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Future-Oriented Educational Model for Next-Generation Facility Management Professionals

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ABSTRACT: The evolving landscape of facility management (FM) is increasingly shaped by technological advancements, globalization, sustainability imperatives, and heightened operational complexity. Traditional educational approaches may no longer fully equip FM professionals with the competencies required to navigate these challenges. This proposes a future-oriented educational model designed to prepare next-generation FM professionals with the skills, knowledge, and adaptability necessary for dynamic, global facility environments. The primary purpose of the model is to create a comprehensive, forward-looking curriculum that bridges technical expertise, digital literacy, sustainability principles, and leadership competencies. The key focus of the model lies in integrating multidisciplinary knowledge and practical experience. Technical expertise encompasses building systems, energy management, health and safety, and operational maintenance, ensuring foundational competence. Digital literacy addresses emerging technologies, including smart building systems, Internet of Things (IoT) integration, artificial intelligence (AI), predictive analytics, and Building Information Modeling (BIM), enabling professionals to harness technological innovation for operational efficiency. Sustainability education emphasizes climate adaptation, resource efficiency, and circular economy principles, equipping graduates to implement environmentally responsible practices. Leadership competencies, including project management, strategic decision-making, cross-cultural communication, and ethical considerations, prepare professionals to guide complex teams, engage diverse stakeholders, and contribute to organizational strategy. The expected impact of this educational model is the development of highly skilled, versatile FM professionals capable of managing complex facilities in diverse, global contexts. Graduates will possess not only technical and operational proficiency but also strategic insight, digital competence, and adaptability, positioning them to address emerging industry challenges proactively. By fostering a culture of continuous learning, innovation, and professional excellence, the model supports the creation of a resilient workforce equipped to lead the next generation of facility management practices, ultimately advancing organizational performance, sustainability, and global industry standards.

KEYWORDS: Future-Oriented Education, Next-Generation Facility Management, Professional Development, Competency-Based Learning, Digital Skills, Leadership Training, Innovation Adoption, AI-assisted learning

1 INTRODUCTION

Facility management (FM) has undergone a transformative evolution in recent years, driven by rapid technological advancements, growing sustainability imperatives, and the globalization of organizational operations (Nwokediegwu *et al.*, 2024; Okiye *et al.*, 2025). Modern facilities, including corporate campuses, healthcare institutions, educational complexes, and industrial sites, are increasingly complex, interconnected, and technologically integrated. Smart building technologies, Internet of Things (IoT) systems, predictive analytics, and artificial intelligence (AI) are reshaping the way facilities are operated, monitored, and maintained (Nwokediegwu *et al.*, 2024; Annan *et al.*, 2025). Simultaneously, organizations are under mounting pressure to meet environmental targets, implement energy-efficient solutions, and ensure operational resilience in the face of climate change and resource constraints. These converging factors have elevated the technical, strategic, and managerial demands on facility management professionals, necessitating a new paradigm in education and training (Naitam *et al.*, 2025; Ayumu and Ohakawa, 2025).

Traditional FM education has often focused on foundational knowledge and operational procedures, emphasizing technical competencies such as building systems, maintenance practices, and basic regulatory compliance (Alonge *et al.*, 2025; Okereke *et al.*, 2025). While these competencies remain essential, they may not fully equip professionals to navigate emerging challenges. Smart buildings require proficiency in digital technologies, data analytics, and automation. AI-driven operations demand skills in predictive modeling, real-time monitoring, and systems integration. Globalized operations introduce cross-cultural management complexities, requiring advanced leadership, communication, and stakeholder engagement capabilities (Nwokediegwu *et al*., 2024; Taiwo *et al*., 2025). Without an educational framework that integrates these evolving requirements, FM professionals risk being underprepared to deliver operational efficiency, sustainability outcomes, and strategic value in contemporary and future facility environments (Nwokediegwu *et al*., 2024; Okereke *et al*., 2025).

The rationale for a future-oriented educational model lies in addressing these gaps. A forward-looking curriculum must blend technical knowledge with digital literacy, sustainability expertise, and leadership development, providing FM professionals with the adaptability and strategic insight necessary to thrive in rapidly evolving contexts (Okereke *et al*., 2025; Okiye *et al*., 2025). By embedding experiential learning, competency-based assessment, and exposure to emerging technologies, the model ensures that graduates possess both theoretical understanding and practical capability. It also emphasizes the development of critical thinking, problem-solving, and innovation, enabling professionals to anticipate industry trends and implement proactive, data-driven solutions (Lawal *et al*., 2025; Umoren *et al*., 2025).

The objective of this, is to propose a comprehensive educational model that prepares next-generation FM professionals for the dynamic and complex demands of contemporary facility operations. The model seeks to bridge current knowledge gaps, integrate multidisciplinary competencies, and cultivate a workforce capable of managing technologically advanced, sustainable, and globally distributed facilities (Onifade *et al*., 2024; Umoren *et al*., 2025). Through its implementation, organizations can foster a highly skilled, versatile, and future-ready cadre of FM professionals who are equipped not only to meet operational and regulatory requirements but also to drive strategic value, sustainability, and innovation across the facility management discipline (Faiz *et al*., 2024; Umoren *et al*., 2025).

The convergence of technological innovation, sustainability imperatives, and globalization has redefined the skill set required for effective facility management. Traditional educational approaches are insufficient to address these demands (Sofoluwe *et al*., 2024; Nwokediegwu *et al*., 2024). This introduces a forward-looking educational model designed to equip FM professionals with the technical, digital, sustainability, and leadership competencies necessary for professional excellence, operational efficiency, and long-term adaptability in a rapidly evolving industry.

2.0 METHODOLOGY

To develop a future-oriented educational model aimed at preparing next-generation facility management professionals, a systematic PRISMA methodology was employed. The process began with a comprehensive search of relevant literature across databases including Scopus, Web of Science, ERIC, and Google Scholar, using keywords such as “facility management education,” “professional development,” “next-generation competencies,” “curriculum innovation,” and “emerging FM skills.” The initial search yielded a broad collection of records, which were subsequently screened for relevance based on titles and abstracts. Inclusion criteria focused on studies addressing innovative or forward-looking educational approaches in facility management, competency frameworks for professional development, and strategies for integrating emerging technologies and sustainability principles, while studies limited to conventional training methods or unrelated sectors were excluded. Full-text articles were then assessed for methodological quality, clarity of reported outcomes, and applicability to preparing facility management professionals for evolving industry demands. Data extraction captured key variables including educational approaches, competency domains, learning outcomes, curriculum design, delivery methods, and evidence of professional skill acquisition. To ensure rigor and reliability, two independent reviewers conducted the screening and data extraction processes, with disagreements resolved through consensus discussions. The selected studies were synthesized using narrative and thematic approaches to identify recurring patterns, innovative pedagogical strategies, competency requirements, and gaps in current educational models. This synthesis informed the development of a conceptual framework for a future-oriented educational model that integrates technical skills, digital literacy, sustainability awareness, and leadership competencies. By following the structured PRISMA methodology encompassing the stages of identification, screening, eligibility, and inclusion, the study ensured transparency, reproducibility, and comprehensive coverage of the evidence base, providing a research-grounded foundation for designing an educational model that equips next-generation facility management professionals with the competencies required for future operational, technological, and strategic challenges.

2.1 Conceptual and Theoretical Foundations

Developing a future-oriented educational model for next-generation facility management (FM) professionals requires a strong conceptual and theoretical foundation. The model must integrate principles of adult learning, competency-based education, systems thinking, and innovation and foresight theory to ensure graduates are equipped with the skills, knowledge, and adaptability necessary for complex, technology-driven, and globally dispersed facilities (Nwokediegwu *et al*., 2024; Faiz *et al*., 2024). These theoretical perspectives provide a structured framework for designing a curriculum that is practical, relevant, and anticipatory of emerging industry trends.

Adult learning theory emphasizes that adult learners acquire knowledge most effectively when learning is self-directed, contextualized, and relevant to their professional experiences. Experiential learning, a key component of this theory, stresses the importance of hands-on, practice-based learning cycles where learners actively engage with real-world scenarios. In FM education, this translates into integrating internships, project-based learning, simulations, and on-site exercises that mirror the operational, technological, and managerial challenges faced in contemporary facilities. By embedding experiential learning into the curriculum, future FM professionals develop not only cognitive understanding but also practical skills, problem-solving abilities, and decision-making competence (Nwokediegwu *et al*., 2024; Faiz *et al*., 2024). This approach ensures that learning is immediately applicable to operational contexts, enhancing retention, confidence, and professional readiness.

Competency-based education (CBE) provides a systematic approach to defining, teaching, and assessing the skills and knowledge essential for professional effectiveness. In the context of FM, CBE identifies both core competencies—such as building systems knowledge, health and safety compliance, and basic operational management—and advanced competencies, including smart building technologies, predictive maintenance, sustainability planning, and cross-cultural leadership. The educational model structures learning outcomes around measurable competencies, allowing learners to progress at their own pace and demonstrate mastery before advancing to more complex modules (Faiz *et al*., 2024; Sofoluwe *et al*., 2024). This approach ensures consistency in skill acquisition across diverse cohorts and facilities, aligning graduates’ capabilities with industry expectations and the evolving requirements of global facility operations.

Systems thinking offers a holistic perspective, emphasizing the interdependencies among facility systems, human resources, operational processes, and external stakeholders. FM professionals must understand how changes in one component, such as energy management systems, can cascade across other subsystems, including HVAC, lighting, and occupant services. Systems thinking enables learners to conceptualize facilities as integrated, dynamic entities, where performance outcomes are determined by the interaction of multiple subsystems. By incorporating systems thinking into education, the model equips professionals to anticipate the operational, environmental, and organizational impacts of their decisions, fostering proactive problem-solving, optimization of resources, and resilient operational strategies (Faiz *et al*., 2024; Sofoluwe *et al*., 2024).

Innovation and foresight theory complements the model by preparing FM professionals to anticipate technological, environmental, and regulatory trends, and to adopt emerging solutions proactively. In an era of rapid digitalization, AI integration, and sustainability pressures, professionals must be capable of evaluating new technologies, designing innovative operational strategies, and adapting to unforeseen challenges. This theoretical perspective emphasizes scenario planning, trend analysis, and strategic thinking, encouraging learners to move beyond reactive problem-solving to forward-looking decision-making (Sofoluwe *et al*., 2024; Faiz *et al*., 2024). By cultivating a mindset oriented toward innovation and foresight, the model ensures that FM professionals can lead organizational adaptation, optimize facility performance, and implement cutting-edge solutions.

The proposed educational model integrates these theoretical frameworks to create a cohesive approach to professional development. Adult learning and experiential education ensure practical skill acquisition and engagement. Competency-based education provides a structured, measurable pathway for skill mastery. Systems thinking fosters holistic understanding and strategic problem-solving, while innovation and foresight prepare professionals for future challenges and technological advancements (Nwokediegwu *et al*., 2024; Umoren *et al*., 2024). Collectively, these foundations ensure that graduates are not only technically competent but also adaptive, strategic, and innovative, capable of managing complex, technology-driven, and globally distributed facilities.

Grounding the educational model in these conceptual and theoretical perspectives ensures its relevance, rigor, and applicability. By combining experiential learning, competency mastery, systemic insight, and forward-looking innovation, the model produces FM professionals equipped to navigate evolving industry landscapes, anticipate emerging challenges, and lead operational excellence. These foundations provide a blueprint for the development of a highly skilled, adaptable, and future-ready FM workforce, bridging the gap between current educational practices and the demands of next-generation facility management.

2.2 Curriculum and Learning Modules

Designing a future-oriented educational curriculum for next-generation facility management (FM) professionals requires a multidisciplinary approach that integrates technical expertise, digital competencies, leadership skills, sustainability knowledge, and professional ethics as shown in figure 1. As the FM sector evolves with increasing complexity, technological innovation, and heightened sustainability demands, the curriculum must equip professionals with the knowledge and skills necessary to navigate operational, strategic, and societal challenges (Ofoedu *et al*., 2024; Okiye, 2024).

Core technical knowledge forms the foundational layer of the curriculum, providing students with a deep understanding of building systems, sustainability principles, energy management, and health and safety requirements. Mastery of building systems—including HVAC, electrical, plumbing, and structural components—is critical for ensuring safe, efficient, and reliable facility operations. Sustainability and energy management modules emphasize strategies to optimize resource utilization, reduce carbon emissions, and achieve cost-effective operations, aligning facility performance with environmental standards and organizational goals. Health and safety training ensures compliance with regulatory frameworks and cultivates a proactive approach to hazard identification, risk assessment, and incident mitigation (Alade *et al*., 2024; Ofoedu *et al*., 2024). Together, these technical competencies establish the operational baseline for effective FM practice.

Digital and smart facility management represents an increasingly critical component of contemporary curricula. Modules focusing on the Internet of Things (IoT), artificial intelligence (AI), Building Information Modeling (BIM), predictive analytics, and facility automation prepare students to leverage data-driven insights for enhanced operational performance. IoT technologies facilitate real-time monitoring of building systems, while AI algorithms support predictive maintenance, energy optimization, and anomaly detection (Adeleke and Ajayi, 2024; Faiz *et al.*, 2024). BIM enables integrated design, construction, and operational workflows, enhancing collaboration and minimizing errors across the facility lifecycle. Predictive analytics further supports decision-making by identifying patterns, forecasting risks, and optimizing resource allocation. By incorporating these digital competencies, the curriculum ensures that graduates are prepared to operate and innovate in increasingly technology-intensive FM environments.

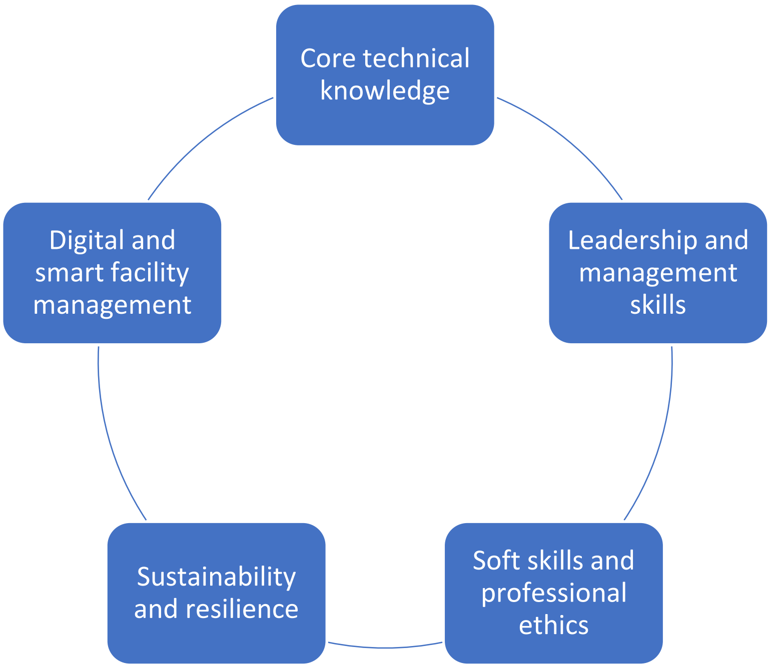

Figure 1: Curriculum and Learning Modules

Leadership and management skills are integral for professionals tasked with overseeing multidisciplinary teams and complex operational portfolios. Communication, project management, strategic decision-making, and cross-cultural competence modules develop the ability to lead diverse teams, negotiate stakeholder expectations, and implement organizational strategies effectively. Project management training equips students with planning, scheduling, and risk management tools to ensure efficient delivery of facility services. Strategic decision-making modules cultivate analytical thinking, problem-solving, and long-term planning capabilities, enabling professionals to align operational activities with organizational objectives (Faiz *et al.*, 2024; Nwanko *et al.*, 2024). Cross-cultural competence fosters effective collaboration in globalized or multicultural work environments, preparing FM practitioners to manage international projects and navigate cultural nuances in stakeholder engagement.

Sustainability and resilience form another critical dimension of the curriculum, reflecting the growing societal and regulatory emphasis on climate adaptation, circular economy principles, and resource efficiency. Climate adaptation modules provide knowledge on mitigating the impacts of extreme weather events and integrating resilient design and operational strategies. Circular economy principles emphasize waste reduction, recycling, and material efficiency, promoting sustainable lifecycle management of facilities. Resource efficiency training focuses on optimizing energy, water, and material use, balancing operational needs with environmental stewardship. Integrating sustainability and resilience into the curriculum ensures that FM professionals contribute to environmentally responsible, adaptable, and future-ready facility operations.

Soft skills and professional ethics complement technical, digital, and leadership competencies by cultivating interpersonal effectiveness and ethical judgment. Teamwork and conflict resolution modules develop collaborative problem-solving capabilities and the ability to manage interpersonal dynamics in complex operational settings. Stakeholder engagement modules prepare students to communicate effectively with clients, regulatory authorities, contractors, and end-users, ensuring alignment with expectations and transparent decision-making (Jambol *et al.*, 2024; Faiz *et al.*, 2024). Professional ethics training reinforces the importance of integrity, accountability, and responsible conduct, emphasizing adherence to legal requirements, industry standards, and societal norms. Together, these soft skills and ethical competencies ensure that FM professionals operate with professionalism, credibility, and social responsibility.

A comprehensive curriculum for next-generation FM professionals must integrate technical knowledge, digital expertise, leadership and management skills, sustainability and resilience awareness, and soft skills with ethical grounding. Core technical modules provide foundational operational competence, while digital and smart FM training prepares graduates for technology-driven environments. Leadership, strategic, and cross-cultural competencies ensure effective team and project management, whereas sustainability and resilience modules align professional practice with environmental and societal imperatives. Soft skills and professional ethics foster collaboration, stakeholder trust, and responsible conduct. Collectively, these learning modules create a multidisciplinary, forward-looking educational framework that equips facility management professionals with the capabilities to deliver operational excellence, adapt to emerging challenges, and lead the sector toward sustainable and resilient futures.

2.3 Implementation Roadmap

The implementation of a future-oriented educational model for next-generation facility management (FM) professionals requires a structured and phased approach to ensure that learning outcomes, competency development, and operational relevance are achieved. The roadmap provides a systematic methodology that enables educational institutions, training providers, and industry partners to collaboratively design, test, refine, and institutionalize the curriculum as shown in figure 2. The process is organized into five phases: needs assessment and competency gap analysis, curriculum design with blended learning, pilot program execution, iterative refinement, and full-scale deployment (Faiz *et al*., 2024; Esiri *et al*., 2024). Each phase is designed to build progressively on the previous one, ensuring the model is both practical and responsive to industry needs.

The first phase establishes the baseline understanding of current FM educational offerings and professional skill requirements. This involves surveying industry stakeholders, analyzing job descriptions, and reviewing emerging trends in technology, sustainability, and global facility operations. Competency gap analysis identifies the core and advanced skills that existing curricula may not fully address, including digital literacy, smart building management, AI integration, sustainability planning, and cross-cultural leadership. The assessment ensures that the educational model is evidence-based and aligned with real-world operational requirements. By establishing a comprehensive picture of industry expectations and existing workforce capabilities, this phase lays the foundation for a curriculum that is both relevant and future-ready.

The second phase focuses on translating identified competencies into a structured curriculum. Blended learning approaches combine traditional classroom instruction with online modules, interactive simulations, and hands-on projects. Digital platforms facilitate access to learning resources, virtual labs, and collaborative exercises, while real-world projects provide experiential learning opportunities in live facilities or through industry partnerships. Modules are organized to integrate technical expertise, digital skills, sustainability principles, and leadership development, with clearly defined learning outcomes and assessment criteria. The curriculum design also emphasizes flexibility, allowing learners to progress at individualized paces while maintaining consistent competency standards (Ochulor *et al*., 2024; Babayeju *et al*., 2024). This phase ensures that educational content is immersive, applied, and aligned with both current and anticipated industry needs.

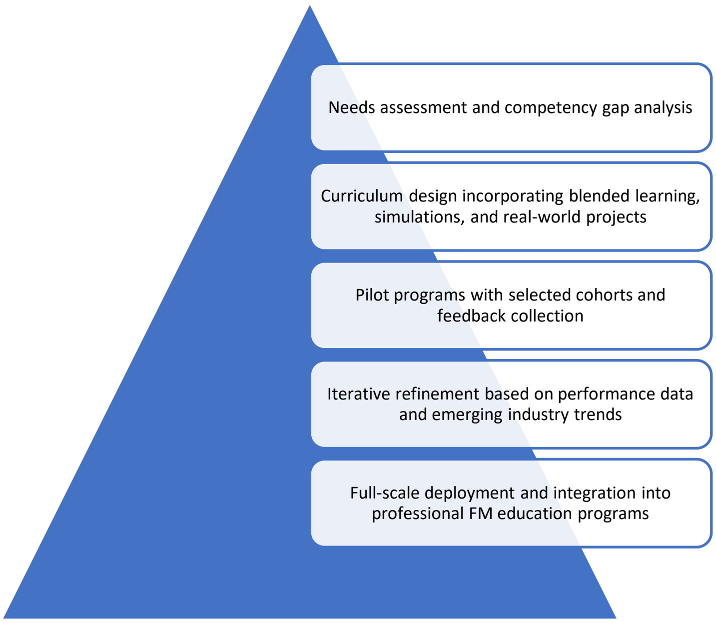

Figure 2: Implementation Roadmap

Pilot programs serve as the initial implementation of the curriculum, testing its effectiveness with selected learner cohorts. During this phase, participants engage in the full range of educational activities, including theoretical instruction, practical exercises, simulations, and project-based assignments. Feedback is collected through assessments, surveys, interviews, and performance evaluations to measure knowledge acquisition, skill mastery, learner engagement, and program applicability. Pilot testing provides critical insights into the curriculum’s practical feasibility, instructional effectiveness, and relevance to contemporary FM challenges. Any challenges, such as gaps in content coverage, technological limitations, or engagement issues, are identified for correction prior to wider deployment.

Following pilot implementation, the curriculum undergoes iterative refinement. Data-driven adjustments address identified gaps, enhance instructional strategies, and incorporate emerging technologies or industry developments. This phase ensures the model remains adaptive and responsive to changes in FM practices, regulatory requirements, and technological innovation. Regular updates may include integrating new smart building technologies, AI applications, sustainability frameworks, and global best practices (Jambol *et al*., 2024; Ukato *et al*., 2024). Iterative refinement strengthens the curriculum’s relevance, maintains learner engagement, and ensures that competency outcomes remain aligned with evolving industry standards.

The final phase involves the organization-wide deployment of the refined educational model. The curriculum is integrated into professional FM education programs, including university degrees, vocational training, and professional certification schemes. Comprehensive faculty training, resource allocation, and institutional support ensure consistent delivery and learner experience across multiple cohorts and locations. Mechanisms for continuous assessment, mentoring, and workplace integration are established to sustain skill development, evaluate performance, and promote career progression. Full-scale deployment ensures that next-generation FM professionals are systematically equipped with technical, digital, sustainability, and leadership competencies necessary for future-ready facility management.

The phased implementation roadmap provides a structured, evidence-based, and iterative approach to developing a future-oriented educational model for FM professionals. By progressing through needs assessment, curriculum design, pilot testing, iterative refinement, and full-scale deployment, the model ensures alignment with industry requirements, technological advancements, and global operational trends. This roadmap fosters the development of highly skilled, adaptable, and innovative FM professionals capable of navigating complex, sustainable, and technologically integrated facilities. Ultimately, it bridges the gap between current educational practices and the evolving demands of the global facility management industry, supporting professional excellence, operational efficiency, and strategic workforce development (Ochulor *et al*., 2024; Jambol *et al*., 2024).

2.4 Evaluation and Continuous Improvement

The effectiveness of a future-oriented educational model for next-generation facility management (FM) professionals relies not only on the design and delivery of the curriculum but also on rigorous evaluation and mechanisms for continuous improvement. Systematic evaluation ensures that learning objectives are achieved, professional competencies are developed, and graduates are prepared to meet evolving operational, technological, and strategic demands (Jambol *et al*., 2024; Ozowe *et al*., 2024). Continuous improvement, in turn, enables the educational program to remain relevant, adaptive, and aligned with industry best practices, emerging technologies, and regulatory changes.

Key performance indicators (KPIs) are central to evaluating educational outcomes and measuring the efficacy of training programs. Knowledge acquisition serves as a primary KPI, assessing the extent to which participants understand core technical principles, digital competencies, sustainability concepts, and regulatory requirements. Skill mastery evaluates the ability of learners to apply theoretical knowledge in practical scenarios, including facility operations, project management, and safety compliance. Adaptability is another crucial metric, reflecting participants’ capacity to respond effectively to emerging technologies, operational challenges, and dynamic workplace conditions. Professional readiness assesses overall preparedness for career responsibilities, encompassing technical competence, leadership capabilities, ethical decision-making, and collaborative effectiveness. By systematically tracking these KPIs, program designers can quantify learning outcomes, identify gaps, and make data-driven adjustments to enhance educational impact.

Post-program assessments, mentorship, and workplace performance tracking constitute additional mechanisms to ensure competency development and professional integration. Post-program assessments, including practical examinations, project simulations, and scenario-based exercises, provide immediate feedback on knowledge retention and application. Mentorship programs support continuous professional growth, pairing learners with experienced FM practitioners who offer guidance, share insights, and facilitate reflective learning. Workplace performance tracking extends evaluation into real operational contexts, monitoring how graduates perform in day-to-day facility management activities, apply best practices, and demonstrate leadership and problem-solving skills. Collectively, these mechanisms bridge the gap between formal education and practical performance, ensuring that theoretical learning translates into measurable professional competency and operational excellence (Ozowe *et al*., 2024; Ukato *et al*., 2024).

Continuous updates to the educational model are essential for maintaining relevance in an evolving field. Integration of emerging technologies, such as IoT, AI, digital twins, predictive analytics, and facility automation, ensures that graduates are equipped with contemporary tools and digital literacy required for modern FM practice. Regulatory changes, including updates to safety, environmental, and sustainability standards, must be incorporated into curricula to maintain compliance and professional credibility. Additionally, global best practices, benchmarking data, and industry innovations should inform curriculum design, enabling learners to adopt strategies proven effective in diverse operational contexts. Continuous updates also support scenario-based learning and adaptive problem-solving, preparing graduates to navigate uncertainty and lead organizational adaptation in complex FM environments.

The synergy between KPIs, post-program assessments, mentorship, workplace tracking, and continuous updates fosters a culture of evidence-based evaluation and iterative improvement. By systematically monitoring learning outcomes, identifying gaps, and integrating feedback, educational programs can enhance the relevance, rigor, and practical applicability of training for facility management professionals. This iterative approach also strengthens professional readiness, ensuring that graduates possess not only technical competence but also adaptability, leadership capability, and strategic insight required to meet current and future FM challenges (Ukato *et al*., 2024; Ozowe *et al*., 2024).

Evaluation and continuous improvement are integral to the effectiveness of future-oriented educational models for facility management. KPIs provide measurable indicators of knowledge acquisition, skill mastery, adaptability, and professional readiness, while post-program assessments, mentorship, and workplace performance tracking ensure translation of learning into practical competency. Continuous updates integrating emerging technologies, regulatory developments, and global best practices maintain curriculum relevance and industry alignment. By embedding these mechanisms into educational design, institutions can produce highly competent, adaptable, and forward-looking facility management professionals capable of achieving operational excellence, advancing sustainability, and driving innovation in an increasingly complex and dynamic sector.

2.5 Expected Outcomes

The implementation of a future-oriented educational model for next-generation facility management (FM) professionals is designed to generate a spectrum of outcomes that are tangible, intangible, and strategic in nature. By integrating advanced technical instruction, digital literacy, sustainability practices, leadership development, and experiential learning, the model aims to produce highly skilled, adaptable, and innovative professionals capable of addressing the complex and evolving demands of contemporary and future facility operations (Ozowe *et al*., 2024; Ochulor *et al*., 2024). These outcomes collectively demonstrate the value of a structured, forward-looking educational framework in fostering professional excellence, operational efficiency, and industry-wide impact.

Tangible outcomes represent measurable skills, competencies, and capabilities acquired by graduates of the program. One of the primary outcomes is the development of advanced technical competencies, including expertise in building systems, energy management, health and safety compliance, predictive maintenance, and sustainability integration. Graduates also gain digital proficiency, encompassing smart building technologies, Internet of Things (IoT) applications, Building Information Modeling (BIM), artificial intelligence (AI)-assisted operations, and data analytics. Leadership competencies are similarly enhanced, equipping professionals with project management, strategic decision-making, cross-cultural communication, and team coordination skills. Collectively, these tangible outcomes ensure that graduates are operationally ready to manage complex, technology-driven facilities with a high level of proficiency.

Intangible outcomes encompass the cognitive, behavioral, and cultural attributes developed through the educational model. Enhanced problem-solving capabilities enable graduates to analyze complex operational scenarios, identify risks, and implement effective solutions. The curriculum fosters an innovation mindset, encouraging creative approaches to facility management challenges, adoption of emerging technologies, and continuous improvement in operational processes. Professional confidence is also strengthened through experiential learning, simulations, and real-world projects, which expose learners to practical challenges and decision-making responsibilities. These intangible outcomes contribute to graduates’ ability to navigate dynamic work environments, collaborate effectively across multidisciplinary teams, and demonstrate initiative in addressing operational and strategic challenges.

The strategic outcomes of the educational model relate to long-term organizational, industry, and global impacts. A highly adaptable workforce is cultivated, capable of responding to technological advancements, regulatory changes, sustainability imperatives, and evolving organizational goals. This adaptability enhances operational efficiency across facilities, as professionals can implement optimized processes, leverage digital solutions, and integrate best practices in a variety of contexts. Furthermore, the development of globally competent FM professionals contributes to international recognition of professional standards and practices, facilitating cross-border collaboration, knowledge sharing, and adherence to global benchmarks in facility management. Strategic outcomes also include strengthening the reputation of educational institutions and industry partners, positioning them as leaders in professional development and innovation in the FM sector (Esiri *et al*., 2024; Ozowe *et al*., 2024).

The interplay of tangible, intangible, and strategic outcomes reinforces the overall effectiveness of the educational model. Tangible competencies provide the foundation for practical performance, intangible skills enhance adaptability and creativity, and strategic outcomes ensure that individual competencies translate into organizational and industry-wide value. This integration ensures that graduates are not only technically proficient but also capable of leadership, innovation, and cross-functional collaboration, aligning professional development with the broader objectives of facility management in a rapidly evolving global landscape.

The expected outcomes of a future-oriented educational model for next-generation FM professionals encompass a balanced spectrum of tangible skills, intangible capabilities, and strategic contributions. Graduates emerge with advanced technical, digital, and leadership competencies; enhanced problem-solving abilities, innovation mindset, and professional confidence; and the capacity to drive operational efficiency, adaptability, and global recognition in the FM industry. These outcomes collectively underscore the importance of forward-looking education in preparing a highly skilled, resilient, and versatile workforce equipped to meet the evolving challenges of modern and future facility management, ultimately advancing professional standards, operational excellence, and industry innovation (Ogedengbe *et al*., 2024; Esiri *et al*., 2024).

CONCLUSION

The development of a future-oriented educational model for facility management (FM) professionals is essential in preparing a workforce capable of navigating the increasing complexity, technological sophistication, and sustainability demands of contemporary facility operations. By integrating core technical knowledge, digital competencies, leadership skills, sustainability principles, and professional ethics, such a model ensures that FM practitioners are not only operationally competent but also strategically and ethically equipped to drive organizational success. The structured curriculum, combined with mechanisms for evaluation and continuous improvement, establishes a framework that aligns professional development with evolving industry needs, fostering workforce readiness and operational excellence.

The benefits of implementing this model extend across multiple dimensions. Workforce readiness is enhanced as graduates acquire a balanced combination of technical expertise, digital literacy, and leadership acumen, enabling them to manage facilities efficiently, respond adaptively to emerging challenges, and implement innovative solutions. Professional excellence is promoted through competency-based training, mentorship, and performance tracking, ensuring that practitioners uphold high standards of operational reliability, safety, and ethical conduct. Moreover, the model facilitates innovation adoption, equipping professionals with the skills to leverage AI, predictive analytics, and smart facility technologies to optimize operations, reduce costs, and enhance sustainability outcomes.

Looking ahead, the evolution of FM education will be shaped by emerging pedagogical technologies and global collaboration. AI-assisted learning can personalize instruction, track progress, and predict competency gaps, enhancing learner outcomes. Virtual and augmented reality simulations offer immersive, experiential training environments that replicate complex operational scenarios, improving skill application and problem-solving. Global collaborative education platforms can facilitate knowledge exchange, benchmarking, and cross-cultural learning, preparing professionals to operate effectively in increasingly international and interconnected FM contexts. Collectively, these innovations position the educational model as a dynamic, adaptive, and forward-looking framework, capable of producing highly competent, innovative, and resilient facility management professionals ready to meet the challenges of the 21st-century built environment.

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