteria at 8 out of 22 components. It is followed by the energy efficiency (EE) and sustainable site planning and management (SM) by 4 components per criteria, 3 components for material and resources (MR), 2 components for innovation (IN) and 1 component for water efficiency (WE). None of the components was selected as not applicable (NA).

These findings are also agreed by other scholars. They stated that EQ, EE, SM and MR are the most important elements in TMH. The Malay house is a model building that is environmentally sustainable. The house is essentially a timber post and beam construction that is lightweight and utilizes one of the earliest prefabrication methods in building construction [11]. Thus, the overall construction process of the TMH reflects a clear manifestation in the way of life and understanding of the Malays themselves in relation to man and the natural environment.

Fig. 1 (cut out ornamentations embedded at TMH allowed for natural ventilation), Fig. 2 (high and double-tier roof create volumetric space and stack effect), Fig. 3 (culturally prefer dimmed lighting indoors for privacy purpose), Fig. 4 (raised floor on stilts ensures good cross ventilation through the openings), Fig. 5 (gap between wooden flooring permit under-floor ventilation), Fig. 6 (the elongated and open concept plan design ease cross ventilation), Fig. 7 (fully openable window at body height provide thermal comfort) and Fig. 8 (semi enclosed *serambi gantung* and *selang* improve the indoor environmental comfort) have more than 50% preference for EQ from the total of respondents.

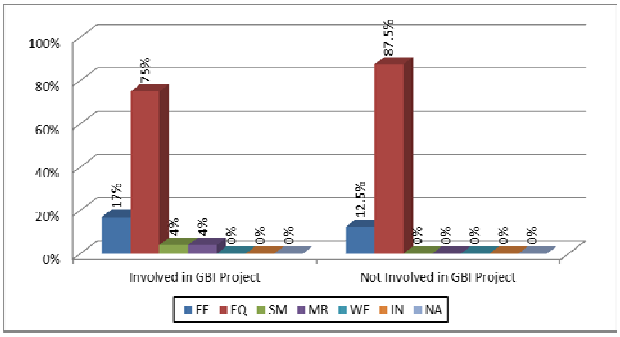

Fig. 1 Cut out ornamentations embedded at TMH allowed for natural ventilation.

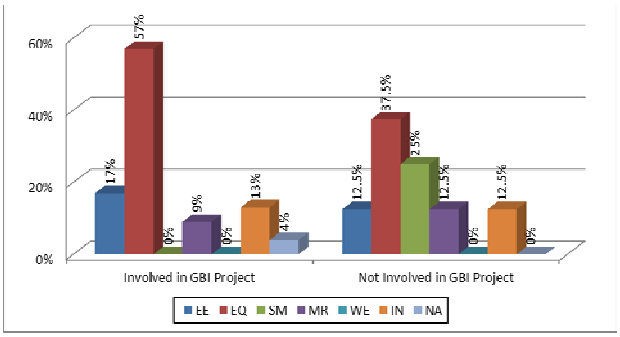

Fig. 2 High and double-tier roof create volumetric space and stack effect.

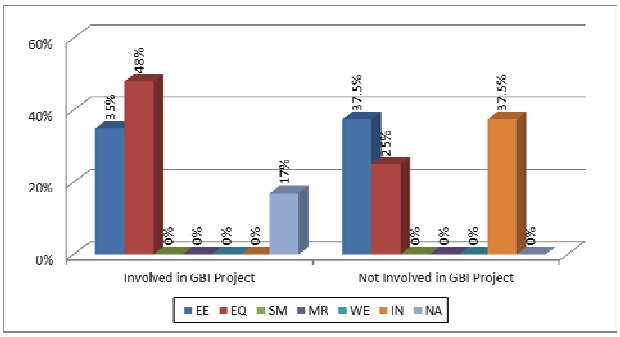

Fig. 3 Culturally prefer dimmed lighting indoors for privacy purpose.

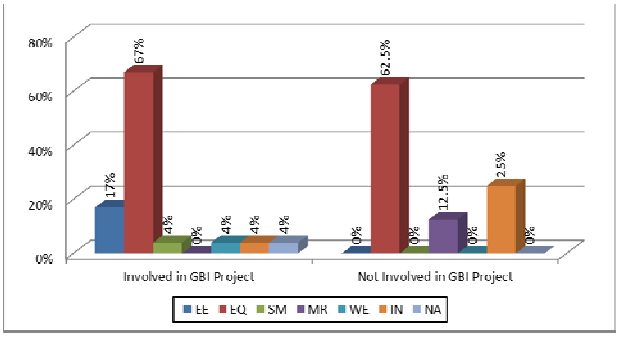

Fig. 4 Raised floor on stilts ensures good cross ventilation through the openings.

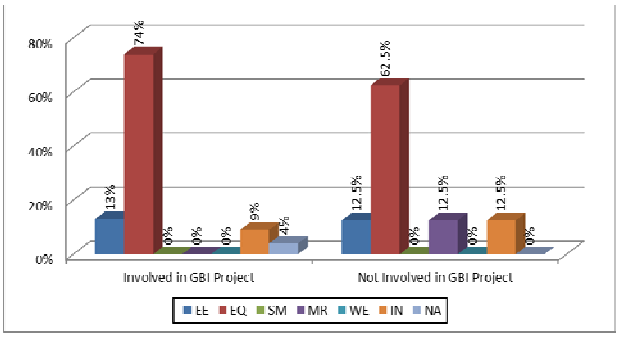

Fig. 5 Gap between wooden flooring permit under-floor ventilation.

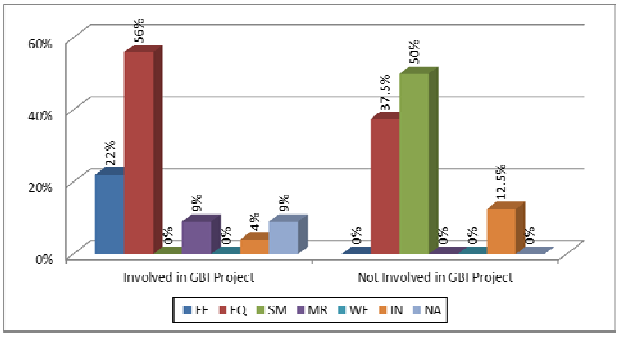

Fig. 6 The elongated and open concept plan design ease cross ventilation.

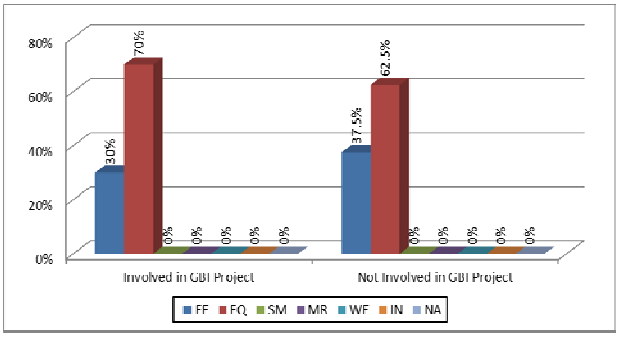

Fig. 7 Fully opendable window at body height provide thermal comfort.

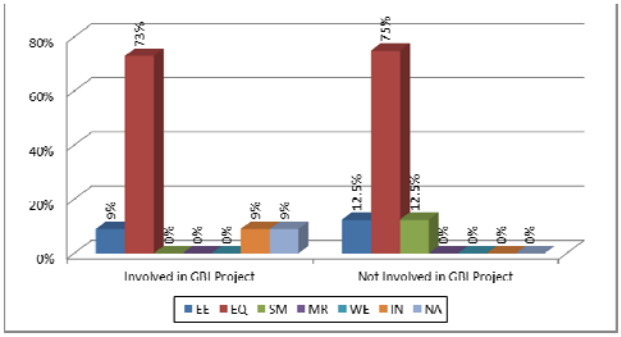

Fig. 8 Semi enclosed *serambi gantung* and *selang* improve the indoor environmental comfort.

However, for Figs. 2, 3 and 6 show that there are minor inclinations from respondents who are not involved in any GBI assessment project. This is resulted from the respondent's different point of views towards TMH sustainability components.

Meanwhile, EE criteria has been mostly selected by both group of respondents for Fig. 9 (cut out ornamentations embedded at TMH allowed for natural lighting), Fig. 10 (high and double-tier roof using materials with good thermal properties) and Fig. 11 (large roof overhangs and low wall height reducing the vertical areas of the house exposed to solar radiation).

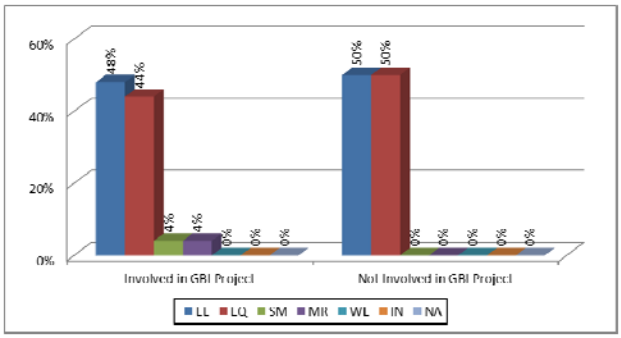

Fig. 9 Cut out ornamentations embedded at TMH allowed for natural lighting.

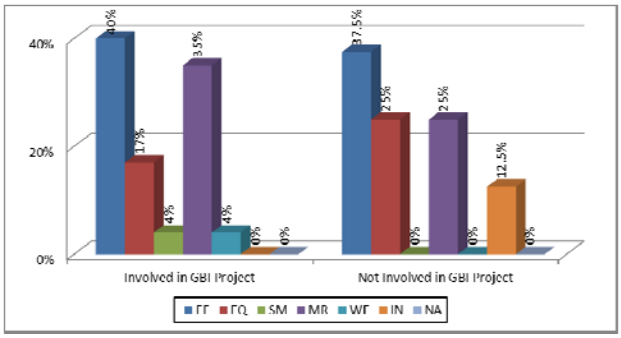

Fig. 10 High and double-tier roof using materials with good thermal properties.

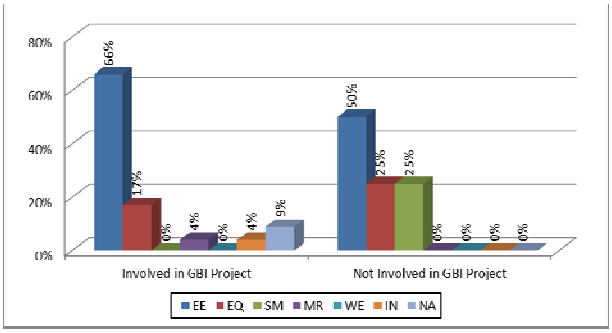

Fig. 11 Large roof overhangs and low wall height reducing the vertical areas of the house exposed to solar radiation.

Nevertheless, Fig. 12 (house is oriented towards Mecca (east-west) reduces direct solar radiation) shows that 50% of the respondents not involved in any GBI project prefer to choose SM criteria while 65% from another group of respondents choose EE. It is anticipated by the author that this result will occur depend on the perception of respondents against this component.

For Fig. 13 (random arrangement of TMH within village area permit path of winds), Fig. 14 (situated nearby the river as a means of transportation), Fig. 15 (minimum intervention towards surrounding area in construction) and Fig. 16 (lush vegetation and trees inside the house compound provide shade and coolness), it is quite clear that majority of respondent agreed at the same outcome to decide on SM criteria. However, from the total of 31 respondents, 6 respondents (19%) choose NA for Fig. 13 which is the highest NA criteria compare to the other components. This occurrence happened because some respondents probably think that the component is not as important as the others.

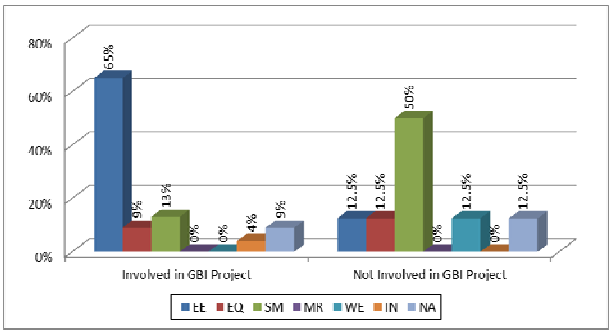

Fig. 12 House is oriented towards Mecca (east-west) reduces direct solar radiation.

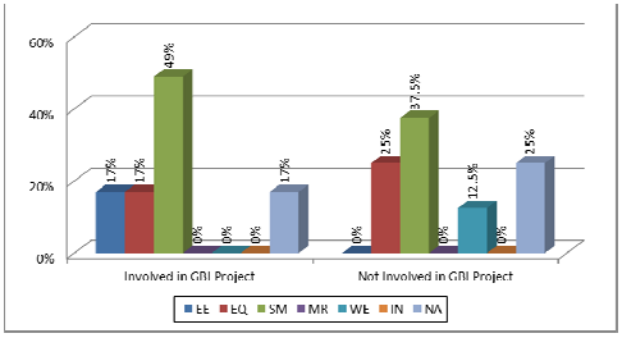

Fig. 13 Random arrangement of TMH within village area permit path of winds.

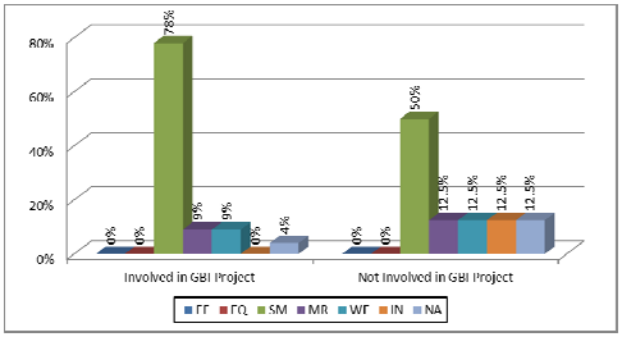

Fig. 14 Situated nearby the river as a means of transportation.

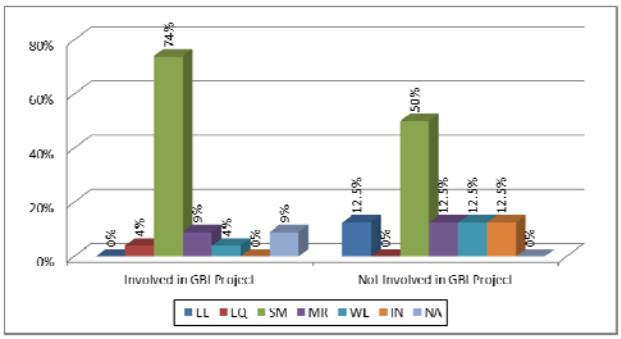

Fig. 15 Minimum intervention towards surrounding area in construction.

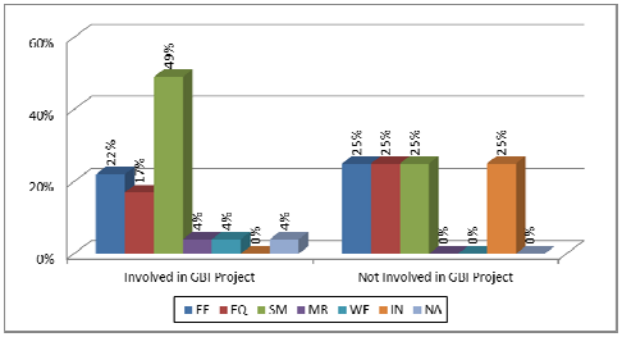

Fig. 16 Lush vegetation and trees inside the house compound provide shade and coolness.

On the other hand, MR criteria is selected for Fig. 17 (regional materials used for construction), Fig. 18 (materials used in TMH are low carbon emission) and Fig. 19 (lightweight and prefabricated construction using modular method allows flexibility in designing according to the needs).

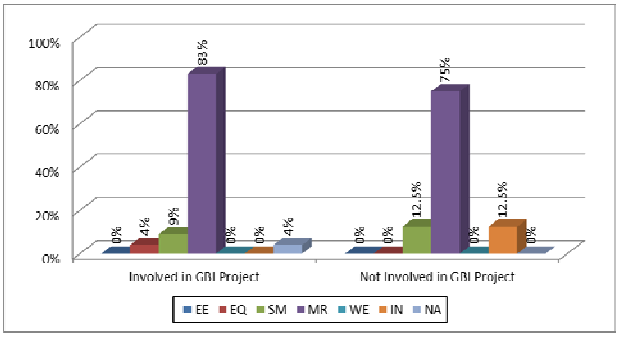

Fig. 17 Regional materials used for construction.

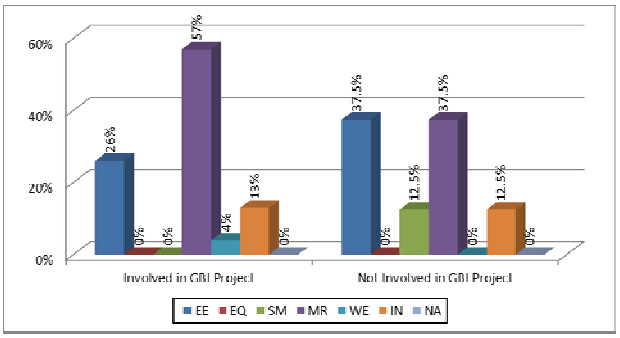

Fig. 18 Materials used in TMH are low carbon emission.

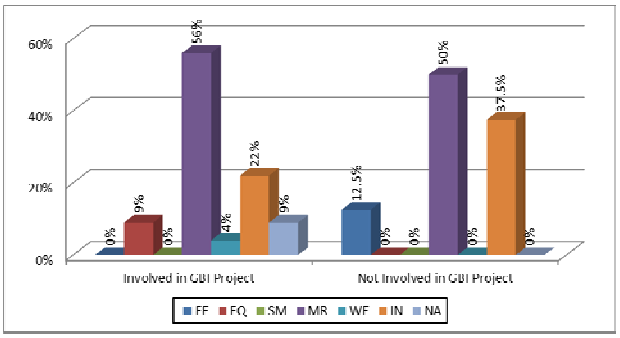

Fig. 19 Lightweight and prefabricated construction using modular method allows flexibility in designing according to the needs.

4. Conclusion

As a conclusion, in this chapter provide initial investigation in order to identify the key elements of sustainability in traditional Malay house. This chapter also defined clearly the objective, significance, scope, limitation and overview of this research. Furthermore, this chapter has outlined the general structure and the step-by-step method that have been undertaken in order to uncover the appropriate findings in the research. All the findings that have been collected would be followed with relevant analysis. It is hoped that the conclusion and recommendations towards the end of the main research body would become beneficial and would encourage future researches of similar nature in other parts of the country.

Based on the findings, the result tends to support the opinion that the GBI assessment criteria such as energy efficiency, indoor environmental quality, material and resources, sustainable site planning and management, water efficiency and innovation also suitable to evaluate TMH sustainability. Most of the identified TMH sustainability components can be attributed with those GBI criteria. These sustainability components are very important to ensure that TMH can achieve GBI certified building. Most of the respondents agree that it is essential to measure TMH sustainability. This is because it can work as a prove that TMH is still relevant as the cultural heritage of the Malays and in Malaysia.

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