Tech Roadmap: Real Estate And Facilities Software (2025)

Real estate and facilities management (FM) is undergoing rapid digital transformation, driven by emerging technologies that promise to improve efficiency, sustainability and occupant experience. This Tech Roadmap report provides an analysis of 27 key technologies in the real estate and facilities software ecosystem. It evaluates each technology’s current maturity, demonstrated business value, pace of innovation and the triggers that are prompting firms to invest. The goal is to help executives, managers and investors prioritize technology initiatives and make informed decisions about which solutions to adopt, monitor or de-emphasize.

**Table of contents**

[Introducing the Tech Roadmap analysis](#_Toc205297619)

[Key questions answered by the Tech Roadmap analysis](#_Toc205297620)

[Tech Roadmap analysis identifies strategic enablers for optimizing real estate, projects and facilities](#_Toc205297621)

[Tech Roadmap for real estate and facilities software](#_Toc205297622)

[Defining the market for real estate and facilities software](#_Toc205297623)

[Tech Roadmap methodology overview](#_Toc205297624)

[Five market phases of technology maturity](#_Toc205297625)

[Three technology life cycles differentiate business value](#_Toc205297626)

[Technology adoption and success influence positioning](#_Toc205297627)

[Pace of innovation determines the time to the next lifecycle phase](#_Toc205297628)

[Real estate and facilities software in Phase 1: Research and Development](#_Toc205297629)

[GenAI software powering robotics for construction](#_Toc205297630)

[Real estate and facilities software in Phase 2: Launch](#_Toc205297631)

[Autonomous building platforms](#_Toc205297632)

[AI-powered multifunctional computer vision](#_Toc205297633)

[Agentic AI maintenance](#_Toc205297634)

[AI-driven generative design for architecture, engineering and construction (AEC)](#_Toc205297635)

[Digital twins for operations](#_Toc205297636)

[AI-powered digital assistants for real estate and buildings](#_Toc205297637)

[Real estate and facilities software in Phase 3: Growth](#_Toc205297638)

[Drone technology applications](#_Toc205297639)

[Digital platforms for building operations](#_Toc205297640)

[Augmented reality (AR) for facilities operations and maintenance](#_Toc205297641)

[Connected portfolio intelligence platforms (CPIP)](#_Toc205297642)

[Climate risk and resilience mapping platforms](#_Toc205297643)

[Building carbon management software](#_Toc205297644)

[Digital twins for architecture, engineering and construction (AEC)](#_Toc205297645)

[AI and GIS portfolio modelling](#_Toc205297646)

[Construction management software](#_Toc205297647)

[Indoor environmental monitoring](#_Toc205297648)

[Data centre infrastructure management (DCIM)](#_Toc205297649)

[Integrated security digital platforms](#_Toc205297650)

[ESG data and reporting software](#_Toc205297651)

[Property valuation and appraisal software](#_Toc205297652)

[Occupant engagement software](#_Toc205297653)

[Real estate and facilities software in Phase 4: Maturity](#_Toc205297654)

[Energy management software (EMS)](#_Toc205297655)

[Access control systems](#_Toc205297656)

[Property and lease management software](#_Toc205297657)

[Integrated workplace management systems (IWMS)](#_Toc205297658)

[Real estate and facilities software in Phase 5: Decline](#_Toc205297659)

[Computer-aided facility management (CAFM)](#_Toc205297660)

**Table of figures**

**Figure 1.** Real estate and facilities software definitions

**Figure 2.** Tech Roadmap for real estate and facilities software

# Introducing the Tech Roadmap analysis

This report focuses specifically on real estate, facilities and construction technology software solutions, highlighting the technologies that underpin modern building operations, construction project delivery, space utilization efficiency, sustainability targets and improved workplace outcomes. The analysis centres on the software innovations enabling these advancements. Our research draws on vendor briefings, market analysis and product evaluations. By mapping each software category onto a standardized technology roadmap, we provide a structured view of the innovation landscape – from early-stage, emerging solutions to well-established platforms. Verdantix applies its proven Tech Roadmap methodology to support corporate technology planning and inform strategic decisions for both software buyers and solution providers in the real estate, facilities and construction sectors.

## Key questions answered by the Tech Roadmap analysis

The Tech Roadmap methodology consolidates the analysis of each technology’s maturity, demonstrated business value, pace of innovation and key triggers influencing investment into a unified outlook and graphic. This structured assessment, derived from desk research, large-scale surveys, and in-depth interviews with suppliers, customers and industry experts, classifies technologies by maturity phase and projects their future trajectory. The analysis addresses the following critical questions for each solution assessed:

* **How mature is the technology?**
* **What is the technology’s proven or predicted business value?**
* **How valuable will the technology be in the future?**
* **What is the technology’s pace of innovation?**
* **Who are the key vendors?**

## Tech Roadmap analysis identifies strategic enablers for optimizing real estate, projects and facilities

The Verdantix Tech Roadmap research evaluates how organizations across real estate and facilities management (FM) are adopting digital technologies to enhance operational efficiency, support sustainability goals and improve occupant experiences. The analysis focuses on identifying technologies that function as strategic enablers and that contribute to automation, data-driven decision-making and long-term performance improvements. We accomplish this by:

* **Targeting enabling technologies.**

The Tech Roadmap analysis identifies core technologies that support key applications in real estate and FM. Each technology is assessed based on maturity, business value and strategic fit. This structured approach enables decision-makers – such as executives, property managers and investors – to select solutions aligned with operational objectives, infrastructure capabilities and risk tolerance.

* **Highlighting emerging innovations.**

Organizations aiming to modernize real estate portfolios often face challenges in evaluating and adopting new technologies. The Tech Roadmap research proactively identifies technologies in the early stages of the life cycle – from Research and Development through to Launch – equipping executives and technology leaders with insights to shape forward-looking digital strategies.

* **Identifying viable technology alternatives.**

Conservative organizations often maintain existing solutions without fully considering alternative technologies that might offer greater functionality, improved efficiencies or cost advantages. The Tech Roadmap framework enables stakeholders to rigorously evaluate substitute technologies that could deliver enhanced operational capabilities, additional strategic benefits or reduced lifecycle costs.

* **Including Decline as a phase in the technology life cycle.**

Some widely used solutions may be entering the Decline phase, posing risks such as inefficiency or missed value. The Tech Roadmap identifies these technologies and highlights replacement options that better align with evolving operational and strategic goals.

# Tech Roadmap for real estate and facilities software

The Verdantix Tech Roadmap analysis equips executives and managers with a structured framework to evaluate the maturity, business value and pace of innovation across the real estate and facilities technology landscape. It also provides software vendors with strategic insights into evolving customer needs and market opportunities – particularly those that enable operational efficiency, automation, sustainability and portfolio-wide performance.

## Defining the market for real estate and facilities software

This roadmap applies the Verdantix methodology to assess digital solutions that support the full building life cycle – from initial design and construction through to operations and performance optimization. Verdantix defines real estate and facilities software in this report as:

*“Any software or digital solution that supports the planning, design and construction, operation, or optimization of buildings and workplaces.”*

The analysis focuses on technologies that enable more connected, data-driven, secure and sustainable real estate strategies. Technologies assessed in this report fall into four primary categories (see **Figure 1**):

* **Occupier-focused tools.**

Solutions that support space utilization, workplace experience, occupancy planning and hybrid workplace enablement.

* **Facilities optimization and maintenance tools.**

Platforms and solutions that improve operational efficiency, such as predictive maintenance, energy optimization, remote monitoring, smart security systems and analytics based on Internet of Things (IoT).

* **Digital design and construction tools.**

Software used in architecture, engineering and construction (AEC) – such as building information modelling (BIM), digital twins and construction project management – which connects construction and design with building operations.

* **Building-owner- and asset-manager-focused tools.**

Software for managing leases, valuations, ESG data and portfolio performance, helping firms ensure financial health, compliance and sustainability of assets.

**Figure 1.**

# Tech Roadmap methodology overview

The Verdantix Tech Roadmap methodology identifies the level of market maturity for a technology and assess its business value. This information, along with research and expert opinion, influences the positioning of an individual technology along the roadmap (see **Figure 2**).

## Five market phases of technology maturity

When analysing the technologies included in the Roadmap, Verdantix tracks a technology from its inception to replacement and retirement. As technology matures, it advances through the phases of:

* **Research and Development.**

The first phase of technology maturity is Research and Development, which encompasses innovations that are being created in labs or by product development teams. Though the market is aware of these technologies through the existence of small-scale pilots and prototypes, they are not yet commercially available.

* **Launch.**

The second phase of technology maturity is Launch, during which technologies are launched commercially, and vendors seek to demonstrate their tangible business value. Over time, the relative success of each technology becomes apparent, with some growing positively from this phase and others encountering challenges in the marketplace. The success of any single technology depends not just on its capabilities, but also on its business value.

* **Growth.**

Following its commercial launch, a product or service typically continues along a product life cycle of high, medium or low proven value during the third phase of Growth. Technologies with high and medium proven value generate benefits that are sufficient for the ecosystem to grow rapidly, while technologies with low proven value, or those lacking a business ecosystem, decline quickly.

* **Maturity.**

In the fourth phase, Maturity, a successful product or service has been widely adopted within the marketplace and maintains a significant customer base with recurring revenues. In addition, there has been consolidation among vendors, and an entire ecosystem and value chain supports the continued purchase and use of the technology.

* **Decline.**

Technology moves into the final stage of the life cycle, Decline, as customers begin switching to more innovative substitutes. Customers either stop using the current technology completely or replace it with alternatives.

**Figure 2.**

## Three technology life cycles differentiate business value

The Tech Roadmap analysis outlines and differentiates between three distinct technology life cycles. Although this approach simplifies the complex nature of how products and services evolve, it plays an important role in evaluating the potential longevity and future business impact of both emerging and current technologies. The technology life cycles are:

* **Short-lived success followed by obsolescence.**
* **Proven success and moderate business value.**
* **Rapid success and high business value.**

## Technology adoption and success influence positioning

Verdantix analysts place technologies on the Tech Roadmap graphic using a combination of evidence provided by research findings and the expert opinion of the Verdantix team. To determine each technology’s placement, Verdantix considered the following key questions:

* **Is the technology commercially available?**
* **What is the scale of the leading vendors?**
* **How much investment capital is supporting the technology growth?**
* **What evidence is there of growing customer demand?**

## Pace of innovation determines the time to the next lifecycle phase

Understanding a product or technology’s current level of maturity and the pace at which it is expected to progress is essential for various stakeholders in the market. This insight supports decisions around factors such as time to market, adoption rates, alternative solutions and necessary investment. Tech Roadmap evaluations rely on consistent criteria to establish the time to the next phase of each technology. To develop these timelines, Verdantix posed the following questions:

* **How long has the product been in development or use?**
* **What are the pros and cons associated with the technology?**
* **What has been the customer interest and demand for the technology?**
* **Are there any substitutes available or in development in the market?**

# Real estate and facilities software in Phase 1: Research and Development

## GenAI software powering robotics for construction

* **Definition:** GenAI (generative AI) software for powering robotics for construction enables autonomous or semi-autonomous robots to interpret and act on construction data such as building information modelling (BIM) files, blueprints or spoken instructions. These systems combine large language models (LLMs) and computer vision with robotic hardware to execute tasks such as lifting, welding or inspection. Unlike traditional automation, the software allows adaptation to site conditions and interaction with human workers. It also improves navigation and tool use without requiring major infrastructure changes. Inspired by early service robotics in real estate – such as inspection drones and mapping tools based on light detection and ranging (LiDAR) – this software layer acts as the robot’s cognitive engine.
* **Maturity phase: Research and Development.** AI-powered robotics for construction remain in the R&D and early pilot stage. Initial deployment is expected in controlled construction environments such as prefabrication sites by 2028 to 2030. However, there are emerging examples of more advanced applications, such as in China where autonomous robots and drones [successfully resurfaced a 157km stretch of highway with minimal human involvement](https://inspenet.com/en/noticias/china-transforms-road-construction-with-autonomous-technology/). This milestone demonstrates the potential for AI-driven machines to operate efficiently and safely in large-scale infrastructure projects. Broader adoption on more complex and dynamic construction sites will take longer, initially focusing on semi-autonomous systems operating under human supervision.
* **Business value: Medium.** These solutions target key challenges in construction: labour shortages, safety and inefficiencies. Business value today is limited to pilot applications, but long-term benefits include improved productivity and site safety. Integration with BIM and management platforms will drive broader value. Early examples in cleaning, inspection and logistics robotics support these outcomes (see [Verdantix Market Insight: Robotization Of Customer-Facing Services (2024)](https://www.verdantix.com/report/market-insight-robotization-of-customer-facing-services)).
* **Pace of innovation: Less than 2 years.** The field of humanoid construction robotics is experiencing rapid advancements, driven by both start-ups and technology giants. Agility Robotics has introduced Digit, a bipedal robot designed to operate in human spaces, and has deployed it in commercial operations. RIC Robotics is developing ‘Zyrex’, a 20-foot-tall construction robot capable of welding, assembling and even performing concrete 3D-printing on large sites, with a working prototype expected by 2026. NVIDIA has announced Project ‘GR00T’, a foundational AI model specifically designed for humanoid robot cognition, aiming to accelerate the development of robotic intelligence. The influx of investment and R&D in this sector indicates a rapidly evolving ecosystem poised to overcome previous technological hurdles.
* **Example vendors:** Agility Robotics, Doxel, GROPYUS, Obralink, Raise Robotics, RIC Robotics, SANY Group, Teleo, Verbotics, Xpanner.

# Real estate and facilities software in Phase 2: Launch

## Autonomous building platforms

* **Definition:** Autonomous building platforms are the next evolution of digital platforms for building operations. They are cloud and edge services powered by AI and Internet of Things (IoT) that act as a single command centre merging information technology (IT) and operational technology (OT) infrastructure seamlessly across one building or an entire portfolio with minimal to no human intervention. These platforms integrate sensor, camera, asset, building management and external systems real-time data, streamlining workflows, and automatically adjusting conditions (such as energy, comfort security) to self-optimize operations without manual oversight, based on ongoing self-learning, analytics and predictions of the building and occupants’ requirements.
* **Maturity phase: Launch.** Cloud-based autonomous platforms for building operations are in the Launch phase of adoption across the real estate sector. While the core technologies – such as IoT integration, AI-driven analytics and remote automation – have matured, few buildings could be described as ‘autonomous’ today. The shift from fragmented or on-premise systems towards cloud-native platforms has enabled greater scalability, interoperability and cross-portfolio visibility. Firms such as Honeywell and Noda Construction have positioned themselves to be beneficiaries when the transition to fully autonomous buildings reaches full market acceptance. However, despite proven functionality, full adoption is still evolving due to integration complexity, proprietary systems and hardware, change management challenges, and variation in digital readiness across portfolios.
* **Business value: High.** Autonomous digital platforms are delivering high business value by integrating building operations, maintenance and energy management into centralized, real-time environments. These platforms enable organizations to move beyond siloed systems, offering unified control, actionable insights and improved responsiveness across building portfolios. The 2024 Verdantix Green Quadrant on IoT digital platforms highlights interoperability, automation and real-time analytics as key factors influencing vendor selection – underscoring the shift from basic digitization to performance-driven optimization (see [Verdantix Green Quadrant: IoT Digital Platforms For Building Operations (2024)](https://www.verdantix.com/report/green-quadrant-iot-digital-platforms-for-building-operations-2024)). Long-term success will hinge on the ability of platforms to scale effectively, generate trust, support seamless integration and deliver measurable impact across diverse real estate operations.
* **Pace of innovation: 2 to 5 years.** Cloud-based autonomous building platforms are rapidly progressing from the Launch to Growth stage. This acceleration is driven by broader PropTech momentum and a strong market push for AI-led, scalable, integrated solutions. Firms – ranging from corporate occupiers to property managers – are actively transitioning away from legacy computer-aided facilities management (CAFM) and on-premise systems in favour of cloud-native platforms that combine IoT integration, AI-powered analytics, and space or asset management functionality. Market trends favour vendors offering unified, end-to-end platforms, reducing reliance on fragmented point solutions. As standards evolve and platform capabilities mature, the segment is expected to reach the Growth stage within two years, driven by increasing demand for automation, real-time visibility and centralized control across property portfolios.
* **Example vendors:** 75F, BrainBox AI, digital blanket, Facilio, Honeywell, Johnson Controls, KODE Labs, Mitsubishi Electric Iconics Digital Solutions (MEIDS), Nantum AI, Noda Construction, Sidara, Siemens, Switch Automation.

## AI-powered multifunctional computer vision

* **Definition:** AI-powered multifunctional computer vision systems analyse visual data – such as CCTV or drone footage – in real time to detect threats, monitor equipment and flag structural issues. In real estate and facilities management (FM), they enhance inspections, automate tenant move-in and -out documentation and optimize space use through occupancy analytics. These systems also support remote monitoring of floods, construction progress and safety compliance. Though they can trigger automated responses, they more often feed insights into integrated workplace management systems (IWMS) or connected portfolio intelligence platforms (CPIP) platforms for better decision-making. By combining AI with vision, they uncover patterns – such as traffic bottlenecks or patient falls – that make them vital for predictive maintenance, safety and efficiency.
* **Maturity phase: Launch.** AI-powered multifunctional computer vision is in the Launch phase for real estate and facilities. While the technology itself is mature, its application in this sector is just moving beyond pilots in advanced smart buildings. Adoption is accelerating due to lower hardware costs, improved AI models and greater comfort with video analytics post-pandemic. Many firms are now testing use cases such as occupancy tracking, security monitoring and remote inspections. [Deloitte’s 2025 Commercial Real Estate Outlook](https://www2.deloitte.com/us/en/insights/industry/financial-services/commercial-real-estate-outlook.html) reports that 76% of commercial real estate firms are exploring AI, including vision tools, signalling strong momentum. Start-ups such as Density and VergeSense have attracted significant funding, showing market demand. However, widespread use is limited by integration hurdles, skill gaps and privacy concerns. As return on investment (ROI) becomes clearer – especially in energy, maintenance and safety – adoption is shifting from experimental to essential.
* **Business value: High.** Multifunctional vision turns ubiquitous images into actionable intelligence that trims cost and risk. By mapping occupancy it reveals underused zones for consolidation or subletting, and, when tied to HVAC and lighting, can shave energy by up to 22%, [according to a study by Schneider Electric](https://www.se.com/ww/en/about-us/newsroom/news/press-releases/new-study-finds-occupancy-based-control-and-automation-solutions-cut-office-energy-use-and-carbon-emissions-by-22-67cef1fa46ef95cdcb0cea53?). Algorithms flag leaks, failing motors or unsafe behaviour early, supporting preventive fixes and faster incident response. As many buildings reuse existing camera networks, capital outlay stays moderate. Though oversight is required, results span property, warehouse, retail and healthcare operations. Insurers increasingly discount premiums for certified deployments, and boards welcome the extra ESG evidence that these vision tools can document.
* **Pace of innovation: 2 to 5 years.** Accuracy gains, processing power and turnkey pre-trained models – people counting, fall detection and meter reading – are slashing deployment time. Bundled offerings with vision occupancy sensors inside lights or thermostats are accelerating rollouts. Real estate giants are scaling: JLL cites vision as critical for accident prevention, and CBRE’s Ellis AI is stitching spatial insight into day-to-day workflows. Emerging standards are addressing privacy, enabling responsible expansion. Vision AI is moving swiftly from boutique pilot to foundational building capability.
* **Example vendors:** Avigilon, Axis Communications, Cisco Meraki, Fyma, Hakimo, Honeywell, IC Realtime, Johnson Controls, PointGrab, Rhombus Systems, ROC, VergeSense, Wesco.

## Agentic AI maintenance

* **Definition:** Agentic AI maintenance refers to the use of autonomous AI agents to detect, diagnose and execute maintenance actions across building systems – minimizing the need for human intervention. These systems leverage Internet of Things (IoT) sensor data, equipment history and real-time analytics to forecast failures, generate work orders, schedule technicians and optimize spare parts procurement automatically. Unlike traditional preventive maintenance, agentic AI operates continuously and dynamically, orchestrating workflows through platforms such as computerized maintenance management systems (CMMS) or connected portfolio intelligence platforms (CPIP) to ensure traceability, compliance and operational efficiency. This marks a shift from static systems to integrated, intelligent platforms capable of real-time response and predictive action across entire property portfolios (see [Verdantix Strategic Focus: Mapping The Digital Platform For Real Estate Buildings And Facilities](https://www.verdantix.com/report/strategic-focus-mapping-the-digital-platform-market-for-real-estate-buildings-and-facilities)).
* **Maturity phase: Launch.** Adoption of agentic AI maintenance sits in the Launch phase. Early adopters – often owners of smart, mission-critical facilities – are embedding autonomous agents inside maintenance operations to deliver real-time diagnostics, automatic work-order creation and predictive task execution. Verdantix highlights an industry pivot from reactive or schedule-based upkeep to AI-enabled workflows aligned with uptime, sustainability and cost-efficiency goals (see [Verdantix Strategic Focus: Is Proactive Maintenance The New Norm?](https://www.verdantix.com/report/strategic-focus-is-proactive-maintenance-the-new-norm)). Schneider Electric’s EcoStruxure Service Bureau, designed as an AI-native ecosystem, exemplifies the trend by integrating agentic intelligence for adaptive, continuous optimization. Integration complexity, data quality and change management still temper scale, yet cheaper edge compute, richer application programming interfaces (APIs) and post-pandemic comfort with digital oversight are accelerating momentum towards mainstream deployment.
* **Business value: High.** Agentic AI transforms maintenance economics by detecting anomalies early, extending asset life and reducing unplanned outages. Continuous data ingestion and autonomous triage allow teams to prioritize strategic work, boosting technician productivity, service consistency and first-time fix rates. Verdantix links condition-based programmes to fewer truck rolls and steadier budgets. When agents integrate with energy, procurement and compliance modules, organizations gain unified dashboards that support ESG reporting and performance contracts. As agents reside inside existing CMMS or building management system (BMS) layers, incremental cost is modest, while benefits span safety, comfort and bottom-line savings.
* **Pace of innovation: 2 to 5 years.** Vendors such as Augury, Sensfix, Uptake and Wipro deliver plug-and-play agents that automate diagnostics, scheduling and optimization, while IBM, Johnson Controls and Siemens embed similar logic within flagship platforms. ServiceNow’s AI Agent Orchestrator showcases multi-agent governance across heterogeneous systems. Drone-based and robotic execution agents are entering field trials, promising end-to-end autonomy from inspection to repair. Regulatory drivers such as the EU Corporate Sustainability Reporting Directive (CSRD) and forthcoming Securities and Exchange Commission (SEC) climate disclosures push owners to prove asset resilience, amplifying investment. Strong return on investment (ROI) and competitive pressure are expected to normalize agentic operations across portfolios within the next half decade – though data quality, standards and trust must still mature.
* **Example vendors:** Augury, Honeywell, IBM, Johnson Controls, Schneider Electric, Sensfix, ServiceNow, Siemens, Uptake, Verdigris, Wipro.

## AI-driven generative design for architecture, engineering and construction (AEC)

* **Definition:** Generative design in AEC leverages AI and algorithmic tools to create and evaluate numerous design or construction scenarios based on user-defined constraints – such as space efficiency, cost limits or sustainability targets. Rather than drafting options manually, users input design rules and performance goals, and the system generates optimized alternatives. Though still emerging, generative design is gaining traction as a way to support leaner, more efficient project delivery – particularly when combined with digital fabrication methods such as 3D printing (see [Verdantix Smart Innovators: Construction Management Software (2024)](https://www.verdantix.com/report/smart-innovators-construction-management-software)).
* **Maturity phase**: **Launch**. Generative design for AEC remains in the Launch phase, with adoption concentrated among early adopters such as large contractors and digitally advanced design firms. Though foundational tools – such as Autodesk Revit with Dynamo, Rhino/Grasshopper and emerging AI-powered platforms – support generative workflows, usage is largely confined to conceptual design tasks such as site massing, daylight optimization or early-stage floorplate studies. Broader integration into full project life cycles remains limited. Current generative systems struggle with complex domains such as mechanical, electrical and plumbing (MEP) design, in which code compliance and spatial coordination require nuanced human input.
* **Business value: Medium.** Generative design delivers moderate but increasing value in construction, primarily during early-stage planning and design. Its core benefit lies in accelerating design iteration and improving spatial and cost efficiency. Tools such as TestFit can generate viable site or floorplan layouts in seconds – enabling rapid scenario testing, optimized rentable areas and more informed feasibility decisions. This supports developers with faster go/no-go assessments and reduces manual design effort. Though direct impacts on construction execution are limited, upstream optimization can lead to material savings and reduced design revisions. Generative tools also enhance stakeholder engagement by visualizing options quickly, aiding faster consensus. However, adoption is relatively sparse, and the technology is often viewed as an innovation tool rather than standard practice. Trust in AI-generated outputs and measurable return on investment (ROI) are still evolving, but the long-term potential to reshape design workflows and improve project outcomes is substantial.
* **Pace of innovation: 2 to 5 years.** Innovation in generative design for construction is accelerating, driven by advances in AEC software and the broader wave of AI development. The integration of generative tools into mainstream platforms – such as Autodesk Forma, following the acquisition of Spacemaker – signals a shift towards commercial readiness. Emerging synergies with GenAI (generative AI), such as tools based on generative pre-trained transformers (GPT), are enabling natural language prompts for layout generation and parametric scripting. Experimental systems now combine real-time design generation with simulation engines for energy or structural feedback, dramatically shortening design loops. Machine learning (ML) is also being trained on large design data sets to assist with compliance checks or suggest new forms. As these capabilities mature, the sector is moving beyond experimentation into scalable applications – positioning generative design as a transformative tool for smarter, faster and more responsive project delivery.
* **Example vendors:** ALICE Technologies, Autodesk (Forma, Revit Generative Design, Spacemaker), Bentley Systems, Delve, Hypar, qbiq, SketchUp Extensions, TestFit.

## Digital twins for operations

* **Definition:** Digital twins for operations are a dynamic virtual replica of a building that duplicates the building’s physical properties, systems and processes. It models and simulates the building’s performance using real-time and historical data and a comprehensive analysis toolkit, to enhance operational decision-making and drive efficiencies and value for that facility. Today, most digital twins are heavily services-driven, requiring vendor or systems integrator investment to set them up and monitor them (see [Verdantix Digital Twin Essentials: A Guide For Real Estate Professionals (2023 Issue)](https://www.verdantix.com/report/real-estate-built-environment/digital-twin-essentials-a-guide-for-real-estate-professionals-2023-issue)).
* **Maturity phase: Launch.** Digital twins for operations are in the Launch phase, with growing vendor interest and early enterprise adoption. Most deployments are limited to proof-of-concept or targeted applications such as HVAC or space utilization, rather than full portfolio integration. Adoption is expanding, but is slowed by unclear definitions, high data requirements and complex integration. A key challenge is the lack of internal expertise and dedicated teams to maintain and update digital twins, limiting their potential. Digital twins are increasingly seen as a ‘grand unifier’, integrating building information modelling (BIM), Internet of Things (IoT) and AI to optimize operations. Early adopters focus on pilots to prove return on investment (ROI), while the industry builds foundational data infrastructure and analytics capabilities. Full portfolio-wide integration remains years away as digital twins continue to find market fit.
* **Business value: Medium.** The business value varies between asset types, with use cases more pronounced for complex assets and strong potential to scale as maturity increases. Early implementations demonstrate meaningful gains in operational efficiency, fault detection, predictive maintenance and energy savings. For example, campus and building-level twins have improved energy optimization and streamlined facility workflows. However, high costs, complex data integration and unclear ROI measurement still limit value realization at scale. Nevertheless, digital twins support strategic real estate objectives, such as sustainability, space efficiency and improved occupant experience (see [Verdantix Global Corporate Survey: Real Estate Technology Budgets, Priorities & Preferences For 2025](https://www.verdantix.com/report/global-corporate-survey-real-estate-technology-budgets-priorities-preferences-for-2025)). As ecosystems mature and standards emerge, integration with connected portfolio intelligence platforms (CPIP), computer-aided facilities management (CAFM) and energy management software (EMS) systems will improve ROI visibility.
* **Pace of innovation: 2 to 5 years.** Industry interest is accelerating, fuelled by broader investment in smart buildings, ESG targets and hybrid workspace demands. While today’s use cases remain relatively niche, momentum is building rapidly. Increased adoption of building operation platforms, integration with CPIPs and integrated workplace management systems (IWMS), and the rise of digital platforms that centralize real estate data will lower the barrier to implementation (see [Verdantix Strategic Focus: Mapping The Digital Platform For Real Estate Buildings And Facilities](https://www.verdantix.com/report/strategic-focus-mapping-the-digital-platform-market-for-real-estate-buildings-and-facilities)). Real estate professionals are increasingly seeking integrated systems over point solutions, which favour the growth of digital twins as part of broader operational ecosystems.
* **Example vendors:** 51WORLD,Augment,Autodesk, Bentley Systems, Bosch, Dassault Systèmes, E8IGHT, Emerson, IBM, Integrated Environmental Solutions (IES), Johnson Controls, KODE Labs, Microsoft Azure Digital Twins, Schneider Electric, Sidara, Siemens Smart Infrastructure, ThoughtWire, Willow.

## AI-powered digital assistants for real estate and buildings

* **Definition:** AI-powered digital assistants in real estate and facilities management (FM) are software agents that uses AI to assist with tasks, answer questions and automate workflows related to building operations and workplace services (see [Verdantix Practical Applications Of AI In Smart Buildings](https://www.verdantix.com/report/practical-applications-of-ai-in-smart-buildings)). These assistants can be chatbots, voice assistants or email bots, using natural language processing (NLP) and machine learning (ML) to understand and respond to user inquiries. They can book rooms, check building conditions and control systems such as HVAC. Advanced versions provide insights and reminders, integrating with various data sources.
* **Maturity phase: Launch.** AI digital assistants for facilities and workplace management are a relatively new technology, currently in the early adoption phase. Though consumer digital assistants such as Amazon’s Alexa and Apple’s Siri are well established, their specialized use in real estate and FM has only recently gained momentum. Early efforts entailed simple chatbots and voice controls in smart homes, with commercial real estate pilots emerging in the late 2010s. Advances in AI, especially NLP, over the past few years have made these assistants viable for broader deployment. Adoption is still limited but growing, driven by hybrid work trends and the demand for touchless services, with growth expected to accelerate soon.
* **Business value: Medium.** AI-powered digital assistants deliver measurable value across FM functions by streamlining service delivery, enhancing user experience and reducing operational friction. Through automation of frequent low-value tasks – such as workspace queries or maintenance requests – firms can redeploy human resources towards higher-impact activities. Vendors such as CBRE and Lessen illustrate this: Lessen integrates its Copilot assistant directly into work order systems, accelerating task completion, while CBRE uses AI interfaces to improve technician dispatch and resolution workflows. Continuous availability and real-time system insights (for example, HVAC inefficiency alerts) improve satisfaction and reduce costs. Early adopters report gains in productivity, service quality and data-led operational decision-making.
* **Pace of innovation: Less than 2 years**. AI in FM is advancing rapidly, with powerful large language models (LLMs) such as OpenAI’s GPT-4 driving context-aware, multi-modal assistants. These AI tools integrate deeply with building systems – energy, security and room booking – enabling complex workflows from simple commands. Major firms such as CBRE and JLL lead GenAI (generative AI) adoption in the corporate real estate realm, and start-ups accelerate feature innovation with cycles measured in weeks. Assistants now process voice, images and sensor data, automating tasks such as maintenance requests from photos. GenAI also drafts communications and summarizes reports, boosting efficiency. Continuous learning, cloud updates and Internet of Things (IoT) expansion make these assistants smarter and more pervasive, from conference room panels to mobile robots. Emerging agentive AI enables proactive actions, and security advances such as biometric authentication address enterprise privacy concerns.
* **Example vendors:** Amazon, BrainBox AI (Trane Technologies), CBRE, HqO, IBM, JLL, Lessen, Meta, Microsoft, OpenAI, ServiceNow.

# Real estate and facilities software in Phase 3: Growth

## Drone technology applications

* **Definition:** Drone technology applications refer to the use of unmanned aerial vehicles (UAVs) to capture visual, spatial and thermal data to support building inspections, asset monitoring, site-progress tracking and compliance verification. In construction contexts, drones contribute to automated progress documentation and site mapping, integrating with digital construction management platforms and building information modelling (BIM) tools. In facilities management (FM), drones are increasingly used for roof inspections, façade condition assessments and perimeter surveillance – minimizing manual inspection effort and enhancing safety.
* **Maturity phase: Growth.** Drone technology has entered the Growth stage in construction and asset-intensive FM, with well-established use cases that extend beyond pilot programmes. In construction, drones support site surveying and mapping at project initiation, often replacing traditional land surveys with faster and more comprehensive aerial scans. Throughout the build phase, they enable progress monitoring via periodic imagery or light detection and ranging (LiDAR), helping project managers compare as-built conditions with plans and flag delays. Drones also improve safety compliance by inspecting hard-to-reach areas and detecting hazards without putting personnel at risk. In corporate real estate, use remains emergent but promising.
* **Business value: High.** Drone technology delivers high value in real estate and facilities by increasing inspection, safety and operational efficiency. In building management, drones are used for roof and façade inspections, thermal scanning for energy loss and structural condition assessments – reducing the need for scaffolding, lifts and risky manual access. In construction, drones enable rapid site surveys, capture progress updates and support compliance verification, allowing teams to identify delays and monitor build quality with minimal disruption. These tools support site-wide visibility and real-time decision-making as part of modern construction workflows (see [Verdantix Smart Innovators: Construction Management Software (2024)](https://www.verdantix.com/report/smart-innovators-construction-management-software)). Emerging use cases in property security, inventory checks and disaster response further extend drone value across diverse facilities contexts.
* **Pace of innovation: 5 to 10 years.** Drones are not only adding operational value, but pushing innovation across real estate and FM workflows. The shift from manual inspections to autonomous aerial assessments reflects a growing sophistication in both hardware and software. With the ability to conduct thermal scans, create 3D models and integrate real-time data into asset monitoring systems, drones are expanding their role beyond documentation into analytics and intelligence. In fact, [a recent S&S Insider survey](https://www.globenewswire.com/news-release/2025/05/20/3084994/0/en/Construction-Drone-Market-Size-to-Hit-USD-15-51-Billion-by-2032-Driven-by-Increasing-Adoption-of-Drones-for-Site-Surveying-Monitoring-and-Safety-Inspections-SNS-INSIDER.html) reported that drone usage on construction projects in the US has led to 61% higher measurement accuracy and 53% time savings in data collection, as drones can swiftly gather detailed site data that would take teams much longer to collect on foot.
* **Example vendors:** Autel Robotics, DJI, DroneDeploy, Identified Technologies, Parrot, Propeller Aero, Skycatch, Skydio.

## Digital platforms for building operations

* **Definition:** An integrated digital software platform with connectivity and communication capabilities to process sensor, camera, asset, building management and external systems data; data management capabilities, for integrating, managing and storing data; and the ability to correlate and analyse data from multiple domains.
* **Maturity phase: Growth.** The market is rapidly advancing from siloed legacy systems to integrated, cloud-based platforms that unify data across multiple building domains. Remote monitoring is table stakes, so differentiation has shifted to data normalization, cross-domain analytics and ecosystem openness. Adoption is accelerating, driven by operational efficiency, sustainability and occupant-comfort goals, though legacy dependencies and vendor fragmentation remain hurdles. Overall, the sector is innovating quickly, but has not yet reached full maturity or universal platform adoption (see [Verdantix Strategic Focus: Mapping The Digital Platform For Real Estate Buildings And Facilities](https://www.verdantix.com/report/strategic-focus-mapping-the-digital-platform-market-for-real-estate-buildings-and-facilities)).
* **Business value: High.** Digital platforms deliver substantial benefits by enabling centralized, remote oversight of multiple sites, streamlining operations and reducing manual workloads. Vendors such as Honeywell Forge (predictive maintenance insights on a feedback loop) and Switch Automation (real-time HVAC and lighting optimization) showcase their range of value, while Nantum AI performs functions such as energy-demand management. Continuous remote monitoring underpins these capabilities, helping facilities teams cut callouts, avoid costly equipment failures and improve occupant experience. Consolidated portfolio data further equip executives with strategic insights for asset performance and investment decisions, modernizing the workforce and delivering strong financial, operational and user-experience gains.
* **Pace of innovation: 5 to 10 years.** The foundational services of data aggregation, visualization and basic remote monitoring are stable, but vendors are expanding into AI-driven automation, better edge processing capabilities and autonomous operations. Near-term advances in the next two to three years encompass smarter alert ranking, low-code orchestration, and secure, self-powered sensors that extend monitoring to legacy assets. Mid-term developments in the next five to 10 years encompass autonomous optimization loops, richer digital twins and outcome-based ‘remote operation centre’ service models. Hyperscaler collaborations – Amazon Web Services (AWS), Google and Microsoft – and open data ontologies are accelerating the shift towards more intelligent, adaptable and integrated building platforms.
* **Example vendors:** Acuity (Atrius), Bosch, Facilio, Honeywell, Johnson Controls (including FM:Systems), KMC Controls, KODE Labs, Mitsubishi Electric Iconics Digital Solutions (MEIDS), Nantum AI, Neeve, Planon, Schneider Electric, Siemens, Spacewell, Switch Automation, Trane Technologies (including BrainBox AI and Nuvolo), Univers, Wesco (entroCIM).

## Augmented reality (AR) for facilities operations and maintenance

* **Definition:** This category covers AR-enabled hardware, such as smartphones, tablets and head-mounted displays, with software to display critical information to on-site workers conducting asset maintenance, inspections and installations. Some solutions provide remote assistance, connecting on-site workers with remote experts to deliver real-time assistance and direction.
* **Maturity phase: Growth.** AR in facilities management (FM) is past the experimental phase and entering wider adoption. Early adopters in sectors such as healthcare, manufacturing and corporate offices have proven its feasibility. This surge in interest, accelerated by remote work and the travel restrictions caused by the COVID-19 pandemic, indicates AR is moving from pilot programmes into scaled deployments. The ecosystem is not yet fully mature – many organizations are still at proof-of-concept or early rollout stages. Hardware and software platforms have improved – such as modern AR headsets and robust mobile AR applications – and a growing number of vendors offer maintenance-focused AR solutions. Market availability is increasing, with large facility services firms and in-house FM teams beginning to roll out AR-guided maintenance and training. However, AR is not ubiquitous in FM: its adoption rate varies by industry, showing higher deployment in hospitality compared with corporate offices, for example.
* **Business value: Low.** AR offers clear return on investment (ROI) by improving maintenance efficiency, speeding repairs, reducing downtime, and enhancing training and safety through real-time contextual information and hazard alerts. It also supports proactive maintenance by integrating with Internet of Things (IoT) data, enabling early issue detection and better asset management. However, widespread adoption in FM faces challenges, such as high hardware costs, ergonomic issues with current devices, technical integration complexities and resistance to organizational change. While complex facilities – such as manufacturing plants, industrial sites and energy infrastructure – have demonstrated success with AR, many established AR vendors continue to prioritize industries such as manufacturing, aerospace and defence over FM. As AR technology advances and costs decline, its role in FM is expected to grow, shifting from niche applications to broader, scalable deployment.
* **Pace of innovation: 5 to 10 years.** AR technology for FM remains in a slow innovation phase, still requiring significant multi-year investments in change management and workflow redesign before delivering strong ROI. The technology is not yet plug-and-play, delaying easy adoption. However, mobile-application-based AR solutions are advancing faster than hardware-dependent ones, as they avoid heavy capital costs. Firms such as Schneider Electric continue to innovate with mobile AR applications – such as EcoStruxure Augmented Operator Advisor – which help engineers remotely troubleshoot electrical equipment, signalling steady but gradual progress towards broader AR adoption in facilities operations. Overall, widespread scalable deployment is still likely five to 10 years away, which is consistent with earlier industry forecasts.
* **Example vendors:** Accruent, Honeywell, Microsoft, Schneider Electric, TeamViewer.

## Connected portfolio intelligence platforms (CPIP)

* **Definition:** Cloud-connected platforms that help firms enhance the performance of buildings across portfolio management, operations and employee experience. These platforms intelligently combine data from building systems, smart building devices and Internet of Things (IoT) sensors with advanced analytics, workflow management engines and mobile solutions.
* **Maturity phase: Growth.** CPIPs are a relatively new software category, introduced around 2022, evolving from mature integrated workplace management system (IWMS) solutions. Though core functionality such as lease management and space planning are proven, CPIPs are now incorporating real-time analytics and advanced data ingestion capabilities, which are in the early adoption phase. In the 2025 Green Quadrant on CPIPs, Verdantix identified 12 leading vendors, with eight demonstrating advanced offerings, signalling a competitive but nascent market (see [Verdantix Green Quadrant: Connected Portfolio Intelligence Platforms (CPIP/IWMS) 2025](https://www.verdantix.com/report/green-quadrant-connected-portfolio-intelligence-platforms-cpip-iwms-2025)). The category has transitioned from a Launch phase – marked by high innovation, vendor investment and early adopters – into a Growth phase, driven by increasing demand for portfolio optimization post-pandemic and industry consolidation through acquisitions. Though CPIPs are delivering value in initial deployments, broad adoption across real estate portfolios remains limited; however, adoption is expected to accelerate significantly in the coming years as the benefits of CPIPs become clearer and more users upgrade from traditional IWMS.
* **Business value: High.** CPIPs deliver significant business value by breaking down data silos and enabling smarter, portfolio-wide decisions through unified data integration and advanced analytics. They drive cost savings by optimizing space utilization, reducing lease expenses and enhancing energy efficiency – leveraging real-time occupancy and system monitoring to identify inefficiencies and support sustainability goals (see [Verdantix Strategic Focus: Mapping The Digital Platform For Real Estate Buildings And Facilities](https://www.verdantix.com/report/strategic-focus-mapping-the-digital-platform-market-for-real-estate-buildings-and-facilities)). CPIPs also offer long-term strategic benefits such as scenario planning and AI-powered predictive maintenance, improving operational efficiency and occupant experience with mobile applications and integrated service management. By aligning with cost reduction, sustainability and employee engagement goals, CPIPs facilitate executive buy-in and transform real estate portfolios into agile, data-driven assets that adapt to evolving work patterns and ESG targets.
* **Pace of innovation: 5 to 10 years.** The pace of innovation in CPIPs is rapid and accelerating. Building on mature IWMS foundations, CPIPs are quickly integrating advanced IoT, real-time analytics and AI-driven features such as predictive maintenance and space optimization. Vendors – both established and new – are continuously expanding capabilities organically, but especially through M&A, driven by the demand for smarter, scalable and interoperable solutions. Emerging technologies such as agentic AI and digital twins further accelerate innovation, positioning CPIPs as a fast-evolving, critical technology in real estate management.
* **Example vendors:** Accruent, Eptura, IBM, Johnson Controls, MRI Software, Nuvolo, Placeform, Planon, Service Works Global (SWG), Spacewell-Nemetschek, Tango.

## Climate risk and resilience mapping platforms

* **Definition:** Climate risk and resilience mapping platforms enable real estate stakeholders to assess asset-level exposure to physical climate hazards – such as flooding, heat stress, wildfires and sea-level rise. These tools draw on geospatial mapping and climate science models to generate asset-specific risk scores and scenario-based projections. These outputs are increasingly used to inform resilience strategies, capital planning and acquisition due diligence.
* **Maturity phase: Growth.** This capability is currently in the Growth stage, with adoption accelerating as real estate firms respond to climate-related disclosure requirements and investor scrutiny. A key driver has been the Task Force on Climate-related Financial Disclosures (TCFD), which encourages firms to assess and report on the financial impacts of climate risk. In Europe, two major regulations are adding pressure: the Sustainable Finance Disclosure Regulation (SFDR), which requires investment firms to explain how they account for sustainability risks (including climate hazards); and the Corporate Sustainability Reporting Directive (CSRD), which mandates large organizations to report on environmental and climate risks in detail.
* **Business value: High.** Market demand for climate risk assessment and data services is forecast to grow at a CAGR of 13% to 2029 (see [Verdantix Market Size And Forecast: Climate Risk Software 2023-2029 (Global)](https://www.verdantix.com/report/market-size-and-forecast-climate-risk-software-2023-2029-global)), driven by rising concern among asset owners, insurers and investors. While providers such as ClimateCheck and ClimateX support this demand, the unpredictability of climate risk still limits full integration into real estate valuation and transaction models. Insurance cost increases are currently the strongest driver for adaptation, tying climate risk directly to financial performance. Over time, intensifying climate impacts will lead to severe devaluation of at-risk assets, pushing owners to invest in resilience or face stranded investments. Yet until these financial risks are fully priced in, resilience remains undervalued, constraining proactive adaptation (see [Verdantix Market Insight: Resilient Buildings – Will It Sell? (2025)](https://www.verdantix.com/report/market-insight-resilient-buildings-will-it-sell)).
* **Pace of innovation: 5 to 10 years.** Investment is flowing into the sector, and vendors are rapidly expanding capabilities. Early platforms focused on a narrow set of hazards, but now firms such as IBM are adding multi-hazard climate modelling, AI-powered forecasting and asset-level risk scoring. Integration with other ESG functionality, such as net zero target tracking and certification readiness – for example, LEED (Leadership in Energy and Environmental Design), GRESB (Global Real Estate Sustainability Benchmark) and ECORE (ESG Circle of Real Estate) – is also accelerating convergence. The rise of mandatory disclosure regulations, such as the Securities and Exchange Commission (SEC) climate rules, is expected to further accelerate mainstreaming over the coming years. However, the space remains fragmented. Risk models vary between providers, and data accuracy can be inconsistent, especially at the asset level.
* **Example vendors:** ClimateCheck, ClimateX, CoreLogic, Deepki, EarthScan, IBM, Jupiter Intelligence, S&P Global.

## Building carbon management software

* **Definition:** Building carbon management software refers to digital solutions that measure, track and help reduce carbon emissions across real estate portfolios. These systems account for both operational carbon (from energy use, water and waste) and embodied carbon (from construction materials and processes). By aggregating utility data and applying emission factors, the software calculates GHG outputs, supports compliance reporting and identifies opportunities for decarbonization. Unlike general energy management tools, these solutions focus specifically on carbon accounting, encompassing offsets, renewable energy credits and scenario-based forecasting – enabling building owners and occupiers to set baselines, monitor progress and implement carbon reduction strategies at scale.
* **Maturity phase: Growth.** Building carbon management software is in the early Growth phase, as real estate firms move from ad hoc tracking to more systematic decarbonization planning. Historically, carbon data were managed using spreadsheets or broad sustainability platforms. Today, dedicated solutions are emerging to meet the rising demand from commercial landlords and corporate real estate teams looking to integrate ESG strategies at the portfolio level. The next three years will be a litmus test for these offerings (see [Verdantix Market Insight: 10 Predictions For Real Estate & The Built Environment In 2025 And Beyond (2025)](https://www.verdantix.com/report/market-insight-10-predictions-for-real-estate-the-built-environment-in-2025-and-beyond)). Early adopters, particularly those managing projects in-house, are trialling these tools, but the wider market is still assessing their accuracy and return on investment (ROI).
* **Business value:** **Medium.** Between 2023 and 2029, the carbon management software market is expected to grow from $557 million to $1.5 billion, at a CAGR of 19%, with the largest spenders across manufacturing, and wholesale and retail trade (see [Verdantix Market Size And Forecast: Carbon Management Software 2023-2029](https://www.verdantix.com/report/market-size-and-forecast-carbon-management-software-2023-2029)). For the real estate industry, building carbon management software delivers moderate business value, primarily through regulatory compliance and risk reduction. It helps real estate owners and operators track emissions, avoid fines and meet climate disclosure requirements. In cities with strict carbon caps – such as New York’s Local Law 97 – these tools can prevent significant penalties, positioning them as safeguards rather than direct cost-savers. While the software does not generate immediate ROI, it can uncover inefficiencies that lead to lower energy use and emissions, yielding indirect financial benefits.
* **Pace of innovation:** **5 to 10 years.** Building carbon management software is evolving steadily. Regulatory pressure and ESG demands are accelerating feature development – such as AI-enabled forecasting, automated data capture and granular embodied carbon analytics. However, widespread adoption depends on integrating carbon tracking into core building operations, which generally requires organizational change and better data infrastructure. A key barrier is the lack of standardized methods for calculating emissions, particularly embodied carbon. As frameworks such as the International Sustainability Standards Board (ISSB) and Securities and Exchange Commission (SEC) rules take hold, standardization will improve, making adoption easier.
* **Example vendors:** Brightly Software, CoolPlanet, EnergyCAP, IBM, Persefoni, Position Green, Schneider Electric, Tango, Univers.

## Digital twins for architecture, engineering and construction (AEC)

* **Definition:** Digital twins for AEC are advanced, data-rich models of buildings or infrastructure used during design and construction. Evolving from building information modelling (BIM) and engineering simulation modelling, they integrate geometry (3D), schedule (4D), cost (5D) and real-time data (for example, from sensors or drones) to simulate construction processes, track progress and align the digital model with the physical build. They enable better collaboration across stakeholders and support simulations for performance and logistics; the most evolved versions serve as a single source of truth throughout the project life cycle.
* **Maturity phase: Growth.** In the AEC industry, digital twins have moved beyond pilot projects into broader adoption, especially on large, complex developments. The market is in a mid-Growth phase – while not yet universal, adoption is rising as tools mature and the benefits become clear. Platforms such as Bentley’s iTwin are actively used to unify design and construction data, and widespread BIM use (by about two-thirds of contractors and engineers) lays the groundwork. Governments such as the UK are accelerating adoption through mandates. Challenges such as data interoperability and skill gaps remain, but a growing number of firms are standardizing digital twin practices, signalling a shift from innovation to mainstream use.
* **Business value: High.** Digital twins deliver significant value in AEC by reducing risk, cutting rework, optimizing schedules and improving decision-making. By simulating construction and running clash detections early, they prevent costly field errors. Digital twins also streamline timelines through better sequencing, support faster, data-driven decisions, and enhance safety through scenario planning. At handover, they provide owners with rich, usable digital assets for operations, reducing lifecycle costs. While implementation challenges remain, successful case studies (such as the Qatar World Cup venues, UK’s Crossrail) and industry surveys show strong return on investment (ROI), especially on large, complex projects.
* **Pace of innovation: 5 to 10 years.** AEC digital twins sit at the intersection of fast-moving technologies – BIM, Internet of Things (IoT), cloud, and augmented reality (AR) and virtual reality (VR). Innovations such as real-time sensor integration (for example, concrete curing and equipment GPS) and on-site AR overlays are moving from pilots to practical use, making twin data more actionable. Standards such as the Industry Foundation Classes (IFC) and openBIM are improving interoperability, while solutions such as Bentley iTwin are adding AI features for compliance checks and risk prediction. Despite cultural conservatism in construction, generational shifts and government-backed initiatives – such as the UK’s Gemini Principles and Singapore’s city twin – are accelerating adoption. The main constraint now is not technology, but training and process adaptation.
* **Example vendors:** Autodesk, AVEVA, Bentley Systems, Dassault Systèmes, Esri, Hexagon, Microsoft Azure, Nemetschek Group (dRofus), Planon, Trimble, Twinview, Unity, Visuant.

## AI and GIS portfolio modelling

* **Definition:** AI and geographic information system (GIS) portfolio modelling applies AI to rich geospatial data, enabling real estate and construction teams to model, optimize and monitor entire asset portfolios. Spatial layers – land use, zoning, climate, traffic and utilities – are merged with real-time Internet of Things (IoT) and market feeds; machine learning (ML) engines then predict outcomes, rank scenarios and recommend actions. The result is a living, cloud-based decision platform that informs site selection, design, construction sequencing, operations and disposition, replacing static maps and spreadsheets.
* **Maturity phase: Growth.** The integration of AI and GIS into real estate portfolio modelling is experiencing rapid growth and entering mainstream adoption. Historically, GIS supported spatial analysis primarily for site assessments. Adoption spiked during the pandemic, but users remain concentrated among digital leaders. [Regional appetite is strongest in the Middle East and Africa](https://www.tritonmarketresearch.com/reports/middle-east-and-africa-geographic-information-system-market?), where the GIS market is projected to grow by almost 10% a year between 2019 and 2027. Mega-projects across the Middle East showcase scale potential, using AI-GIS modelling to boost productivity, safety and risk mitigation. Leading edge adopters, such as real estate investors, corporate occupiers, retailers and healthcare providers, are harnessing these platforms for enhanced asset tracking, predictive maintenance and strategic asset optimization.
* **Business value: Medium.** Return on investment (ROI) is compelling across the entire asset life cycle. In construction, geospatial AI supports smarter site selection by integrating terrain, zoning and environmental risk data, while digital twins and augmented reality (AR) enable stakeholders to visualize proposed developments before construction begins. During the build phase, drones and IoT sensors provide real-time tracking of progress, improving safety, scheduling and team coordination. In commercial real estate, geospatial-AI models combine demographic, behavioural and competitive data to guide high-impact location strategies – factoring in foot traffic, competitor proximity and geo-tagged consumer activity. In-store analytics and real-time, location-based marketing further optimize space usage and revenue per square metre. Collectively, these capabilities deliver measurable gains in operational efficiency, customer engagement and asset value.
* **Pace of innovation: 5 to 10 years.** Innovation in AI-driven GIS portfolio modelling is accelerating, driven by geospatial analytics, AI and data availability. Real-time data from satellites, drones, IoT and location services enable continuous, precise assessments. Construction professionals can visualize developments, assess terrain and identify challenges – critical for site selection, access planning and logistics. AI GIS portfolio modelling resolves logistics by optimizing resources, forecasting labour, predicting delivery schedules and recommending routes using live traffic data. ML refines predictive models for demand, asset valuation and spatial optimization, while tasks such as demographic segmentation and drive-time analysis are automated in seconds. Natural language processing (NLP) enables intuitive, conversational interaction for executives. Cloud computing and big data support near-instant processing, and climate resilience analytics improve scenario modelling. With start-ups introducing novel approaches and high-resolution data, innovation will continue accelerating to meet complex spatial analytics demands.
* **Example vendors:** AI Geo Navigators, AI-InfraSolutions, Arkance, EcoSpatial, Esri, Geo5, NavVis, SiteZeus, Tango.

## Construction management software

* **Definition:** A specialized software tool designed to simplify the management of a construction project from its inception to completion. It enables users to plan, execute and deliver the project within a specified timeframe and budget, covering the construct and build phase of the building life cycle (see [Verdantix Green Quadrant: Construction Management Software (CMS) (2025)](https://www.verdantix.com/report/green-quadrant-construction-management-software-cms-2025)).
* **Maturity phase: Growth.** The CMS market is currently in the Growth phase. Verdantix valued the market at $2.9 billion in 2023 and projects it to reach $5.1 billion by 2029, growing at a CAGR of 9.4% (see [Verdantix Market Size And Forecast: Construction Management Software 2023-2029 (Global)](https://www.verdantix.com/report/market-size-and-forecast-construction-management-software-2023-2029-global)). This growth is driven by demand for process automation due to labour shortages and productivity pressures. Regulatory pressure – such as the Building Safety Act and building information modelling (BIM) mandates – is increasing the need for better data and documentation. Moreover, sustainability targets prompt the use of CMS for ESG reporting and material traceability. However, barriers such as high implementation costs, integration challenges and reluctance to move away from traditional practices prevent the market from reaching full maturity.
* **Business value: High.** The business value of CMS platforms is substantial, especially for firms managing complex projects or extensive portfolios, as well as for smaller firms seeking to automate manual processes. These platforms deliver tangible operational benefits by enhancing project coordination, automating compliance workflows, and improving cost, schedule and quality control. Risk mitigation is another key driver – CMS platforms provide robust documentation and audit trails that reduce exposure to legal disputes and regulatory penalties. As sustainability becomes increasingly central, CMS tools also support ESG data collection and material traceability. The market is shifting towards purpose-built CMS suites that integrate multiple project lifecycle functions rather than isolated specialized tools. [Autodesk’s recent repositioning](https://adsknews.autodesk.com/en/views/embracing-aeco/) to an AECO (architecture, engineering, construction and operations) platform illustrates this trend, emphasizing integrated workflows that bridge design, construction and facilities management (FM).
* **Pace of innovation: 5 to 10 years.** Vendors are investing in features such as AI-enabled issue detection, mobile-first user experiences and greater integration with BIM models. There is also a push towards linking construction-phase data to long-term asset operations, enabling continuity between project delivery and FM. Cloud-based deployments are helping reduce implementation timeframes, while enhanced interoperability and sustainability modules are responding to the increasing need for transparent, auditable construction data. However, despite these advances, full digitization across all workflows remains a challenge, especially for small and mid-sized firms where change management and user training remain significant hurdles.
* **Example vendors:** Accruent, Autodesk, Bentley Systems, Dassault Systèmes, Hilti, Nemetschek Group, Omega 365, Oracle, Planon, Procore, RIB Software, Trimble.

## Indoor environmental monitoring

* **Definition:** Indoor environmental monitoring software tracks and analyses key indoor air quality (IAQ) factors in office settings – such as CO₂, humidity, noise, temperature and volatile organic compounds (VOCs) – using sensor data. Facilities managers rely on this information to detect poor air quality and take corrective measures to protect occupant wellbeing. For example, elevated CO₂ or noise levels can hinder concentration, while research shows that excessive humidity or temperature cause discomfort, and higher VOC concentrations are linked to increased sickness and absenteeism (see [Verdantix Staff Are Not Cattle: Best Practices For Delivering Space Consolidation And Wellbeing](https://www.verdantix.com/report/staff-are-not-cattle-best-practices-for-delivering-space-consolidation-and-wellbeing)).
* **Maturity phase: Growth.** Indoor environmental monitoring is in the Growth stage and is at maturity in many markets, especially in Asia. Established sensor technologies for CO₂, VOCs and particulates have seen widespread deployment, especially after the COVID-19 pandemic further raised awareness of IAQ. Adoption is accelerating, with real-time monitoring becoming standard by 2025, supported by government regulations and industry standards such as WELL and RESET. RESET emphasizes continuous, real-time IAQ monitoring with performance-based certification to ensure data quality and transparency, empowering building owners to improve occupant health and sustainability outcomes. Most new commercial buildings and major renovations now include environmental sensors by default. The device ecosystem is mature and more affordable, enabling easier retrofits. Remaining challenges focus on integration with building management systems (BMS) and data analytics.
* **Business value: Medium.** Indoor environmental monitoring delivers clear value by improving occupant health, comfort and productivity – reducing sick leave and boosting performance. It mitigates risks such as sick building syndrome by ensuring air quality meets standards and enables energy savings through real-time HVAC adjustments based on CO₂ and occupancy data. Additionally, it supports sustainability and ESG goals by documenting healthy environments for certifications and tenant wellbeing. IAQ monitoring is widely viewed not as a cost, but as an investment offering return on investment (ROI) through better productivity, compliance, operational savings and enhanced reputation.
* **Pace of innovation: 2 to 5 years.** Innovation in indoor environmental monitoring is moderate, focusing on steady improvements rather than leaps. Sensors such as optical particulate and non-dispersive infrared (NDIR) CO₂ are becoming more accurate, affordable and compact. In 2025, key advances centre on AI-driven integration, with smart systems such as 75F’s HyperStat adjusting ventilation in real time based on IAQ and occupancy. Multi-parameter comfort sensors and wireless, long-life devices using protocols such as LoRaWAN support flexible, large-scale use (see [Verdantix Market Insight: Demand And Opportunities For Smart Devices Capturing Real-Time Data (2025)](https://www.verdantix.com/report/market-insight-demand-and-opportunities-for-smart-devices-capturing-real-time-data)). Machine-learning-powered analytics detect issues early and optimize operations. These evolutionary gains, fuelled by health and sustainability priorities, are making indoor environment data widespread and deeply integrated with building automation.
* **Example vendors:** 75F, Airthings, Ambisense, Awair, Disruptive Technologies, EnOcean, Nuvap, OccupEye (part of FM:Systems), PureLiving, RESET, Schneider Electric, Spica Technologies (part of Nordomatic), Wesco.

## Data centre infrastructure management (DCIM)

* **Definition:** Data centre infrastructure management (DCIM) software provides centralized monitoring and management of all physical and information technology (IT) infrastructure in a data centre. It integrates data from power, cooling, lighting and IT equipment systems to optimize energy use, improve asset management and boost operational efficiency while ensuring uptime.
* **Maturity phase: Growth.** DCIM is in the Growth phase, driven by the increasing complexity and scale of modern data centres. As rack densities rise due to AI workloads and more power-hungry chipsets, operators require advanced tools to optimize cooling, power distribution and IT asset management. DCIM solutions are evolving beyond basic monitoring, integrating energy data from IT equipment and environmental sensors to enable more contextualized facilities management (FM) (see [Verdantix Future of Data Centres (North America) (2024)](https://www.verdantix.com/report/future-of-data-centres-north-america)). Vendors such as Eaton, Nlyte Software and Schneider Electric are expanding their DCIM offerings to incorporate predictive maintenance and energy optimization. With data centres adopting higher power densities and modular designs, the role of DCIM is becoming critical for balancing efficiency, uptime and sustainability, supporting a [forecasted](https://www.futuremarketinsights.com/reports/dcim-market) global CAGR of 15.8% from 2023 to 2033.
* **Business value: High.** DCIM delivers high business value by enhancing uptime, efficiency and capacity utilization in increasingly complex data centres. Continuous monitoring of power and cooling enables proactive risk management, helping prevent costly outages. By providing detailed visibility into space and power usage, DCIM supports smarter capacity planning that defers capital expenditures through optimized resource utilization. It also drives sustainability by identifying cooling inefficiencies and overprovisioned power, leading to significant energy savings. Automation of asset tracking and workflows improves operational productivity and reduces errors. As enterprises increasingly operate in hybrid environments, which combine on-premise data centres, dedicated facilities, colocation centres and public cloud services, DCIM remains essential. It provides unified management across these diverse infrastructures, ensuring efficient, resilient and sustainable operations, whether resources are on-site, leased or cloud-based.
* **Pace of innovation: 5 to 10 years**. After an initial surge in innovation, DCIM development slowed in the mid-2010s as the market matured. However, innovation is now accelerating again, driven primarily by AI, cloud adoption and system integration. Vendors are embedding AI-powered analytics for predictive maintenance and real-time cooling optimization, enabling smarter, more autonomous operations. The shift towards cloud-based DCIM – currently adopted by a growing minority of organizations – is facilitating faster updates and remote management. Key trends are integration with broader enterprise platforms and automation of operational responses, especially to support distributed and edge data centres. Industry standards such as Redfish, which offers a modern, standardized application programming interface (API) for detailed hardware access, are enabling richer and more consistent data collection. While core DCIM functions are stable, innovation in AI, cloud delivery and integration is moderate to high, with maturity expected as DCIM evolves into a flexible, intelligent platform for hybrid and software-defined data centres.
* **Example vendors:** Eaton, Nlyte Software, Schneider Electric, Sunbird Software, Vertiv.

## Integrated security digital platforms

* **Definition:** Software designed to support the monitoring and management of building asset physical security and occupant safety in a unified fashion (see [Verdantix Green Quadrant: Integrated Smart Building Security Software (2023)](https://www.verdantix.com/client-portal/report/green-quadrant-integrated-smart-building-security-software-2023)).
* **Maturity phase:** **Growth.** The market is expanding as firms retire fragmented digital video recorders (DVRs) and badge servers in favour of multi-tenant Software as a Service (SaaS). Legacy majors are containerizing code and launching cloud tiers, while challengers such as Brivo, Eagle Eye Networks and OpenEye are delivering micro-service platforms that scale from one site to global portfolios. Verdantix finds global security operation centres now demand native application programming interfaces (APIs) in building management and workplace applications, accelerating upgrades ([see Verdantix Market Trends: Building System Verticals Entering The Platform Arena (2025)](https://www.verdantix.com/report/market-trends-building-system-verticals-entering-the-platform-arena)). Adoption is uneven: Access Control as a Service (ACaaS) is spreading fast, whereas deep AI analytics remain early-stage. Hybrid work and regulatory scrutiny keep demand globally resilient.
* **Business value: High.** Consolidating surveillance, credentialing and visitor management into one platform eliminates redundant licences, reduces guard headcount and shortens incident resolution from minutes to seconds. Unified credential databases and rules engines cut insider-threat risk, while cross-domain analytics correlate occupancy with HVAC or lighting set-points to cut utility spend. Centralized dashboards automate General Data Protection Regulation (GDPR), ISO 27001 and insurance reporting, and mobile-first experiences give tenants frictionless, badge-less access that lifts satisfaction scores, brand perception and operational continuity. As the architecture is cloud native, upgrades land continuously and insights scale portfolio-wide without extra servers, driving the total cost of ownership down, even as coverage expands.
* **Pace of innovation: 5 to 10 years**. The core features of security platforms, such as access control, video surveillance and alarm management, are already reliable. However, there will be continuous innovation over the next five to 10 years before the product is fully mature. Key upcoming improvements entail AI-driven video systems that automatically detect weapons or overcrowding; audio analytics that recognize distress signals; enhanced cyber security using zero-trust frameworks that eliminate passwords in favour of multi-factor authentication; and simplified integrations enabling easy communication between security and building management systems (BMS). Providers will also focus strongly on cyber security, encrypting data throughout their journey from devices to the cloud and safeguarding tenant privacy. Overall, while technology is rapidly advancing, these new features must carefully balance user-friendly functionality with strict compliance, privacy and security standards.
* **Example vendors:** ABB, Axis Communications, Bosch, Brightly Software, Brivo, Delta Controls, Eagle Eye Networks, Enlighted, HID Global, Honeywell, Johnson Controls, LenelS2, OpenEye, Runwise, ServiceNow, Trane Technologies.

## ESG data and reporting software

* **Definition:** Solutions that allow building owners and occupants to collect, manage and analyse ESG information related to buildings and real estate, to improve sustainability performance; report to mandatory regulations, voluntary sustainable building standards and frameworks; and achieve or maintain building- or asset-related certifications. This encompasses data collection and reporting methods specifically for building data across ESG metrics; ESG risk management of building assets; and analytics for performance optimization, across buildings and portfolios (see [Verdantix Buyer’s Guide: ESG Data Management And Reporting Software For Real Estate (2024)](https://www.verdantix.com/report/buyer-s-guide-esg-data-management-and-reporting-software-for-real-estate-2024)).
* **Maturity phase: Growth.** ESG reporting software has gained significant traction in real estate asset management in recent years, driven by regulatory pressures and growing stakeholder demands for transparency. However, this segment appears poised for a transition – potentially pivoting towards broader sustainability or climate risk management platforms as market needs and regulatory frameworks evolve. While currently essential for compliance and risk management, firms are increasingly looking for integrated solutions that go beyond reporting to enable strategic ESG decision-making.
* **Business value: Medium.** ESG reporting platforms are vital for meeting regulatory requirements, managing risk and maintaining capital access – though direct financial returns may be indirect or longer-term compared with energy-efficiency technologies. The key benefits are enabling accurate regulatory reporting, enhancing investor and lender confidence through transparency, and identifying operational inefficiencies that support cost savings. The depth of business impact depends on how firms leverage ESG data – those embedding them into strategic decision-making see greater value. As ESG-linked financing and carbon pricing mature, the tangible financial benefits of these platforms are expected to rise.
* **Pace of innovation: 2 to 5 years.** ESG reporting software is expected to remain a critical investment area for the real estate asset management sector, despite political headwinds in some markets. The EU’s proposed Omnibus package seeks to ease certain regulatory burdens under the Corporate Sustainability Reporting Directive (CSRD), but regulatory and political adjustments may temper the pace of adoption. Demand for ESG solutions in real estate remains strong, driven by investor expectations, global sustainability commitments and voluntary frameworks such as the Global Real Estate Sustainability Benchmark (GRESB) and the Task Force on Climate-related Financial Disclosure (TCFD). Innovation also continues, particularly in tools that quantify ESG impact across buildings and portfolios.
* **Example vendors:** Alasco, BuildingMinds, Conservice ESG, Deetu, Enertiv, Etainabl, Evora Global, IBM Envizi, Infogrid/Aquicore, Johnson Controls, Quantrefy, Scaler Global, Schneider Electric, SedaiNow, SiemensSI, Utopi.

## Property valuation and appraisal software

* **Definition:** Property valuation and appraisal software uses data and automation to assess real estate value more efficiently and accurately than traditional methods. Tools such as automated valuation models (AVMs) apply algorithms to large data sets – such as comparable sales, property details and market trends – to instantly estimate property values. These digital platforms assist appraisers by streamlining data collection and report generation. Leveraging AI and machine learning (ML), they analyse features such as location and size, generate value estimates with confidence scores, flag anomalies and interpret unstructured data. While they do not replace human judgment, they facilitate a collaborative workflow in which appraisers, data sources and AI-powered tools work together to accelerate valuations, enhance consistency and deliver data-driven insights.
* **Maturity phase:** **Growth.** This software is in a Growth phase, with mature tools such as residential AVMs widely used by lenders for low-risk mortgages continuously improving in accuracy. Commercial appraisal technology is less mature, but rapidly advancing, driven by PropTech start-ups and increased adoption of software for gathering comparable data and auto-generating valuation reports. While technology-driven valuation is broadly accepted, regulatory and trust barriers keep human appraisers essential for official sign-offs. Growth is fuelled by cloud collaboration platforms, AI analysis of leases and pandemic-driven digital workflows. Rising start-up activity and M&As signal momentum, with full maturity expected once AI valuations gain universal trust and certification.
* **Business value: High.** Valuation and appraisal software delivers significant business value by speeding up valuations, improving consistency and reducing reliance on costly full appraisals. By automating data collection, these platforms increase appraiser productivity and enable deeper insights into value drivers and investment scenarios. Standardized valuation methods enhance risk management, compliance and auditability. The technology also provides valuable market intelligence for benchmarking and forecasting, supporting more agile and informed decision-making across lenders, investors and portfolio managers.
* **Pace of innovation: 2 to 5 years**. The pace of innovation in valuation and appraisal software is driven by advances in AI, data availability and changing industry attitudes. ML models now incorporate structured and unstructured data, improving AVM accuracy. Cloud-based platforms enable real-time collaboration and digital inspections, with remote property inspection tools integrated during the COVID-19 pandemic. Start-ups are integrating geospatial, satellite and Internet of Things (IoT) data into valuations. Regulatory technology is advancing model validation and transparency. Competition among PropTech firms drives frequent innovation, with new AI approaches and crowd-sourced data-enhancing valuations. Generative AI (GenAI), such as OpenAI’s ChatGPT, is automating report writing and complex queries. Strong investor interest fuels continuous R&D, with frequent M&A activity injecting new technology into workflows. The appraisal process is becoming more digitized and streamlined, with expectations for real-time valuations and broader acceptance of automated valuations in the coming years.
* **Example vendors:** Altus Group (Argus Enterprise), Bowery Valuation, C3 AI, CBRE (internal platforms), Clear Capital, CoreLogic, CoStar, JLL (Valorem platform), Moody’s CRE, MSCI Real Estate (Real Capital Analytics), Reonomy.

## Occupant engagement software

* **Definition:** Occupant engagement applications are mobile-first solutions that improve tenant and employee experience by enabling easy access to building updates, amenity bookings, environmental controls and community features. They integrate with smart building systems for wellness and sustainability, support flexible workspace use, and foster social interaction through event management and personalized communication (see [Verdantix Smart Innovators: Tenant Engagement And User Experience Software (2025)](https://www.verdantix.com/report/smart-innovators-tenant-engagement-and-user-experience-software)). These applications help landlords boost tenant satisfaction, retention and operational efficiency. They are most prevalent in offices, but are also common in retail and student accommodation asset classes.
* **Maturity phase: Growth.** Occupant engagement applications are in a rapid Growth phase, having gained significant momentum between 2018 and 2020. The COVID-19 pandemic accelerated their importance by highlighting features such as contactless access and hybrid work scheduling. By 2025, many large landlords and corporate workplaces – especially in technology-forward regions such as North America, Western Europe and Asia-Pacific – have widely deployed these applications, often viewed as standard amenities in Class A buildings. However, adoption is uneven globally and within organizations: some see daily active use, while others struggle with engagement. Vendor market consolidation indicates maturity, with core functionality stabilizing, even as innovation continues around wellness and integration with city services. Leading cases such as Savills with its 99% adoption and J.P. Morgan’s rollout of HqO demonstrate high maturity in usage and value.
* **Business value: Medium.** Occupant engagement applications deliver moderate business value. For occupants, these applications simplify workspace booking, service requests and building navigation, boosting satisfaction, productivity and wellbeing. They enable quick, personalized workspace selection and faster issue resolution, improving comfort and safety. From a landlord’s perspective, the applications generate critical data on space usage and occupant sentiment, supporting optimized facilities management (FM) and real-time feedback. In the Verdantix global corporate real estate survey, enhancing occupant experience ranked as the highest priority objective across all industries, driving strong demand (see [Verdantix Global Corporate Survey: Real Estate Technology Budgets, Priorities & Preferences For 2025](https://www.verdantix.com/report/global-corporate-survey-real-estate-technology-budgets-priorities-preferences-for-2025)). These platforms also streamline tenant communications, automate processes and increase amenity utilization, improving return on investment (ROI). Leading landlords view these applications as strategic differentiators that attract and retain tenants by making buildings more ‘frictionless’ and engaging.
* **Pace of innovation: 2 to 5 years**. The pace of innovation is driven by evolving workplace needs and advancing technologies. Occupant engagement applications have quickly expanded from simple tools to comprehensive, feature-rich platforms, amid strong competition from start-ups and major integrated workplace management system (IWMS) providers. Key innovation areas are seamless integration with building systems (access control, HVAC and elevators), corporate tools (for example, Microsoft Teams) and mobile wallets (such as Apple Wallet for digital badges). AI-driven personalization and conversational interfaces enhance user experience by automating requests and optimizing workspace bookings. Frequent update cycles and significant PropTech investment underpin this brisk innovation pace, which is expected to continue as these applications mature towards mainstream adoption.
* **Example vendors:** Appspace, Chainels, digital blanket, Equiem, essensys, HqO, JLL (Building Engines), Matrix Booking, Smart Spaces, View The Space (VTS).

# Real estate and facilities software in Phase 4: Maturity

## Energy management software (EMS)

* **Definition:** Energy management software (EMS) helps organizations monitor, analyse and optimize energy use across building portfolios. It integrates data from building systems, Internet of Things (IoT) sensors and utilities into centralized platforms, offering real-time analytics, automated control and carbon tracking. EMS supports energy procurement, fault detection, predictive maintenance, project performance and emissions management, leveraging AI to improve efficiency, reduce costs and ensure regulatory compliance. It is essential for managing energy risks, grid variability and sustainability goals (see [Verdantix Smart Innovators: Energy Management Software (EMS) (2025)](https://www.verdantix.com/report/smart-innovators-energy-management-software-2025)).
* **Maturity phase: Mature.** EMS has evolved from monitoring and targeting applications in the 2000s, experiencing strong growth. After energy prices stabilized between 2014 and 2020, investment slowed, prompting some vendors to exit or pivot (see [Verdantix Tech Roadmap: Energy Management Technologies (2024)](https://www.verdantix.com/report/tech-roadmap-energy-management-technologies-2024#:~:text=This%20Tech%20Roadmap%20report%20provides%20an%20analysis%20of,storage%2C%20generation%2C%20lighting%2C%20windows%2C%20software%2C%20controls%20and%20sensors.)). However, recent price volatility has reignited demand. Modern EMS platforms have transformed from basic dashboards into integrated, cloud-based solutions offering real-time analytics, automated controls, carbon management and procurement risk analysis. Vendors embed AI and machine learning (ML) for predictive maintenance, autonomous HVAC optimization and emissions reduction planning. Buyers prioritize portfolio-wide scalability, deep integration and advanced carbon tracking aligned with ESG regulations.
* **Business value: High.** Access to accurate, real-time energy consumption data drives significant cost savings. EMS empowers real estate managers to collect, analyse and act on detailed energy data to identify inefficiencies and optimize consumption. Advanced solutions integrate external data such as real-time energy prices and weather forecasts, enabling more agile and informed operational decisions. Integration with building management systems (BMS) allows EMS platforms to enhance control strategies and optimize building performance. Beyond cost savings, EMS plays a vital role in sustainability by centralizing carbon emissions data, simplifying compliance and supporting reporting aligned with evolving regulatory requirements.
* **Pace of innovation: 10+ years to Decline**. Improving the IoT capabilities of EMS is a key focus for many vendors, as the ability to collect detailed usage data from distributed assets provides valuable insights into energy consumption patterns. Advanced solutions are increasingly integrating AI and ML to enable more powerful analytics and predictive capabilities – such as forecasting future energy use based on historical data, weather conditions and occupancy trends. Additionally, with emerging sustainability regulations such as the EU’s Corporate Sustainability Reporting Directive (CSRD), EMS platforms are evolving to support carbon emissions tracking and reporting, making them essential tools for compliance and sustainability strategy.
* **Example vendors:** ABB, Accruent, aedifion, Ameresco, Bosch, BrainBox AI, Bueno, Clockworks Analytics, digital blanket, Enel X, EnergyCAP, EnergyElephant, Eptura, Facilio, Grid Edge, GridPoint, Hank Solutions, Honeywell, IBM, Infogrid, Johnson Controls, Metron, MRI Software, NodaAI, Planon, Resolute, Runwise, Schneider Electric, Sidara, Smarkia, Spacewell.

## Access control systems

* **Definition:** Access control systems provide facilities management (FM) teams with data and analytics on occupancy levels at the building or floor level. Capturing data on space usage, the technology offers an alternative to Internet of Things (IoT) sensors or Wi-Fi-based approaches. It can also provide data on employee identity, helping corporate heads of real estate and facilities identify who is entering buildings.
* **Maturity phase: Mature.** Electronic access control systems have been used widely for decades, with card-based access common in office buildings from the 1990s. The technology is well-established, particularly in medium to large commercial and institutional facilities – most office towers, hospitals and campuses now rely on some form of electronic access control. However, smaller businesses and older residential buildings are still catching up. While traditional components such as radio-frequency identification (RFID) cards and electronic locks are mature and standardized, the industry is evolving towards more advanced and integrated solutions, such as biometric and smartphone-based systems. Access controls are a critical component of integrated smart building security platforms, increasingly converging with video surveillance, intrusion detection and broader building management systems (BMS) (see [Verdantix Market Size And Forecast: Building Security Technology 2022-2028 (Global)](https://www.verdantix.com/report/market-size-and-forecast-building-security-technology-2022-2028-global)). The sector can thus be described as ‘early mature’: the core technology is stable, but innovation centres on integration and mobile-first approaches.
* **Business value: High.** Electronic access control delivers strong business value, primarily through enhanced security and operational efficiency. It plays a key role in risk mitigation by controlling who can access facilities, reducing threats such as theft, workplace violence and espionage – making it essential for many organizations, especially when it is mandated by policies or insurance. Its auditability supports compliance in regulated industries, such as pharmaceuticals, offering traceability that physical keys cannot. Operationally, it enables rapid response – credentials can be deactivated instantly, avoiding delays and security gaps tied to lost or unreturned keys. Though its financial return on investment (ROI) is hard to quantify directly, like insurance, its value lies in preventing massive losses and streamlining access processes. For large or high-risk facilities such as data centres, the technology is mission-critical; for smaller offices, it is still beneficial, though less vital.
* **Pace of innovation: 10+ years to Decline.** Traditional access control technology – centred on card readers, control panels and on-premise server software – still has more than 10 years before any real decline, as it remains widely used and reliable. However, the industry is now undergoing a moderate refresh, driven by innovations such as mobile credentials, cloud-based management, biometric authentication, and integration with systems such as video surveillance and visitor management. While the core function of electronically controlling access remains unchanged, improvements in user convenience, system integration, analytics and emergency response are steadily modernizing the ecosystem. Adoption is cautious due to the critical nature of security; most new or upgraded systems are expected to incorporate mobile and cloud capabilities, along with the gradual adoption of AI and biometrics.
* **Example vendors:** ASSA ABLOY, Bosch Access Control, Brivo, HID Global, Honeywell Security, Johnson Controls, Kastle Systems, LenelS2, Salto Systems, Siemens SiPass integrated.

## Property and lease management software

* **Definition:** Property and lease management software refers to technology solutions designed primarily for landlords and property owners to manage real estate assets efficiently. These tools handle tenant engagement, lease administration, rent collection, maintenance coordination, compliance tracking and financial reporting, helping landlords optimize asset performance and streamline operational processes.
* **Maturity phase: Mature.** These technologies are currently in the Maturity phase of the technology life cycle. They have achieved widespread adoption across various sectors, including commercial, residential and industrial real estate. The market has seen significant consolidation, with leading vendors offering comprehensive, integrated solutions that address a wide range of property management needs. Today’s leading platforms offer integrated lease administration, space optimization and financial compliance modules. This maturity also reflects the existence of established best practices, strong vendor ecosystems and ongoing investment in customer support and integrations.
* **Business value: High.** The business value of property and lease management systems is consistently rated as high due to their broad impact on operational efficiency, cost savings and regulatory adherence. Automating lease lifecycle processes reduces human error and administrative costs, while improving speed and accuracy. Financially, these technologies help track and forecast rent revenues, manage operating expenses, and ensure timely payments and renewals – all of which enhance cash flow management. Strategic decision-making is also strengthened through dashboards and analytics, allowing real estate managers to optimize space utilization, assess portfolio performance and drive sustainability goals. Market data support the importance of these systems – the [global property management software market](https://www.techsciresearch.com/report/property-management-software-market/14757.html?) is projected to grow at a CAGR of 10.9% to 2029.
* **Pace of innovation: 5 to 10 years.** Thiscategory is expected to remain in the Maturity phase for the next five to 10 years, before entering a potential Decline phase. This relatively extended timeframe reflects the ongoing evolution of core functionality, continued integration with AI and Internet of Things (IoT), and the growing regulatory complexity that will keep driving product enhancements. Over the next decade, innovation will likely focus on real-time analytics, machine learning (ML) lease risk models, sustainability tracking, and deeper enterprise resource planning (ERP) and workplace system integrations. However, once these advanced capabilities are fully embedded and the market reaches saturation, innovation will plateau. At that point, most organizations will already be on their second or third generation of these platforms, and new growth will depend on replacing legacy systems or expanding into adjacent offerings. Unless a disruptive paradigm emerges (such as blockchain-based lease execution or fully autonomous smart buildings), the technology will gradually transition into the Decline phase as adoption stabilizes and differentiation among platforms diminishes.
* **Example vendors:** Accruent, AppFolio, Buildium, DoorLoop, Entrata, FinQuery, Grosvenor Systems, insightsoftware, MRI Software, Oracle, RealPage, ReLeased, SAGE, SAP, TenantCloud, Trace Solutions, View The Space (VTS), Visual Lease, Yardi Breeze.

## Integrated workplace management systems (IWMS)

* **Definition:** Integrated workplace management systems (IWMS) are enterprise-scale software platforms that help organizations capture information and optimize and report on the management of real estate portfolios. They do this by gathering and storing data on capital projects, space, maintenance, energy and sustainability metrics. IWMS solutions comprehensively support space and workplace management processes, covering space reporting, restacking, recharging, reservation tools and move management (see [Verdantix Green Quadrant: Integrated Workplace Management Systems (2022)](https://www.verdantix.com/report/green-quadrant-integrated-workplace-management-systems-2022)).
* **Maturity phase: Mature.** The IWMS software market has undergone a massive transformation since its inception in the 1980s. Initially, IWMS offerings encompassed five key capability areas for real estate and facilities professionals: property and lease management, maintenance management, capital project management, space and facilities management (FM), and energy and utility bill reporting. Over time, IWMS vendors broadened and evolved their solutions in response to new customer demands and technological advances, such as the Internet of Things (IoT) and advanced analytics, with many developing into connected portfolio intelligence platforms (CPIP).
* **Business value: Moderate.** The business value of IWMS lies in providing a unified platform that improves data quality by creating a single source of truth, driving process standardization, and reducing the information technology (IT) costs associated with managing multiple applications. IWMS enhances decision-making across real estate management through better space utilization, optimized maintenance scheduling, stronger financial control over capital projects, timely lease renegotiations, improved lease accounting, and streamlined supplier management. Post-COVID-19, firms are leveraging IWMS lease modules to implement systematic lease renegotiation programmes, unlocking further cost savings. While the push for all-in-one platforms has softened due to open application programming interfaces (APIs) enabling better system connectivity, IWMS remains a critical tool for operational efficiency, financial management and portfolio optimization. However, the value of IWMS is reduced when the various modules lack full integration with each other, other complementary point solutions or with base building data.
* **Pace of innovation: 5 to 10 years.** Vendors are rapidly evolving traditional IWMS into CPIPs by integrating IoT data, AI-powered analytics and advanced data management capabilities (see [Verdantix Green Quadrant: Connected Portfolio Intelligence Platforms (CPIP/IWMS) (2025)](https://www.verdantix.com/report/green-quadrant-connected-portfolio-intelligence-platforms-cpip-iwms-2025)). Innovation is focused on expanding data integration from operational technology (OT) systems, improving mobile applications for occupant and technician engagement, and embedding AI-driven tools such as chatbots and space optimization algorithms. While the core IWMS functions are well-established, vendors compete on the depth of integration, configurability and industry-specific capabilities. Overall, the innovation pace reflects a mature market adapting to new technologies and customer demands to deliver more intelligent, responsive real estate and FM solutions.
* **Example vendors:** Accruent, Collectiveview, Eptura, IBM (via TRIRIGA), Johnson Controls (including FM:Systems), MRI Software, Nuvolo, Planon, Service Works Group, Spacewell (part of the Nemetschek Group), Tango, VLogic Systems, zLink.

# Real estate and facilities software in Phase 5: Decline

## Computer-aided facility management (CAFM)

* **Definition:** Computer-aided facility management (CAFM) is a real estate software solution that enables facilities management (FM) operations to run smoothly, with minimal interruption. This is achieved by allowing end-users to track and coordinate customer service requests for soft FM services such as catering, space use, room booking and move management, and work orders for maintenance repairs. CAFM functionality is now included within integrated workplace management system (IWMS) solutions for corporate enterprises and within many property management software solutions for building owners and landlords.
* **Maturity phase: Decline.** Though CAFM solutions have been instrumental in FM, the market is witnessing a shift towards more integrated platforms. The emergence of IWMS and the integration of advanced technologies are leading to a gradual phasing out of standalone CAFM systems. Organizations are increasingly adopting comprehensive solutions that offer broader functionality beyond traditional CAFM capabilities (see [Verdantix Market Insight: The Transformation Of IWMS To Connected Portfolio Intelligence Platforms (CPIP)](https://www.verdantix.com/report/market-insight-the-transformation-of-iwms-to-connected-portfolio-intelligence-platforms-cpip?)).
* **Business value: Low.** CAFM systems continue to deliver value by enhancing operational efficiency, reducing downtime and providing insights into facility performance. However, as organizations seek more holistic solutions that encompass a wider range of functionality, as well as integrating with both enterprise resource planning (ERP) and base building systems, the standalone value proposition of CAFM is diminishing. The integration of CAFM functionality into broader platforms is becoming the preferred approach for many enterprises.
* **Pace of innovation: 5 to 10 years until evolution or replacement by IWMS or IoT platforms.** The FM landscape is evolving rapidly, with technologies such as AI, Internet of Things (IoT) and cloud computing reshaping operational paradigms. These advancements are driving the development of more comprehensive and intelligent systems, leading to the gradual obsolescence of traditional CAFM solutions.
* **Example vendors:** Accruent, Collectiveview, Eptura, FMX, IBM (via TRIRIGA), Idox Software, MRI Software, Oracle, Planon, ROSMIMAN, SAP, ServiceNow, Service Works Global (SWG), Upkeep, VLogic Systems, zLink.