

ASSESSING THE IMPACT OF IMPLEMENTING THE GREEN BUILDING CONCEPT FOR THE CONSTRUCTION PROJECT IN THE EAST COAST REGION

Izatul Farrita Mohd Kamar^{1*}, Nor Suzila Lop²,
Tanti Lyana Farisha Mohd Zulkarnain³, Wahyudi P Utama⁴
& Putranesia Thaha⁵

***Corresponding Author**

^{1,2,3}Department of Built Environment Studies & Technology,
Faculty of Built Environment, Universiti Teknologi MARA, Perak Branch,
32610 Seri Iskandar, Perak, MALAYSIA.

^{4,5}Quantity Surveying Program, Faculty of Civil Engineering and Planning,
Universitas Bung Hatta, Padang 25133, INDONESIA.

izatul739@uitm.edu.my^{1*}, norsu993@uitm.edu.my²,
lyana.zul02@gmail.com³, wahyudi@bunghatta.ac.id⁴,
putranesia@bunghatta.ac.id⁵

Received: 12 July 2025

Accepted: 29 November 2025

Published: 31 March 2026

ABSTRACT

The implementation of the green building concept for human life creates cleaner and healthier environments for people to live in. However, this does not imply that everyone is interested in implementing the green construction concept by putting it into practice, as numerous obstacles are involved. Notably, insufficient research into the effects of implementing green building practices in the East Coast area has been identified. Accordingly, this study focuses on Kelantan city. The selected research methodology applies a structured interview conducted among the construction players involved in the green building project. The data collected was analysed using an ATLAS.ti tool. The findings show that several impacts of implementing the green building concept are helping to reduce energy and waste, upgrading the construction industry, reducing air or water pollution, and helping to attract professional teams to work in Kelantan, thus, achieving more sustainable development of construction projects in Kelantan city and increasing the



Copyright© 2021 UiTM Press.
This is an open access article
under the CC BY-NC-ND license

supply of local green material.

Keyword: *Green building concept, Impact, Construction project, East coast region, Sustainable development goals (SDG)*

INTRODUCTION

The concept of constructing green has developed to protect the environment and preserve ecosystem balance. One approach to addressing this issue is introducing the green building concept in Malaysia. The green building concept is a concept where the focus is to conserve energy, help balance the ecosystem and improve the quality of life. The idea of ‘green building’ is to maximise the use of resources such as water, electricity, and materials as efficiently as possible (Yee Sin et al., 2021). The green building concept conveys numerous benefits to the environment, including social and economic aspects. The most substantial benefit of green building is energy conservation (Azis et. al., 2019). Implementing this concept can help Malaysia achieve one of the 17 Sustainable Development Goals (SDG), the 9th goal, Industry, Innovation, and Infrastructure.

Green construction is not just for the present but also for future generations and must be made sustainable and adaptive in the face of the shifting climate worldwide (World Green Building Council, 2022). Besides that, this study can also be related to the policies that have been implemented in the 12th Malaysia Plan and the National Green Technology Policy (NGTP), which is advancing towards green growth for sustainability and resilience and to boost the national economy and advance sustainable development by implementing green technology. Although it is simple to state that adopting the green building concept in daily life can help minimise the environmental effect, it is considered to be challenging to put this concept into practice because of potential gaps in resources (knowledge, skills, materials, etcetera). However, as stated by Yudelson, J. (2007), the United States is the first country that led the green building evolution which has now spread throughout the world. This is the turning point where people acknowledge the concept and realise the benefits of implementing this concept in life.

In recent years, green building practices have received tremendous global attention for their ability to protect the environment and foster sustainable development, and Malaysia, as one of the fastest-growing countries, is enthusiastically embracing the green building movement (Zakaria et. al., 2024). Nonetheless, even with the current development of the construction industry in Malaysia, implementing green buildings still takes much work due to numerous issues in putting this concept into practice. According to Fateh et al. (2021), a study shows that financial problems in the construction sector continue to this day. This is supported by Abidin (2010), where the financial problem is revealed as the main reason that has hindered the application of green building construction. Furthermore, according to a study by Nordin et al. (2017), the degree of awareness and comprehension of green buildings among construction players and the public is moderate to low. This is because only a few green buildings are being implemented on the East Coast, and there needs to be more awareness from both the public and construction players to increase the development of green buildings. Besides that, according to the executive summary of the Green Building Index (2022), as of 30 September 2022, Pahang has 11 registered green buildings, whereas Kelantan and Terengganu each have 2. While Pahang has 4 buildings that are rated as green buildings, Kelantan and Terengganu only have 1 in each state.

This shows that the number of green buildings is still lacking in the East Coast Region, thus, the implementation of the green building concept is a must to help conserve the environment and help preserve the ecosystem balance. Therefore, this research aims to assess the impact of implementing the green building concept among the construction industry players in the East Coast Region. The findings may help to encourage construction companies in the East Coast Region to implement the green building concept in their construction project.

LITERATURE REVIEW

The Impact Of Implementing Green Building Concept

The impact of implementing the green building concept on human life

is that it will create a healthier and cleaner environment for people to live in, especially for future generations to live healthy lives without worrying about pollution. Residents live more comfortably in green buildings (Mallawaarachchi et al., 2017) as green buildings provide a cleaner indoor environment that provides the occupants with a comfortable air environment and reduces discomfort from the pollution outside the building. Besides that, the green concept focuses on reducing energy waste, minimising carbon footprint, and reducing the cost of its life cycle. According to Fauzi et al. (2018), the primary focus of green buildings is typically to minimise costs through increased energy efficiency, decreased carbon emissions, and decreased costs related to operations and maintenance.

The benefits of a green building are it can reduce the life cycle cost; help maintain people's health and create a clean environment for living. In general, green building is defined as a building that focuses on the efficient utilisation of resources and has a low negative impact on the ecosystem where they use technology that can help conserve energy, reduce output wastage, and improve indoor environmental quality. The benefits of GBs, according to stakeholders, are undeniable. They noted that GBs offer distinct advantages from environmental protection to high energy efficiency, and as a result, stakeholders are calling on GBs to lessen both their environmental impact and occupancy costs (Darko et al., 2017).

To Reduce the Life Cycle Cost of the Building

Even though the initial cost used to construct green buildings is higher than the initial cost of conventional construction, the life cycle cost of green buildings is lower compared to conventional buildings. According to Pauzi et al. (2021), the green construction idea not only helps the environment but also helps save money by reducing the amount of energy that is utilised, which in turn helps lower the cost of operations. This shows that the operational cost and maintenance of green buildings are also lower than traditional conventional buildings, which use technology that helps conserve energy and save water, reducing the maintenance that is needed for green buildings. Besides that, Doan et al. (2017) stated that their research led them to conclude that green-certified buildings should be applied because they were found to have much lower operating expenses over the long run than non-certified buildings. This shows that, even though the cost of building

green buildings is higher than traditional construction, in the long run, the cost will eventually be recovered.

To Reduce Environmental Pollution

Furthermore, aside from reducing the cost in the long run, reducing environmental pollution is one of the Sustainable Development Goals (SDG) 2018 targets to achieve by 2030. According to He-Jie (2019), GB strives for improved indoor environmental quality, decreased energy consumption and carbon emissions, and relief of waste, pollution, and ecological degradation. These goals can be achieved with the help of diverse energy, water, and other resources. In the opinion of Isopescu (2018), the case study findings indicate the necessity to adopt customised solutions for each region but with specific results to achieve the primary objective of green buildings, i.e., for energy efficiency and a low impact on environmental pollution.

To Reduce Energy and Waste

Besides that, as aforementioned, implementing this concept can help increase energy efficiency and reduce the wastage output. According to Pauzi et al. (2021), one of the applications of green buildings is using natural daylight illumination, which enables sunlight to enter buildings while reducing the need for artificial lighting, thereby, reducing the energy that is needed for light sources and the environmental pollution caused by daylight systems.

Corresponding to Abanda and Byers (2016), optimising a building's orientation and shape can result in a more than 30% reduction in energy use. Moreover, an argument also reveals that excellent orientation, placement on site, and landscaping alterations may reduce a structure's energy requirements by around 20% by increasing the quantity of daylight entering an internal area (Abanda & Byers, 2016). This argument posits that a building's energy requirements can be reduced by increasing the amount of daylight entering an internal space.

Increase Government Incentive

The development of green buildings will increase if the construction player receives incentives for buying green materials or constructing a green

building, especially if the building that is constructed achieves the rating required by the client. This can be done to motivate the contractor to accept more jobs implementing green building construction or to attract others to invest in green buildings. Darko et al. (2017) noted that a green rating or certification was one of the main external drivers for building GBs. This finding has gained significant interest in the literature since it was mentioned in their study. They have also claimed that government incentives could assist in pushing green building practices since they can pay stakeholders for the additional expenses and work that may be required to construct green.

According to Wong and Abe (2014), past research based on the survey of 436 green-accredited professionals, indicates that market incentives can drive project stakeholders to adopt and promote GB in Japan. Besides that, Darko et al. (2017) have mentioned that preferential interest rates and financial incentives are two of the most desired forms of incentives and assert that these two types are among the most desired types of incentives. Both types are among the most sought-after types of rewards.

Coordination From Various Parties

Notably, a lot of work is involved in one element, for instance, constructing a solar roof requires labour to construct the roof and specialists to install all the required materials and wiring for the solar system. Thus, in this situation, a lot of coordination involves one element. Adopting and developing the GB includes participation from many different parties. According to Darko et al. (2017), these parties' coordination, management, and acceptance of responsibility are extremely important factors in adopting GB practices, despite the parties' differences in their relationships with one another.

METHODOLOGY

A qualitative method was used for this study to clarify the data, thus giving a better explanation. The interview will take place over the phone, the conversation will be audio-recorded, and the notes will be taken to analyse and interpret further without missing any crucial aspects. The data gathered and processed from the conducted interview can be used to develop the

research findings that are intended as a goal, to achieve the research aim. Purposive sampling was used to choose the respondents for the structured interviews. The participants in this research study include a landscape consultant, an architect, a developer, a project manager, and a quantity surveyor. The study population comprises five (5) stakeholders who are involved in the construction project of green buildings in Kelantan.

The interview has been separated into two sections, which are Section A- Demographic Background and Section B- The Significant Impact of Green Building Concept. Four questions were posed to the participants: the impact on the construction projects, the impact on the environment and individuals, noticeable changes from implementing this concept, and other impacts from implementing the green building concept. As a result of the interview sessions, a significant amount of material was gathered; hence, all the information will be reviewed and discussed in greater depth. After the interview session has concluded, the data will be analysed and interpreted based on the findings from both the data obtained from the interview and the literature study. Utilising ATLAS.ti qualitative analysis software is the most appropriate strategy for analysing this qualitative data. Because it will consider the result of the individual who can provide the finest information on the research, this sort of sampling is the most suitable with the qualitative approach.

RESULTS

Background Information of the Respondents

Table 1. Demographics of the Participants

Participant	Stakeholder	Position	Years of Experience
Participant 1 (P1)	Landscape Architect	Landscape Consultant	12
Participant 2 (P2)	Architect	Architect	9
Participant 3 (P3)	Developer	Engineer	10
Participant 4 (P4)	Contractor	Project Manager	9
Participant 5 (P5)	Quantity Surveyor	Quantity Surveyor	10

Source: Author

According to the data presented in Table 1, the individuals who have participated in the interview session are from various organisations. Only one representative from each organisation was selected to participate in the interview. Different stakeholders and respondent positions were chosen to participate in the interview session. As a result, the reliability of the data obtained was ensured by the fact that it was collected from the most relevant individuals. The degree of perception heavily depended on the experience one had working in the construction sector. Because of this, one may conclude that despite the number of years spent working in the construction industry that might fall anywhere on a spectrum, every single one of them is qualified because they have adequate engagement in this field.

Determining The Significant Impact Of Implementing The Green Building Concept In The Construction Project In Kelantan

This section aims to determine the significant impact of implementing the green building concept on the construction project. For this section, the participants' opinions regarding the implementation of green building concepts are discussed, including determining the significant impact on the construction project by implementing the concept and the impact on the environment and individuals.

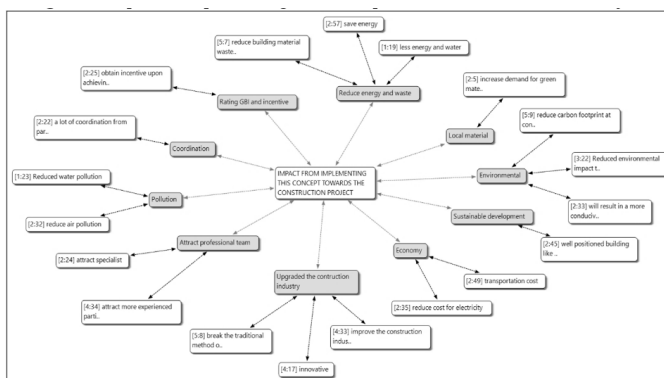


Figure 1. Impact of Implementing this Concept Towards the Construction
Source: Author

Impact On Construction Project

Based on the networking, the responses have summarised several impacts related to the implementation of the green building concept in the

construction project, where the first impact in implementing this concept towards the construction project can help reduce energy and waste as stated by Participant 1 in Quotation 19 (P1:Q19). This statement was supported by (P2:Q57) and (P5:Q7). Besides that, the second impact is upgrading the construction industry, as provided by Participant 4 in Quotation 17 (P4:Q17), which was then supported by (P4:Q33) and (P5:Q8). Furthermore, Participant 2 in Quotation 33 (P2:Q33) mentioned that implementing this concept in the construction project has an impact on the environment and was supported by (P3:Q22) and (P5:Q9).

Besides that, Participant 1 in Quotation 23 (P1:Q23) stated that implementing this concept could help reduce air or water pollution, and this statement was supported (P2:Q32). The economy is one of the things that was impacted by the implementation of this concept, as stated by Participant 2 in Quotation 35 (P2:Q35). This was then supported by (P2:Q49). After that, Participant 2 in Quotation 24 (P2:Q24) mentioned that the increase in the construction of green buildings could help attract professional teams to work in Kelantan, and this was supported by (P4:Q34).

Other than that, Participant 2 in Quotation 45 (P2:Q45) mentioned that implementing the green building concept could achieve more sustainable development, especially a well-positioned building. The impact of implementing the green building concept in the construction project could help increase green building development in Kelantan, which in turn could help increase the supply of local green material, according to Participant 2 in Quotation 5 (P2:Q5). Moreover, Participant 2 in Quotation 25 (P2:Q25) mentioned that the impact of the implementation of this concept could help the construction project gain an incentive if they achieve the GBI rating required by the client. Besides that, Participant 2 in Quotation 22 (P2:Q22) also stated that there was a lot of coordination involved between the construction players during the implementation of the green building concept in the construction project.

Impact on the Environment And Individuals

Implementing this idea, in the perspective of Participant 1 in Quotation 24 (P1:Q24), has an impact on both the individual and the environment. Participant 2 in Quotation 27 (P2:Q27), claimed that green buildings could

automatically maintain themselves without impacting the environment, leading to more sustainable growth. For instance, green buildings may produce energy without squandering any resources; they do not use resources like coal, nuclear, or gas to do it. In addition, Participant 1 in Quotation 25 (P1:Q25) added that this idea offers the vista an aesthetic value, which the surrounding greenery substantially enhances. Therefore, the building occupants' moods can be improved, as the air is considerably cleaner when the surroundings are green and peaceful.

Participant 2 in Quotation 26 (P2:Q26) backed up this idea by pointing out that applying the "green" idea might improve our surroundings and make life more enjoyable without having to worry about wasting energy. Furthermore, Participant 2 in Quotation 29 (P2:Q29) added that putting this idea into practice would influence the economy. For instance, one's house might employ a sensor ceiling fan, which would cause it to switch off automatically when it senses that there is no movement or presence in the space. Through this means the durability and longevity of the item can be extended while saving energy and lowering the cost of maintenance.

Besides that, Participant 5 also mentions how implementing this concept can help reduce carbon footprint, minimise the use of non-renewable resources, and contribute towards the conservation of natural resources. Other than that, the usage of non-toxic materials, efficient ventilation systems and proper filtration can help improve indoor air quality including improving the health of the occupants.

Noticeable Changes from Concept Implementation

Participant 1 in Quotation 32 (P1:Q32) notes that for his part, it is difficult to detect a noticeable improvement that can be noticed from the application of the green building concept. This may be because he handles the landscape, which most people view as having an aesthetic value only. He also mentions that it is not implemented as a green building idea as a whole and thus is just executed to achieve a higher GBI score.

Participant 2 in Quotation 37 (P2:Q37) remarked that when this concept is adopted, a reduction in the amount of energy used and the waste produced can be observed. An example would be that of an escalator in a

shopping mall that operates without stops all year round as compared to an escalator that only moves when someone steps on it; it can be deduced which is more cost-effective and will last longer. This comparison shows the potential expenses for electricity and maintenance: the rationale is that allowing it to function even when no one is using it contributes to a waste of resources. Therefore, by adopting environmentally friendly practices, the amount of energy consumption can be reduced, resulting in financial savings.

In addition, Participant 2 in Quotation 10 (P2:Q10) has brought up the influence it would have on subsequent generations. They emphasise that current practices can jeopardise future generations; for instance, we now regard plants as having aesthetic value and can enhance the environment, but what about future generations? In the future, there will be a shortage of plants, which is not sustainable because it does not risk future generations' well-being.

Participant 4 in Quotation 16 (P4:Q16) has noted that applying the green building concept can attract professional teams, including making the contract more of a desire to serve this green building concept owing to the increasing demand from the people. This idea is gradually becoming common knowledge among the people, and they are taking new initiatives to steer their lives towards a different outcome. Typically, when one individual takes the lead in an action, another will likely respond in kind, making it easier for others to join in thereafter.

Other Impacts that can be Seen From Implementing this Concept

Participant 2 in Quotation 49 (P2:Q49) has pointed out that the cost of transportation can be reduced if the materials are locally sourced or if the product in question is stocked in Kelantan. In addition, recycling and reusing water utilizing a rainwater harvesting system is one of the parts of the green construction concept. This will lower the cost of generating water supply while also saving water. Moreover, environmentally friendly actions and decisions have a direct impact on the environment, creating a situation where both humans and the environment benefit. The use of this idea not only brings promised benefits, but it can also boost the social well-being of a society, fostering greater happiness and pleasure in life.

Participant 4 in Quotation 24 (P4:Q24) places more emphasis on

the social well-being of individuals, arguing that an abundantly green environment enhances our natural lifestyle, promoting a healthier way of living. This can contribute to a reduction in mental health issues, as exposure to greenery allows us to breathe in more fresh air.

Proposing Solutions To Address The Challenges Of Implementing Green Building Concepts In Construction Project In Kelantan

Based on networking, several suggestions have been summarised from the responses to overcoming the challenges of implementing this concept in the construction industry. According to Participant 1 in Quotation 3 (P1:Q3), there are numerous possibilities to reduce the challenges in implementing the concept in construction projects. This statement is supported by (P2:Q2), (P2:Q3), (P2:Q4) and (P2:Q9). A second proposed solution is to increase awareness, as stated by Participant 3 in Quotation 26 (P3:Q26), which is supported by (P4:Q29), (P5:Q2) and (P5:Q11). In addition, Participant 3 in Quotation 27 (P3:Q27) states that promoting the benefits of implementing this concept is another way to overcome the challenges. This latter is supported by (P4:Q27) and (P4:Q28).

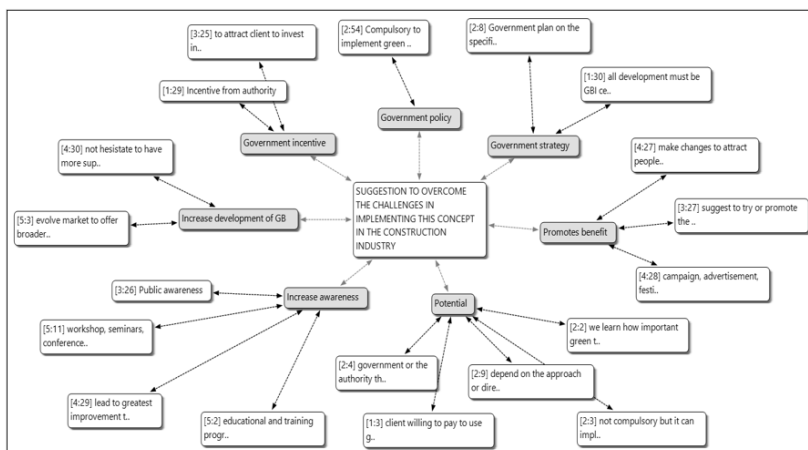


Figure 2. Suggestion to Overcome the Challenges in Implementing this Concept in the Construction Industry

Source: Author

Furthermore, Participant 1 in Quotation 29 (P1:Q29) has mentioned that government incentives are one of the solutions to overcome the

challenges in implementing this concept. This was supported by (P3:Q25). Besides that, implementing the green building concept can help increase the development of green buildings in Kelantan. This statement was stated by Participant 4 in Quotation 30 (P4:Q30) and supported by (P5:Q3). Government strategy is also one of the suggestions mentioned by Participant 1 in Quotation 30 (P1:Q30) to overcome the challenges in implementing green building concepts in the construction project, which was then supported by (P2:Q8). Finally, the suggestion to overcome the challenges in implementing this concept in the construction project is Government policy, as provided by Participant 2 in Quotation 54 (P2:Q54).

DISCUSSION

Based on the findings, one of the impacts that can be seen by implementing this concept is the improvement of social well-being. According to Fauzi et al. (2018), those who believe in and enjoy green structures and the environment will be fine if they make their homes green.

One effect of applying this idea to the construction project is to reduce waste and energy consumption. Esa et al. (2011) support this perspective, emphasising that Malaysians must adopt a new mindset and begin considering greener solutions that are less harmful to the environment and more energy efficient. However, Niig (2016), pointed out that this green design may not be as eco-friendly as it seems because glass walls require a lot of water for cleaning, which ultimately results in higher water usage, particularly by cleaning contractors who may not employ sustainable cleaning practices.

The application of this concept has the potential to positively impact the surrounding natural environment. The World Green Building Council (2022) supports this notion, stating that a green building is a sustainable structure that benefits the environment. This assertion is further substantiated by the information presented here. Additionally, reducing pollution is another outcome that can result from implementing this concept. Yee et al. (2020) emphasise that the green initiative should not be disregarded and should be pursued to achieve greater success. This is corroborated by the potential to reduce pollution, address environmental issues, safeguard

ecosystems, and improve energy and water efficiency.

Although the initial cost of implementing the green building concept in the construction industry is higher than constructing a conventional building, it can result in cost savings over time. Tjenggoro and Prasetyo (2018) explain that operational expenses are reduced through the green building concept, which utilises less water and electricity. It is possible to achieve sustainable development through the concept of transformation towards green practices. This assertion is supported by Zhang et al. (2019), who indicate that sustainable growth in the construction industry is mainly driven by market demand. Building new firms, institutions, and luxury houses seems particularly promising for the future. Developing green buildings in the construction sector can help boost the supply of locally sourced green materials. This can assist in increasing the supply of local green environmentally friendly resources. In correspondence, the Green Building Materials Industry Size & Growth Analysis (2023) asserts that the growing demand for green building materials over traditional construction materials will boost the industry's growth.

While the findings suggest a solution to overcome the challenges in implementing the green building concept, it can be said that the demand for and knowledge of green building can grow as public awareness of the advantages of the green idea increases. The construction industry sees the Green Building Index (GBI), a building rating system that is used in Malaysia, to promote sustainability and increase awareness of environmental issues among the public and those working in the building sector. This perspective is supported by Niig (2016). In addition, promoting the benefits of using the green building concept can also help reduce the challenges in implementing the green building concept in the construction industry. Accordingly, Alqadami et al. (2020), mentioned that the concept must overcome several challenges, such as the project stakeholders' knowledge and awareness, to promote green infrastructures and buildings.

Besides that, incentives from the government are one of the suggestions that can be implemented to reduce the challenges in implementing green building concepts in the construction project. Saka et al. (2021) backed the idea that the federal, state, and municipal governments, as well as other governmental levels, should be responsible for establishing incentives

to encourage the creation of green buildings. Moreover, governmental strategies are one of the recommendations for overcoming the difficulties in adopting the green building idea in the construction sector. This assertion is further supported by Hargrave (2022), who argues that a substantial standard considering operational and embodied carbon is necessary if the government is serious about assisting the building industry in reaching net zero.

The challenges in adopting green building ideas in the construction project can be partly resolved by government policies. According to Esa et al. (2011), who support this claim, the government should start requiring all developers to include some green building features in all their upcoming constructions before approving any construction. Clients and architects are obliged to follow the specifications in this way.

CONCLUSION

Based on the findings, implementing this concept into the construction project will have a beneficial impact. The significant effects that can be observed include a decrease in energy consumption and waste, improvements in the construction sector, positive environmental impacts, reduced pollution, and economic benefits. This also involves attracting skilled professionals to Kelantan, achieving sustainable development through the adoption of green principles, increasing the availability of local green materials, receiving incentives for attaining GBI ratings, and necessitating extensive collaboration among all stakeholders in the construction project. Moreover, proposed solutions to address the challenges of implementing the green building concept in construction projects encompass several strategies: raising awareness, promoting benefits, providing government incentives, enhancing the development of green buildings, and formulating effective government strategies and policies. Each recommended solution aimed at overcoming the challenges encountered in the implementation of the green building concept within construction projects has been identified and discussed.

ACKNOWLEDGEMENTS

The authors would like to express their sincere appreciation to Universiti Teknologi MARA for their financial support of this research article.

DECLARATION OF AI-GENERATED CONTENT

AI tools (e.g, ChatGPT, Grammarly) were used for drafting, assistance, paraphrasing and grammar checking. All content was critically reviewed and edited by researcher.

FUNDING

There is no funding for this research.

AUTHOR CONTRIBUTIONS

All authors contributed significantly to this work and agreed to be accountable for all aspects of the research. All authors approved the final version of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- Abanda, F. H., & Byers, L. K. (2016). An investigation of the impact of building orientation on energy consumption in a domestic building using emerging BIM (Building Information Modelling). *Energy*, 97, 517–527. <https://doi.org/10.1016/j.energy.2015.12.135>.
- Alqadami, A., Zawawi, N. A., Rahmawati, Y., & Alaloul, W. (2020). Challenges of implementing green procurement in public construction

- projects in Malaysia. *IOP Conference Series: Materials Science and Engineering*, 849(1), 012047. <https://doi.org/10.1088/1757-899x/849/1/012047>.
- Darko, A., Zhang, C., & Chan, A. S. C. (2017). Drivers for green building: A review of empirical studies. *Habitat International*, 60, 34–49. <https://doi.org/10.1016/j.habitatint.2016.12.007>.
- Doan, D. T., Ghaffarianhoseini, A., Naismith, N., Zhang, T., Ghaffarianhoseini, A., & Tookey, J. (2017). A critical comparison of green building rating systems. *Building and Environment*, 123, 243–260. <https://doi.org/10.1016/j.buildenv.2017.07.007>.
- Esa, M. R., Marhani, M. A., Yaman, R., Noor, A. A. H. N. H., & Rashid, H. A. (2011). Obstacles in implementing green building projects in Malaysia. *Australian Journal of Basic and Applied Sciences*, 5(12), 1806–1812.
- Fateh, M. A. M., & Tan, Y. H. (2021). Revisiting the financial issues and the impact to construction projects in Malaysia. *Malaysian Journal of Civil Engineering*, 33(2). <https://doi.org/10.11113/mjce.v33.16269>.
- Fauzi, N. S., Zainuddin, A., Nawawi, A. H., Johari, N., & Ali, S. H. (2018). The Green Building Concept: Is it a Trend? *International Journal of Academic Research in Business & Social Sciences*, 8(1). <https://doi.org/10.6007/ijarbss/v8-i1/3892>.
- Fauzi, N. S., Zainuddin, A., Nawawi, A. H., Johari, N., & Ali, S. H. (2018). The Green Building Concept: Is it a Trend? *International Journal of Academic Research in Business & Social Sciences*, 8(1). <https://doi.org/10.6007/ijarbss/v8-i1/3892>.
- Green Building Index. (2022). *GBI Executive Summary – Green Building Index*. <https://www.greenbuildingindex.org/how-gbi-works/gbi-executive-summary/>.
- Hargrave, S. (2022). *How the government could boost green building*. Raconteur. <https://www.raconteur.net/construction/how-the-government-could-boost-green-building/>.

- He-Jie, B. (2019). Towards the next generation of green building for urban heat island mitigation: Zero UHI impact building. *Sustainable Cities and Society*, 50, 101647. <https://doi.org/10.1016/j.scs.2019.101647>.
- Isopescu, D. N. (2018). The impact of green building principles in the sustainable development of the built environment. *IOP Conference Series*, 399, 012026. <https://doi.org/10.1088/1757-899x/399/1/012026>.
- Mallawaarachchi, H., De Silva, L., & Rameezdeen, R. (2017). Modelling the relationship between green built environment and occupants' productivity. *Facilities*, 35(3–4), 170–187. <https://doi.org/10.1108/F-07-2015-0052>
- Niig, L. N., (2016). *The Challenges in Implementing Green Building Concept—A Study Among Contractors in Sibuluan*. Sarawak Go to reference in article.
- Nordin, R. M., Halim, A. S., & Yunus, J. (2017). Challenges in the Implementation of Green Home Development in Malaysia: Perspective of Developers. *IOP Conference Series*. <https://doi.org/10.1088/1757-899x/291/1/012020>.
- Pauzi, N. N. M., Yeow, P. K., Go, Z. H., & Hadibarata, T. (2021). Overview on the implementation of green building design in Malaysia, Singapore, Vietnam and Thailand. *International Journal of Advanced Research in Technology and Innovation*, 3(3). <https://myjms.mohe.gov.my/index.php/ijarti/article/view/15046>
- Saka, N., Olanipekun, A. O., & Omotayo, T. (2021). Reward and compensation incentives for enhancing green building construction. *Environmental and Sustainability Indicators*, 11, 100138. <https://doi.org/10.1016/j.indic.2021.100138>.
- Tjenggoro, F. N., & Prasetyo, K. (2018). The usage of green building concept to reduce operating costs (study case of PT Prodia Widyahusada). *Asian Journal of Accounting Research*, 3(1), 72–81. <https://doi.org/10.1108/ajar-06-2018-0005>
- Wong, S., & Abe, N. (2014). Stakeholders' perspectives of a building environmental assessment method: The case of CASBEE.

- Building and Environment*, 82, 502–516. <https://doi.org/10.1016/j.buildenv.2014.09.007>.
- World Green Building Council. (2022). *World Green Building Council*. <https://worldgbc.org/about-us/our-mission/>.
- World Green Building Council. (2022). *World Green Building Council*. <https://worldgbc.org/about-us/our-mission/>.
- Yee, H. C., Ismail, R., & Jing, K. T. (2020). *The barriers of implementing green building in Penang Construction Industry*. Akademia baru. https://www.researchgate.net/profile/Progress-In-Energy-And-Environment/publication/342122445_The_Barriers_of_Implementing_Green_Building_in_Penang_Construction_Industry/links/5ee33286299b1faac4e7df9/The-Barriers-of-Implementing-Green-Building-in-Penang-Construction-Industry.pdf.
- Yee, S. O., Yusof, N., & Osmadi, A. (2021). Challenges of green office implementation: A case study in Penang, Malaysia. *International Journal of Sustainable Construction Engineering and Technology*, 12(1), 153–163. <https://doi.org/10.30880/ijscet.2021.12.01.015>.
- Yudelson, J. (2007). *The Green Building Revolution*. Island Press; 2nd edition.
- Zhang, Y., Wang, H., Gao, W., Wang, F., Zhou, N., Kammen, D. M., & Ying, X. (2019). A Survey of the Status and Challenges of Green Building Development in Various Countries. *Sustainability*, 11(19), 5385. <https://doi.org/10.3390/su11195385>.

