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Research Article/ Review Article/ Perspective Article (Remove where relevant)

Identification of Challenges in the Application of Artificial Intelligence in Facility Management and Highlighting Optimization Potentials

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Abstract

Artificial Intelligence (AI) and data collection in facility management bring a variety of improvements, such as increased efficiency, cost control, enhanced user experiences, and more. With targeted data management, this information can be further processed and contribute to the sustainable operation of buildings. AI currently presents several challenges that prevent its optimization potential from being fully realized. These challenges can be specified across various data domains, such as data quality, data security, and more. Additionally, legal aspects, such as the collection of user data and the associated legal restrictions, play a significant role. A systematic literature review was conducted to identify the potential for the application of AI in facility management (FM). In addition, a market analysis was carried out to determine how many AI applications are already being used in the market.

To identify and address these challenges, an Ishikawa diagram is created. The Ishikawa diagram is used to systematically analyze possible problems. This method helps visualize connections, prioritize causes, and identify approaches to solutions. During its application, the problems are first defined, and their impacts are analyzed. Subsequently, the main categories of causes are determined, such as people, machines, methods, and so on. Afterward, the causes are identified through brainstorming, followed by an analysis of these causes. Based on this analysis, appropriate measures can be derived. These measures may include avoidance, mitigation, acceptance, and transfer.

The results are then used to eliminate or minimize the causes of the challenges. The results and corresponding measures are documented and reviewed to determine whether the problem can be resolved or reduced. The outcomes are presented in the form of a table, linked with the respective measures, and the proposed solutions are outlined.

Keywords: Facility Management (FM), Artificial Intelligence (AI), Literature Review, Ishikawa diagram, Risk allocation

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Highlights

- Overview of the most relevant applications and use cases of Artificial Intelligence in Facility Management
- Market analysis of current applications of AI in facility management (FM)
- Presentation of a Ishikawa diagram regarding the lack of application of AI in FM
- Presentation of how to respond to and manage risks resulting from Artificial Intelligence in Facility Management

1 Introduction

The usage phase of a building represents the most cost-intensive phase of a property's lifecycle, accounting for around 60-80% of total life cycle costs (Ibn-Mohammed, Greenough, Taylor, Ozawa-Meida, & Acquaye, 2013; Marocco & Garofolo, 2021). Furthermore, this phase is crucial in terms of the building's efficiency and sustainability. To optimize both costs and sustainability, efficient facility management (FM) during the usage phase is essential.

According to DIN EN 15221, FM is divided into strategic, tactical, and operational levels (DIN Deutsches Institut für Normung, 2007). Although the norm is actually partly withdrawn, the structure is commonly used (Talamo & Atta, 2019). Particularly at the strategic level, the goal is to manage processes optimally for users and owners. In order to reduce costs and increase building efficiency, new ideas and concepts are continually being developed at the strategic level to optimize the tactical and operational service delivery for a building. For example, decisions might include the use of cleaning robots to save human resources, which in turn can lead to long-term cost savings (Zhang & others, 2021).

Currently, the use of Artificial Intelligence (AI) is especially in focus in strategic FM discussions (Scaife, 2024). The potential deployment of AI in FM is being actively discussed by companies and associations, with the goal of identifying suitable application areas (Association for Real Estate and Facility Managers, 2025). To apply AI effectively, appropriate training data and a functioning process are required. Due to fragmented data landscapes—caused by various service providers or different software tools—this is currently difficult to implement. Moreover, many FM companies still lack the capability to handle AI and digital tools comprehensively or have problems with personal data privacy, what leads to a low maturity level of AI in FM (Martinez & others, 2021; Pedral Sampaio, Aguiar Costa, & Flores-Colen, 2022). Therefore, beyond the use of language models, the industry shows a clear need for improvement (Wills & Bartels, 2023).

However, particularly larger companies with access to extensive building data hold the potential to train AI systems. This can provide advantages in service delivery and serve as a basis for broader deployment across the industry, including for SMEs. For AI to contribute meaningfully to efficiency, cost-effectiveness, and sustainability, it needs to be implemented widely across the sector.

First, the research questions and methodology are presented. Then, the possible application areas of AI in facility management (FM) are outlined. This is followed by a market analysis to identify which application areas already utilize AI.Based on this, specific research questions are derived, challenges are identified using an Ishikawa diagram, and potential measures to reduce these challenges are developed. Finally, the results are summarized and conclusions are drawn.

2 Research Questions and Methodology

Despite the numerous potentials of AI in Facility Management, its application is still far from widespread. This raises the following research questions:

- What are the current challenges in the application of AI in Facility Management?
- What measures can be taken to reduce these challenges?

The methodology is outlined in the following chapters.

2.1 Literature Review

A literature review was conducted to identify the application areas of AI in FM. This is especially important in order to derive corresponding challenges from these fields. The literature review was carried out between January 2025 and March 2025. Publications from various academic databases—particularly Google Scholar and Scopus—were analyzed. Additionally, contributions from specific professional conferences such as EuroFM were considered. The following search strings were used:

- Facility Management AND Artrificial Intelligence
- Facility Management AND Machine Learning
- Facility Management AND Large Language Model
- Facility Management AND Natural Language Processing
- Facility Management AND Internet of Things
- Facility Management AND Big Data

The literature was then analyzed to identify AI application areas in FM. To categorize and structure these application areas, they were clustered according to the withdrawn—but still widely used—DIN EN 15221 standard "Facility Management – Part 1: Terms." The classification was based on the following levels: strategic, tactical, and operational:

- The strategic level includes long-term planning, goals, and concepts.
- The tactical level focuses on medium-term planning, processes, and control.
- The operational level involves daily operations and the execution of tasks.

2.2 Market Analysis

In addition, a market analysis was conducted using Google as the search engine. The current state was recorded, and it was examined which AI methods are already being applied in FM.

The following search strings were used:

- AI application AND facility management
- Facility management AND AI
- AI AND services in facility management
- AI AND services in strategic facility management
- AI AND services in tactical facility management
- AI AND services in operational facility management

The results were presented in the form of a radar chart.

2.3 Ishikawa Diagram

The Ishikawa diagram resembles a fishbone. The main causes are drawn along diagonal lines that lead to the central spine of the "fish," which ends in the identified problem or effect. (Ishikawa, 1981) The procedure for using an Ishikawa diagram follows a standard approach (Blodyk, 2018):

1. Definition of the problem or effect: This is noted at the right end of the diagram—the "head of the fish."
2. Determination of the main causes: Typically, four to six main causes are selected, often based on the 6M method, which includes the following categories:
   - People
   - Machines

- Material
- Methods
- Measurements
- Environment

3. Detailed collection of causes: Specific causes are gathered for each category and entered on the smaller “bones” of the diagram. Additional subcategories may be added as needed.
4. Identification of critical causes: Various methods are used to determine the key causes:
   - 5-Why Method: Repeatedly asking “why?” (typically five times) to get to the root cause.
   - Pareto Analysis: Based on Vilfredo Pareto’s 80/20 principle—80% of effects come from 20% of causes. Uses frequency distributions.
   - Brainstorming: Originally developed by Alex F. Osborn in the 1940s, this is a group creativity technique.

For this paper, a hybrid method combining Pareto analysis and brainstorming was used. The challenges were first identified by the authors through brainstorming. They were then qualitatively arranged by estimated frequency: the more likely a challenge, the closer it was positioned to the “spine” of the fish.

2.4 Measures for Risk Management

Building upon the identified causes, suitable solutions and actions are derived to address the root problems. According to ISO 31000, four general strategies for risk management can be applied in organizations, projects, or enterprises. In this context, the focus is placed not on the term "risk" itself but rather on the concrete measures. (Becker, Friedinger, & Sander, 2024)

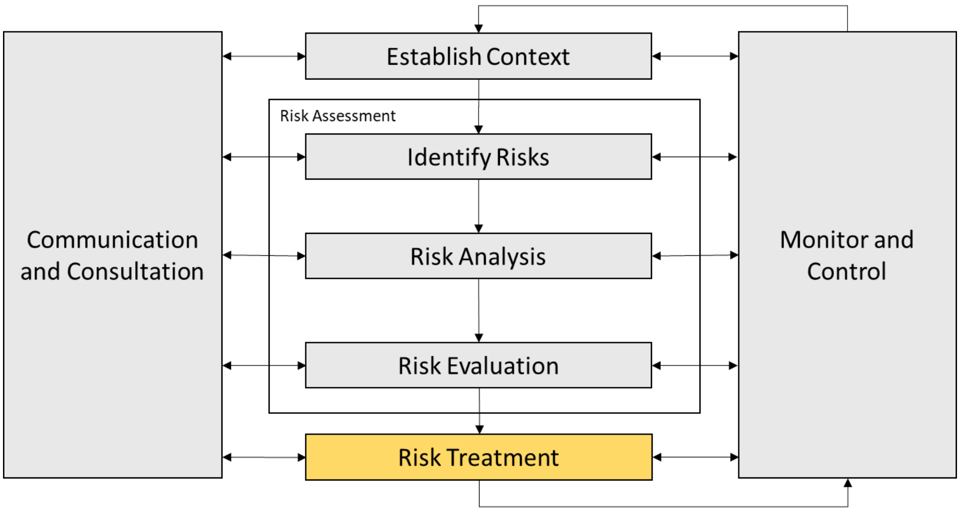

Figure 2. Risk Management according to DIN 31000 (DIN ISO 31000)

Following, the measures for managing the risks will be described (Becker, Friedinger, & Michal, Maja, Sander, Philip, 2024):

- Avoidance: The risk is entirely eliminated by not carrying out the activity that involves risk.
- Mitigation: The likelihood or impact of the challenge is reduced.
- Transfer: The financial or operational risk is shifted to third parties.
- Acceptance: The risk is tolerated without initiating any countermeasures.

Figure 3 qualitatively illustrates how a risk can be reduced through risk management measures. On the left-hand side of the figure, risks are shown before the measures, and on the right-hand side after. The

Risk (R) decrease as a result of the risk treatment—although the measures themselves may also incur costs.

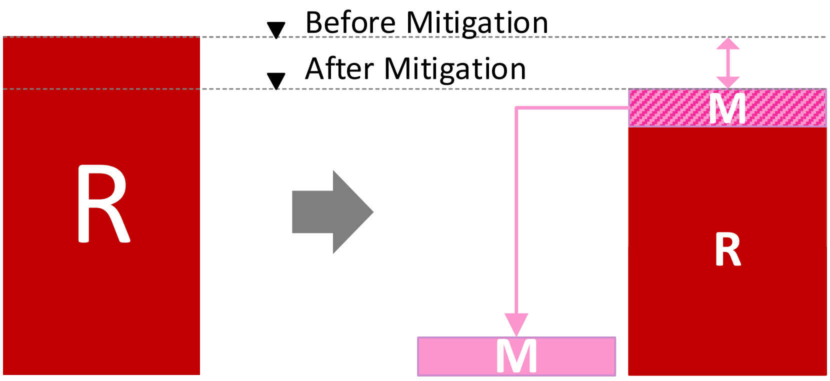

Figure 3. Risk reduction through risk management measures (Becker, Friedinger, & Michal, Maja, Sander, Philip, 2024)

When choosing the appropriate strategy, the cost-benefit ratio must always be considered to ensure economic viability.

3 Application Areas of AI in FM

Based on the literature review, eight overarching application areas were identified, as shown in Figure 1. First, the use cases cited in the literature were clustered to create an overview. The application areas were then assigned to the respective FM levels. In some cases, they apply across strategic, tactical, and operational levels.

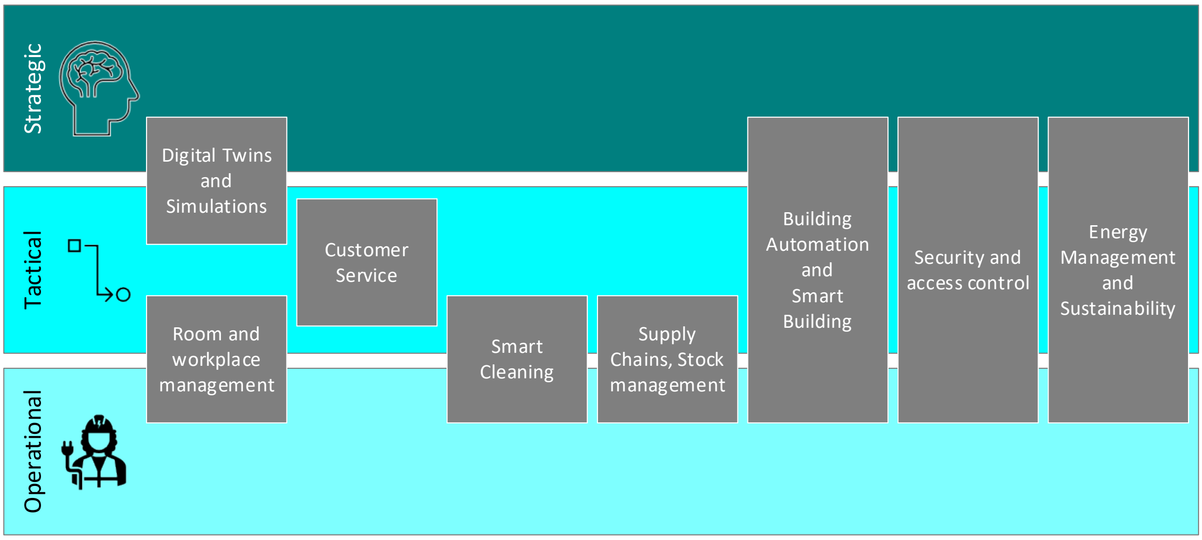

Figure 1. Application Areas of AI in FM

The individual application areas are listed below according to the levels that relate to artificial intelligence.

3.1 AI on strategic FM level

The strategic level of FM deals with long-term planning and resource allocation in close coordination with the building's stakeholders. The internal and external goals of the organization are considered, with the building serving as a secondary process to support these goals.

The following potential use cases for the strategic level are derived from the literature review, with a focus on energy management and sustainability, digital twins and simulations, and building automation and smart buildings, as these are central to achieving efficiency and sustainability.

Table 1. Application Areas on strategic FM level, based on: (J. C. P. Cheng & others, 2017; Y. Gao & others, 2021; Han & others, 2019; Huang & others, 2020; Koch & others, 2020; Tushar & others, 2020; Y. Zhao & others, 2021)

Category	Possible Applications
Energy Management and Sustainability	• CO_2 reduction: AI helps develop sustainable operational strategies and reduce emissions. • Integration of renewable energies: AI can efficiently control electricity generation and consumption from solar or wind energy. • For future neighborhood or campus solutions in the context of UrbanFM, AI forms the basis for load management and energy storage.
Digital Twin and Simulations	• Virtual building representations: AI can run simulations for various scenarios. • Predictive analytics: AI can detect developments and risks early. • The digital twin of the building, with models and IoT data, serves as the sole foundation for FM and can be used as training data for AI.
Building Automation and Smart Building	• Predictive maintenance: AI analyzes sensor data to identify maintenance needs early and prevent failures (e.g., anomaly detection). • User guidance based on data enables optimal space utilization. • Comfort-based user profiles can be stored and used for room control (considering GDPR). • Refurbishment and new construction decisions can be made based on data; AI may reveal additional potentials.

3.2 AI on tactical FM level

The tactical level connects the strategic and operational levels in facility management. It involves medium-term planning and the management of facility services.

At this level, AI use cases that focus on process optimization are particularly relevant. All eight categories identified in the literature review are applicable here, making the tactical level a crucial lever for AI deployment. It's important to note that many use cases are interconnected—without synergy, the costs for sensors, cloud infrastructure, and hardware may be too high.

Table 2. Application Areas on tactical FM level, based on (Bordass & others, 2020; W. Gao & others, 2020; Gupta & others, 2021; Kuester & Kastner, 2024; Seal, 2024; Tian, Liu, Huang, & Tang, 2024; Q. Zhao & others, 2020)

Category	Possible Applications
Space and workplace management	• Space optimization: AI evaluates booking data to improve space usage, especially for meeting rooms and shared areas. • Hot-desking and desk reservations: AI-supported apps help employees reserve workspaces efficiently. • Based on space usage, systems (e.g., HVAC) can be optimized—unused areas may not need to be heated or cooled. • AI supports the assessment of whether mobile working makes sense. By evaluating attendance and occupancy rates, it can provide a basis for incentives to work from home or at the office.
Smart Cleaning and Hygiene	• Demand-based cleaning: Sensors and AI analytics optimize cleaning intervals, reducing costs. • Hygiene monitoring: AI detects and reports contamination or poor disinfection based on factors like movements and usage. This is especially useful when combining parameters (e.g., weather data and entrance movement during winter to track salt entry).
Supply Chain and Inventory Management	• Optimized logistics planning: AI analyzes transportation and delivery processes, e.g., elevator usage times for maintenance outside peak hours or equipment transportation. • Automated ordering and inventory: AI automatically reorders supplies and spare parts using predictive models to minimize stock and storage costs.

Artificial Intelligence in Customer Service	• User satisfaction analysis: AI analyzes feedback to improve service quality. • Automated ticket management: AI prioritizes and processes maintenance requests. A training phase is required to ensure optimal prioritization, especially in critical areas like hospital operating rooms.
Security and Access Control Systems	• Automatic hazard detection: AI identifies fires, smoke, or intrusions early through sensors like motion detectors, improving FM security service operations.

3.3 AI on operational FM level

The operational level covers the day-to-day supervision and maintenance of buildings, facilities, and infrastructure.

Here, various AI use cases exist, though they are largely dependent on the strategic and tactical levels, which define the framework and requirements for actual implementation at the object level.

Table 3. Application Areas on operational FM level, based on: (Bordass & others, 2020; J. Cheng & others, 2020; Gupta & others, 2021; Jiang & others, 2020; Jin & others, 2020; Kim & others, 2020; Kumar & others, 2020; Liu & others, 2021; Wang & others, 2021; Zhang & others, 2021; Q. Zhao & others, 2020)

Category	Possible Applications
Building Automation and Smart Building	• Intelligent HVAC systems: AI optimizes energy use in real time based on weather conditions and occupancy. • Automated lighting control: AI-driven sensors adjust lighting intensity according to the time of day and occupancy. • AI can assist in system balancing during commissioning and highlight optimization potential.
Security and Access Control Systems	• Facial recognition and biometric access: AI-based security solutions enhance access control. • Intelligent video surveillance: AI automatically detects unusual movements or safety risks.
Smart Cleaning and Hygiene	• Autonomous cleaning robots: AI-guided robots clean buildings efficiently based on usage, weather, and contamination. • Future literature points to potential AI-based image analysis that can recommend optimal cleaning agents for specific surfaces.
Space and Workplace Management	• Enhanced employee comfort: AI can personalize temperature, lighting, and air quality. • Note: This requires the collection of personal data, so GDPR compliance must be ensured.
Supply Chain and In-ven-tory Management	• Predictive maintenance: AI detects potential failures early and recommends maintenance actions (e.g., for elevators). • AI-optimized ordering of consumables based on usage data.
Digital Twin and Simulations	• Real-time monitoring: Digital twins collect sensor data to optimize operations. • Refurbishment scenarios can be simulated in advance with AI.
Artificial Intelligence in Customer Service	• Chatbots and virtual assistants: AI answers questions about FM services and resolves common issues. • AI systems can be deployed at reception areas to welcome guests.

In the next step, the market study was conducted.

4 Status Quo based on Market Research

The search strings had already been defined beforehand. The key results are listed in the table below.

The comprehensive table lists companies worldwide that develop or use AI in facility management. It includes both traditional FM service providers and technology or software companies offering AI-powered FM solutions. Each entry contains the company name, location, industry, type of AI application in

FM, the corresponding search string, and the source.Table 4. Application Areas on operational FM level, based on:

Company	Location	Sector	Type of AI application	Search String	Quelle
Mitie	United Kingdom	Facility Management Services	Predictive maintenance, intelligent cleaning, security analytics, carbon monitoring	Facility management and AI	(Mitie, 2025)
ISS	Denmark (Global)	Facility Managemen t Services	AI-powered connected workplace, hybrid work optimization	AI and services in facility management	(ISS, 2024)
JLL	United States (Global)	Real Estate & FM Services	Generative AI for portfolio insights, leasing visualization, sustainability analysis	AI application and facility management	(Burns, 2023)
CBRE	United States (Global)	Real Estate & FM Services	AI platform for predictive maintenance and workflow optimization	AI and services in operational facility management	(CBRE, 2025)
Cushman & Wakefield	United States (Global)	Real Estate & FM Services	Enterprise-wide generative AI for facility decision-making	AI and services in strategic facility management	(Rooney, 2023)
Sodexo	France (Global)	Facility Management & Food Services	AI-driven service robots in healthcare facility operations	AI and services in operational facility management	(Businesswire, 2023)
BrainBox AI	Canada	PropTech (Building AI Solutions)	AI-powered assistant for HVAC and lighting optimization	AI application and facility management	(Burns, 2024)
IBM (TRIRIGA)	United States	Technology (IWMS Software)	AI for predictive maintenance, space utilization, and virtual assistants	AI and services in strategic facility management	(Örarbäck, 2023)
Honeywell (Forge)	United States	Technology (Building Automation)	ML for energy optimization and AI analytics for security	AI and services in tactical facility management	(Örarbäck, 2023)
Siemens (Building X)	Germany	Technology (Building Infrastructure)	AI-driven insights for energy, space, and emissions management	AI and services in strategic facility management	(Siemens, unknown)
Johnson Controls (OpenBlue)	Ireland / USA	Technology (Building Infrastructure)	Generative AI for autonomous building and energy controls	AI and services in operational facility management	(Johnsoncontrols, unknown)
ServiceChannel	United States	Technology (FM Software)	Prescriptive analytics for contractor and work order automation	AI and services in tactical facility management	(Servicechannel, unkown)
Spacewell	Belgium	Technology (Smart Building Software)	AI-powered energy and occupancy management	Facility management and AI	(Spacewell, unkown)
Facilio	United States / India	Technology (Property O&M Software)	Cloud-based AI for predictive maintenance and workflow automation	AI and services in facility management	(Facilio, unkown)
MRI Software	United States	Technology (IWMS/PropTech)	AI for space optimization, maintenance, and energy management	AI and services in tactical facility management	(Mrisoftware, unkown)

Each of the above companies has a concrete AI-related application or offering in the FM domain, as evidenced by the sources. The information is current (primarily from 2023–2024) and illustrates how AI is being leveraged in strategic, tactical, and operational facets of facility management.

In some cases, an in-depth insight into the AI solutions could not be obtained. The authors assume that the manufacturers or reporters have presented the information truthfully.

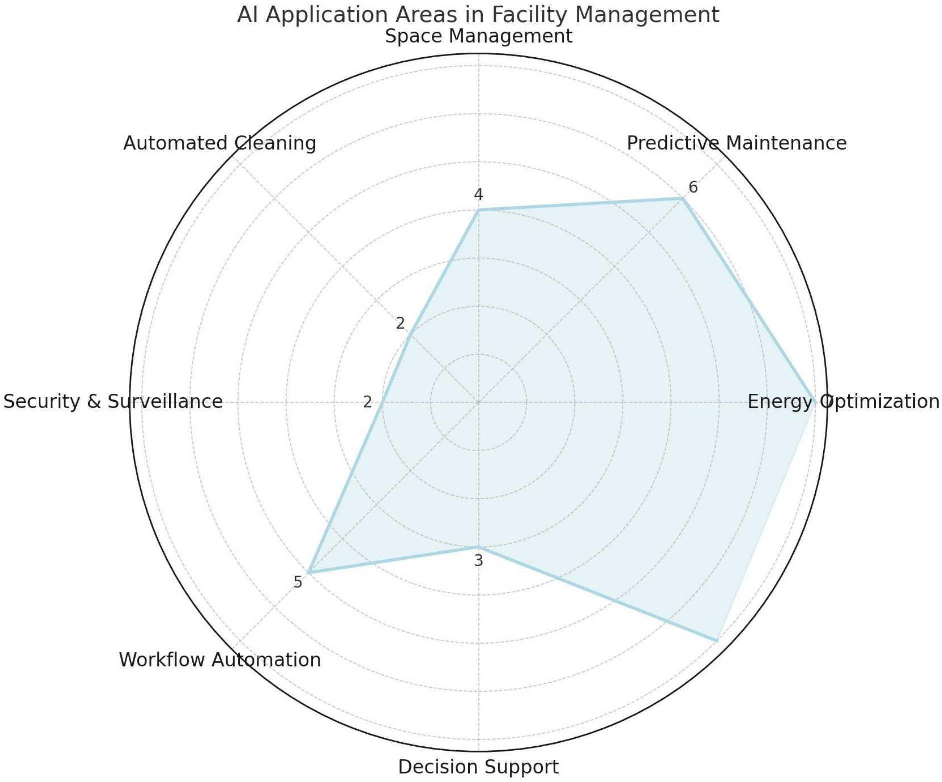

Figure 4. Radar chart of AI applications in FM

The diagram shows how AI applications in facility management are distributed across various task areas:

- Energy optimization is the most common area of application. Companies use AI to analyze and control HVAC systems, lighting, and CO_2 emissions.
- Maintenance is also strongly represented, especially in the form of predictive maintenance, which reduces failures and lowers operating costs.
- Workflow automation closely follows, for example through AI-powered service platforms and assistants.
- Space management is also made more efficient by AI, such as through the analysis of occupancy data.
- Security and cleaning applications are less common but growing, often relying on image analysis or autonomous robots.

5 Analysis

Following the method described above, challenges were identified using the 6M method. These challenges are represented in Figure 4 and are described briefly below.

5.1 Identified Challenges Using the 6M Method

The figure 4 visualizes the challenges derived both from the literature review and the authors' own evaluations. At this point, the results are not discussed further in detail.

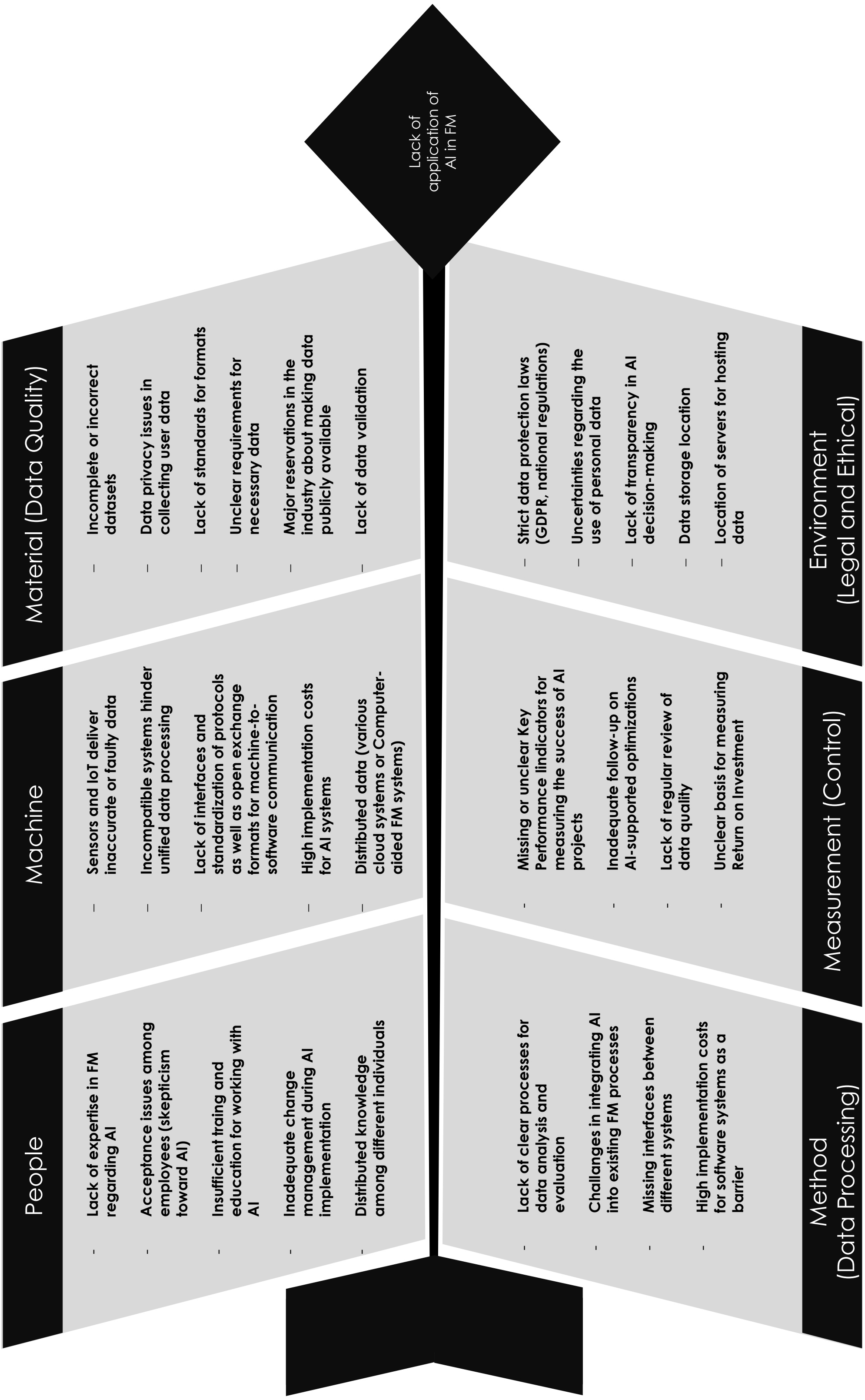

Figure 5. Ishikawa diagram regarding the lack of application of AI in FM

5.2 Derived Measures from the Identified Challenges

Table 5 presents the 6M categories, specific causes, recommended measures, and a brief explanation for each. The overall conclusion is that none of the identified challenges can be completely avoided. On the one hand, this is because technological limitations continue to exist and, on the other, because the human factor always plays a role and cannot be completely excluded or "eliminated". As a detailed description of all causes would exceed the scope of this section, two exemplary causes will be explored at this point in order to better clarify the approach and improve understanding of the methodology. The following table shows examples from the six factors.

Table 5. Measures for avoiding risks

No	6 M	Cause	Measure	Beschreibung
1	People	Lack of knowledge about AI technologies	Mitigation	Employee training programs
2	People	Resistance to AI integration	Mitigation	Change management initiatives
3	Machine	Outdated infrastructure	Acceptance/Avoidance	Investment in modern technologies
4	Machine	Lack of system interoperability	Avoidance	Define standards and interfaces
5	Method	Absence of AI strategies	Mitigation	Develop a company-wide AI strategy
6	Material	Inaccurate or faulty sensor data	Mitigation	Quality control of data sources
7	Measurement	Lack of KPIs for evaluation	Transfer	Develop KPI systems
8	Environment	Data protection regulations	Acceptance	Ensure GDPR compliance
9	Environment	Cybersecurity risks	Mitigation/Acceptance	Implement IT security measures

Point number 1 could be addressed by actively training employees in the use of AI, showing them its potential, and helping them understand the added value it can bring to them or the company. To achieve this, the technical fundamentals should first be clarified, followed by an introduction to the areas of application—using examples or working groups that develop solutions collaboratively.

Point two—the resistance to AI integration—can partly be explained by employees' fear of losing their jobs, but also by the lack of knowledge mentioned in point one. To address this, a change management process should be introduced that guides employees through the seven psychological phases. Only when emotional acceptance is achieved can AI be successfully implemented within the company. This requires coaches who can effectively convey these changes to the employees.

Point number three in Table 4 represents the outdated infrastructure. Infrastructure here refers in particular to modern building automation, sensors and actuators that produce data in the building. This challenge is particularly common in existing buildings. In new buildings, the relevant information technology can be integrated directly into the structure. However, it is also important to select suitable and open protocols so that they can be used throughout the entire utilization phase. Complete avoidance of this challenge is only possible to a limited extent. It must primarily be accepted, unless targeted investments are made in existing buildings in order to integrate new technologies and enable their use. This can at least reduce the challenge. However, as the use phase of buildings usually extends over several decades, it cannot be guaranteed that data can be processed until the end of the operation & maintenance phase.

Point 4 represents a current challenge for companies. To address this, a unified data basis and standardized interfaces need to be established so that data can be properly prepared and efficiently integrated into the company.

Number five in Table 4 cites the lack of an AI strategy. This challenge can be mitigated by introducing a company-wide AI strategy. A long-term strategy ensures that the company implements AI in a gradual and meaningful way, with a clear timeframe for integration. However, with the introduction of an AI strategy, it is necessary for FM companies to hire employees to implement it. In addition to data analysts, people for change management, facility information management, IT specialists and system integrators are particularly necessary (Bartels & Wills, 2023). Due to the lack of transparency with regard to the return on investment, a clear definition of the goals, use cases and success criteria of the AI strategy is necessary against the background of the initial investment in the AI strategy.

Number six—*inaccurate or faulty sensor data*—is a major challenge at the beginning of AI implementation. This is simply associated with a lot of effort, as data first needs to be collected and compared in order to exclude faulty measurements and then develop a reliable learning process. It is important to start by collecting small amounts of data and testing them directly. In addition, data that is not needed should not be documented unnecessarily.

The lack of KPIs for evaluation, as mentioned in point seven, is a typical issue. This occurs especially often when such systems have not yet been implemented in a company. To avoid this, measurements must first be carried out (over a longer period, e.g., 3–6 months) in order to develop suitable KPIs. It is also possible that these KPIs will need to be adjusted again after two years. This is an iterative process that can take a considerable amount of time.

Point eight is a common issue in the context of AI application. Data protection regulations generally need to be adapted to allow the collection of building and user data. However, this sensitive topic will not be discussed further in this context. Both technical experts and legal professionals must work together to enable potential adjustments and thus achieve more efficient processes in facility management.

Cybersecurity is an important aspect, especially in connection with user data. The data must be adequately protected to prevent misuse. To achieve this, companies must implement appropriate technical measures, such as firewalls, and also ensure that employees are properly trained to protect against cybercrime.

6 Conclusion

After the analysis has been carried out, the research questions will first be answered and then a conclusion and a brief outlook will be given.

6.1 Answering the research questions

Research Question 1: What challenges currently exist in the application of AI in Facility Management?

> The challenges that arise from the use of Artificial Intelligence (AI) in Facility Management (FM), as presented in section 5.1, were identified using the 6M method. It is clear that many difficulties are due to technical limitations as well as human willingness to use AI. Another key factor is data quality, as a reliable data foundation is essential for the successful use of AI. Additionally, the legal and ethical environment (milieu) plays a crucial role in implementation. If legal restrictions, cybersecurity requirements, and other constraints are not taken into account or adhered to, AI cannot be successfully implemented in FM.

Research Question 2: What measures can be taken to reduce these challenges?

> In considering the possible measures, it is evident that many challenges can be mitigated. Risk transfer is only possible in certain areas, such as through Key Performance Indicators, but only to a limited extent. Particularly with regard to challenges like data protection regulations and security risks, direct changes are often not feasible. Legal risks must, in many cases, be accepted, as they are defined by statutory requirements. Even with cyberattacks, there is always a residual risk that can never be fully eliminated.

In summary, the successful application of AI in Facility Management can be achieved especially when:

- Employees are appropriately trained and have a positive attitude toward using AI, supported by professional change management.
- The company has sufficient high-quality training data to use AI systems effectively.
- A clear strategy with defined goals and use cases is pursued.

6.2 Final conclusion

It is clear that AI has enormous potential for application in the field of facility management. However, the market analysis also shows that there are still relatively few actual AI applications in facility management. To advance this further, measures such as those described in Table 5 must be implemented to increase acceptance.

Using the Ishikawa diagram, the key challenges in the use of Artificial Intelligence (AI) in Facility Management (FM) were analyzed. The identified causes were categorized according to the 6M method, and appropriate measures to reduce these challenges were proposed.

By applying suitable measures, the potential of AI in FM can be further exploited, reducing or, in some cases, even fully addressing existing challenges. However, this does not mean that new challenges may not arise from the increased use of AI in FM.

Furthermore, it should be noted that the adoption of certain measures may bring additional challenges. The present analysis is based on a literature review. In the next step, it is necessary to apply the findings in practical projects for validation, or to conduct expert interviews to further validate the results. Due to the current implementation status of AI, this is not yet fully possible.

Moreover, it will be necessary in the future to analyze the implemented AI projects in terms of goal achievement and company satisfaction. For this, further studies in conjunction with practice are required, outside the scientific environment in which the previous research results were created.

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Data can be accessed from the authors.

Conflicts of Interest
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