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SEMINAR ON BUILT  
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(USBET) 2023**

**SUSTAINABLE BUILT  
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# e-Proceeding

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# THE CHALLENGES AND BEST PRACTISES FOR GREEN OFFICE BUILDING IN PUTRAJAYA: THE PROPERTY MANAGERS' PERSPECTIVE

Nur Aqilah Johari<sup>1</sup>, Lizawati Abdullah<sup>1\*</sup>

<sup>1</sup>Department of Built Environment Studies and Technology, College of Built Environment, Universiti Teknologi MARA, Perak Branch, Seri Iskandar Campus, 32610, Seri Iskandar, Perak, Malaysia

nraqilhjri@gmail.com, \*lizaw327@uitm.edu.my

## ABSTRACT

*Green office structures are intended to have a minimal impact on the environment and promote sustainability. However, property administrators in Putrajaya face unique challenges in maintaining these green structures. This research attempts to investigate the obstacles that contribute to the failure of green office building operations and maintenance and to identify the best practises adopted by property managers and maintenance teams in selected case studies. Literature categorises the operational and maintenance challenges of green office buildings into five categories: technical defects, financial problems, environmental and biological effects, social and cultural issues, and political and legal factors. The primary method for collecting data in this qualitative study is semi-structured interviews with property managers. The results highlight two significant obstacles: cost constraints and technical issues. Furthermore, the research identifies two significant best practices employed by property managers to effectively resolve these challenges: closely monitoring progress and implementing preventive maintenance plans to ensure the long-term efficiency and sustainability of green office buildings. Case study research focuses on two significant buildings in Putrajaya, Malaysia: Menara PJH and the Energy Commission Diamond Building. The importance of the selected case studies in providing valuable insights for property managers and maintenance teams in handling green office building challenges. The research outcomes could catalyze enhanced training, regulatory refinement, and broader adoption of effective strategies, driving the advancement of sustainability within Putrajaya's green office building sector.*

**Keywords:** green office building, challenges, best practices

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## **INTRODUCTION**

Green buildings play a powerful part in implementing the work towards sustainable development which is through preserving the environment. According to the World Green Building Council, a 'green' building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. The development of green buildings has recently become a trend in the construction industry, especially among those who are aware of the benefits, which include not only noble environmental concerns but also profits that can be gained through higher rental rates and incentives from the government, such as tax and stamp duty exemption. Regardless of how sustainable or "green" a building is in terms of its design and construction, it is worthless if it is not operated and maintained properly. Otherwise, the obstacles will increase and quickly eclipse the advantages of the green building.

There is a demand in sustaining maintenance for green buildings. "Sustainable maintenance is a maintenance system that meets the value system of the present users without compromising the ability of meeting the value system of the future users" (Olanrewaju & Kafayah, 2008). The conservation of green buildings does not only trouble the social and environmental aspects but also affects operations cost. Olanrewaju and Kafayah (2008) believe that a building that is poorly maintained will impact the quality and productivity of the occupants and the environment.

As the administrative capital of Malaysia, Putrajaya's commitment to sustainability and green building practices sets a positive example for other cities and regions. However, the maintenance of these green office buildings poses unique challenges for property managers in the city. The problem statement arises from the need to understand the distinct challenges encountered by property managers in Putrajaya when managing green office buildings.

## **LITERATURE REVIEW**

According to the World Green Building Council (n.d), a green office building, also known as a sustainable or environmentally friendly office building, is a structure designed and constructed with a focus on minimizing its impact on the environment, improving energy efficiency, and promoting occupant health and well-being. Green office buildings incorporate various sustainable design principles, technologies, and practices to reduce resource consumption, enhance indoor environmental quality, and lower carbon emissions. Property management

involves the responsible handling of properties to cater to the needs and interests of all individuals with a stake in the property (Razali, Kamarudin, Zainuddin, Othman, 2015). A property manager for a green office building is an individual or a company that specializes in overseeing and managing environmentally sustainable office properties.

## **Challenges Factor in Maintaining Green Office Building**

Othman (2021) stated that building maintenance is a worldwide problem that almost every building faces also relates with occupant's satisfaction with the building itself. However, reducing the problems will help to accomplish a sense of achievement as it is mandatory for a management of the green building. Thus, "identifying and recognizing main practices management are necessary to achieve an effective management of the green buildings" (Aghili, 2016). Saghatforoush (2012) emphasized the challenges factors in maintaining green office building are into five aspects namely technical defects, financial problems, environmental and biological effects; social and cultural problems and political and legal factors.

### **Technical defects**

"Technical defects are important challenges sources and expensive reworks during the operations and maintenance phase of a building. These factors do not belong to a specific phase and can occur during planning, design, construction or even maintenance" by Saghatforoush, et al. (2012). The term "technical defects" refers to design problems. The structure problems of the building can stop maintenance work from being fulfilled straightforwardly, speedily and inexpensively. "The huge amount of operations and maintenance cost is the result of the increasing number of failings attributed by design defects" (Al-Hammad et al., 1997).

### **Financial problem**

The financial importance of maintenance in the sustainability of green office buildings cannot be overstated. Regular maintenance and upgrades for energy-efficient systems and sustainable features are essential to ensure they function optimally. The cost of eco-friendly supplies and materials may also be higher than their conventional counterparts, further adding to the financial burden. While green buildings generally have lower operating costs over time due to energy savings, they may require higher ongoing maintenance costs. Specialized equipment and sustainable materials can be costlier to repair or replace. However, a failure to perform maintenance at the right time is often due to insufficient budgets (El-Haram & Horner, 2002).

## **Environmental and biological effects**

It is crucial to address environmental and biological effects to minimize any negative impacts on the surrounding environment, wildlife, and biodiversity. Implementing sustainable construction practices and adopting eco-friendly maintenance protocols are vital in this regard. "One of the degradation factors is indoor and outdoor environmental changes such as external and internal climate" (Duling et al., 2006). During the design phase, the designer should always specify material that can tolerate existing weather conditions. "Aggressive environment, abrasive uses of tie facility and weather conditions cause early deterioration to materials" (Al-Hammad et al., 1997).

## **Social and cultural problems**

The social and cultural aspects necessitate fostering a green office culture, engaging employees in sustainability initiatives, and ensuring that green practices align with the preferences and needs of the workforce and local communities. Next, cultural practices significantly impact people's behavior and way of living, leading to varying approaches in performing duties and interacting with others. Maintenance management teams encounter numerous challenges in maintaining and operating buildings due to cultural influences (Ogunbayo, Aigbavboa, Thwala, Akinradewo, Ikuabe, Adekunle, 2022).

## **Political and legal factors**

The third factor will create obstacles for operations and maintenance stakeholders of the green building projects, which result in an inefficient and ineffective management process as mentioned by Saghatforoush et al. (2012) which is political or governmental restrictions/standards. Navigating the ever-changing landscape of political and legal factors, including compliance with green building regulations, obtaining necessary permits, and staying informed about the latest sustainability policies, is vital to maintain a truly eco-friendly office building. Successfully tackling these aspects demands a comprehensive approach, collaboration between stakeholders, and a deep commitment to environmental stewardship.



**Table 1: Matrix of challenges factor in maintaining green office**

Author(s)	Saghatforoush et al.	Al -Hammad et al.	El- Haram & Horner	Azlan Shah et al.	Moua & Russel	Duling et al.	Ogunbayo et al.	Frequency
Year of Publication	2012	1997	2002	2010	2001	2006	2022	
Challenges Factor								
Technical defects	√	√	√					3
Financial problems				√	√	√		3
Political and legal factors	√							1
Environmental effects		√					√	2
Social and cultural problems	√			√			√	3

### **Best practises for overcoming the challenges in green office building maintenance**

By integrating these best practices, green office building maintenance can overcome various challenges, resulting in improved efficiency, reduced environmental impact, and a healthier, more sustainable workspace for occupants. To overcome the challenges of green office building maintenance, implementing a comprehensive set of best practices is essential.

#### **Monitoring and Coordinating**

Regular monitoring allows for proactive identification of any deviations or potential issues, enabling prompt action. By coordinating activities and closely monitoring equipment performance, you can stay on top of maintenance tasks, promptly address concerns, and mitigate risks (Lee, 1998). Effective communication and collaboration contribute to smoother operations, better resource management, and improved overall maintenance outcomes.

## **Proactive Maintenance Plan**

Implementing a preventive maintenance plan is crucial for green office building maintenance. It involves creating a scheduled maintenance program that includes routine inspections, servicing, and performance tests. To make it effective, resource allocation plays a vital role (Zul-Atfi Ismail, 2023). Allocate appropriate budgets for regular maintenance, system upgrades, and specialized maintenance personnel.

## **Staff Training and Awareness**

By equipping staff with the necessary skills and knowledge, property managers empower them to effectively operate and maintain green building features, identify potential issues, and take proactive measures to optimize energy efficiency and resource conservation (Creating Awareness for Involvement in Building Maintenance Management, 2021). Additionally, fostering a culture of sustainability through continuous education and awareness campaigns helps promote environmentally responsible behaviours among staff, ensuring that everyone understands and actively participates in achieving the goals of green office building maintenance.

## **METHODOLOGY**

Semi-structured interviews were used to understand the challenges of maintaining green buildings, with questions covering respondent and building details, main challenges faced by property managers, and best practices. The interview protocol was prepared in both Bahasa Malaysia and English, targeting property operation and maintenance teams of green office buildings in Putrajaya, chosen due to its emphasis on sustainability. Respondents were selected through purposive sampling for their expertise, with property managers having at least three years of experience in directly managing green office buildings, providing insights into the complexities and practices of green building maintenance. Case study research focuses on two significant buildings in Putrajaya, Malaysia: Menara PJH and the Energy Commission Diamond Building as depicted on the site map, is situated in a specific location within the designated area by referring to the provided map below. The site map indicates that Menara PJH is in the red area, while the Energy Commission Diamond Building is situated in the yellow area.

The research procedure encompassed several key steps. Firstly, a review of existing literature on green building maintenance, challenges, and best practices was conducted to establish a strong theoretical foundation. Data collection involved in-depth semi-structured interviews, allowing property managers to share their insights and experiences related to challenges and effective strategies. The

collected data was meticulously transcribed and subjected to thematic analysis to identify recurring patterns, challenges, and successful practices. These themes were then organized into a coherent framework, which served as the foundation for deriving implications and recommendations for the green building industry in Putrajaya. However, this research relies on self-reported data provided by property managers, which may introduce certain limitations. Property managers' responses may be influenced by their personal experiences, perceptions, or a desire to present themselves in a favorable light, potentially impacting the accuracy and reliability of the data collected.



**Figure 1: Location of selected case study**

## **DATA ANALYSIS AND FINDINGS**

The data collected from the interview has been analyzed and interpreted using thematic analysis to indicate the most challenges factor and best practices for each case study of green office building. The qualitative data analysis computer software that used was ATLAS.ti.

### **Background of Respondents**

#### **(R1) Environmental Executive**

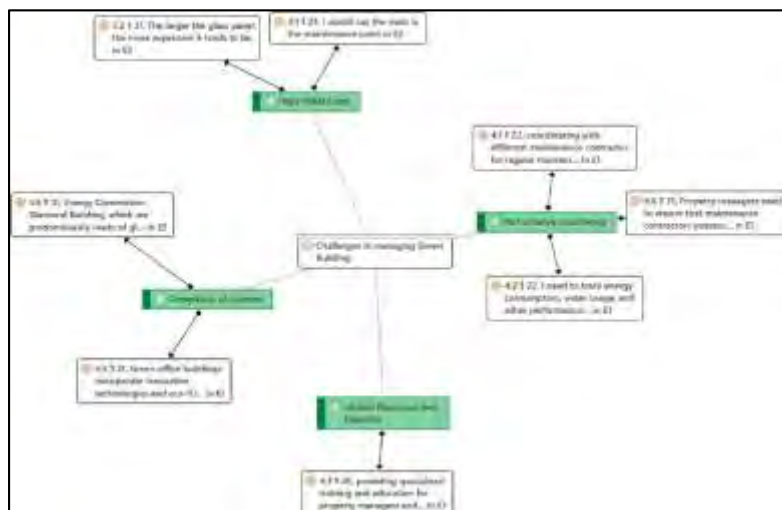
Respondent 1 as an Environmental Executive at Menara Putrajaya Holdings holds a Master's degree in Environmental Management from Universiti Putra Malaysia (UPM). R1 has accumulated 23 years of experience in the field. This suggests that R1 has gained significant knowledge, skills, and expertise through the extensive professional career. Prior to the current role as an environmental executive, R1 worked as a

process engineer.

## (R2) Facility Executive

Respondent 2 holds a position as Facility Executive Suruhanjaya Tenaga (Energy Commission) with an experience almost 5 years. R2 started the career in Facility Management from 2018 in Konsortium ProHAWK. R2 graduated from Universiti Teknologi Malaysia (UTM) in Bachelor of Engineering - BE, Mechanical Engineering.

## DATA ANALYSIS ON CHALLENGES



**Figure 2: Challenges in managing Green Office Building**

The two respondents have different views or interpretations regarding the theme of the statement. While the first respondent identified the theme as "maintenance costs and sustainability," the second respondent suggested a different theme related to challenges in coordinating with contractors in the context of managing green office buildings.

### Coordinating Maintenance Problem

The respondent is discussing a specific challenge they have faced in their role, which is coordinating with contractors when managing green office buildings. They emphasize the importance of working closely with contractors responsible for implementing sustainable technologies and systems. However, coordinating



with contractors can be challenging for various reasons. One common challenge mentioned is ensuring that the contractor fully understands the project requirements and objectives. This suggests that effective communication and alignment between the respondent and the contractors are essential for successful implementation of sustainable technologies in office buildings.

### Maintenance Cost

The respondent is identifying maintenance costs as the main challenges. They emphasize the need to allocate budgets for regular maintenance, system upgrades, and specialized maintenance personnel. This allocation is crucial for ensuring that sustainable features continue to perform effectively. In summary, the respondent recognizes that sustaining the performance of sustainable features requires financial investment in maintenance and skilled personnel.

### Data Analysis on Best Practices

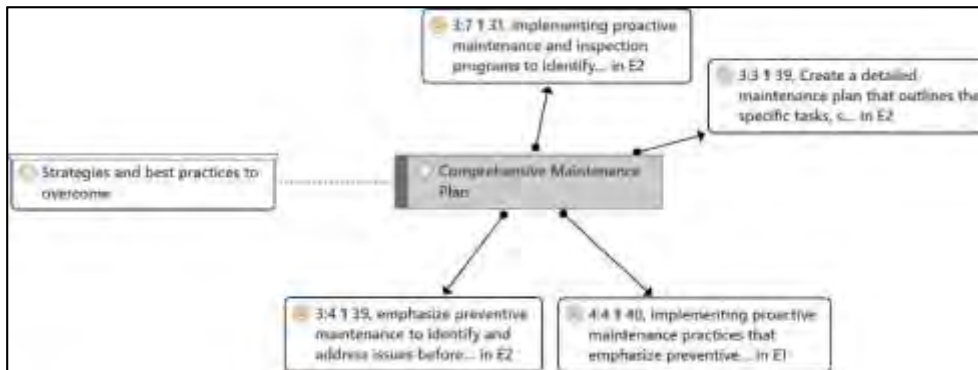


Figure 3: Strategies and best practices

### Monitoring and Coordinating

The respondent describes their approach to addressing the challenges associated with coordinating with contractors. They emphasize the importance of open and regular communication with contractors, ensuring that detailed project briefs and documentation are provided. By establishing clear lines of responsibility and fostering a collaborative relationship, the respondent aims to overcome coordination challenges. They also mention the prompt addressing of concerns and closely monitoring the progress as part of their strategy.

Overall, through effective communication, proactive problem-solving, and close monitoring, the respondent has been able to navigate the challenges of coordinating with contractors successfully.

### **Proactive Maintenance Plan**

The respondent suggests implementing effective resource allocation practices as a proposal. They recognize the need to optimize the use of limited budgets and prioritize preventive maintenance. By allocating resources efficiently, they aim to make the most out of the available funds. They emphasize the importance of regularly inspecting and servicing equipment, as well as conducting performance tests. This proactive approach helps identify and address potential challenges before they escalate into more significant issues. The respondent's proposal demonstrates a focus on strategic resource management and preventive maintenance to ensure efficient operations and minimize the risk of problems in the future.

## **DISCUSSION ON THE FINDINGS**

A study examining the challenges encountered by property managers in maintaining green office buildings in Putrajaya revealed two primary areas of concern. R1 highlighted technical challenges, particularly in coordinating maintenance activities. This finding aligns with prior research that emphasizes the importance of effective communication, clear responsibilities, and collaborative relationships with contractors to address coordination issues. R2 identified financial challenges, specifically cost considerations. This finding is supported by previous studies that suggest implementing resource allocation practices to optimize limited budgets and prioritize preventive maintenance. Together, these findings indicate that property managers in Putrajaya must address both technical coordination and financial aspects to successfully maintain green office buildings.

As for the second objective; best practices they employ to overcome the challenges of green office building maintenance. R1 emphasized the importance of coordinating and monitoring activities, focusing on effective monitoring and coordinating as a means to address the challenges.

This aligns with previous studies that stress the significance of regular monitoring, inspections, and proactive identification of potential issues. R2 highlighted the implementation of a preventive maintenance plan with effective resource allocation. This supports prior research that advocates for allocating appropriate budgets and prioritizing preventive maintenance to optimize limited resources. These findings collectively indicate that property managers in

Putrajaya rely on strategies such as coordinating and monitoring, as well as effective resource allocation through preventive maintenance, to successfully overcome the challenges of maintaining green office buildings.

## **CONCLUSION**

By recognizing these challenges, the research contributes to a better understanding of the unique issues property managers encounter in maintaining sustainable buildings. The research also provides valuable insights into the perspectives of property managers regarding green office building maintenance. Through interviews, the study captures the firsthand experiences, knowledge, and opinions of property managers in Putrajaya. This helps in gaining a comprehensive understanding of their viewpoints and the specific difficulties they encounter in their roles.

Several recommendations can be made for further research and improvements is conduct a comparative study that includes multiple regions or cities to compare the challenges faced by property managers in Putrajaya with those in other areas. This will provide a broader understanding of the unique factors influencing green office building maintenance and allow for a more comprehensive analysis of best practices. Firstly, conduct a longitudinal study that follows the maintenance practices of green office buildings in Putrajaya over an extended period. This would provide insights into the long-term challenges and potential solutions, allowing for a deeper understanding of the effectiveness of various maintenance strategies over time. Also, supplement the qualitative findings with quantitative data analysis to quantify the impact of different challenges on green office building maintenance. This could involve analyzing energy consumption patterns, maintenance costs, occupant satisfaction surveys, and performance metrics to provide a more robust and objective assessment of the challenges.

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*nar*

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