Challenges and Strategic Approaches in Sustainable Facility Management

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ABSTRACT

Facility Management (FM), which was traditionally a repair-oriented term, has now transformed into a strategic function that aids organizational effectiveness, longevity, and adaptability. Sadly, FM is still having problems with the integration of technology, operational efficiency, financial availability, and communication with significant people. These constraints make it harder for firms to come close to achieving global sustainability goals and commonly realize added value. This paper examines the most significant limitations of FM practices and discusses the approaches based on Sustainable Facility Management (SFM) strategies. The key strategies include positioning with the UN Sustainable Development Goals (SDGs) framework, implementation of a holistic sustainability plan, reassessment of institutional resistance, and effective use of smart technologies. By undertaking an all-encompassing literature review, the research found that an emphasis on the sociotechnical system and lifecycle-based perspective in FM has great potential to improve performance, reduce environmental impacts, and bring about a culture of sustainability. The insights provided above are poised to guide policymakers, practitioners, and researchers in identifying the roadmap for a sustainable trajectory in the FM landscape, as well as for implementing the required changes across various facility types.

Keywords: Sustainable Facility Management, Sustainable Development Goals, Operational Challenges

INTRODUCTION

Facility Management (FM) is a concept that integrates people, places, technique, and processes under one roof to ensure that buildings work as they should, bringing comfort and security to their users. It is a combination of management, architecture, psychological science, and engineering that achieves the ambitions of an organization by focusing more on physical working conditions (Okoro, 2023). From an operational department a decade ago, FM is now a strategic area of emphasis, which is not only aimed at green and economic development, but also at user satisfaction with a long vision of sustainability (Lin et al., 2022).

This transformation which is the major cause of global awareness on environmental issues has been coupled with the growing demand for energy-efficient innovations, affordable power supply, and the initiation of regulatory frameworks pushing for sustainable solutions. In view of that, matrons of today are not only responsible for making sure infrastructure stays in order and for providing operational continuity, they also have to lead initiatives in relation to global sustainability, for example, the United Nations Sustainable Development Goals (SDGs) (Hauashdh et al., 2024; Olimat et al., 2023).

However, the transition to Sustainable Facility Management (SFM) is complex and filled with challenges. Important problems include the existence of a reactive maintenance system, restricted budgets, modern technologies that cannot be integrated into today's operations, and the continuous coordination with

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stakeholders (Hassanain et al., 2023; Ensafi & Thabet, 2021). On the other hand, contemporary FM leaders must adapt levels of rapid technological change, customer preferences, regulatory aspects, and globalization effects (Okoro, 2023; Opoku & Lee, 2022). Possible explanations for the slow incorporation of technology and architecture such as Building Information Modelling (BIM), high-tech building systems, and data-driven solutions are not only poor investment but also resistance to change established in the organizational culture (Lok et al., 2023; Store-Valen & Buser, 2019). These obstacles reveal a void, which exists between the present obstacles of FM and a strategic planning for sustainability.

From this perspective, the question of whether elements of sustainability-driven performance should be integrated into contemporary facility management practices is to be placed at the center of this research. To consider that matter, the following objectives are set out: (1) analysing the main operational and strategic issues that hamper the application of SFM; (2) elaborating on practical recommendations that can help to close the gap between academic goals of sustainability and current adverse plight of SFM. The present research paper is aimed at addressing the issue of the FM role in sustainability by identifying emerging trends and analysing the consequences of their implementation on the environmental, socio-economic, and corporate performance aspects. The research findings, in this regard, are targeting FM practitioners, policy designers, and researchers, with the aim of coming up with such effective strategies that promote sustainability and facilities resiliency.

Challenges in Facility Management

FM plays a pivotal role in ensuring the safety, usability, and sustainability of the built environment. While the profession is experiencing a shift towards more strategic involvement, FM professionals still face various challenges that hinder their ability to maximize operational efficiency and long-term value. These challenges can be broadly categorized into four major dimensions: technological, operational, financial, and communication. Each category not only disrupts daily facility operations but also contributes to systemic inefficiencies across sectors, leading to organizational underperformance and missed sustainability targets.

Technological Challenges

With the rise of advanced digital technologies such as Building Information Modelling (BIM), digital twins, and Internet of Things (IoT) applications, FM now has the potential to transform operations through real-time monitoring, predictive maintenance, and optimized asset lifecycle management (Ghansah, 2024). However, the adoption of these technologies remains inconsistent. In many public-sector facilities, such as government office buildings, the integration of BIM is stalled due to the absence of standardized templates and skilled personnel. For instance, a municipal government in Malaysia attempted to digitize its asset registry using BIM but had to pause the initiative due to a lack of interoperable data formats and trained digital infrastructure engineers (Ensafi & Thabet, 2021).

Similarly, in hospital settings, while smart building systems are being piloted to monitor HVAC and lighting for energy efficiency, their successful deployment is hampered by incompatible legacy systems and the overwhelming volume of data produced, which requires specialized analytics and robust cybersecurity frameworks. According to Olimat et al. (2023), this lack of capacity to process and secure data prevents many healthcare institutions from using energy or maintenance insights effectively. In community centers and smaller religious facilities, where digital readiness is low, staff often lack even basic digital skills, further widening the gap in technological adoption. These examples illustrate how the digital divide impacts FM differently across facility types, limiting the realization of data-driven decision-making.

Operational Challenges

Operational inefficiencies continue to plague FM environments, particularly in facilities still reliant on reactive maintenance models and outdated workflows. A public university in Southeast Asia, for example, recently reported frequent disruptions in its electrical and plumbing systems due to its continued reliance on manual fault reporting rather than preventive or condition-based maintenance. The institution lacked a centralized asset

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monitoring system, which resulted in poor visibility over equipment conditions and delays in fault detection (Opoku & Lee, 2022).

In another case, an aging public hospital complex faced constant issues managing diverse facility types, from emergency rooms to administrative buildings, due to the varied age and condition of its infrastructure. Without a uniform maintenance management system, its FM department struggled with scheduling, procurement, and cost estimation, leading to inefficient service delivery and user dissatisfaction (Svensson & Löwstedt, 2021). These examples emphasize the need for strategic planning, workforce reskilling, and digital tools to transition away from reactive systems toward proactive and integrated facility operations.

Financial Challenges

Budget limitations represent one of the most pervasive barriers to effective facility management, especially in institutions that rely on limited government funding or donor-based support. In Malaysia, many religious and community-based facilities such as mosques and temples depend heavily on public donations, which are often irregular. A mosque in Johor Bahru, for instance, postponed multiple critical maintenance projects, including roof repairs and electrical rewiring, due to budget shortfalls. This delay not only jeopardized safety but also increased long-term costs as damage worsened over time (Cruz & Cruz, 2019).

Similarly, in public schools and educational institutions, budget constraints have forced administrations to delay upgrading aging facilities and purchasing energy-efficient systems. A case in point is a government-funded school that shelved plans to retrofit classrooms with solar panels despite long-term cost savings, because of insufficient upfront capital and lack of access to green financing. According to Sarpin et al. (2018), poor procurement practices and the absence of lifecycle cost analysis often compound these problems, making institutions miss out on sustainable investment opportunities. Incorporating green financing schemes, performance-based contracting, and better budgeting tools could help reframe FM as a value-generating function rather than a cost center.

Communication Challenges

Disruption of communication between FM teams and interests may result in inadequate facility operations augments time and efficiency. In commercial office complexes, like high-rise buildings where third-party contractors manage them, delays with real-time communication among tenants, technicians, and compliance equal dangerous safety risks. One instance was a fire alarm mishap in a Kuala Lumpur office building, which came to the limelight due to a conspiracy between the control room operator and security teams (Kipli et al., 2022).

Another situation is that of conflicting instructions and duplicated directives resulting from operating departments autonomy in multi-campus universities. It occurred that the planning of campus facilities at a university in Penang was totally uncoordinated with the operations of the maintenance department, and this was leading to a scheduling conflict that was annoying to the students. It should be noted that the process of implementing a coordinated action in community centers or smaller institutions, often encountered are the overlapping of responsibilities, a lack of understanding of one's own role, and unclear reporting lines (Ensafi & Thabet, 2021). However, these problems are coming up much more severely in sustainability projects, where cross-functional collaboration and stakeholder engagement are the keys for success.

For communication an FM organization should integrate communication platforms, standardize reporting systems, and organize stakeholder engagement. As an instance, mobile fault-reporting apps and shared digital dashboards have proven effective in improving transparency and coordination of operations in the course conduct of pilot programs in some private hospital chains and shopping malls. These systems, when correctly executed, can lead to the elimination of downtimes, improved accountability, and the perception of service quality.

Generally, it is Table 1 that summarises the difficulties in FM. It presents the salient problems affecting FM in five major facility types: public, commercial, educational, hospital, and place of worship/community centers.

In the technical side, one of the common problems is lack of BIM standardization and skilled professionals in public facilities, but on the contrary, commercial buildings struggle with dated connections between digital platforms, poor integration, and outdated legacy systems. Most of the educational institutions or campuses usually do not have the kind of IT infrastructure that is required for proper monitoring of large campuses, healthcare facilities are besieged by data overload that is running short of analytics capacity, and religious or community centers have generally low digital literacy combined with the absence of automation tools. For a public-school FM, the operations are mostly reactive, involving manual work orders, and at the same time, commercial properties might suffer communication breakdowns within the three parties between vendors and operators. Educational institutions are facing scheduling difficulties because of varied uses of buildings, healthcare is entangled with computer networks that are absent from centralized monitoring, and there is not much planning in community facilities and they function on an ad hoc basis. On the financial side, the challenges range from having to deal with the public planning department, which may freeze the budget for upgrades, to commercial facilities whose top priority is quick ROI, to educational facilities that do not have the right funding for retrofitting, to healthcare facilities that do not have the funds to maintain their facilities due to other projects, to religious/community facilities that have to rely on donations or their own fundraising effort, which requires that they plan ahead. Lastly, the sensation of communication problems becomes widespread. Public agencies usually lack inter-agency coordination, when operational emergencies are getting commercial properties, sometimes there is a delay in communications, educational institutions are operating within silos that have overlapping roles for staff members, in healthcare facilities there are (but not limited to) departmental misalignments (these are especially visible between FM and clinical teams), and in community centers there are hardly any reporting structures, as well as full stakeholder engagement. These challenges with manifold nature emphasize even more the need for custom, sector-specific strategies to fully impel and effectively keep an eye on the management of environmentally friendly and functional facilities.

Table 1. Summary of Challenges in FM

Challenge Dimension	**Public Facilities (e.g., govt offices, town halls)**	**Commercial Buildings (e.g., malls, office towers)**	**Educational Institutions (e.g., schools, universities)**	**Healthcare Facilities (e.g., hospitals, clinics)**	**Religious/Community Facilities (e.g., mosques, centers)**
Technological	Lack of BIM standardization and skilled staff	Incompatible legacy systems, poor platform integration	Limited IT infrastructure for campus-wide monitoring	Data overload, lack of analytics capacity	Low digital literacy, absence of automation tools
Operational	Manual work orders and reactive maintenance	Faulty communication delays between vendors and operators	Diverse building types, uncoordinated scheduling	Old infrastructure, lack of central monitoring	Reactive maintenance, ad hoc scheduling
Financial	Budget freezes delay upgrades and compliance	Focus on short-term ROI over long-term sustainability	Lack of capital for retrofitting, poor green financing access	Deferred maintenance due to funding priorities	Donation-based funding limits proactive planning
Communication	Poor inter-agency coordination	Delays in real-time response, miscommunication in safety alerts	Siloed departments and overlapping responsibilities	Misalignment across departments (FM, compliance, medical teams)	Unclear reporting roles, limited stakeholder involvement

Sustainable Facility Management Strategies

To address the multifaceted challenges in FM, organizations are increasingly adopting SFM strategies. SFM represents a comprehensive approach that integrates environmental stewardship, economic efficiency, and social equity into place management (Lok et al., 2023). These strategies align facility operations with both national regulations and international sustainability commitments, enabling resilience, long-term performance, and stakeholder trust. This section outlines key SFM strategies, ranked by impact and ease of implementation, incorporating legal, technological, organizational, and financial considerations. The strategies are tailored to different types and sizes of organizations and culminate in a phased roadmap for gradual implementation.

Fostering Synergy with Sustainable Development Goals

The United Nations Sustainable Development Goals (SDGs) alignment between the FM practices and the SFM approaches is one of the most productive yet moderately reachable tasks. Moreover, SDG 7 (Affordable and Clean Energy), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action) are the three goals that best apply to FM. By integrating energy-efficient systems, renewable energy, water conservation, and green procurement, FM departments can relatively easily make contributions to these goals (Lok et al., 2023). The outcome involves the reduction of greenhouse gas emissions, better indoor environments, and the creation of more durable buildings (Store-Valen & Buser, 2019).

National regulations such as Malaysia's Green Technology Master Plan (GTMP), Energy Efficiency and Conservation Act (EECA), and Green Building Index (GBI) build up this strategy by providing incentives, tax credits, and compliance guidelines, respectively. Firms that are large in size will have these ESG mandates as their corporate ethos; but a small enterprise may have to introduce simple changes, for instance, lighting upgrades, which can be affordable entry points. The public organizations are usually obliged to adhere to the government green procurement standards, which make this avenue both timely and practicable.

Application of Holistic Frameworks and Tools

Applying lifecycle-oriented sustainability frameworks such as Life Cycle Assessments (LCAs), Green Building Index (GBI), GreenRE, and LEED certifications is critical in SFM (Rahman, 2021; Islam et al., 2019). These tools allow facility managers to assess environmental impacts, guide retrofitting projects, inform procurement, and standardize sustainable benchmarks across facility operations.

Although upfront certification costs may range from RM 50,000 to RM 200,000, long-term benefits include 10–30% energy savings, enhanced building valuation, and improved tenant satisfaction. These tools also provide third-party validation, which builds trust among investors, clients, and stakeholders. Frameworks should be selected based on sector needs: GreenRE may be best for educational campuses, LEED for healthcare institutions, and GBI for commercial properties aiming to increase energy and water efficiency.

Overcoming Socio-organizational Barriers

Behavioural and organizational challenges are often overlooked, yet they can critically limit the success of SFM initiatives. Resistance to change among staff, low sustainability awareness, and limited involvement in decision-making create barriers to implementation (Store-Valen & Buser, 2019). To counter this, capacity building is essential through targeted training, participatory planning, and transparent communication.

Digital upskilling plays a crucial role in this strategy. FM staff should be trained progressively starting from basic sustainability workshops, advancing to online courses on smart building tools, and eventually earning certifications such as the Certified Facility Manager (CFM). According to Lok et al. (2023), building internal competency and ownership leads to lasting behaviour change, particularly when staff are involved from the planning stage. SMEs often need additional support in this area, and government interventions like grants and technical advisory programs are key to bridging the capability gap.

Smart Technologies as Operational Modules

Smart technologies are reshaping how FM is practiced. Tools such as IoT sensors, cloud-based systems, and Building Information Modelling (BIM) enable real-time data collection, predictive maintenance, and performance optimization (Karanasios, 2025). These systems enhance efficiency, reduce costs, and improve occupant satisfaction.

Initial investment may range from RM 100,000 to RM 300,000 for medium-sized buildings. However, organizations can expect energy savings of 15–35% and maintenance cost reductions of 20–40%, with payback periods of 2–4 years (Ensafi & Thabet, 2021). Successful adoption requires attention to digital literacy, cybersecurity, and organizational readiness. A sociotechnical approach, where technology adoption is coupled with culture change and continuous learning is necessary to realize full benefits.

A Phased Roadmap for Implementing SFM

To advance effectiveness of implementation, there is a suggestion of the phased roadmap of SFM. Phase 1 aims at creating a baseline understanding and building readiness through the performance of regulatory audits and stakeholder education. In this way, a series of assessments will be done. In Phase 2, sustainability frameworks are chosen by the lessees, and the most impactful ones with low cost and quick results are put into operation. Phase 3 consists of deploying smart technologies and tools in selected departments, while simultaneously working on building up the staff's competence and capability so that their added operational value and business alignment are realized. Lastly, in Phase 4, it will focus on implementing the proven models on the entire organization and integrating the SFM practices into ESG reporting and long-term strategic corporate planning. Pacing the process allows for gradual implementation, where matching the needs of the organization, as well as human and technical development, is provided. In addition to this, flexibility is brought, which allows the organization to shift the position if it considers it necessary according to its size, sector, and strategic priorities.

Overall, Table 2 shows the ranking of SFM strategies by impact and ease of implementation. Based on that table, it outlines the relative impact, ease of implementation, initial cost, and time to return on investment (ROI) for key SFM strategies. Aligning SFM efforts with SDGs and national green policies is shown to have high impact and moderate ease of implementation, with relatively low to moderate initial costs and a typical ROI within 1–2 years. Adopting holistic sustainability frameworks, such as LEED or GBI, also offers high impact but tends to be more complex and cost-intensive, with a longer ROI horizon of 3–5 years. Socio-organizational capacity building, which focuses on enhancing staff knowledge and engagement, has moderate impact but is easy to implement, low in cost, and often yields quick results, sometimes immediately. Implementing smart technologies like IoT, BIM, and AI brings high impact and moderate ease of adoption, though it involves medium to high initial investment, with returns typically seen in 2–4 years. Finally, employing a phased roadmap that integrates these strategies offers high impact and high feasibility when well-planned. While costs and timelines vary by phase, this approach allows for progressive implementation and elaboration over time, ensuring adaptability and sustained value.

Table 2. Ranking of SFM Strategies by Impact and Ease of Implementation

SFM Strategy	Impact	Ease of Implementation	Initial Cost	Time to ROI
Synergy with SDGs and Green Policies	High	Moderate	Low to Moderate	1–2 years
Holistic Frameworks (LEED, GBI, etc.)	High	Low to Moderate	Moderate to High	3–5 years
Socio-organizational Capacity Building	Moderate	High	Low	Immediate to 1 year

Smart Technologies (IoT, BIM, AI)	High	Moderate	Medium to High	2–4 years
Phased Roadmap (Across All Strategies)	High	High (if well planned)	Varies by Phase	Progressive

CONCLUSION

This paper has brought to view an upgrading role of FM, as from the traditional operational function to a strategic discipline, which ensures sustainability, operational efficiency, and user satisfaction. It has focused on the main issues that obstruct the enhancement, which include the technological, financial, operational, and communicational ultimatums. Despite the challenges, it is contended that FM can have the potential of being a stakeholder aligning agent when it comes to meeting sustainability goals, technological innovations, and strategic planning. To remove these constraints, there is a need to combat with a transformation from a responsive approach to the usage of proactive techniques based on data. Integration of such lifecycle-based assessment tools as LEED and GBI, along with the development of intelligent building technologies and the alignment of SDGs are among the strategies for advancing sustainability achievement. Organizational transformation, capacity building of leadership, as well as cooperation between the sectors, remain to be the significant factors for the success of such endeavours. Going forward, these are the responsibilities that governments, private sector actors, and facility managers have to shoulder through the prioritization of capacity building, diverting funds to digital infrastructures, and the development of proper regulatory frameworks. Consequently, FM becomes an agent of sustainable advancement, resilient infrastructure, and long-term value creation within the domains of both public and private.

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