

EFFECTIVENESS OF FACILITIES MANAGEMENT PERFORMANCE DURING OCCUPANCY PHASE OF CONDOMINIUM BUILDINGS IN SRI LANKA

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Abstract. When a condominium is built and transferred the ownership, there is usually a performance gap between actual and expected performance. User satisfaction with facilities and well-maintained services is a key indicator of performance in condominium buildings in the occupancy phase. However, assessing the effectiveness of facilities management performance during this phase of condominiums remains questionable, due to unclear frameworks for stakeholder involvement, lack of effective participation, and challenges in data management. Also, organisational effectiveness has challenges due to FM outsourcing practices in Sri Lanka. Therefore, recent studies highlighted the requirement of assessing the FM performance across different timelines to identify inefficiencies and opportunities for improvement. Thus, this study aims to determine the effectiveness of facilities management performance during the occupancy phase of condominium buildings in Sri Lanka. Under a quantitative research approach, study was utilized an online questionnaire survey for primary data collection. To evaluate FM service delivery, three aspects of effectiveness were considered, namely schedule compliance, availability, and quality and expectation. The findings reveal strong adherence to schedule compliance, with preventive maintenance, cleanliness, security, energy management, and sustainability receiving high ratings. However, service availability issues were noted in several areas. Polarised views on access control, sustainability, and cleanliness highlight varying resident experiences, emphasising the need for targeted improvements.

Keywords. Condominium, Facilities, Facilities Management, Performance, Performance Measurement

1. Introduction

The Facilities Management (FM) discipline emerged in the 1970s due to the coexistence of rapidly growing complexity in the workplace and the understanding of the connectedness between occupants' behaviours and building design (Bascoul et al., 2018). Facilities management encompasses multiple disciplines in built environment including building services, energy management, water conservation, handling building management system and occupational health and safety management (Pilanawithana & Sandanayake, 2017). International Facilities Management Association (IFMA) (2022), specified 11 specific roles of facilities manager, including finance and business, operations and maintenance, project management, facility information management and technology management, performance and quality, leadership and strategies, communications, occupancy and human factors, real state, risk management and sustainability.

FM in condominiums, covers operation and maintenance, building services such as security, housekeeping, cleaning, pest control, and general services such as furnishing and procurement (Riratanaphong & Limjaroensuk, 2020). The rising price of land and change in the new generation's attitudes and lifestyle had caused demand multi-unit residential buildings (Che-Ani et al., 2010). Also, there is a significant demand for condominiums in the Colombo metropolitan area because of the higher population density and limited supply of land (De Silva et al., 2015). Considering the condominium buildings, user satisfaction with facilities and maintenance services is a key indicator of performance, with residents generally satisfied when services are well-managed (Che-Ghani et al., 2023). Accordingly, facilities management plays a variety of roles in the performance of an organization including control of resources, operating, supply chain management, and change management, but not limited to (Amaratunga & Baldry, 2003). Since FM is crucial for coordinating buildings and building systems, equipment, and other physical assets to achieve organizational long-term goals, higher concern has to be given to the Performance Measurement (PM) of FM (Amaratunga et al., 2000). Benchmarking, a balanced scorecard approach, post- occupancy evaluation, and Key Performance Indicator (KPI) metrics

come under major PM practices in FM (Lavy et al., 2014). Regrettably, the majority of the high-rise residential complexes discovered were poorly managed, thereby abandoning the sustainable agenda in housing management (Nazali Mohd Noor & Pitt, 2009). According to de Silva and Ranasinghe (2010), repair and replacement costs was 41.6% and cleaning costs was 18.5% of total maintenance costs of condominiums. By developing comprehensive performance measurement systems, facilities managers can make better decisions to improve facility effectiveness and efficiency (Amaratunga et al., 2000). According to Fatayer et al. (2019), when a facility is built and ownership is transferred, there is usually a performance gap between actual and expected performance.

There is a growing need to measure FM performance to integrate business and facilities domains effectively (Kulatunga et al., 2007). Thus, researchers explored various approaches to develop and implement FM performance frameworks in developing countries (Amos et al., 2021). Amos et al. (2021) concluded that measuring performance act as a key to ensuring ideal service delivery and is also an essential tool for the effective implementation of FM strategy. It is evident that the researchers have focused on performance measurement and tools in the existing studies.

However, recent research highlights several gaps in assessing the effectiveness of facilities management (FM) performance in buildings, including condominiums. These gaps encompass unclear frameworks for stakeholder involvement, lack of effective participation, and challenges in data management (Ensafi & Thabet, n.d.; Sedhom et al., 2023). The COVID-19 pandemic has further emphasized the importance of assessing FM performance across different timelines to identify inefficiencies and opportunities for improvement (Lynn J. Lopez et al., 2023). It is notable that, the effectiveness of FM performance during the occupancy phase of condominiums remains questionable, with factors like aesthetic appearance and client satisfaction influencing project success (Rajapaksha & Ranasinghe, 2021). Also, the adoption of FM outsourcing in Sri Lanka offers benefits and same time faces challenges in organizational efficiency (Fayasa et al., 2020). Considering these gaps in existing studies and remaining questions, this study aims to determine the effectiveness of facilities management performance during the occupancy phase of condominium buildings in Sri Lanka

2. Literature Review

Residential real estate in Sri Lanka contains various types of properties including single houses, storied houses, annexes, twin houses, lined houses, and condominiums. Among them, condominiums are currently gaining popularity, especially in Colombo metropolitan areas (Prathapasinghe et al., 2018). In Sri Lanka types of condominiums can be categorized as luxury, upper -middle and middle income, and Lower- middle income (Udayangani et al., 2017).

2.1. Facilities management Operations In condominiums

According to Apartment Ownership Law, No.11 of 1973 condominium property comprise a land with a building or buildings. It also allows the owners of all registered condominium units to control, manage, maintain or administer the common elements of the condominium property within themselves. Making decisions about the management of the property falls under the condominium's Management Corporation (Udayangani et al., 2017). According to Lai (2012), FM in condominium buildings focused on areas including general management, cleaning, repair and maintenance and landscape and leisure. Also, in condominium project, FM in charge in common properties, building services, residential services, and community services (Riratanaphong & Limjaroensuk, 2020). Building Information Modeling (BIM) is increasingly utilized for efficient condominium facility management, helping to solve data inconsistency issues and streamline processes (Tochaiwat et al., 2022). Facilities manager needs to have certain competencies to carry out the various roles in each of stages of the building life cycle, which are the strategic definition stage, preparation, and brief stage, concept design stage, developed design stage,

technical design stage, construction stage, handover and close out stage, and in use stage (Pilanawithana & Sandanayake, 2017). Riratanaphong & Limjaroensuk (2020), argued that compared to FM in other building types, multi-unit residential FM takes a distinct approach.

2.1 PERFORMANCE MEASUREMENTS IN FACILITIES MANAGEMENT

Performance measurement in facilities management (FM) has evolved to become a critical tool for organizational success. It involves assessing FM performance in terms of quality, cost, and effectiveness, integrating both business and facilities domains (Kulatunga et al., 2005). Organizations with effective performance management systems in place can achieve cost savings of up to 30%. Also, performance measurements through establishment of KPIs allows the senior management to make important strategic decisions (Richard et al., 2009).

The effectiveness of facilities management performance is highly influenced by Key facilities management variables. In condominiums, occupant interactions with building systems, plays a vital role in energy performance and sustainability, often leading a gap between estimated and actual energy consumption (Ebuy et al., 2023). In addition, Cleanliness and general maintenance are among the key service quality dimensions that influence resident satisfaction (Ramli et al., 2021). Also, Security and access control are crucial components of intelligent buildings, affecting occupant satisfaction (Amusan et al., 2021). In condominiums, occupant satisfaction with facility services varies among age groups, influenced by physical environment characteristics and service arrangements (Riratanaphong & Limjaroensuk, 2020). For uninterruptible power supply maintenance is vital, with factors extracted based on industry standards and expert knowledge (Zakeri & Shahabi, 2023). Thus, it is notable that energy management, sustainability, maintenance, cleanliness, security, access control, uninterrupted utility supply are crucial factors in effectiveness of FM performance.

2.2 THE FACTORS THAT DETERMINE THE EFFECTIVENESS OF FM PERFORMANCE

. Neely (1999) defined, performance measurement is "the process of quantifying the effectiveness and efficiency of an action. When evaluating and analysing the performance of organizations, the terms effectiveness and efficiency are crucial. (Mouzas, 2006). The effectiveness is determined by how well it delivers services and how much it helps the building's occupants, who have to have a clear understanding of the caliber of the services it offers (C.W. Ho & Liusman, 2016).

Considering quality and expectation Riratanaphong and Limjaroensuk (2020) reported that client satisfaction is the key performance measurement in real estate. In a condominium building, residents expect effective FM services because they pay monthly (Che-Ani et al., 2010). Therefore, Stakeholder expectations and service quality are crucial in FM, with a need for improved expectation management (Rahman Jumat et al., 2012). Schedule compliance, a key logistic objective in production systems, can be improved by adjusting control variables like safety time and lateness distribution and impacting the effectiveness of facility services (Schmidt et al., 2014). It involves ensuring proper performance by landlords and tenants in leased facilities, including tenant satisfaction, proper maintenance of spaces and adherence to guidelines (Scott-Napier, 2024). The Global Process Effectiveness metric, which incorporates schedule adherence, has been proposed to enhance traditional performance indicators like Overall Equipment Effectiveness (Oliveira et al., 2019). Availability, as a measure of FM effectiveness, relates to the accessibility and readiness of services and facilities. Physical environment characteristics, such as the location and design of common areas, impact occupant satisfaction with facility services (Riratanaphong & Limjaroensuk, 2020). For utility-scale photovoltaic power plants, "Effective Availability" measures energy-based performance, considering factors affecting plant output (Hunt et al., 2015). It is notable that, quality and

expectation, schedule compliance and availability can be identified as the key aspects of determining effectiveness in facilities management performance.

Further, a method for assessing their effectiveness is necessary as the quality-of-service delivery in property management companies are differ (C.W. Ho & Liusman, 2016). Performance measurement in FM is a way to gauge how well FM can recognize the needs of the users and its capacity to put in place appropriate solutions to meet those demands and increase their productivity (Koleoso et al., 2013).

2.3 FM PERFORMANCE MEASUREMENT TOOLS

Various performance measurement tools have been developed for performance measurement in FM such as Post Occupancy Evaluation (POE), Building in Use (BIU), Service Quality (SERVQUAL), Service Performance (SERVPREF), Key performance Indicator model (KPIM), Balanced Score Card (BSC) (Koleoso et al., 2013).

The SERVQUAL model is based on the perception gap between the service quality obtained and the service quality expected (Krishnamurthy et al., 2010). SERVQUAL evaluates two components of service quality. Customers' expectations are measured using 22 measures, while perceptions are evaluated using 22 measures. The five aspects of tangibility, reliability, responsiveness, assurance, and empathy are separated into 22 items for this scale (Abdelkrim & Salim, 2015). BSC is a tool for measuring and evaluating organizational performance and a management tool that facilitates effective strategic management (Tochaiwat et al., 2022). The many forms of performance indicators can be divided into what BSC practitioners refer to as "four perspectives", namely, financial, customer, business perspective and learning and growth (Amaratunga et al., 2002). Key performance indicator model, also referred to as the management by variance tool, contributes primarily to the creation of a model of key performance indicators (Koleoso et al., 2013). The performance indicator is a tool the measurement of work outcomes that aids the team or organization's members in moving forward together and ensure that team members concentrate their efforts on the critical elements of organizational success (Tochaiwat et al., 2022). In addition, several additional types can be used to gauge how well facilities management is performing in terms of cost management, efficiency, and effectiveness.

3. Methodology

A comprehensive literature review was conducted to understand the emergence of condominiums in Sri Lanka, the role of FM in condominiums, and finally the available tools for assessing the FM process. To achieve the research aim, it was required to analyse the perception of occupants and property managers and quantify the factors to obtain a result. Accordingly, quantitative research approach is suitable for quantifying and analysing factors to obtain results (Apuke, 2017). As the data collection technique study was utilized an online questionnaire survey. The questionnaire was titled as "Assessing the Effectiveness of Facilities Management in Condominiums". The sampling technique selected for the selection of participants in this study is purposive sampling. Purposive sampling is an appropriate method for selecting participants in a condominium because it allows to specifically target the respondents. Participants were selected from the condominium units which are aged at least one year after occupancy. Questionnaire survey was distributed among 65 potential respondents and 33 responds were received. The questionnaire was designed using the Likert scale. Respondents responded considering their level of satisfaction which is scaled from 1-4 and schedule compliance, availability, and quality & expectation fulfilment are the aspects of Effectiveness considered. To analyse the data general descriptive analysis was executed to provide a summary of trends shown in responses.

4. Results

Total response rate was identified as 51% (33/ (65-0) *100%) The questionnaire was designed using defined Likert scale as follows.

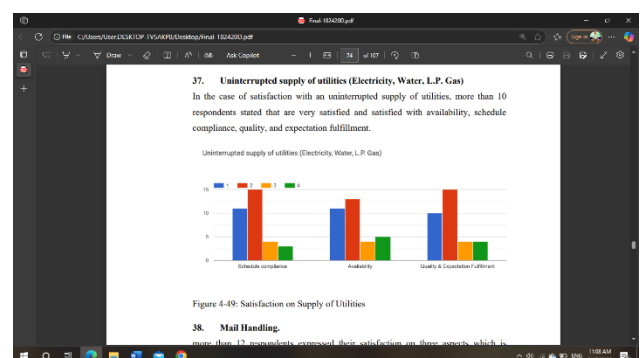
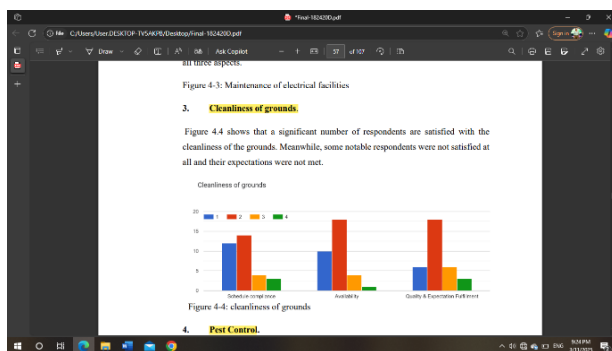
- Score 1- Very Satisfied / Exceeded expectation
- Score 2- Satisfied / Matched expectation
- Score 3- Dissatisfied / Less than expected
- Score 4- Very Dissatisfied / Much less than expected

4.1. Evaluation of occupant's perception of FM service delivery in condominium

Based on literature; to evaluate FM service delivery, 3 aspects of effectiveness were considered namely schedule compliance, availability, and quality and expectation. Also, considering the criticality of the FM services including energy management and sustainability, maintenance, cleaning, uninterrupted utility supply, security and access control and civil- work-related complaints handling was selected to evaluate effectiveness of facilities management performance. The survey results are shown in Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, Figure 7 and Figure 8. Each figure contains responses ratings on different FM services under three evaluating criteria namely, schedule compliance, availability, and quality and expectation.

Considering the schedule compliance, survey results indicate that preventive maintenance, ground cleanliness activities, operation of security facilities, energy management and sustainability implementation received high ratings from the respondents, suggesting strong adherence to the schedule compliance in FM service delivery. Regarding the availability of these FM services, the majority of respondents were either highly satisfied or satisfied with the available services. However, a significant proportion of respondents reported that access control, civil works, energy management services were unavailable. Notably, for these services, a similar number of respondents rated them as highly available and as dissatisfied, indicating various perception and experience with their availability. Although more than 15 respondents were satisfied with availability of access control, only a few were very satisfied, which is a signal for improvement. Similarly, cleanliness, energy management areas also indicated very few respondents who were very satisfied.

Considering the quality and expectations, respondents are suggested that, the supply of utilities including electricity, water and LP gas was in satisfactory level. Similarly, the quality of security services of the condominium buildings was also high. However, considering the access control, energy management and sustainability, civil works and ground cleanliness received considerably similar higher scores and lower scores. It was identified that the respondents have polarized perceptions based on their experience on this service quality. Access card failures in critical areas for improvement were determined based on the number of unsatisfied respondents.



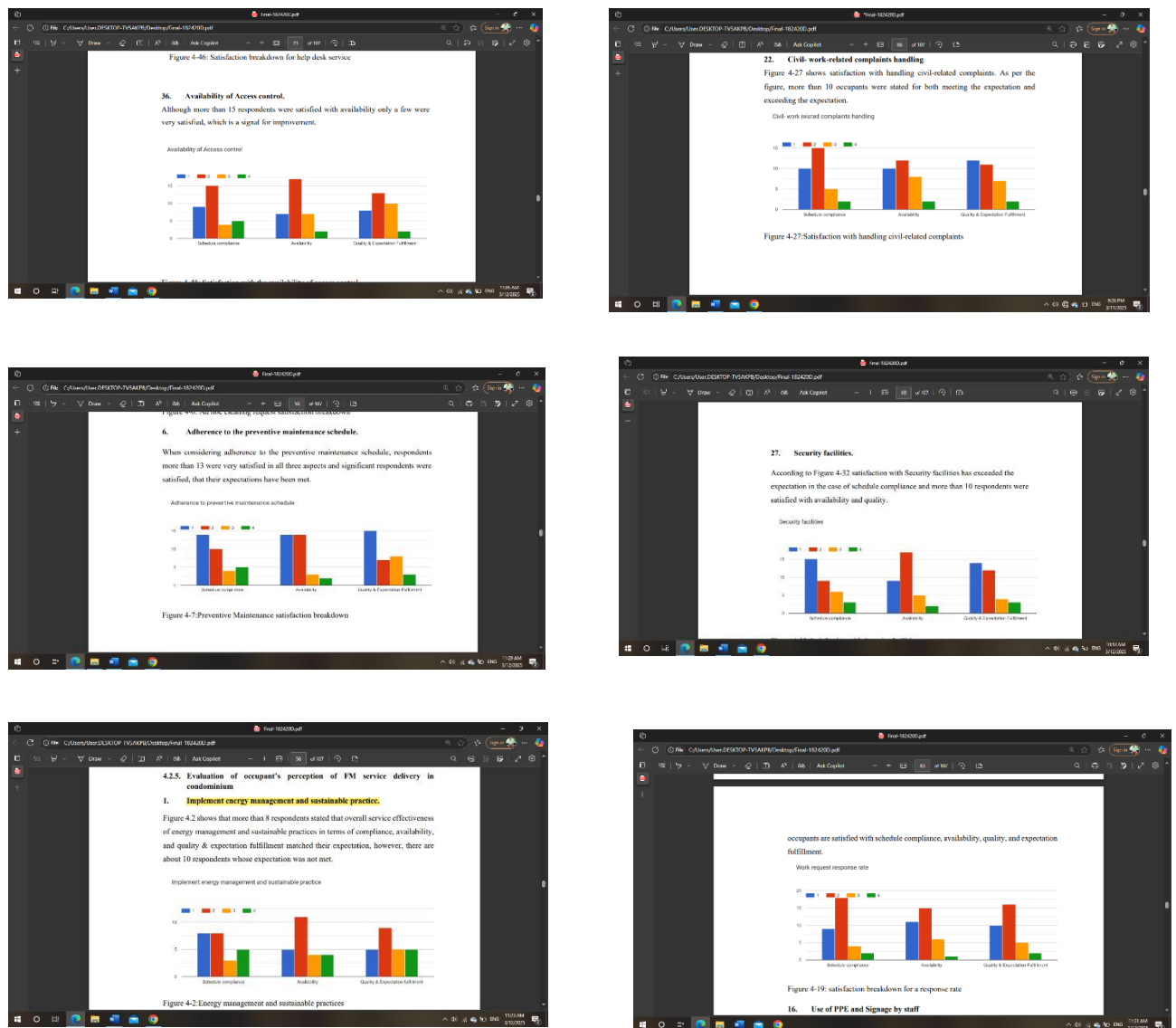


Figure 1: Occupant's Perception of FM Service Deliver

5. Discussion

Facilities management operations in condominium focused on areas including general management, cleaning, repair and maintenance, building services, residential services, and community services (Lai, 2012; Riratanaphong & Limjaroensuk, 2020). Effectiveness of FM performance highly influenced by areas such as energy management, sustainability, maintenance, cleanliness, security, access control and uninterrupted utility supply (Amusan et al., 2021; Ebuy et al., 2023; Ramli et al., 2021; Zakeri & Shahabi, 2023). Participants also revealed that these areas are highly impacted for the effectiveness of the FM performance. To determine the effectiveness of these areas three key aspects were considered; quality and expectation, schedule compliance and availability (Rahman Jumat et al., 2012; Riratanaphong & Limjaroensuk, 2020; Scott-Napier, 2024). Table 1 indicates the effectiveness of performance of each FM areas as per rated by participants.

Table 1: Effectiveness of FM performance

Areas of Facilities Management	Schedule compliance	Availability	Quality and expectation
Energy management and sustainability	High adherence	Medium availability	Satisfied
Maintenance	High adherence	Highly available	Very satisfied
Cleanliness of ground	High adherence	Highly available	Satisfied
Uninterrupted utility supply	Medium adherence	Highly available	Very satisfied
Security	High adherence	Highly available	Very satisfied
Access control	Medium adherence	Medium availability	Satisfied
Civil works	Medium adherence	Medium availability	Satisfied

6. Conclusion

The research aims to determine the effectiveness of FM during the occupancy phase of condominium buildings in Sri Lanka. A comprehensive literature has been carried out about the condominium, their operation, the role of FM in condominiums, parameters of FM, PM in FM, and tools to measure performance. There is much understanding among researchers about the importance of FM in both manufacturing and service organizations. But the performance of FM and evaluation of FM in condominiums and their effectiveness in particular in residential buildings is still undeveloped. Questionnaire surveys were carried out to understand the occupants' satisfaction level with the performance of FM using a Likert scale. Effectiveness was examined under 08 factors. Also, the level of satisfaction was analysed by incorporating aspects of effectiveness such as availability, schedule compliance, and quality and expectation fulfilment. It is evidenced that residents were not fully satisfied with the FM performance in their respective condominiums. It was evident that, there is a strong adherence to schedule compliances. Preventive maintenance, ground cleanliness, security facility operations, energy management, and sustainability implementation were rated highly, indicating effective FM service delivery. While most FM services were generally available, security, civil works, and energy management had notable availability issues, with some respondents finding them highly accessible while others reported unavailability. There were polarized perceptions of service quality in areas such as access control, energy management, sustainability, civil works, and ground cleanliness, highlighting varying user experiences. Thus, recommendations can be provided to enhance overall FM service quality, improvements should focus on service availability, resolving access control issues, and addressing disparities in user experiences, particularly in civil works, energy management, and cleanliness. This study enables to explore further on the effectiveness of facilities management in addressing the specific needs and concerns of different types occupants and further research can be carried out to assess the effectiveness of facilities management in design phase of condominium buildings.

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