

Improving Facilities Maintenance Management Practices for Government Quarters Apartment in Putrajaya

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ARTICLE INFO

Article history:

Received 27 May 2024

Revised 17 August 2024

Accepted 30 August 2024

Online first

Published 30 September 2024

Keywords:

Facilities maintenance management

Facilities management

Government quarters apartment

High rise building

DOI:

10.24191/bej.v21iSpecial

Issue.1576

ABSTRACT

Facilities Maintenance Management (FMM) practices such as preventive, corrective, and predictive maintenance are essential to ensure the effective operation of building systems. These practices involve regularly inspecting, fixing, and replacing building components to prevent failures and extend the building's lifespan. Maintaining high-rise residential buildings is a multifaceted task that necessitates a comprehensive approach to ensure the optimal functioning of all building systems. To maintain their condition and functionality, government quarters apartments rely heavily on FMM practices. This study provides an in-depth examination of FMM practices in government quarters apartments in Putrajaya, Malaysia. While there is existing research on facilities and maintenance services, there needs to be a more specific focus on high-rise residential buildings, particularly those in government quarters. Therefore, the study aims to improve FMM practices in government quarters apartments in Putrajaya. The research objectives are to identify the current FMM practices in these high-rise residential buildings and develop strategies for improvement. The research methodology adopts a qualitative research approach by collecting data via semi-structured interviews with Putrajaya Corporation (PjC) strategic management level personnel and five (5) facility managers from FM service providers. The data has been analysed using ATLAS. Ti software is based on content analysis techniques. The findings reveal that FM practices for these case studies employed a comprehensive approach that includes technological advancement, sustainability, asset management, communication, outsourcing, performance metrics, and training. The recommendation for strategies permits future research improvements and contributes to the FMM body of knowledge in the context of high-rise buildings and government quarters apartments.

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<https://doi.org/10.24191/bej.v21iSpecial.Issue.1576>

INTRODUCTION

In recent years, rapid urbanisation and population growth have increased the demand for high-rise residential buildings in urban areas. Facilities Management (FM) plays a crucial role in the housing industry by supporting human daily routines and enhancing the productivity of activities within and around residential buildings (Chua et al., 2018). Maintenance can be described as a variety of technical and administrative tasks aimed at preserving or restoring an item's functionality, as well as ongoing efforts to maintain a building's overall quality and value, including its components, services, and environment (Mong, et al., 2019). This is supported by Au-Yong et al. (2019), who state that maintenance is required for all buildings, as it enables the uninterrupted operation of the building's framework while preserving its optimal value and prolonging its lifespan. A study by Sia et al. (2018) shows that most high-rise unit residents do not value property management until their buildings and shared amenities severely decline. Therefore, FMM is critical to ensuring the longevity and sustainability of high-rise residential buildings.

Performing facility maintenance on high-rise residential buildings poses significant challenges. To guarantee the best possible performance of different building systems, such as lifts, fire protection systems, electrical systems, civil and structural systems, waste management, plumbing, and sanitary systems, specialised management techniques, adequate planning, and proactive strategies are needed (Ufere & Absalom, 2022). Meanwhile, Au-Yong et al. (2019) stated that many maintenance management practices in high-rise housing are compromised due to inadequate planning, the lack of a proactive maintenance strategy, and subpar execution of maintenance tasks. Similarly, the FMM practices in government quarters apartments pose significant challenges in ensuring quality and budgetary control. The government has set aside a substantial budget to assist local governments in their efforts to prioritise asset maintenance and reduce the occurrence of building failures (Mong et al., 2019). For instance, the government has designated a total sum of RM401.24 million for the period spanning from 2017 to 2020 to facilitate the maintenance of occupied quarters units and the repair of vacant quarters units (BERNAMA, 2021). However, Agergaard et al. (2021), Chua et al. (2018), and Olanrewaju et al. (2018), indicate that there is a budget constraint in practising FMM, which causes poor maintenance performance.

Government quarters apartments rely heavily on FMM practices to maintain their condition and functionality. To preserve the value of these properties and provide residents with a safe and comfortable living environment, it is essential to implement effective maintenance management strategies (Ismail et al., 2017). Effective maintenance practices on buildings can increase the structure's value and safety while concurrently mitigating the risk of deterioration (Zolkafli et al., 2019). Cheng et al. (2020) state that to mitigate risks, extend the lifespan of building systems, and reduce disruptions to residents, it is essential to develop maintenance plans that incorporate proactive strategies. Therefore, a thorough investigation into the current practices and possible areas for improvement in FMM in high-rise residential buildings, specifically government quarters apartments, is urgently required. While there is existing research on facilities and maintenance services, there needs to be a more specific focus on high-rise residential buildings, particularly apartments and low-cost housing (Sia et al., 2018). Mong et al. (2019) state that it is possible to gain critical insights and make suggestions for improvement by looking at the current procedures and problems with implementing FMM in high-rise residential buildings.

Based on the problem statements that exist from the previous authors, this study was conducted to identify current practices in FMM at government quarters apartments and propose strategies that can improve maintenance, benefiting residents, managers, and service providers. Adding to existing knowledge offers insights and solutions for better building management and sustainability.

FACILITIES MANAGEMENT

FM is a multidisciplinary field that integrates people, processes, and technology to manage and maintain built environments supporting organisational goals (Radebe & Ozumba, 2021). Industry organisations have

proposed various definitions. The International Facility Management Association (IFMA) defines it as coordinating the physical workplace with the organisation's people and work. The European Committee for Standardization (CEN) defines it as integrating processes within an organisation to maintain and develop services that support its primary activities.

Table 1. Definition of FM

Organisation	Definition of FM
ISO41011:2017 and BIFM	Organisational function integrates people, places, and processes within the built environment to improve people's quality of life and the productivity of the core business.
IFMA	Is a profession that encompasses multiple disciplines, integrating people, place, process, and technology to ensure the functionality of the built environment.
RICS	The total management of all services that support an organisation's core business. Good facilities management makes a huge difference to the efficiency and productivity of a company, its staff, and even its clients.
CEN	The integration of processes within an organisation to maintain and develop the agreed services that support and improve the effectiveness of its primary activities.

Source: Authors, 2024

Facilities Maintenance Management

FMM plays a critical role in ensuring the smooth functioning of an organisation's physical infrastructure. FMM refers to activities taken to prevent the functional failure of facilities (Chen et al., 2019). FMM is a subset of FM's broader field, which integrates people, places, and processes within the built environment to improve people's quality of life and the productivity of the core business. While FM covers a wide range of services, including hard (physical building management) and soft (people-oriented services), FMM focusses explicitly on the physical upkeep of the building and its systems.

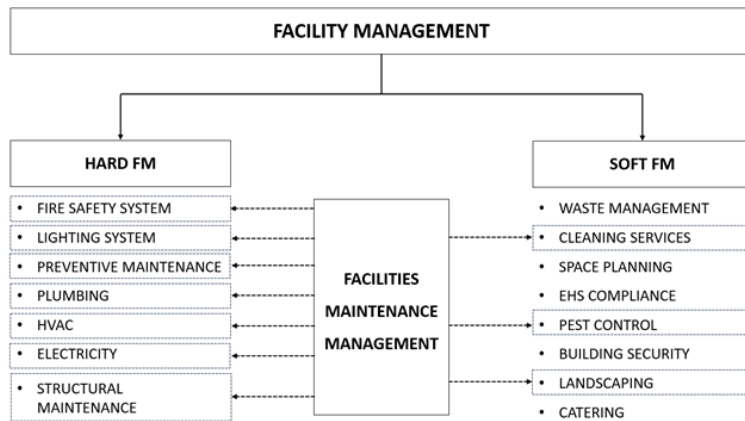


Fig. 1. Facility Management and Facilities Maintenance Management Relationship

Source: Author, 2024

The role of FMM is framed within the broader scope of ensuring the managed asset's usability, reliability, and safety, thereby necessitating a system to control the maintenance function (Fraser, 2014). According to a study by Janjalkar, Singh, and Delhi (2023), efficient FMM is critical for the smooth functioning of an organisation's day-to-day operations. This is supported by a study conducted by Mong et al. (2018), which states that the implementation of an effective FMM decreases the likelihood of exceeding budgeted costs and guarantees the efficient completion of repair projects with adequate resources.

High Rise Residential Building

A High-rise building is a multi-storey building where elevators are essential for most residents to access their floors. Many countries classify these buildings as prominent large structures, with some even including tower blocks (Paurnami, 2021). This is parallel with studies conducted by Abas et al. (2021) and Au-Yong et al. (2019), who stated that managing high-rise residential buildings is a complex task that requires the creation of a specialised management entity to oversee and maintain public spaces like parking lots, gyms, and swimming pools, as well as essential systems like lift, power, and water supply.

Government Quarters in Putrajaya

Putrajaya, the administrative centre of the Federal Government of Malaysia, were created in the early 1990s. It is envisioned as the metropolis of the new millennium, conceptualised according to the Putrajaya Masterplan ideas of "City in a Garden" and "Intelligent City," which foster harmony between the natural environment, iconic built environment, and community (Perbadanan Putrajaya, 1997).

Talib (2011) defines the term "Government Quarters" or "Government housing" as any premises that are specifically designed, constructed, modified, or intended for the exclusive use of government employees in different grades. The government quarters in Putrajaya are managed by the Prime Minister's Department's Property Management Division (BPH). BPH manages 27,751 units of various types of housing in six (6) locations across the country, including 22,007 units in Putrajaya. Government quarters in Putrajaya comprise 17,254 units (78.4%), which are apartment types, while the remaining 4,753 units (21.6%) are landed quarters (Jabatan Audit Negara, 2019). The FMM of the landed quarters is managed by the Public Works Department (JKR), while the apartment types are managed by Putrajaya Corporation (PjC). Table 1 shows the classification of government quarters in Putrajaya.

Table 1. Classification of Quarters in Putrajaya

Gred Pegawai	Kelas Kuarters	Jenis Kuarters	Bilangan Unit	%
JUSA C ke atas	A	Banglo	99	0.4
54	B	Semi-D	50	0.2
48-52	C	Semi-D	1,118	5.1
41-47	D	Teres	1,793	8.2
27-40	E	Teres	1,693	7.7
22-26	F	Pangsapuri	7,891	35.9
1-21	G	Pangsapuri	9,363	42.5
		Jumlah	22,007	100

Source: Jabatan Audit Negara, 2019

Current Practices of Facilities Maintenance Management in High Rise Residential Buildings and Government Quarters Apartment

FMM practices for government-quarters apartments involve a combination of preventive maintenance, responsive repairs, and continuous improvement efforts. Regular inspections and maintenance schedules are implemented to ensure proper functioning and upkeep of the apartments. Chua et al. (2018) and Ufere & Absalom (2022) agreed that preventive maintenance strategies, such as routine checks, equipment servicing, and timely part replacements, are carried out to address potential issues before they become major problems. Table 2 shows the current practices in FMM at both high-rise residential buildings and government quarters apartments.

Table 2. Current practice in facilities maintenance management

<https://doi.org/10.24191/bej.v21i1Special.Issue.1576>

Element	Che-Ghani et al (2023)	Sanzana et al., (2022)	Ohaedeghasi et al. (2021)	Liu et al. (2021)	Olanrewaju et al (2021)	Gusnadi and Hermawan (2020)	Alfalah & Zayed, (2020)	Hauashd h et al. (2020)
Maintenance Practice		√	√					√
Technology Advancement		√	√					√
Sustainable Practice		√					√	
Asset Management								
Communication and Collaboration			√					√
Outsourcing	√				√	√		
KPI and SLA				√		√		
Training and Development		√	√					√

Element	Lu et al (2020)	Au-Yong et al., (2019)	Mong et al., (2019)	Hristov and Cirico (2019)	Chua al., (2018)	Matarneh et al., (2019)	Au-Yong et al., (2017)	Olanrale et al., (2013)
Maintenance Practice		√	√			√	√	
Technology Advancement			√				√	
Sustainable Practice								
Asset Management	√							
Communication and Collaboration								
Outsourcing				√				√
KPI and SLA				√	√			
Training and Development								

Source: Author, 2024

i) Maintenance Practices

As mentioned by Mong et al. (2019), comprehensive maintenance practices should include all essential elements, such as competent staff members with suitable training and experience, acceptable standards of materials and spare parts, allocated budgets, and comprehensive maintenance data. These strategies involve regular inspections, maintenance tasks, and repairs to proactively address potential issues and prevent equipment failures or facility deterioration (Chua et al., 2018; Lu et al., 2020).

ii) Technology advancement

Technological advancements support proactive maintenance, optimise resource allocation, and enable data-driven decision-making (Aloisio, 2018). These technological advancements streamline maintenance processes, improve efficiency, and enable better decision-making based on real-time information (Lu et al., 2020). Management can effectively plan tasks, track progress, and generate performance reports for informed decision-making.

iii) Sustainable Practices

Sustainable practices are also being incorporated into FMM (Okoro, 2023). These practices emphasise adopting environmentally friendly strategies like energy efficiency initiatives, waste management protocols, green building practices and strategic maintenance (Alfalah & Zayed, 2020; Okoro, 2023). The study by Faremi (2021) proposes that stakeholders should continuously and dedicatedly implement sustainable facilities management practices.

iv) Asset Management and Inventory Control

Asset management involves identifying, tracking, and maintaining all apartment assets, such as equipment, machinery, and infrastructure (Lu et al., 2020). A comprehensive asset management system provides a centralised database with information on asset location, condition, maintenance history, and replacement schedules. In addition, implementing a CMMS can greatly enhance asset management and inventory control. It enables management to track asset usage and schedule maintenance activities efficiently with automated alerts or work order generation while maintaining an accurate inventory record (Lu et al., 2020).

v) Communication Channels and Collaboration among Stakeholders

Effective communication channels should be established between residents, maintenance staff, maintenance service providers, and administrative personnel to ensure that maintenance issues are reported promptly and addressed efficiently (Au-Yong et al., 2017). It is essential for all stakeholders to have a thorough understanding of the importance of maintenance activities and to take appropriate actions to preserve and enhance the value of a building (Sani et al., 2022). It is crucial to prioritise maintenance consistently and ensure that all parties understand its significance in optimising operational performance, productivity, safety, and building quality.

vi) Outsourcing and Contracting Considerations

FMM requires careful consideration of outsourcing and contracting. These considerations entail determining whether to outsource specific maintenance tasks or engage external contractors to supplement the in-house team. As Gusnadi and Hermawan (2020) mentioned, one (1) crucial factor to consider is the availability of in-house resources and expertise. A study by Che-Ghani et al. (2023) confirms this, noting that the preference for outsourcing residential maintenance stems from potential knowledge and capability gaps within residents' management teams regarding building maintenance. In addition, a study by Olanrele et al. (2013) states that factors such as cost-effectiveness, service quality, and vendor selection criteria are analysed to aid organisations in making informed decisions regarding outsourcing functions. Besides that, the scope and complexity of maintenance tasks also impact outsourcing decisions (Hristov & Chirico, 2019). Furthermore, selecting reliable contractors is crucial when considering outsourcing or contracting (Hristov & Chirico, 2019). This is supported by Olanrewaju et al. (2021), who stated that choosing an outsourcing service provider without proper selection criteria can result in adopting an ineffective strategy, which, in turn, can negatively impact maintenance performance.

vii) Performance Metrics and Key Performance Indicators (KPIs) for FMM

Performance metrics and Key Performance Indicators (KPIs) are essential in assessing the effectiveness of FMM for high rise residential buildings. One (1) crucial metric is measuring maintenance response time, which evaluates how quickly maintenance staff respond to reported issues or service requests (Hristov & Chirico, 2019). Another essential metric is maintenance completion time, which measures the duration of maintenance tasks or repairs. According to Gusnadi and Hermawan (2020), monitoring completion times identifies opportunities for process optimisation, resource allocation, or training needs, minimising disruptions to residents' daily lives. Additionally, management may establish KPIs specific to their objectives and priorities. Examples include completing planned preventive tasks within a specified timeframe or reducing costs while improving resident satisfaction (Liu et al., 2021).

Another significant performance metric is the percentage of planned maintenance tasks completed on schedule. A high percentage indicates effective planning, timely execution, and minimal resident disruptions (Gusnadi & Hermawan, 2020). Resident satisfaction surveys serve as a valuable performance metric for assessing the effectiveness of maintenance services. Chua et al. (2018) mention that by collecting feedback from residents on their satisfaction with the quality and responsiveness of maintenance, facility managers can evaluate their overall perception and experience. Another important metric is the maintenance cost per unit, which calculates the average maintenance cost per housing unit (Gusnadi & Hermawan, 2020).

viii) Training and Development Program

Investing in continuous training and professional development programs for maintenance personnel is essential. Hauashdh et al. (2020) state that the lack of adequate institutional training for maintenance staff and the absence of skilled building maintenance professionals contribute to the insufficient implementation of various responsibilities within building maintenance projects. Providing relevant training opportunities can enhance their technical skills, increase their knowledge of modern maintenance practices, and keep them updated with industry trends.

RESEARCH METHODOLOGY

The qualitative research method involved interviews with Putrajaya Corporation strategic management and facility managers from five (5) government quarters apartments used in this study. Semi-structured interviews help identify current practices and propose improvements for FMM practices for government quarters apartments in Putrajaya by addressing questions about individuals' experiences, interpretations, and viewpoints.

Research Sampling and Data Collection

The management of quarters for qualified Federal Civil Service officers is supervised by the Quarters Management Section, Property Management Division, and Prime Minister's Department (Jabatan Audit Negara, 2019). Two (2) types of government quarters exist: landed and apartment. The researcher used primary data from a Putrajaya government quarters case study on apartment-type housing. Putrajaya has thirty-three (33) apartment phases. For this study, the researchers selected five (5) phases from the dataset. The selection criteria were similar, with specific structures over twenty (20) years old. This strategy reduces inaccuracies from a variety of FMM practices and building ages.

Table 3. Characteristics of Each Case Study

Phase	Precinct 9 Phase 4	Precinct 9 Phase 5	Precinct 11 Phase 4A	Precinct 14 Phase 14-7	Precinct 16 Phase 1C
Coding	CS1	CS2	CS3	CS4	CS5
Year Built	1998	1999	1999	2003	1998
Age of buildings	25 years	24 years	24 years	20 years	25 years
No of Blocks	6	3	5	5	6
No of Floors	12	13 -15	19 - 21	14 - 19	15 - 16
No of Units	520	378	755	830	704
Gross Area (m ²)	35,070	23,891	15,559	48,560	42,610

Source: Author, 2024

Data Analysis

This section presents results obtained through semi-structured interviews. Structured interviews use a predetermined set of questions that are consistently administered to participants. Once the interview sessions are completed, the gathered information is transcribed and written in a detailed textual format. The interview transcripts capture the conversation between the researcher and the interviewees. Content analysis is performed on the data gathered from these interviews using the software ATLAS.ti to gain meaningful insights.

The first step in using ATLAS.ti is to import qualitative data, which includes text documents and audio recordings of interview sessions. The researcher then proceeds with the initial codes. The coding process began with open coding, where each line of text was examined and labelled with codes representing key ideas or concepts. These codes were based on both the literature review and insights from the interviews. The next step is to organise the codes. Related codes were then classified into categories, which helped in organising the data systematically and identifying patterns.

After coding, the researchers identified themes by analysing the categories and grouping related ideas. The researchers developed themes by reviewing the categories and identifying predominant patterns that aligned with the study's objectives. Multiple rounds of review refined this process to ensure accuracy and subsequently compared the themes with the raw data and findings from the literature to ensure consistency. The final step is to conduct an analysis using ATLAS.ti's code search, annotation, and visualisation tools to identify patterns, investigate code connections, and draw structured conclusions from qualitative data. Figure 3 shows examples of steps taken in this study to form the sub-themes to generate the final theme.

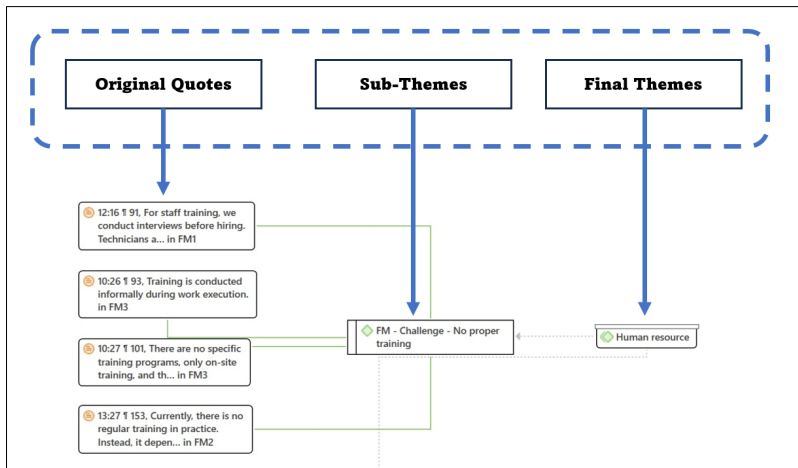


Fig.3. Method for Encoding Quotations

Source: Author, 2024

RESULTS AND DISCUSSION

This section presents the findings and examination of the transcript and data generated from a face-to-face structured interview with the individual responsible for FMM in chosen government quarters apartments in Putrajaya.

Current FMM practices for government quarters in Putrajaya

To identify current FMM practices for government quarters apartments in Putrajaya, this study involved one (1) respondent from a strategic level for a semi-structured interview, who manages and oversees FMM in Putrajaya government quarters apartments. This interview provides a complete picture of FMM implementation in buildings and facilities. This data analysis identified the specific activities of FMM practices based on a literature review and interview results. Figure 4 shows Atlas.ti tabulated respondent information on current FMM practices for government quarters apartments in Putrajaya.

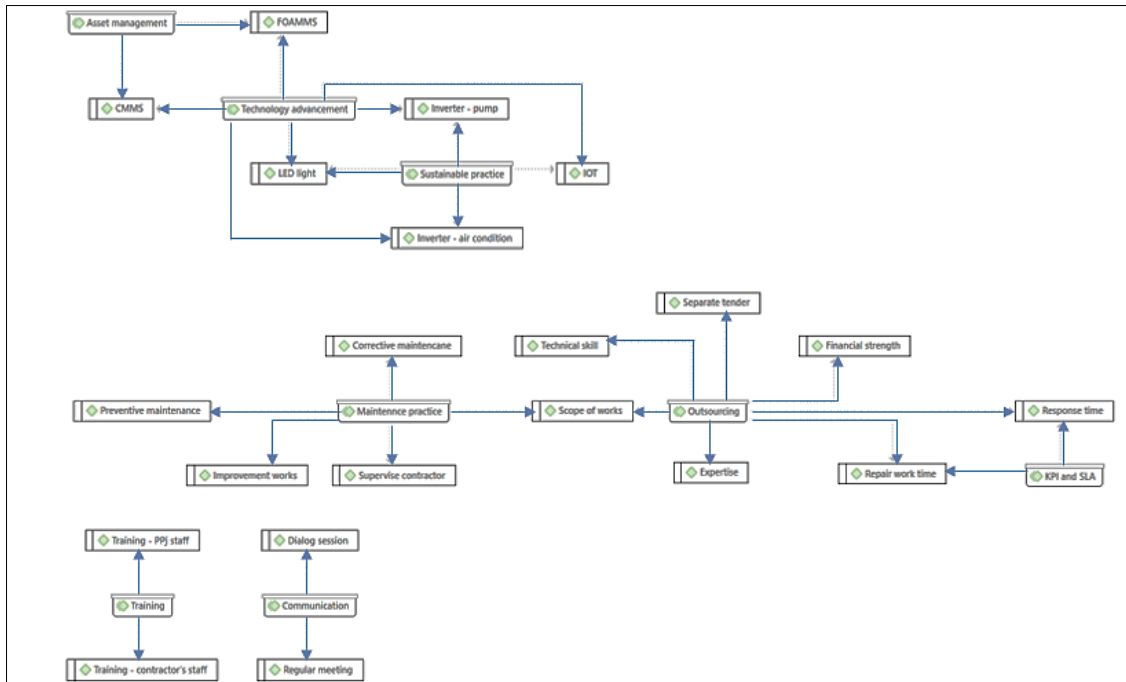


Fig. 4. Current FMM practices for government quarters apartments in Putrajaya

Source: Author, 2024

The current practices for managing government quarters apartments in Putrajaya employ a comprehensive approach to safeguard residents' well-being and maintain the infrastructure's longevity. The elements cover maintenance management, technological advancement, sustainability, asset management, communication, outsourcing, performance metrics, and training. In terms of maintenance practices, the PjC employed preventive and corrective maintenance. The respondent highlights the significance of preventive and corrective maintenance, and the execution of improvement work. Chua et al. (2018) and Lu et al. (2020) support this, recommending regular inspections, maintenance tasks, and repairs as part of preventive maintenance to proactively address potential issues and prevent equipment failures or facility deterioration. Meanwhile, in terms of technological advancement, PjC currently uses a limited number of CMMS and IoT devices for managing the quarters. The Facilities, Operations, Asset Management, and Maintenance System (FOAMMS) is the only system used for data and record-keeping related to complaint management in Putrajaya quarters.

Whereas this technological advancement offers the potential to streamline maintenance processes, enhance efficiency and enable better decision-making by providing real-time information, as noted by Lu

et al. (2020). As for sustainable practices, environmentally friendly measures are being implemented in the quarters, such as the adoption of LED lights for energy conservation and inverter technology for air conditioning systems and pumps to reduce energy usage. Pertaining to asset management and inventory control, PjC is planning to enhance current FOAMMS to include asset management and inventory control, as the usage of CMMS for asset management enables management to track asset usage, schedule maintenance activities efficiently with automated alerts or work orders while maintaining an accurate inventory record (Lu et al., 2020). FOAMMS is also part of communication channels and collaboration among stakeholders. In fostering effective communication channels and a proactive approach, the management has utilised a WhatsApp group for different stakeholders to channel complaints and coordinate repair works.

As for the outsourcing element, PjC appointed an outsourced contractor to perform maintenance works at the quarters where the contractor provides all the expertise in terms of personnel and equipment to carry out the work. The presence of a verifier in the outsourcing contract can also be considered to represent PjC in monitoring and supervising on-site work on a full-time basis. From the interview, there appears that the implementation of Key Performance Indicators (KPIs) and Service Level Agreements (SLAs) in outsourcing contracts and the training programs for maintenance personnel, however it needs to be enhanced and improved. Lastly, the most crucial component of FMM is resource allocation. The financial allocation within the contract is divided into routine planned preventive maintenance, corrective maintenance, and provisional sums. These elements collectively uphold a superior quality of life for residents while safeguarding the physical assets of government quarters.

Improvements for FMM Practices in Government Quarters Apartments

The result comprises a series of FMM practice recommendations customised explicitly for government quarters apartments. These recommendations are based on qualitative data to ensure they are evidence-based and reflect the preferences and experiences of FMM participants in government quarters apartments. Table 4 shows recommendations from the respondents.

Table 4. Recommendation for FMM in government quarters apartment

No	Recommendation for FMM in government quarters apartment	Respondents					Frequency	
		SM1	FM1	FM2	FM3	FM4		FM5
<u>Technology</u>								
1	Improvement in inventory management	√			√			1
2	Enhancing FOAMMS		√	√	√			3
3	CMMS			√				1
<u>Communication</u>								
4	Utilise WhatsApp group	√	√		√			3
5	Regular meetings with the resident	√						1
6	Educating residents on the complaint system						√	1
<u>Outsourcing</u>								
7	Improve contractor's skills.	√						1
8	Enhance KPI and SLA	√						1
9	Enhance outsourcing contract	√						1
<u>Sustainability</u>								
10	Sustainability approach			√			√	2
<u>Ageing defect</u>								
11	Structure integrity audit	√					√	2
12	Replacement ageing equipment		√			√		2

Source: Author, 2024

Based on interview responses, most respondents agreed that improving communication is essential for improving FMM practices in government quarters apartments. Three (3) respondents suggested using WhatsApp groups and FOAMMS to improve facility manager-resident communication. FOAMMS is a system initiated by PjC to oversee the admission of complaints and accelerate the process of taking prompt

and successful resolution measures. Au-Yong et al. (2017) emphasised the importance of establishing effective communication channels between residents, maintenance staff, service providers, and administrative personnel to ensure prompt and efficient reporting of maintenance issues.

Meanwhile, as part of the call for sustainable facilities management, two (2) respondents suggested implementing sustainability practices in FMM to balance operational efficiency with environmental responsibility. Faremi (2021) supported this approach, emphasising that stakeholders should make a continuous and dedicated effort to implement sustainable practices. Additionally, two (2) respondents highlighted the importance of conducting structural integrity audits and replacing ageing equipment to address defects and ensure safety and functionality. Finally, respondents underlined the necessity of improving contractor skills, improving Key Performance Indicators (KPIs) and Service Level Agreements (SLAs), and refining outsourcing contracts to optimise the quality and efficiency of outsourced maintenance services.

CONCLUSION AND RECOMMENDATION

The study thoroughly examined existing FMM practices and-strategies for improvement, which were categorised into five (5) distinct areas: technology, communication, outsourcing, sustainability, and ageing defect management. The measures encompass the establishment of a comprehensive maintenance program, the implementation of technical enhancements to overcome deteriorating infrastructure and design flaws, the management of human resources to address staffing shortages and training requirements, financial management to ensure efficient utilisation of funds, the adoption of sustainability practices to minimise energy consumption and environmental consequences, the involvement and education of residents to enhance awareness of maintenance, and regular audits and reviews to enhance FMM practices consistently. The study also outlines potential areas for future research, such as expanding FOAMMS to include more aspects of FMM, using digital tools to improve communication, evaluation of the efficacy of preventive maintenance practices, integration of a comprehensive CMMS, optimisation of resource allocation, systematic analysis of complaint management processes, and assessment of the influence of building age on maintenance requirements.

ACKNOWLEDGEMENTS

The authors are thankful for the cooperation from Putrajaya Corporation (PjC), Putrajaya, and the Postgraduates Studies, College of Built Environment, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia, for supporting this research.

CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with any parties.

AUTHORS' CONTRIBUTIONS

Mohd Azmi Saperi carried out the research and wrote the original draft. Wan Zuriea Wan Ismail supervised the research progress and revised the article. Masreta Mohd reviewed the article. All authors approved the article submission.

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