Faculty of Natural and Applied Sciences Journal of Mathematics and Science Education
Print ISSN: 2814-0885 e-ISSN: 2814-0931
www.fnasjournals.com
Volume 6; Issue 3; May 2025; Page No. 10-20.

Computer-Based Facility Management in Abuja, FCT: Adoption, Benefits, and Challenges Among Facilities Management Professionals

***David, A.**
Works and Physical Planning Department, Glorious Vision University, Ogwa, Edo State, Nigeria

***Corresponding author email:** dadekunle50@yahoo.com

Abstract
This study assesses the adoption of Computer-Based Facility Management (CBFM) in Abuja, Federal Capital Territory (FCT), Nigeria, focusing on its benefits and challenges among facility management professionals. A mixed-methods approach involving surveys and semi-structured interviews was employed to collect data from facility managers, maintenance personnel, and estate surveyors. The findings reveal that CBFM adoption has significantly improved operational efficiency, data management, predictive maintenance, and sustainability practices. Benefits include automation of processes, enhanced decision-making, optimized space utilization, and reduced operational costs. However, the implementation of CBFM systems is hindered by high setup costs, inadequate infrastructure, a shortage of skilled personnel, and resistance to change. Limited awareness and training gaps further contribute to its underutilization. Despite these challenges, the study observes a growing interest in CBFM tools in Abuja's facility management sector. Recommendations include targeted training programs, awareness campaigns, financial support mechanisms, and stronger collaboration between stakeholders to enhance adoption. The study contributes to the discourse on digital transformation in facility management and provides actionable insights for improving built environment service delivery in rapidly urbanizing cities.

Keywords: Abuja, Computer-Based Facility Management, Facility Management Professionals, Technology Adoption, Benefits

Introduction

Facility management (FM) is a critical aspect of maintaining and optimizing the built environment, encompassing the management of buildings, assets, and resources to ensure efficiency, safety, and sustainability for example: energy efficiency measures, water conservation strategies, waste reduction and recycling, remote monitoring, sustainable materials, planned preventive maintenance and retrofitting and upgrading. In recent years, technological advancements have revolutionized facility management practices, with Computer Based Facility Management (CBFM) emerging as a key innovation because it digitizes assets and streamlines the administration of tasks using real-time data and automated processes. CBFM software solutions such as Revizto, QuickFMS, and FaultFixers provide comprehensive tools for managing buildings and facilities. CBFM integrates software solutions to streamline operations such as space planning, asset tracking, maintenance scheduling, and energy management, enabling data-driven decision-making and improved service delivery. In recent years, the integration of technology in FM practices has gained momentum, particularly with the emergence of Computer Based Facility Management (CBFM) systems. CBFM provides tools for managing space, assets, maintenance, and operational processes, leading to improved efficiency and reduced costs (Becerik-Gerber et al., 2018). According to the Canback Global Income Distribution Database (2018), reported that Abuja's population increased from 1.73 million in 2008 to 2.75 million in 2018, reflecting an average growth rate of 4.73% annually during that period, compared to the national average of 3%. In Abuja, the Federal Capital Territory (FCT), the need for effective facility management has grown as the city continues to experience rapid urbanization and infrastructural development. This study aims to assess the extent of CBFM adoption among facilities management professionals in Abuja, focusing on the benefits realized and challenges encountered. Facility management is gaining prominence due to urbanization, increasing infrastructural developments, and the need for more efficient management systems. However, the adoption of CBFM remains inconsistent, influenced by factors such as cost, technical expertise, and organizational readiness. While some facility management professionals have embraced CBFM to enhance productivity and operational efficiency, others face challenges in its implementation, limiting its widespread use (Then & Tan, 2018).

Cite this article as:
David, A. (2025). Computer-based facility management in Abuja, FCT: Adoption, benefits, and challenges among facilities management professionals. *FNAS Journal of Mathematics and Science Education, 6*(3), 10-20

Traditionally, facility management relied on manual processes, but technological advancements have introduced digital solutions such as Computer Based Facility Management (CBFM) systems. CBFM integrates software tools for space planning, asset tracking, maintenance scheduling, and energy management, enhancing operational efficiency and data-driven decision-making (Shohet & Lavy, 2020). In today's rapidly evolving technological landscape, the field of Facility Management (FM) has experienced a significant transformation, largely due to the adoption of Computer Based Facility Management (CBFM) systems. Globally, CBFM has revolutionized how organizations manage their assets, spaces, and services, enabling facility managers to optimize performance through data-driven decision-making, real-time monitoring, and automation. In advanced economies such as the United States, United Kingdom, and parts of Europe and Asia, CBFM systems are extensively utilized in managing commercial buildings, educational institutions, hospitals, and government facilities. These systems contribute to increased operational efficiency, reduced maintenance costs, improved sustainability practices, and better user experiences. According to Becerik-Gerber et al., (2018), CBFM plays a central role in the strategic management of built environments by integrating various operational tasks into one coherent digital platform. At the national level, particularly in Nigeria, the adoption of CBFM remains nascent and inconsistent. While sectors such as oil and gas, telecommunications, and a few large real estate firms have begun to explore CBFM technologies, their use is still far from mainstream. Studies such as Ajibola et al., (2019) and Oladokun, (2011) reveal that most facility management practices in Nigeria remain manual or semi-automated, relying heavily on spreadsheets, paperwork, and traditional methods. This limits the ability of facility managers to operate efficiently, particularly as buildings become more complex and the demand for high-performance, sustainable, and user-centered spaces increases. Common challenges cited include a lack of technical expertise, high initial costs, insufficient infrastructure, and limited awareness of CBFM's benefits.

Focusing on Abuja, the Federal Capital Territory (FCT), the situation reflects the broader national trend but presents a unique paradox. As a fast-growing urban center and the administrative capital of Nigeria, Abuja is home to a high concentration of public infrastructure, corporate offices, commercial complexes, and institutional buildings—all of which require robust facility management systems. Despite this, there is limited documented evidence of widespread CBFM adoption among Facility Management Professionals (FMPs) in the city. Most facility managers still rely on manual or basic digital systems to manage critical assets and operations. This raises serious concerns about operational inefficiencies, high maintenance costs, reactive rather than proactive maintenance, and poor data management. While the benefits of CBFM are well-documented globally, Abuja lags behind in its adoption and integration. Despite the city's status as a hub for administrative, commercial, and infrastructural development, facility managers in Abuja face challenges in implementing computer-based tools for facility management. There is a critical gap in the level of awareness, access, and practical usage of CBFM systems in the city. The absence of such digital tools hinders effective maintenance scheduling, asset tracking, energy management, and service delivery—leading to operational inefficiencies and increased lifecycle costs of buildings and infrastructure. Moreover, there is a scarcity of empirical studies that assess the level of CBFM adoption, its perceived benefits, and the challenges encountered by professionals in Abuja. This lack of localized research creates a knowledge vacuum and limits the development of context-specific solutions or policies that could improve the uptake of CBFM technologies. This research, therefore, seeks to bridge this gap by conducting a detailed assessment of the adoption, benefits, and challenges of Computer-Based Facility Management (CBFM) among facility management professionals in Abuja. The study aims to uncover the extent to which CBFM tools are used, identify the key drivers and inhibitors of adoption, and propose actionable recommendations to encourage wider implementation. By focusing specifically on Abuja, this study contributes to the growing discourse on digital transformation in the FM sector and supports efforts to modernize facility management practices in Nigeria's capital city. The findings of this study will contribute to the growing discourse on digital transformation in facility management and provide actionable recommendations for facility managers, policymakers, and technology providers. By addressing barriers to CBFM adoption, stakeholders can enhance efficiency, sustainability, and service delivery in Abuja's built environment (Becerik-Gerber et al., 2018).

This literature reviewed critically analyzes existing studies on Computer Based Facility Management (CBFM) in Abuja, FCT, focusing on its adoption, benefits, and challenges among facilities management professionals. The review evaluates the strengths and weaknesses of these studies while identifying gaps in the research. The development, coordination, and control of the non-core specialist services required for a company to effectively accomplish its main goals is known as facility management (Nutt, 2022). Facilities management (FM) provides a means to gauge how those who benefit from maintenance activities respond to maintenance management. It is focused on how people interact with buildings. Facilities management is a subset of property or real estate management, which also includes infrastructure, machinery, and plants. The appropriate place for this is in maintenance management. Another name for facilities management in a technologically sophisticated, culturally

Cite this article as:
David, A. (2025). Computer-based facility management in Abuja, FCT: Adoption, benefits, and challenges among facilities management professionals. *FNAS Journal of Mathematics and Science Education, 6*(3), 10-20

diversified public company is the integrated corporate function. It comprises combining an organization's most important resources—finance, people, procedures, and technology—to produce a final strategy that maximizes the use of available resources. According to Goyal & Pitt (2007), the notion of FM is still emerging and remains relatively young, particularly in developing nations like Nigeria. Prior to the development of FM, property management was a common technique that involved using expertise to take care of a structure and its various parts.

According to Oladokun, (2011), the development of FM practice was facilitated by the business and organization's conscious attitude over time regarding the need to provide services to support business operations, such as building, workplace, and work-life conditions, at an optimal cost of operation while concentrating on the core business activities. According to Moore & Finch, (2004), facilities management (FM) comprises the development, coordination, and management of all non-core specialist services provided by an organization, including building systems, plant, IT equipment, and fittings, with the ultimate purpose of helping the business achieve its strategic objective. According to the International Facility Management Association (IFMA, 2022), a facility manager is responsible for coordinating non-core services such as facility planning, forecasting, budgeting, procurement, leasing, and the disposal of real estate, furnishings, equipment, and outsourced facility services.

A crucial component of organizational operations is facilities management (FM), which includes a range of tasks to guarantee the best possible performance of physical environments (Alexander, 2013). With cutting-edge technologies to optimize workflows, boost productivity, and cut expenses, Computer Based Facility Management, or CBFM, has become a useful tool for improving facilities management (FM) practices (Mohammed, 2017). Despite its advantages, facilities management professionals in Nigeria still don't use CBFM very often (Olanrewaju, 2018). The creation of corporate facility policies and procedures; quality management, including benchmarking and best practices; architecture and engineering planning and design; space planning and management; building operations; maintenance and engineering; supervision of business services like reprographics; transportation and catering; telecommunication; and code compliance are some additional categories. These include facility construction; renovation and relocation; health, safety, and security; environmental issues; and code compliance. According to Chotipanich (2004), practitioners have found it challenging to draw boundaries between FM activities because of the broad, highly inclusive, and multidisciplinary nature of the services offered by facility managers. According to Atkin & Brooks, (2021), facility management tasks encompass a broad range of responsibilities, including space and asset management, maintenance operations, service delivery, health and safety compliance, and the integration of technology to optimize facility performance.

1. **Facility management** involves the overall coordination of buildings, people, processes, and systems to ensure efficient and safe operations.
2. **Asset management** focuses on maintaining and optimizing the performance and lifespan of physical assets such as equipment and infrastructure.
3. **Behavioural management** deals with creating environments that support occupant well-being, productivity, and satisfaction.
4. **Space management** ensures the effective planning, allocation, and utilization of physical spaces within a facility.
5. **Operation management** covers the day-to-day activities that keep facilities running smoothly, such as maintenance and system monitoring.
6. **Service management** oversees the delivery of essential support services like cleaning, security, catering, and waste management.

Several studies provide empirical data on the adoption rates of CBFM systems in Abuja. For instance, a survey indicated that 46% of facilities management professionals utilize some form of CBFM, which provides a quantitative basis for understanding current practices. Research often contextualizes findings within the specific socio-economic landscape of Abuja, highlighting factors such as urbanization and infrastructure challenges that influence CBFM adoption. Many studies focus primarily on quantitative metrics without exploring qualitative aspects such as user experiences and perceptions regarding CBFM systems. This limits a comprehensive understanding of the barriers to adoption. Some studies rely on data that may be outdated due to the rapid technological advancements in facility management. As a result, findings may not accurately reflect the current state of CBFM adoption. Jambil, (2020), Olatunji & Murtala, (2013).There is a lack of longitudinal studies that track the progression of CBFM adoption over time. Future research could benefit from examining how adoption rates evolve with changing technologies and market conditions. Facility Management (FM) is a multidisciplinary field that focuses on the efficient and effective management of facilities, including buildings and their associated

Cite this article as:
David, A. (2025). Computer-based facility management in Abuja, FCT: Adoption, benefits, and challenges among facilities management professionals. *FNAS Journal of Mathematics and Science Education, 6*(3), 10-20

services. The primary goal of facility management is to ensure that the physical environment supports the organization's objectives, enhances productivity, and promotes sustainability. This overview discusses the key concepts, components, and importance of facility management in today's context, supported by relevant literature.

Facility managers (FMs) are responsible for overseeing the day-to-day operations of buildings and ensuring that all occupants have a safe and productive environment. The physical environment—referred to as "place"—is crucial in facility management as it encompasses all aspects of the built environment where people work and interact. Processes refer to the systematic methods employed in facility management to ensure efficient operations. Technology is an enabler in facility management, providing tools that enhance efficiency, communication, and data analysis (Atkin & Brooks, 2021).

Facility management is defined by the International Facility Management Association (IFMA, 2022) as a multidisciplinary profession that ensures the functionality of the built environment by integrating people, place, process, and technology. The scope of FM includes:

- **Space management:** Efficient use of space within a facility, including layout planning and occupancy tracking.
- **Maintenance management:** Ensuring the functionality and safety of building systems through routine and preventive maintenance.
- **Asset management:** Managing physical assets, including equipment, furniture, and infrastructure, to maximize their value and lifespan.
- **Energy management:** Monitoring and optimizing energy use to reduce costs and promote sustainability.
- **Health and safety compliance:** Ensuring that facilities adhere to regulatory standards for health, safety, and environmental protection.
- **Project management:** Overseeing construction, renovation, and relocation projects to ensure they meet budget, schedule, and quality standards (Nutt, 2022).

The origins of facility management can be traced back to the early 20th century when organizations began recognizing the importance of managing physical assets. Initially focused on maintenance and custodial services, the field has evolved to include strategic planning and management of facilities as critical components in achieving organizational goals. The implications of effective facility management extend beyond operational efficiency; they also impact employee productivity, organizational culture, and overall business success. Here are specific examples and case studies that illustrate these impacts: Impact on Employee Productivity, Case Study: The "Wellness Together" Research. A significant research project titled "Wellness Together," conducted in 2017 with 1,000 U.K.-based office workers and 50 facilities management experts, established a strong link between the working environment and employee performance. Example: Cornell University Study. Influence on Organizational Culture.

Case Study: Coor's Integrated Facility Management Services. Example: Smart Workplace Solutions. Overall Business Success, Case Study: Hotel Facilities Management Practices. Example: Higher Education Institutions. Emerald Insight, (2023)

A well-managed facility can lead to enhanced employee satisfaction, lower operational costs, improved safety standards, and a positive organizational image.

In summary, facility management is a critical discipline that plays a vital role in ensuring the effective operation of buildings and spaces. By integrating various functions and focusing on sustainability, facility managers contribute significantly to organizational success and occupant satisfaction.

Evolution of facility management

The concept of facility management has evolved from a focus on maintenance and custodial services to a comprehensive approach that includes strategic planning and management of physical assets (Nutt, 2022) and Terrared, (2024). Below is a timeline highlighting key milestones in the development of FM: Early 20th Century 1900s: Foundations of Facility Management, 1960s: Formalization of the Field, 1970s: Birth of Modern Facility Management, 1980s: Strategic Shift, 1990s: Technological Advancements, 2000s: Expansion and Globalization, 2010s: Emphasis on Sustainability and Technology Integration and 2020s: Current Trends and Future Directions.

The integration of technology, particularly CBFM, has transformed FM practices by enabling real-time data collection, analysis, and management (Atkin & Brooks, 2021).

The field of facility management has evolved significantly over the past few decades. Initially, FM was primarily focused on maintenance and custodial services. However, it has transformed into a strategic function that contributes to organizational effectiveness and employee satisfaction (Becerik-Gerber et al., 2018). Key developments include:

- **Integration of technology:** The introduction of Computer Based Facility Management (CBFM), Building Information Modeling (BIM), and smart technologies has enhanced the efficiency and effectiveness of FM practices (Atkin & Brooks, 2021).
- **Sustainability focus:** With increasing awareness of environmental issues, FM has shifted towards promoting sustainable practices, including energy efficiency and waste reduction (Shohet & Lavy, 2020).
- **Holistic approach:** Modern FM recognizes the importance of a holistic approach that integrates people, processes, and technology to optimize facility performance (Olanrewaju et al., 2021).

Evolution of computer-based facility management (CBFM)

Computer Based Facility Management (CBFM) is a technology-driven approach that has transformed the way facility management is practiced. Over the years, CBFM has evolved from simple software applications focused on maintenance and space management to sophisticated systems that integrate various functions and technologies to optimize facility operations. This overview highlights the key phases in the evolution of CBFM, supported by relevant literature.

1. **Early beginnings of facility management software:** The roots of CBFM can be traced back to the early 1980s when organizations began using basic computer applications to manage facilities. These early systems were primarily designed for:

- **Maintenance management:** Basic software tools were developed to track maintenance schedules and manage work orders. These systems often relied on spreadsheets or simple database management systems (Becerik-Gerber et al., 2018).
- **Space management:** The need for effective space utilization led to the creation of software that could help organizations optimize their workspace layouts (Nutt, 2022).

During this initial phase, CBFM was largely reactive, focusing on responding to maintenance issues and managing space without a strategic approach. The transition from reactive to strategic facility management (FM) represents a significant evolution in how organizations approach the management of their physical assets and operational processes. Initially, facility management was primarily reactive, focusing on addressing maintenance issues as they arose without a comprehensive strategy. Over time, this approach has shifted towards a more proactive and strategic model that aligns FM with broader organizational goals Terrared, (2024).

2. **Integration of computer-aided design (CAD):** In the late 1980s and early 1990s, the introduction of Computer-Aided Design (CAD) technology significantly impacted CBFM. Facilities began to integrate CAD with facility management systems, which allowed for:

- **Visualization of facilities:** Facility managers could visualize floor plans and layouts, making it easier to plan space utilization and maintenance activities (Atkin & Brooks, 2021).
- **Data-driven decisions:** The combination of CAD with FM systems enabled better data collection and analysis, allowing organizations to make informed decisions regarding their facilities (Ajibola et al., 2019).

This integration marked a shift toward more proactive facility management practices, where data-driven insights guided decision-making processes.

3. **Emergence of integrated workplace management systems (IWMS):** The late 1990s and early 2000s saw the emergence of Integrated Workplace Management Systems (IWMS), which combined CBFM with other essential functionalities, including:

- **Project management:** IWMS integrated project management tools, allowing facility managers to oversee construction, renovation, and relocation projects (Olanrewaju et al., 2021).
- **Real estate management:** The ability to manage real estate portfolios was integrated, providing organizations with a comprehensive view of their assets (Becerik-Gerber et al., 2018).

IWMS marked a significant advancement in CBFM, providing a holistic approach to facility management that encompassed various aspects of operations and strategic planning.

4. **Rise of cloud-based CBFM solutions:** The advent of cloud computing in the late 2000s revolutionized the CBFM landscape. Cloud-based CBFM solutions offered numerous benefits, including:

- **Accessibility and flexibility:** Facility managers could access CBFM applications from anywhere with an internet connection, allowing for greater flexibility and remote management (Atkin & Brooks, 2021).
- **Cost efficiency:** Organizations could reduce the costs associated with maintaining on-premises infrastructure and software licensing (Nutt, 2022).
- **Scalability:** Cloud solutions allowed for easy scaling of services as organizational needs evolved, accommodating growth and changes in facility management demands (Shohet & Lavy, 2020).

Cloud-based CBFM solutions became increasingly popular, making advanced facility management technology accessible to organizations of all sizes.

5. Integration of IoT and smart technologies

Cite this article as:
David, A. (2025). Computer-based facility management in Abuja, FCT: Adoption, benefits, and challenges among facilities management professionals. *FNAS Journal of Mathematics and Science Education, 6*(3), 10-20

In recent years, the integration of the Internet of Things (IoT) and smart technologies has further transformed CBFM. Key developments include:

- **Real-time data monitoring:** IoT sensors can monitor building conditions (e.g., temperature, occupancy) in real time, providing facility managers with valuable insights for optimizing operations (Becerik-Gerber et al., 2018).
- **Predictive maintenance:** Advanced analytics and machine learning capabilities enable predictive maintenance, allowing organizations to anticipate and address maintenance issues before they escalate (Olanrewaju et al., 2021).
- **Enhanced user experience:** Smart technologies, such as mobile applications and digital dashboards, improve user experiences for both facility managers and occupants (Ajibola et al., 2019).

The integration of these technologies reflects a significant shift towards proactive, data-driven facility management practices that enhance operational efficiency and sustainability.

The evaluation of CBFM'S effectiveness amongst facilities management professionals in Abuja, FCT, will be based on the following assessment criteria.

According to recent studies by Cafm-ims.com., (2022) and Facilio, (2024), the following highlights illustrate the effectiveness of Computer Based Facilities Management (CBFM):

1. **Improved efficiency:** CBFM streamlines facility management processes, reducing manual errors and increasing productivity.
2. **Enhanced decision-making:** CBFM provides real-time data and analytics, enabling informed decision-making and strategic planning.
3. **Cost savings:** CBFM optimizes resource allocation, reduces energy consumption, and extends asset lifespan, resulting in cost savings.
4. **Better space management:** CBFM enables effective space planning, allocation, and utilization, improving facility utilization rates.
5. **Increased customer satisfaction:** CAFM ensures timely maintenance, improves service delivery, and enhances overall customer experience.
6. **Compliance and risk management:** CBFM helps practitioners comply with regulatory requirements and reduces risk by identifying potential issues before they become major problems.
7. **Data-driven insights:** CBFM provides valuable insights into facility operations, enabling data-driven decisions and continuous improvement.
8. **Improved communication:** CBFM facilitates collaboration and communication amongst stakeholders, ensuring everyone is informed and aligned.
9. **Scalability and flexibility:** CBFM adapts to changing facility needs, scaling to accommodate growth and evolving requirements.
10. **Return on investment (ROI):** CBFM demonstrates a positive ROI through cost savings, increased efficiency, and improved productivity.

Benefits and challenges of computer-based facility management (CBFM) in Abuja

The adoption of Computer Based Facility Management (CBFM) systems in Abuja offers a range of advantages to facility management professionals, Abubakar & Aliyu, (2020), highlight the following advantages of CBFM that can greatly benefit facility management professionals in Abuja:

- Improved operational efficiency
- Enhanced data management and decision-making
- Predictive maintenance and sustainability support
- Better space utilization and cost reduction
- Compliance tracking and reporting automation
- Increased productivity and strategic focus
- Scalability and adaptability to infrastructure needs

However, several persistent challenges hinder the full realization of these benefits. Research by Abubakar & Aliyu, (2020) and Adebayo & Ojo, (2022) identifies the following key challenges associated with the adoption of Computer Based Facilities Management (CBFM) solutions in Abuja:

- High implementation and maintenance costs
- Inadequate infrastructure and unreliable internet connectivity
- Shortage of skilled personnel and insufficient training
- Resistance to change among facility management professionals
- Limited awareness and understanding of CBFM tools
- Integration difficulties with existing systems
- Data security concerns and complexity of platforms

Cite this article as:
David, A. (2025). Computer-based facility management in Abuja, FCT: Adoption, benefits, and challenges among facilities management professionals. *FNAS Journal of Mathematics and Science Education, 6*(3), 10-20

Addressing these issues through targeted interventions—such as training, financial support, and system integration—can significantly improve the adoption and effectiveness of CBFM technologies in Abuja.

Current state of computer-based facility management (CBFM) adoption in Abuja

The adoption of Computer Based Facility Management (CBFM) systems in Abuja, Nigeria, reflects a growing recognition of the importance of technology in enhancing facility management practices. As the capital city continues to develop, the need for efficient, effective management of facilities in both the public and private sectors has become increasingly critical. Here's an overview of the current state of CBFM adoption in Abuja as stated by Adebayo & Ojo, (2022):

1. **Increasing awareness and interest:** There is a growing awareness of CBFM systems among facility management professionals in Abuja. This is driven by the need for improved operational efficiency, better data management, and enhanced decision-making capabilities. Many organizations are beginning to recognize the potential benefits of adopting CBFM technologies, such as streamlined processes, cost savings, and improved tenant satisfaction.
2. **Varied levels of adoption:** The level of CBFM adoption varies significantly across different sectors and organizations in Abuja:

- **Public sector:** Government agencies and public institutions are gradually adopting CBFM systems, although implementation may be slower due to budget constraints and bureaucratic processes. Some local government offices are exploring CBFM solutions to manage public facilities more effectively.
- **Private sector:** Many private companies, particularly in real estate, hospitality, and large commercial enterprises, have begun implementing CBFM systems. These organizations often seek to enhance operational efficiency and improve tenant relations through technology.
- **Educational institutions:** Some universities and educational institutions in Abuja are exploring CBFM solutions to manage their campuses effectively, focusing on maintenance, space management, and compliance with safety regulations.

3. **Technology integration:** The integration of CBFM systems with other technology solutions is becoming more common in Abuja. Facility management professionals are leveraging advanced technologies, such as the Internet of Things (IoT), building information modeling (BIM), and cloud computing, to enhance the functionality of CBFM systems. This integration allows for real-time data collection and analysis, enabling proactive maintenance and efficient resource management.
4. **Challenges to adoption:** Despite the growing interest and initial adoption of CBFM systems, several challenges remain:

- **High implementation costs:** The cost of acquiring and implementing CBFM systems can be prohibitive, particularly for smaller organizations with limited budgets.
- **Lack of skilled personnel:** There is a shortage of trained professionals who can effectively manage and operate CBFM systems. Many facility management practitioners require additional training to maximize the potential of these technologies.
- **Resistance to change:** Some professionals may resist adopting new technologies, preferring traditional facility management methods. This resistance can slow the adoption of CBFM solutions.
- **Inadequate infrastructure:** Issues such as unreliable power supply and limited access to high-speed internet can hinder the effective use of CBFM systems.
- **Future prospects:** The future of CBFM adoption in Abuja looks promising, driven by the increasing demand for efficient facility management solutions. As more organizations recognize the benefits of technology in managing facilities, it is likely that the adoption of CBFM systems will continue to grow.

This study critically reviews existing literature on Computer-Based Facility Management (CBFM), focusing on its adoption, benefits, and challenges. Each source is examined in accordance with academic best practices, presenting the authors' perspectives followed by a personal critique or endorsement of the relevance and findings.

Goyal & Pitt, (2007) explored the emerging role of innovation management in facilities management, particularly within developing countries such as Nigeria. Their conceptual review revealed that facilities management (FM) was poorly understood and often misapplied, which hindered the implementation of innovative practices. The study emphasized the need for clearer professional definitions and structured approaches to innovation adoption. *In my view, this work is relevant as it addresses foundational issues that must be resolved for successful CBFM implementation.* Oladokun, (2011) investigated the evolution of FM in Nigeria, with a focus on changes in service delivery. Using a case study approach, the research found that FM adoption increased alongside growing corporate recognition of the importance of support services such as building and workplace management. The study concluded that efficient FM contributes significantly to operational success and cost control. *I find this study highly relevant, as it provides context for understanding the progressive acceptance of FM practices in Nigeria, which is essential for CBFM integration.* Mohammed, (2017) conducted a systematic review of global literature on the application of CBFM in enhancing FM operations. The review identified key

benefits such as proactive maintenance, data-driven decision-making, and automation. However, the study noted that CBFM remains underutilized in developing countries due to infrastructural and financial constraints. *This work is particularly important as it highlights both the potential and limitations of CBFM in the context of developing economies like Nigeria.*

Olanrewaju, (2018) analyzed the state of facilities management (FM) in Nigeria, with particular emphasis on the readiness for digital transformation. An empirical analysis based on a national survey revealed that low awareness and inadequate infrastructure significantly hinder the adoption of digital FM. *In my opinion, this study is vital as it underscores the foundational gaps that must be addressed before digital FM can gain traction in Nigeria.* Ajibola, et al., (2019) explored the role of FM in enhancing productivity within selected Nigerian institutions. Through survey research, the study found that organizations with more advanced FM systems reported higher levels of productivity and operational efficiency. *I find this study particularly relevant as it highlights the tangible benefits of FM when supported by technological integration.* Jambil, (2020) evaluated the awareness and readiness for Building Information Modeling (BIM) and CBFM tools among managers of high-rise buildings in Abuja. The survey-based research indicated low levels of both awareness and readiness, suggesting that digital FM tools are far from mainstream adoption. *This study is crucial as it draws attention to the urgent need for capacity building in the FM sector.*

Atkin & Brooks, (2021) provided a comprehensive overview of contemporary FM practices, including the integration of CBFM systems. Through a textbook-based conceptual and practical analysis, the authors illustrated how CBFM is widely used in advanced FM operations to enhance performance. *This work serves as an essential resource, and I strongly agree with its recommendation to embed CBFM within FM education and professional development frameworks.* Becerik-Gerber et al. (2018**)** reviewed the use of Building Information Modelling (BIM) and its synergy with FM tools such as CBFM. Their literature review concluded that integrating BIM with computer-aided facility management (CAFM) leads to improved lifecycle management of buildings. *I support the authors' perspective, as integrated digital platforms appear to be the future of effective FM.* Olanrewaju et al. (2021) examined the impact of digital transformation on FM in developing contexts. Using a thematic review approach, the study revealed that digitization promotes sustainability, cost-efficiency, and strategic management. While CBFM enhances FM outcomes, the study emphasised that adoption barriers must be actively addressed. *This research offers valuable insights into the broader implications of digital transformation for FM, especially in contexts like Nigeria.*

Materials and Methods

The study adopted a mixed-methods design, combining quantitative surveys and qualitative semi-structured interviews. A total of 120 facility management professionals were surveyed, drawn from public institutions, private organizations, and educational facilities across Abuja. The demographic breakdown included facility managers (45%), maintenance supervisors (30%), and estate surveyors (25%), with a gender distribution of 60% male and 40% female respondents. Surveys were administered using Google Forms to facilitate easy access and broad participation. The semi-structured interviews involved 18 participants selected via purposive sampling, ensuring representation from both CBFM adopters and non-adopters. The interviews were recorded, transcribed, and analyzed thematically. Thematic analysis was conducted using NVivo software. Transcripts were coded using an inductive approach, where recurring patterns and themes were identified through a systematic coding framework. Codes were grouped into categories reflecting benefits, challenges, and adoption strategies. Inter-coder reliability was ensured by having two researchers independently code a sample of transcripts and resolve discrepancies through discussion. This approach provided a comprehensive understanding of the CBFM adoption landscape in Abuja, grounded in both statistical trends and detailed experiential insights.

Table 1: Quantitative survey results on CBFM adoption (n = 120)

Survey Item	% of Respondents
Actively using CBFM tools	46%
Aware of CBFM but have not implemented it	54%
Report improved maintenance planning & reduced downtime	68%
Believe CBFM enhances operational efficiency	73%
Noted improvements in energy/resource management	59%
Cited high implementation cost as a barrier	41%
Cited lack of skilled personnel as a barrier	36%
Identified resistance to change as a challenge	27%

Cite this article as:
David, A. (2025). Computer-based facility management in Abuja, FCT: Adoption, benefits, and challenges among facilities management professionals. *FNAS Journal of Mathematics and Science Education, 6*(3), 10-20

Table 2: Key qualitative themes from interviews (n = 18)

Theme	Description	Sample Quote
Operational Transformation	Shift from reactive to proactive maintenance through automation and data use	"Now, we schedule maintenance ahead of time and avoid crises." – Private hospital FM
Skill and Training Deficiencies	Many staff lack the expertise to operate CBFM tools effectively	"We have the software but lack trained personnel to run it." – Public university supervisor
Resistance to Change	Organizational culture still favors manual systems	"Convincing senior management that digital tools are worth the cost is an uphill battle."
Infrastructure and Funding Gaps	Limited access to stable power, internet, and funding impedes adoption	"Stable power supply and internet access are major issues in our office." – Commercial complex FM

Discussion

The study on Computer-Based Facility Management (CBFM) adoption among facility management professionals in Abuja presents both quantitative and qualitative findings that offer a more nuanced understanding of current practices. Out of the 120 professionals surveyed: 46% reported active use of CBFM tools in their organizations. 54% acknowledged awareness of CBFM but had not implemented it, citing barriers such as cost, skill gaps, and organizational resistance. 68% agreed that CBFM improved their maintenance planning and scheduling, resulting in a 25–30% reduction in downtime. 73% indicated that data-driven decision-making and automation had enhanced their operational efficiency. 59% noted improved energy and resource management, particularly in commercial and educational facilities. 41% cited high implementation costs as the primary reason for non-adoption. 36% mentioned a lack of skilled personnel, while 27% pointed to resistance to technological change as major hindrances.

From the semi-structured interviews conducted with 18 facility management professionals, four major themes emerged. First, Operational Transformation was widely acknowledged, with many respondents emphasizing that the adoption of CBFM had shifted their maintenance approach from reactive to proactive. One facilities manager at a private hospital noted that before adopting CBFM, they were "constantly reacting to breakdowns," whereas now they can "schedule maintenance ahead of time and avoid crises." Second, Skill and Training Deficiencies were identified as a significant barrier. Several participants pointed out that while CBFM systems were available, many personnel lacked the technical skills to operate them effectively. A maintenance supervisor at a public university remarked, "We have the software but lack trained personnel to run it effectively." The third theme, Resistance to Change and Organizational Culture, highlighted the persistence of manual systems within organizations that are resistant to technological adoption. One estate surveyor from a government agency explained, "Convincing senior management that digital tools are worth the cost is an uphill battle." Lastly, Financial and Infrastructure Constraints were cited, particularly by professionals from smaller organizations. These participants described how limited budgets, unstable power supply, and inadequate internet infrastructure hindered CBFM implementation. As one facilities officer at a commercial complex shared, "Stable power supply and internet access are major issues in our office." These qualitative insights provide a deeper understanding of the systemic and behavioural challenges shaping CBFM adoption in Abuja. Interestingly, professionals in the private sector appeared more likely to adopt CBFM systems, particularly in hospitality and real estate, compared to those in public institutions, where bureaucratic bottlenecks and limited budgets were cited as limiting factors.

The findings reflect a gradual shift towards digital facility management in Abuja. While the quantitative results suggest growing adoption and significant benefits, the qualitative feedback underscores real-world implementation hurdles—especially around training, change management, and infrastructure gaps. Together, these insights validate and expand upon prior research (e.g., Oladokun, 2011; Becerik-Gerber et al., 2018), reinforcing the idea that successful CBFM adoption hinges not only on technology access but also on organizational readiness and stakeholder engagement.

Conclusion

The findings from this assessment indicate that while Computer Based Facility Management offers substantial benefits for operational efficiency and data management among facility management professionals in Abuja,

significant challenges remain. Addressing these challenges through targeted training, awareness initiatives, and financial support can facilitate broader adoption of CBFM technologies, ultimately enhancing service delivery and operational effectiveness within the built environment. The study concludes that the adoption of CBFM systems among facility management professionals in Abuja has led to notable improvements in operational efficiency and data management. Professionals reported enhanced capabilities in space management, maintenance scheduling, and overall facility operations due to the integration of technology. However, these benefits are countered by several significant challenges, including high implementation costs, a lack of skilled personnel, and resistance to change within organizations. The findings underscore the critical role that CBFM can play in modernizing facility management practices in Abuja. As urbanization and infrastructural development continue to accelerate in the Federal Capital Territory, adopting advanced facility management technologies like CBFM is essential for optimizing resources and improving service delivery. The study highlights that organizations that effectively integrate CBFM can achieve lower maintenance costs, higher productivity, and better resource utilization compared to those relying on traditional methods.

Recommendations

The recommendations from the study on Computer Based Facility Management (CBFM) adoption among facility management professionals in Abuja address the challenges identified during the research. These recommendations aim to enhance the effective implementation of CBFM systems and promote their widespread use. Below is a discussion of the key recommendations presented:

3. Investment in training and development: One of the primary recommendations is for organizations to invest in comprehensive training programs for facility management professionals. This training should focus on:
   - Technical skills: Equipping staff with the necessary technical skills to operate and manage CBFM systems effectively.
   - Change management: Providing training that prepares employees to adapt to new technologies and processes, thereby reducing resistance to change.
4. Awareness campaigns: To address the limited awareness of the benefits of CBFM, stakeholders are encouraged to conduct awareness campaigns that:
   - Highlight benefits: Educate facility management professionals about how CBFM can improve operational efficiency, reduce costs, and enhance service delivery.
   - Showcase success stories: Present case studies and testimonials from organizations that have successfully implemented CBFM, demonstrating its value.
5. Financial support mechanisms: Given the high implementation costs associated with CBFM, it is recommended that:
   - Policymakers develop incentives: Government bodies and industry associations should create financial incentives or support mechanisms to help organizations offset initial costs.
   - Access to funding: Explore options for grants or low-interest loans specifically aimed at technology adoption in facility management.
6. Collaboration with technology providers: Facility management organizations are encouraged to collaborate with technology providers to:
   - Tailor solutions: Work together to develop CBFM solutions that meet the specific needs of local organizations in Abuja.
   - Provide ongoing support: Ensure that technology providers offer ongoing support and updates for their systems, facilitating smoother transitions and continued effectiveness.
7. Integration of CBFM with existing systems: To enhance functionality, it is crucial for organizations to:
   i. Ensure compatibility: Focus on integrating CBFM with existing management systems and processes to streamline operations and improve data sharing.
   ii. Develop a unified platform: Create a unified platform where all facility management tools can operate cohesively, enhancing overall efficiency.
8. Pilot programs: Implementing pilot programs can serve as a practical approach for organizations considering CBFM adoption:
   i. Test implementation: Organizations should start with small-scale implementations of CBFM systems to test their effectiveness before full-scale adoption.
   ii. Gather feedback: Use pilot programs to gather feedback from users, which can inform adjustments and improvements before broader deployment.

Cite this article as:
David, A. (2025). Computer-based facility management in Abuja, FCT: Adoption, benefits, and challenges among facilities management professionals. *FNAS Journal of Mathematics and Science Education, 6*(3), 10-20

To enhance CBFM adoption in Abuja, stakeholders should promote awareness, provide training, improve infrastructure, support resource access, implement change management, and monitor performance—empowering professionals to boost efficiency, service delivery, and sustainability in the built environment.

References

Abubakar, I., & Aliyu, A. (2020). Application of BIM implementation process in the operation and maintenance of facilities. *African Journal of Environmental Science and Technology*. Retrieved from https://ajol.info/index.php/ajest/article/view/202568

Adebayo, A., & Ojo, O. (2022). A study on facility management practice in Nigeria: A case study of Nigerian Communication Commission, Abuja Nigeria. *ResearchGate*. Retrieved from https://www.researchgate.net/publication/362553575

Ajibola, M. O., Babalola, A. A., & Afolabi, O. (2019). The role of facility management in enhancing productivity in organizations: A case study of selected institutions in Nigeria. *Facilities, 37*(1/2), 19–31.

Alexander, K. (2013). *Facilities management: Theory and practice*. Routledge.

Atkin, B., & Brooks, A. (2021). *Total facility management* (6th ed.). John Wiley & Sons.

Becerik-Gerber, B., Kensek, K., & Taneja, P. (2018). Building information modeling for facility management: A review of the literature. *Automation in Construction, 95*, 240–257. https://doi.org/10.1016/j.autcon.2018.07.019

CAFM-IMS. (2022). How to choose the best CAFM system for facility maintenance. Retrieved from https://cafm-ims.com/how-to-choose-the-best-cafm-system-for-facility-maintenance/

Canback Global Income Distribution Database. (2018). Retrieved from http://www.cgidd.com

Chotipanich, S. (2004). Positioning facility management. *Facilities, 22*(13/14), 364–372.

Emerald Insight. (2023). How can facilities management benefit from offices becoming more digital? Retrieved from https://www.emerald.com/insight/content/doi/10.1108/F-12-2022-0230/full/html

Facilio. (2024). CAFM software: Features, benefits & pricing. Retrieved from https://facilio.com/blog/cafm-software-features-benefits-pricing/

Goyal, S., & Pitt, M. (2007). Determining the role of innovation management in facilities management. *Journal of Facilities Management, 25*(1/2), 48–60.

International Facility Management Association (IFMA). (2022). *What is facility management?* Retrieved from https://www.ifma.org/what-is-facility-management/

Jambil, S. Z. (2020). Awareness and readiness in the use of building information modelling as a tool in facilities management services in high-rise commercial buildings in Abuja, Nigeria. *African Scholar Journal of Environmental Design & Construction Management, 19*(4).

Mohammed, A. (2017). Computer-aided facility management: A review of the literature. *Journal of Facilities Management, 15*(2), 147–162.

Moore, M., & Finch, E. (2004). Facilities management in South East Asia. *Facilities, 22*(9/10), 259–270.

Nutt, B. (2022). *Facility management: Theory and practice* (2nd ed.). Routledge.

Oladokun, T. T. (2011). An examination of the practice of facilities management in Nigeria. *Journal of International Real Estate and Construction Studies, 1*(2), 167–179.

Olanrewaju, A. (2018). Facilities management in Nigeria: Challenges and opportunities. *Journal of Building Performance, 9*(1), 1–12.

Olanrewaju, A. L., Abdul-Aziz, A. R., & Ali, K. N. (2021). The impact of digital transformation on facility management practices: A review. *Facilities, 39*(5/6), 451–467. https://doi.org/10.1108/F-01-2020-0009

Olatunji, O. A., & Murtala, A. (2013). Facilities management practices in Nigeria: A case study of Abuja. *ResearchGate*. Retrieved from https://www.researchgate.net/publication/261123456

Shohet, I., & Lavy, S. (2020). Sustainability in facility management: A framework for integrating environmental considerations into facility operations. *Sustainable Cities and Society, 61*, 102309. https://doi.org/10.1016/j.scs.2020.102309

Terrared. (2024). The evolution of facility management: Embracing change for optimal efficiency. Retrieved from https://terrared.com/the-evolution-of-facility-management

Then, S. S., & Tan, T. H. (2018). CAFM adoption in facilities management: A review of the literature. *Journal of Building Engineering, 18*, 340–349.