OBSTACLES AND SOLUTIONS FOR GREEN CONSTRUCTION

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Abstract:
Green building, also known as sustainable building, confronts several challenges that could stymie its widespread acceptance. It focuses on certain typical roadblocks and suggests potential strategies to overcome them. Green building is fraught with difficulties due to greater upfront costs, a lack of understanding, reluctance to change, and a scarcity of materials and technologies. These factors discourage developers and investors from adopting sustainable practices, preventing widespread adoption. Governments and industry organizations can provide financial incentives, raise awareness through training programmers, encourage collaboration, mandate sustainable building codes and standards, and invest in research and development for cost-effective green materials and technologies to overcome obstacles. Adoption of sustainable construction practices can be hastened by resolving cost concerns, raising awareness, encouraging collaboration, and strengthening regulatory support, resulting in a more ecologically friendly society.

IndexTerms - technologies, green construction, sustainable building, widespread acceptance

I. INTRODUCTION

Green building attempts to reduce environmental effect while increasing resource efficiency and occupant well-being. It entails energy-efficient design, environmentally friendly materials, water conservation, trash reduction, and better indoor air quality. However, barriers to widespread adoption exist. This introduction discusses the major challenges and potential answers. Green construction faces obstacles due to higher upfront costs, but long-term benefits like energy savings, reduced operational costs, and improved occupant satisfaction can outweigh the initial investment. Developers and investors may hesitate to embrace sustainable practices due to profitability concerns. The adoption of green construction practices is hampered by a lack of information among stakeholders. This can lead to opposition and skepticism. To address this, education and awareness activities, such as training programmers, workshops, and industry conferences, should be launched. Another big barrier is resistance to change, yet a shift in perspective and joint effort can develop a culture of sustainability. Encouragement of collaboration, sharing success stories, and demonstrating positive benefits can all help to drive the adoption of sustainable practices. Green construction is hampered by scarcity and high cost of green materials and technologies. Builders and developers may be put off by a lack of accessibility or high prices. To address this, invest in research and development, as well as government incentives for the production and use of sustainable materials. Green construction faces challenges that necessitate a multifaceted approach that includes financial incentives, education, awareness campaigns, a shift in industry thinking, and breakthroughs in materials and technologies. Addressing these issues can lead to a more sustainable future with environmentally friendly structures and better health.

II. LITERATURE REVIEW

Heba Farouk Abdelkhalik et al. (2022) described the management of green building projects in Egypt has various flaws, which could add yet another barrier to the list of barriers drawn from earlier studies. Repetition work and delays may be caused by late hiring of a green consultant or late decision to use develop concepts. To overcome some of the challenges green buildings face globally, especially in Egypt, green architecture needs to develop more easily implemented management approaches. Project managers and green building consultants should have different roles and duties. A green project manager must be involved in the project from the pre-design stage on. Most of the barriers to sustainable construction in Egypt might be removed through project management. A critical concern, especially for the certification process, is the verification of green construction works. Project managers should be aware of and pay closer attention to stakeholder management.

Joshua Ayarkwa A et al. (2022) from their study it was found that the important mitigating tactics, like educating stakeholders on the long-term advantages of green construction. The method of non-probability sampling was applied to create a representative sample. A total of 50 questionnaires were sent to D1 building contractors based on the sample methodology. The obstacles experienced by project management teams in sustainable building processes include inadequate training and education,
unfamiliarity with green technologies, and greater expenses for green construction. Clients and designers will be better prepared to suggest the use of green buildings in construction projects if tactics like education about their possible benefits are. Researchers from Ghana have investigated how project management teams’ capability and sustainable buildings in Ghana’s construction industry relate to one another. The study’s conclusions could be seen as a knowledge of the difficulties provide solution for these barriers.

Aussama Khalil et al. (2021) in their paper they examined the difficulties in the Libyan construction industry is having to incorporate sustainability standards into its operations. Semi-structured interviews and a questionnaire survey were used to gather the data. The findings demonstrated a lack of sustainability awareness in the building industry in Libya. a study looking into the difficulties in applying sustainable building methods in Libya. The difficulties resulted from challenges with organization, technology, expense, and expertise and guidance. It shows that these results can be applied to other emerging nations with comparable socioeconomic and educational circumstances.

Davies O.O.A (2021) says that the traditional construction sector in Nigeria has developed more quickly than the country’s construction sector. Client resistance, a lack of accurate information, the absence of sustainable building materials, insufficient capacity for the implementation of sustainable projects, and an inability to enforce policies on sustainable construction projects are a few of these issues. Wet construction, as it is known professionally, is preferred in Nigerian construction above other types that are used around the world. The assumed greater investment costs for sustainable buildings compared to standard buildings and the potential for unexpected costs are major barriers to their acceptance. Today’s design education must include a critical component on sustainable design. In Nigeria, there are currently no laws, rules, or organizations that support environmental sustainability and energy efficiency. Due to their strategic development, bye-law development for Nigeria’s main cities should be supported and promoted. Designers should constantly enquire about the raw materials, manufacturing procedures, and country of origin of products from product suppliers and manufacturers. Green Building Council must create and supervise a global standard. The status of the project’s sustainability will be positively impacted by the usage of tool rating for corporate projects.

Mikhail Leontev (2021) says that the reach of green construction is still limited globally, particularly in Russia. Compared to Europe and the US, Russia adopted green building a little later. There are 19 difficulties that prevent the implementation of green building projects in Russia. One of the main problems is that not enough people are knowledgeable about construction-related issues, particularly green building. The popularity of future green construction efforts will increase. This study examines the main obstacles to the execution of such efforts in Russia. Lack of knowledge and information is the main obstacle to green building, followed by higher costs, a lack of consumer interest, and a lack of market demand. According to the survey the obstacles can be overcome by providing project team members with financial incentives, green project efficacy can be raised. By providing project team members with financial incentives, green project performance can be raised. By reducing administrative procedures, green building projects can operate more effectively.

M. R. I. Chowdhury et al. (2021) according to their study, the biggest obstacles to the implementation of sustainable building in Bangladesh are a lack of awareness about it, a project manager who is unqualified, and a lack of experience with sustainable technologies. The study used a questionnaire survey to pinpoint the key variables influencing the adoption of sustainable building practices in construction projects. Numerous factors have been chosen in accordance with the literature mentioned. The principal and driving stakeholders in this research are the contractor, the worker, and the engineer. A total of 20 elements have been chosen as barriers or hurdles to sustainable building. Conflict with the architect over the chosen material was viewed by the contractor as having less of an impact.

G. A. Niyemta et al. (2020) explained that green construction is becoming more popular to address problems including resource depletion, population growth, and pollution build up. The implementation of green design has been delayed by real or imagined constraints for developing nations. Understanding these obstacles may help modify Burkina Faso’s policies and practices to encourage more environmentally friendly design. As part of its data collection techniques, a trial study tested questionnaire surveys and semi-structured interviews. If the following criteria were met, participants believed that the future of sustainable design and construction was bright. For green projects, accessibility to affordable construction, lowering building and running costs, environmental protection, and cultural heritage preservation were crucial factors. It is anticipated that more people would adopt green technologies, materials, and designs, especially in Burkina Faso and Africa. This study looked at these obstacles from the viewpoint of Burkinafs green design experts.

Daniel Uchenna Chukwu et al. (2019) in their article they explained that the green building aims to reduce energy and material consumption, recycle and reuse resources to protect the environment, promote economic growth, and increase everyone’s quality of life. In their analysis it shows that, the key areas of capacity requirements for adopting green buildings are accurately highlighted. This study’s main objective was to fill the knowledge gap in traditional constructions, which needed for further training, seminars, and workshops. It was discovered that workers in building-related sectors in both the educational and industrial sectors generally coincide on the green buildings under consideration.

Ifije Ohiomah et al. (2019) from their study suggested that South African construction professionals are likely to accept the idea of sustainable project management as there is a correlation between the drivers and barriers. The research found that people are aware of sustainable project management, and as a result, they care about the environment. The results of this study, which uncovers the drivers and barriers of sustainable project management, demonstrate a strong positive link, with the greatest drivers also being the highest ranked barriers. Sustainable project management must be one of the construction practices that help address the issue to lessen the amount of CO2 that the construction sector is known to produce. This study suggests that experts and the government collaborate to develop policies that will result in a successful outcome for both parties.
Yinqi Zhang et al. (2019) described that the development of green building development across several nations is compared in this essay. To produce green buildings, it is important to clarify the major influencing elements relating to various stakeholders. The term "interior factor" refers to elements of a green building's design, management, and occupant behavior. Analyzing these three elements offers a clear detailed plan for developing national standards and formulating policies. Greater complexity, a lack of awareness of sustainability, and high cost are impeding the adoption of GB technologies and their spread. The idea of GB develops as a comprehensive strategy to address numerous issues brought on by the building sector. This paper includes presentations of the United States, Europe, the United Kingdom, Japan, China, and a few other nations. This study discovered that green building in China have a big impact. Most nations created and used Green Building Rating Systems to meet sustainable building construction targets. Lack of a social welfare education programme that can give people who can incorporate green building into their building life cycle a clear grasp of green building knowledge.

Adrian Firdaus et al. (2018) described that the purpose of the research is to identify several barriers to the adoption of the green construction concept in Indonesia. No client demand, cost of investment, awareness, and site quality are the identified barriers in order of likelihood of occurrence. In this study, no client demand, cost of investment, awareness, and site condition were shown to be the barriers with the highest rate of occurrence. The problem of client demand could be resolved by establishing the necessary policies, an official evaluation system, and incentives. To raise contractor awareness, more education about many aspects of green construction is needed. The Assessment Green Construction tool should take the site condition barrier into consideration.

Albert Ping Chuen Chan et al. (2018) from their study it gives detail explanation regarding barriers and solutions for the implementation of green construction Management in Ghana. Green construction management techniques as a means of implementing sustainability within the building industry has attracted considerable attention on a global scale. However, adoption of green construction management in Ghana is still in its infancy and faces significant obstacles. The adoption of green construction techniques in Ghana is still in its infancy and is beset by many obstacles. Higher green building technologies prices, a lack of government incentives, and a lack of funding options are the main obstacles (e.g., bank loans). The promotion of green building technologies in Ghana requires a more active participation from the government. This essay presents the preliminary findings of a deep inspection into how to encourage the use of green building technologies in Ghana. Although the study's sample size was sufficient for statistical analysis, it should be noted that they are still quite limited.

Pleasa Serin Abraham et al. (2018) says that the building sector can make a significant contribution to cutting energy use and carbon emissions. A major drawback is a lack of knowledge on energy-efficient building approaches and life cycle costing. The second biggest barrier is a lack of enforcement of building laws and regulations. Following the Energy Conservation and Building Code could result in energy savings of 27% to 40%. Codes should be enforced properly with strict penalties for refusals, and they should be required. Lack of knowledge about the advantages green buildings have for the economy, the environment, human health, and technology. Shortage of informational resources and a lack of experts with relevant experience create problems. To introduce people to green building techniques, IGBC holds workshops, training sessions, and assessments. To help the transformation, there is a need for government regulation, including adding this to the national agenda, implementing command and control, and using market-based tools. A well-balanced combination of several tools, including legislation, fees, consumer subsidies for green products, and special mortgage loan. Green construction is essential. According to a study by the Institute of Green Building and Design (IGD) and the Department of Environment, Buildings and Urban Development, it is vital to adopt a lifetime approach to determine the cost savings that green buildings offer.

Ruchira Ashok Pagar et al. (2018) from their study it shows that technology, training, and economic challenges are the major drawbacks in adaptation of this concept. moreover, the two significant hurdles to the adoption of green building technology in Nashik are highlighted as being attitudes and the market. green technology costs are rising. The one that holds that green building technologies are more expensive due to lack of demo projects aren't readily available. These barriers can be overcome by technical training for project workers and implementing new technologies related to green building techniques are the relevant solutions.

Mohammed shareef M. S. Hasan et al. (2016) explained that Building energy conservation challenges are now becoming more prevalent in China because of the country's fast urbanization and economic growth, sustainable building, environmental concerns in the industry are regarded as being of the biggest importance. Many developers are unwilling to incorporate sustainability into their projects due to lack of awareness, inadequate comprehension, and cost-cutting measures. Some difficulties have a major impact on the community and the environment. By encouraging green development, these problems might be lessened. A questionnaire survey was chosen among the Chinese construction industry's stakeholders. Findings demonstrate that extra cost for green building construction was the major obstacle and significant portion of stakeholders believe there these obstacles must be considered.

O.E. Ogumakinde et al. (2015) according to published research, most clients in poor nations don't demand Sustainable construction for projects. What is being done in terms of sustainable development and what needs to be done in the future are significantly different. Sustainable construction is difficult to execute, and all stakeholders must work together to make it work. It is advised that construction industry professionals receive education, training, and Sustainable construction awareness.

Solomon W. Were et al. (2015) says that most urban structures are tightly built, which prevents airflow after they are finished. As the construction process has a substantial impact on several sustainability elements, site planning is an important component of sustainable building. Large green spaces are typically destroyed rather than incorporated into the developed environment. The adoption of green building is likely to be aided by an integrated policy framework that includes regulatory and non-regulatory mechanisms. By creating building sustainability checklists during the licensing process and including check lists for the issue of occupation certificates, the local authorities can encourage some level of adaption. Adequate education and training are also required for improved implementation. The authors propose that to offer the necessary leverage for adoption, a suitable legal and institutional framework should be created.
K. A. M. Kamar et al. (2014) from their study it shows that the present efforts being made in Malaysia by the public and commercial sectors to promote the use of sustainable development and green buildings are highlighted the construction sector generates a lot of garbage and uses a lot of non-renewable resources. About half of all CO2 emissions are caused by buildings in operation. Moreover, six million tons of trash were produced in Malaysia, according to records. The era of sustainability is adopting a position, and the building sector needs to show that it can support this new stance. Investments are necessary to bring about change, and most of those investments must be made by the private sector, with adequate facilitation from the public sector. The Malaysian government must make the most of any potential gains from this shift.

Milad Samari et al. (2013) from their article they stated that the Green Design Forum in January 2009, the Malaysia Green Building Index (GBI) was launched. GBI is a detailed rating system and environmental evaluation used to evaluate the performance and environmental design of buildings in Malaysia. The Malaysian construction industry realized the need for a green rating system to advance and adjust to the climatic condition. The main obstacles have been determined after looking at the level of green building development from the perspective of professionals. According to the research, government initiatives, particularly those that provide incentives, such as structural incentives, subsidy and cashback programmes, tax incentive schemes, low-interest mortgage loans, voluntary rating systems, and market and technology assistance, are key factors in removing barriers.

Bon-Gang Hwang et al. (2012) they illustrated that the amount of information and communication needed are where traditional and green construction projects diverge most. Better communication is required for green projects. The lack of demand for construction to go beyond legal standards is caused by a lack of R&D on green buildings and green technologies. Given that the proposed procedural framework may make executing green building projects easier, Singapore's construction sector may be more eager to switch to green building construction in the future than conventional construction. The introduction of interaction delivery methods and public education on the benefits of green buildings may promote demands for these structures.

Dubem I. Ikediashi A et al. (2012) from their study they surveyed 58 respondents (facilities managers and other top managers) who worked for 58 business organisations in Nigeria that were registered with the corporate affairs commission using a poll. it identifies a lack of awareness, a lack of necessary rules and regulations, and a lack of training and tools as the three key obstacles to a sustainable practise. The lack of awareness, the absence of essential legislation and regulations, and the lack of training and instruments were found to be the three main hurdles.

II. CONCLUSION

Green construction, despite its numerous benefits, faces a range of obstacles that hinder its widespread adoption. These obstacles include higher upfront costs, lack of knowledge and awareness, resistance to change, and limited availability of green materials and technologies. However, there are viable solutions to overcome these challenges. For example, providing financial incentives such as tax breaks or grants, the higher upfront costs of green construction can be offset, making it more economically viable for developers and investors. Increasing knowledge and awareness through education and awareness campaigns is crucial to overcome scepticism and promote the understanding of the long-term benefits of sustainable construction. Encouraging collaboration, sharing success stories, and showcasing the positive impacts of green construction can help overcome resistance to change within the industry. Additionally, investing in research and development can lead to advancements in green materials and technologies, making them more affordable and accessible.

REFERENCES
2. A. Orsi, I. Guillen-Guillamón, E. Pellicer, Sustainability 12(6), 2276 (2020)
11. R. A. Popov, A. A. Pospelov, Scientific works of KubGTU 8, 167-175 (2016)
16. Z. Hamedani, F. Huber, 7th International Conference on Urban Regeneration and Sustainability (2012)