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Green Quadrant Integrated Workplace Management Systems 2019

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This version of the report contains Verdantix's summary of IBM's capabilities to help prospective customers evaluate whether the vendor is a good fit for their real estate and facilities information management requirements. It does not contain other vendor profiles.

SMART BUILDINGS

Green Quadrant Integrated Workplace Management Systems 2019

This report provides a detailed fact-based comparison of the 16 most prominent integrated workplace management system solutions available on the market today. Based on the proprietary Verdantix Green Quadrant methodology, the analysis is based on two-hour live product demonstrations with pre-set usage scenarios and vendor responses to a 165-point questionnaire. To understand customer needs Verdantix conducted in-depth interviews with 15 software buyers at organizations that occupy mid to large real estate portfolios and reviewed the data from a survey of 303 real estate decision-makers. Our fact-based analysis concludes that six vendors lead the market and they demonstrated an excellent breadth of functionality and strong market momentum. The analysis also reveals that other vendors offer strong propositions in workplace management, mobile solutions for facility engineers and tenant-facing engagement.

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ORGANIZATIONS MENTIONED

Accela¸ Accruent, Addnode Group, Airbus, Amazon, Amey, Aquicore, ARCHIBUS, ASOS, AssetWorks, Autodesk, Axxerion, Bayer HealthCare Pharmaceuticals, BC Hydro, Big Fish Games, Blue Cross Blue Shield, Bouygues Energies & Services, BrokerSavant, Brookfield Europe, Brown University, Bruges Police, BT, CADM, Caleres, Calgary Board of Education, California Polytechnic State University, Canadian Tire, Canon, Carolina Union University, Catholic Health Initiatives, Causeway Technologies, CBRE, City of Bruges, City of Cleveland, City of Hamilton, City of Sint-Niklaas, Co3 Group, Concordia, conjectFM, CoWorkr, Current, Danfoss, Danish Building and Property Agency, Dartmouth College, Debenhams, Deloitte, Dixons Carphone, ECH, eCIFM Solutions, Eindhoven University of Technology, EMS, ENGIE, eSight Energy, EVORA, Excitech, Facilicom, FASB, Federal Pensions Service, FieldFLEX, Flemish Government, FM:Systems, Frontier Capital, FSI, G4S, Gasunie, GelreDome, Gemeente Culemborg, General Authority of Civil Aviation, General Electric, Genstar Capital, Gentech, Glose, Google, Granlund, Gravicon, Guitar Center, H&M, Halfords, Hammerson, Hanesbrands, Herman Miller, Horizant, Hydro Ottawa, IASB, IBM, iOFFICE, ISS, JMI Equity, Kaiser Permanente, Kier Group, King's College, Kwintes, Kykloud, Lancashire NHS Foundation Trust, London City Airport, Lucernex, Marks & Spencer, MathWorks, McKesson, MCS Solutions, Mercy Medical Center, Michigan Department of Transportation, Mishcon de Reya LLP, Mobiess, MRI, MVGM, National Land Survey of Finland, Nemetschek Group, New York City School Construction Authority, NJW Limited, Nuvolo, OCS, Oracle, Oregon Department of Transportation, Peterborough City Hospital, Planview, Planon, Portfolio Solutions, Portsmouth Regional Hospital, Progressive Casualty Insurance, ProLease, QED Advanced Systems Limited, Qlik, Q-Park, Qube Global Software, Raiffeisen Property Holding International, Rapal, RCG Ventures, REDEVCO, Rosmiman, Salford Royal Hospital, School District of Philadelphia, Scudo Solutions, Sellafield, Senate Properties, ServeU, Service Works Global, Siemens, Signet Jewelers, Sodexo, SpaceTrak, Spacewell, SPIE, St. Francis Medical Center, STRABAG Property and Facility

Services, Symetri, Tesco, Trimble, UberRetail, UK Defence Infrastructure Organisation, UniCredit, University of Eastern Finland, University of Edinburgh, University of Helsinki, University of Oulu, US Department of Homeland Security, United States Department of Veterans Affairs, VA Long Beach Healthcare System, Vantaa City Centre, VergeSense, Vista Equity Partners, VLogic, Waud Capital, Whitesmiths, Woodside Energy, World Bank Group, Yelp, zLink.

The State Of The Market For Integrated Workplace Management Systems

Integrated workplace management systems (IWMS) are used by building occupiers, facilities services firms, landlords and managing agents to centralize real estate and facilities data and drive operational improvements. The traditional audience of IWMS solutions were real estate and facilities professionals, but today the solutions are expanding their touchpoints to include all building occupants and visitors. Globally there are hundreds of specialist real estate and facilities software products available on market. IWMS solutions are distinct because they offer the broadest range of software functionality and are the leading contender to be the supervisory layer to consolidate a firm's real estate data in the future (see Verdantix Market Overview: Real Estate, Energy And Facilities Information Management).

This report provides the individuals responsible for selecting, implementing and getting value from IWMS solutions with a detailed benchmark of the 16 most prominent solutions available on the market. These individuals include executives in facilities, IT, operations, and real estate roles. Their questions include:

- **Which IWMS solutions will meet the requirements of my organization?**
- **Which IWMS solutions are leading the market?**
- **How does my existing software compare to other products available on the market?**
- **How can I benchmark the functionality and depth of experience of IWMS providers and assess the ability of these providers to deliver value?**

To answer these questions, Verdantix analysed 16 software solutions using a 165-point questionnaire and conducted two-hour live software demonstrations. We also interviewed a panel of 15 buyers of real estate software solutions with collective annual revenues of $230 billion, to understand their requirements and gather feedback on the solutions in the market. The resulting analysis is based on the proprietary Verdantix Green Quadrant methodology designed to provide an evidence-based, objective assessment of suppliers providing comparable products or services.

We note that the denomination of IWMS solutions is not consistent across the market and there are some regional variations. In some instances, vendors and buyers use the term computer-aided facility management (CAFM) and IWMS interchangeably, while in other instances vendors use the term CAFM to describe software products that offer narrower functionality focused on facilities management. To cut through the confusion, later in this report we set out the inclusion criteria for the solutions covered in this benchmark.

IWMS Gets A New Lease Of Life As New Deployments Swell In 2018

The evolution of IWMS solutions dates back to the 1980s, with the launch of software products to help organizations collect, centralize and report real estate and facilities data efficiently and consistently. While customer uptake continues to grow, today some market commentators are proclaiming that IWMS solutions are now outdated under the slew of new entrants offering IoT-based software. In addition, the rise of open APIs, which allow different software applications to communicate and exchange data, naturally challenges the need for firms to implement a single platform from one vendor. So are IWMS solutions resonating with buyers? Verdantix research shows that IWMS solutions are thriving today because:

- **New IWMS implementations roared ahead in 2018.**
  2018 was one of the hottest years for new IWMS implementations. On average, IWMS vendors grew their revenues 15% to 20% in 2018, a strong indicator their products are resonating with buyers. Buyer demand was triggered by a host of factors, particularly interest from real estate managers in adopting new software solutions to improve their management of lease data as the new accounting deadlines loomed (see Verdantix Using Software To Simplify FASB and IASB Lease Accounting Changes: Eight Critical Questions When Selecting A Solution). Other factors driving interest included large firms looking to acquire better tools for room booking and for improving the tracking of vendor performance.

- **Buyers have a long-term vision to manage data through an integrated platform.**
  Most real estate managers have a long-term ambition to centralize all their firm's real estate and facilities data. According to our 2018 survey with 303 real estate managers, 35% of firms want to pursue this vision by using a platform from a single vendor (see Verdantix Global Survey 2018: Smart Building Technology, Budgets, Priorities & Preferences). A further 25% of firms want to tie together 'best-of-breed' software products from multiple providers using a single reporting platform. In both of these scenarios, there is a clear role for an IWMS solution in centralizing all or some of a firm's data and workflows. The benefits of rolling out an IWMS include reduced complexity for IT teams maintaining the applications as well as providing users a consistent user interface throughout (see Verdantix The Business Case For Integrated Workplace Management Systems).

- **Vendors are allocating healthy portions of revenue towards product development.**
  The data that Verdantix collected as part of our Green Quadrant benchmark shows that, on average, IWMS vendors are reinvesting 20% to 25% of their annual revenue into product development. This has translated into vendors deepening the functionality of their platforms in areas such as maintenance management, space management and lease management. In 2018 most IWMS vendors raised the quality of their space management capability by launching the functionality to capture more detailed data on space usage via sensors and other sources such as room booking and badge swipe systems (see Verdantix IWMS Benchmark: Space Management And Workplace Services). This is enabling IWMS vendors to steadily catch up with the space tracking functionality offered via specialist workplace software products.

- **Vendors are building APIs so buyers can use an IWMS alongside specialist software.**
  IWMS solutions today are being designed by vendors to be modular and work alongside third-party real estate and facilities management software solutions, with data exchange enabled via open APIs. This helps address buyers' concerns that rolling out an IWMS necessitates being locked into a single vendor for all their real estate and facilities data management needs. For example, iOFFICE operates a software marketplace whereby customers can integrate its IWMS with software from specialist providers such as Planview for capital project planning or Portfolio Solutions for lease management.

IWMS Solutions Will Become More Employee-Centric And Support Interactions Beyond The Desktop

The IWMS market is thriving today as vendors funnel significant proportions of revenue into product development, and there was strong uptake by buyers in 2018. The next three years will be shaped by the:

- **Consolidation of the vendor landscape following lots of M&A.**
  Since Verdantix ran the 2017 IWMS Green Quadrant benchmark there has been a high volume of mergers and acquisitions between vendors (see Figure 1). This deal activity has been driven by software

FIGURE 1

Market Transactions Impacting The IWMS Vendor Landscape July 2017 To January 2019

Date	Event	Description
2017		
July	Acquisition	IT solutions provider Addnode Group acquires SWG
August	Acquisition	Accruent acquires IWMS solution provider Lucernex
October	Acquisition	Real estate software vendor MRI acquires Qube Global Software
2018		
January	Acquisition	Accruent acquires surveying and inspection software provider Kykloud
February	Acquisition	Planon acquires CAFM software vendor conjectFM
June	Acquisition	Accruent acquires resource scheduling software vendor EMS
July	Acquisition	Industrial solutions vendor Fortive acquires Accruent
August	Acquisition	Nemetschek Group acquires MCS Solutions (now Spacewell)
September	Merger	Axxerion (now Spacewell) merges with maintenance software vendor Plandatis
December	Acquisition	ARCHIBUS acquires workplace software vendor Serraview
December	Buyout by PE	Waud Capital buys out iOFFICE
December	Investment	ARCHIBUS receives funding from JMI Equity
December	Merger	SWG merges with the facilities management division of Symetri, a provider of 3D modelling and simulation solutions
2019		
January	Acquisition	MCS Solutions acquires Axxerion. Both vendors are now part of the Spacewell division of Nemetschek Group

Source: Verdantix

firms looking to grow their international scale and customer bases, and deepen functionality. For example, in 2017 Accruent acquired Lucernex to provide it with a specialist product for real estate and property management; then in 2019 Spacewell (formerly MCS Solutions) acquired Axxerion to boost its presence in the Netherlands and US. The result for buyers? The M&A activity initially consolidates the volume of IWMS vendors, but it increases the choice of vendors with international delivery capabilities.

- **Push by vendors to accelerate the time to value of their products.**
  We expect that IWMS vendors will continue their push to reduce the length of implementation time by launching industry-configured solutions and embedding more best-practice workflows into their software. Trimble has already increased the number of workflows it offers out-of-the-box, which has reduced the time to implement its lease management and space management solutions by as much as 50%. Planon finds that the application of its best-practice frameworks reduces the cost to implement by 30%. However, customers will only benefit from these savings in the cases where they do not ask for significant customization.

- **Further investment in APIs so buyers can knit together IWMS and specialist software.**
  Going forward, Verdantix expects vendors will develop a broader set of APIs so their IWMS platforms can tie together neatly with third-party software products. This trend will be valuable for buyers that want to use their IWMS alongside software solutions offered by specialists or innovative software start-ups. For example, MRI has developed an ecosystem of 350 APIs so its customers can exchange data between MRI software products and third-party or custom applications. Its partnership ecosystem currently includes BrokerSavant for lease abstraction and EVORA for sustainability data management.

- **Revitalization of user interfaces with the application of visual analytics.**
  Verdantix hears from IWMS users that they want vendors to improve the user interface of their complex software solutions by making them more graphical and easier to use. Some IWMS vendors have already enhanced the quality of their visual analytics and dashboards by embedding specialist business intelligence tools into their platform. For example, Tango embeds Oracle's business intelligence graphical technology directly into its platform; and Spacewell's MCS brings data visualization tools from Qlik into its solution to improve charts and dashboards. Buyers need to question IWMS vendors on their three-year strategy to launch user interface improvements.

- **Revamp of mobility solutions for maintenance workers.**
  Most IWMS, CAFM and CMMS vendors already offer mobile apps that provide maintenance and asset data to technicians working in the field. These mobile apps were launched over the past four years as add-ons to existing desktop applications. Verdantix hears from IWMS vendors that improving mobile apps are a priority for product roadmaps over the next three years; as such, we expect vendors will launch revamped mobile apps that bring deeper functionality using location-based services and more intuitive user interfaces. Buyers looking to enhance the mobile capabilities of their existing IWMS solution should also review the offerings from specialist mobile app extension providers such as eCIFM Solutions, FieldFLEX, Mobiess, NJW Limited (part of Causeway Technologies) and Whitesmiths to improve their mobile capabilities.

- **Innovation in digital twin technology filtering into IWMS solutions.**
  Digital twins are a hot topic throughout the software world. The term is not used consistently but typically describes a digital model of an asset or factory production line and real-time performance data that draws on sensors and simulation analytics (see Verdantix Tech Roadmap For Facilities Optimization Software). Most IWMS solutions can already show a digital model of a building based on integrations with BIM software, such as Autodesk's Revit. Going forward, Verdantix expects IWMS vendors will bring more real-time performance data onto digital models of buildings.

- **Rise of digital signage and voice-based interfaces for workplace tools.**
  Verdantix expects IWMS vendors will continue their push to take workplace tools beyond the desktop in response to agile working and homeworking trends. IWMS vendors have already formed partnerships to make their solutions available on interactive kiosks and touch screens. For example, FM:Systems offers bookME, which enables employees to use digital signage and mobile apps to find and reserve space. FSI integrates its Concept Evolution system with Qubi from QED Advanced Systems Limited, an interactive light cube that supports rapid check-ins and check-outs of hot desks. Verdantix has heard from multiple real estate and facilities software vendors they will offer voice-based user interfaces for workplace services as the technology matures. IBM already offers Watson Assistant for the workplace, which allows users to make voice-activated requests to locate workstations and make service requests.

Buyers Need To Watch Out For Variation In IWMS Vendor Strategies

Over the next three years, IWMS vendors will invest in their solutions across multiple areas such as mobile apps, visual analytics and voice-based user interfaces. Buyers should also be aware that the term 'IWMS' also masks the underlying variation in the vendor strategies, product architecture and functionality offered by the prominent vendors. No two IWMS solutions are the same. Buyers should be aware that IWMS vendors are:

- **Pursuing diverse approaches to providing an integrated solution.**
  Most IWMS vendors have developed their suite of IWMS modules in-house to work on a single technology platform and data repository. This is the case for vendors such as ARCHIBUS, FM:Systems, IBM, iOFFICE, MCS (part of Spacewell), Planon, Tango and Trimble. Other vendors provide most of the IWMS functionality via their own platform and have turned to partners to fill in functionality gaps in targeted areas such as space management or energy management. For example, SWG provides its space management functionality via a partnership with Excitech. Accruent, because of its history, provides its solution via six separate products which customers can integrate via IT services and pre-built software connectors and together give 90% of the functionality expected of an IWMS.

- **Following divergent strategies for managing IoT data.**
  With growing deployments of sensors and smart equipment, there is a continuing upsurge in the amount of data being produced throughout buildings. Verdantix has heard from IWMS vendors that they are pursuing different strategies to build IoT capabilities. For example, Spacewell provides COBUNDU, a dedicated building IoT platform that aggregates and mines IoT data. IBM has developed its Watson IoT platform as the core of its big data and analytics capabilities, which is designed to effectively manage and analyse the massive amounts of data created through smart devices (see Verdantix Siemens And IBM Collaborate To Enhance Smart Buildings With IoT). Other IWMS vendors have developed narrower IoT capabilities to enable them to capture data from space utilization sensors.

- **Offering different depths of industry-focused functionality.**
  Some IWMS vendors offer industry-focused configurations of their software. As examples, FM:Systems offers configurations of its software focused on the healthcare and university sectors. Planon offers a configuration of its IWMS focused on the needs of facilities services providers. iOFFICE does not offer industry-focused versions of its IWMS, but buyers can configure its solution in-house or with the support of an IT services provider.

- **Pushing product investment into diverse areas.**
  Given the broad reach of IWMS solutions, vendors naturally have to focus on different areas for product development. For example, Trimble has built on its heritage in providing strong financial management functionality, to focus its product investment on developing tools for the lease accounting standards; while FM:Systems has elected not to build out the accounting functionality, to focus its product investment in developing tools for tracking space utilization and running strategic real estate planning. Buyers should refer to the vendor profiles in this report to understand the strengths and weakness of each vendor.

- **Offering a variation of deployment options.**
  Vendors offer different options for customers to deploy their software. For example, the entire customer base of iOFFICE and Tango use their software on a multi-tenant SaaS basis. While for vendors including ARCHIBUS, IBM TRIRIGA and Trimble, customers are primarily using their solution on a hosted single instance basis or on-premise. Verdantix details the deployment options for all IWMS vendors in the Verdantix report Integrated Workplace Management Systems Buyer's Guide 2018.

Buyers Prioritize IWMS Platforms To Improve All Facets Of Real Estate Decision-Making

To gain an objective understanding of buyer decision-making, value drivers, purchase preferences and functional requirements of an IWMS, Verdantix ran a series of interviews with facility and real estate directors at large organizations. As part of this process, we performed in-depth interviews with a panel of 15 budget holders; the respective organizations had collective revenues of over $230 billion and spanned industries that included business services, energy, insurance, facilities management services, manufacturing, retail and the public sector. This section of the report also analyses contextual data, on how IWMS sit amongst other priorities collected through our 2018 global smart building survey, where we interviewed 303 corporate executives about their broader technology budget and preferences (see Verdantix Global Survey 2018: Smart Building Technology, Budgets, Priorities & Preferences Data Tables).

Cost Management, Occupant Wellbeing And Agile Working Strategies Will Shape Real Estate Strategies In 2019

To establish the overall strategic priorities for real estate and facilities teams, we asked a global panel of 303 real estate and facilities directors to tell us their priorities for the next 12 months. The main findings are that:

- **Cost control continues to be the focal point for most facilities management departments.** Real estate and facilities management departments continue to be under corporate pressure to deliver cost savings (see Figure 2). Across our global survey panel, 92% of the 303 respondents told us that reducing utility bills is a high or medium priority in 2019. While utility expenses (including energy and water) are only a negligible part of overall building expenses, they are visible, easy to measure, and therefore continue to be a focal point for cost management programmes. Firms are also exploring opportunities to defer capital investments; 37% of firms told us that optimizing maintenance processes to extend the lifetime of assets is a high priority.

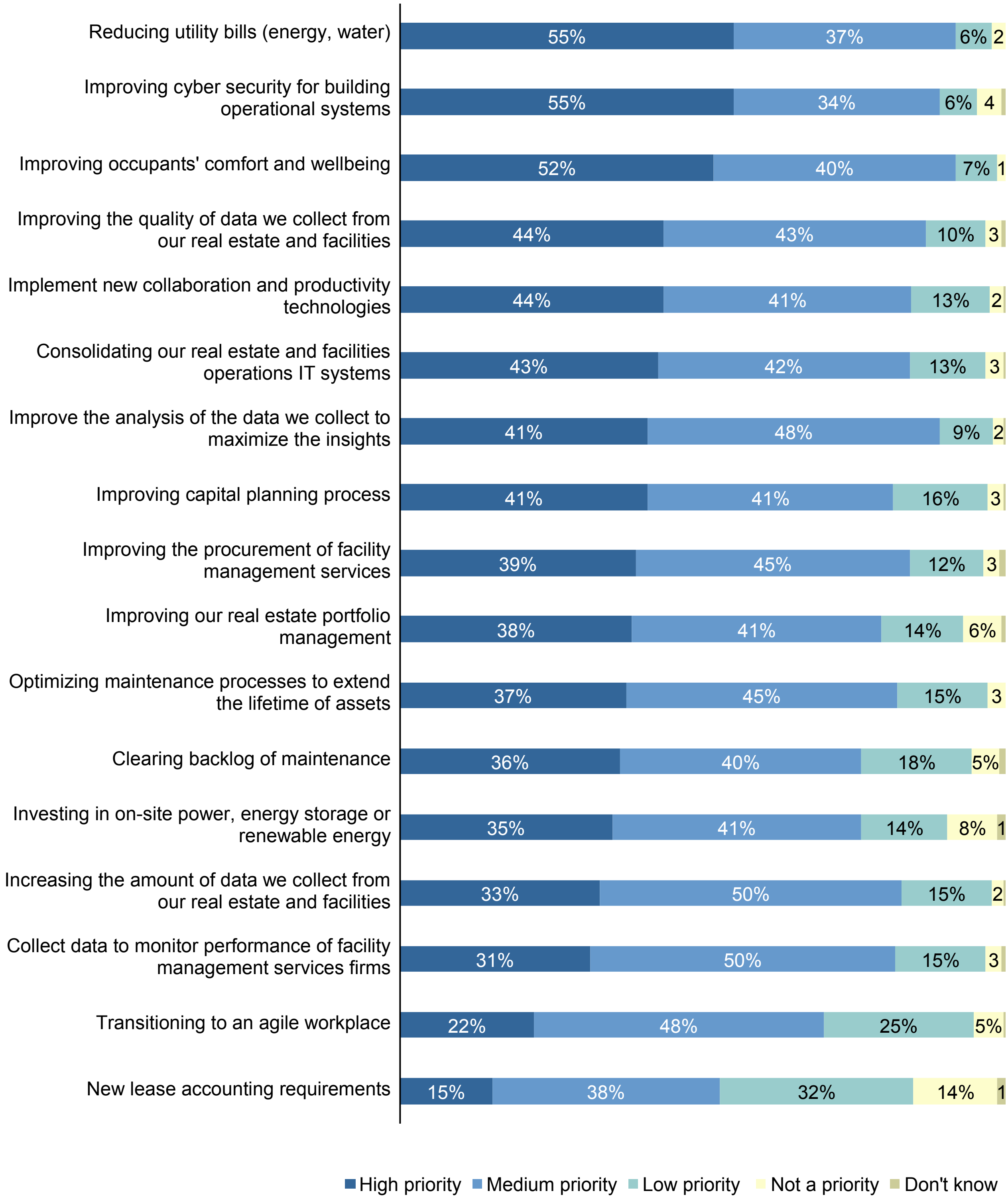
- **Cybersecurity has emerged as an important aspect of facilities management.** Eighty-nine per cent of the 303 interviewees rate improving the cybersecurity of building operational systems as a high or medium priority in 2019. The explosion of networked devices in buildings and growing role of remote management services has been steadily opening up the exposure of building systems to hackers. It is also an issue getting heightened visibility: in 2017 and 2018 a spate of cyber-attacks on building and security systems in the hotel sector hit the headlines as hackers took remote control of locks and temperature control systems. In addition, high-profile buildings, including a Google building in Sydney and a US Department of Homeland Security building, have been hacked through their building management systems.

- **Building occupant wellbeing will also shape building management strategies in 2019.** Employee wellbeing and employee productivity are hot topics in the real estate sector, driven by the heightened awareness of the linkages between staff wellbeing and their productivity levels. In the Verdantix global survey, 92% of respondents rate improving the experience of building occupants as a high or medium priority for 2019. We also hear that the ongoing push to maximize the number of employees per building is spurring on new efforts to improve the occupant experience of offices. As a corporate facility manager told us, “Our open-plan offices were cheap to fit out and allow us to pack in staff, but we recognize that we need to invest more in building amenities to offset any employee frustration.”

FIGURE 2

Real Estate Managers' Priorities Over The Next Twelve Months

"What level of priority will the following initiatives have in your organization in the next 12 months?"



N=303

Source: Verdantix Global Survey 2018: Smart Building Technology, Budgets, Priorities & Preferences

- **Pursuing agile working strategies is a high priority for 22% of firms.**
  Space utilization continues to be a top factor shaping real estate management strategies, reflecting the fact that it can be a high-return activity that can deliver cost savings into the millions for large firms. In 2019, firms are not just collecting space usage data, they are also pursuing agile working strategies based on employees not having a fixed desk. To date, activity has been led by corporate buildings in city centre locations and the public sector where there is a strong push for cost control. In the UK, the Lancashire NHS Trust redesigned its office space to expand the number of desks from 192 to 268 and introduced hot desking. This enabled it to increase the number of staff using its office, reducing the occupancy cost per office-based employee by 30%; while Deloitte in Australia has been using hot desking and remote working practices to grow its office space by only 7% as staff numbers swelled by 42%.

Firms Have Invested In Real Estate And Facilities Software To Tackle Multiple Usage Scenarios

The Verdantix survey shows that firms will look to balance cost efficiency and occupant experience in their real estate strategies in 2019. How are organizations using software systems to manage their real estate and facilities management data? To find out, we polled our panel of 15 real estate and facilities budget holders. We heard that executives on our customer panel:

- **Run a multitude of technology strategies for their real estate data.**
  Across our customer panel, firms are using multiple systems to manage their real estate and facilities data. In this survey panel, 40% of firms told us they are using an IWMS to manage multiple real estate and facilities processes, with the remaining 60% using multiple IT systems at the same time. This high proportion of IWMS deployments in the customer panel reflects the fact we deliberately sought out IWMS users to get feedback on this type of software solution. To get a better view into the penetration of IWMS solutions across the broader market, readers should refer to the Verdantix 2018 Smart Building Technology Survey data (see Verdantix Global Survey 2018: Smart Building Technology, Budgets, Priorities & Preferences).

  "We installed an IWMS to reduce the number of touch points of different systems and cut down on the time required to run reporting." (Pharmaceutical firm)

- **Are broadening existing deployments of IWMS solutions.**
  Not all firms in the interview panel are using the full expanse of functionality offered through IWMS platforms. This reflects the trend for buyers to install only a few modules from an IWMS platform before expanding the deployment over time. This approach helps firms to ease the implementation burden on IT teams and measure the performance of a vendor before making a larger investment. For example, we interviewed a firm that has recently purchased modules from an IWMS vendor to support space management and will expand the platform across more processes if there is positive feedback.

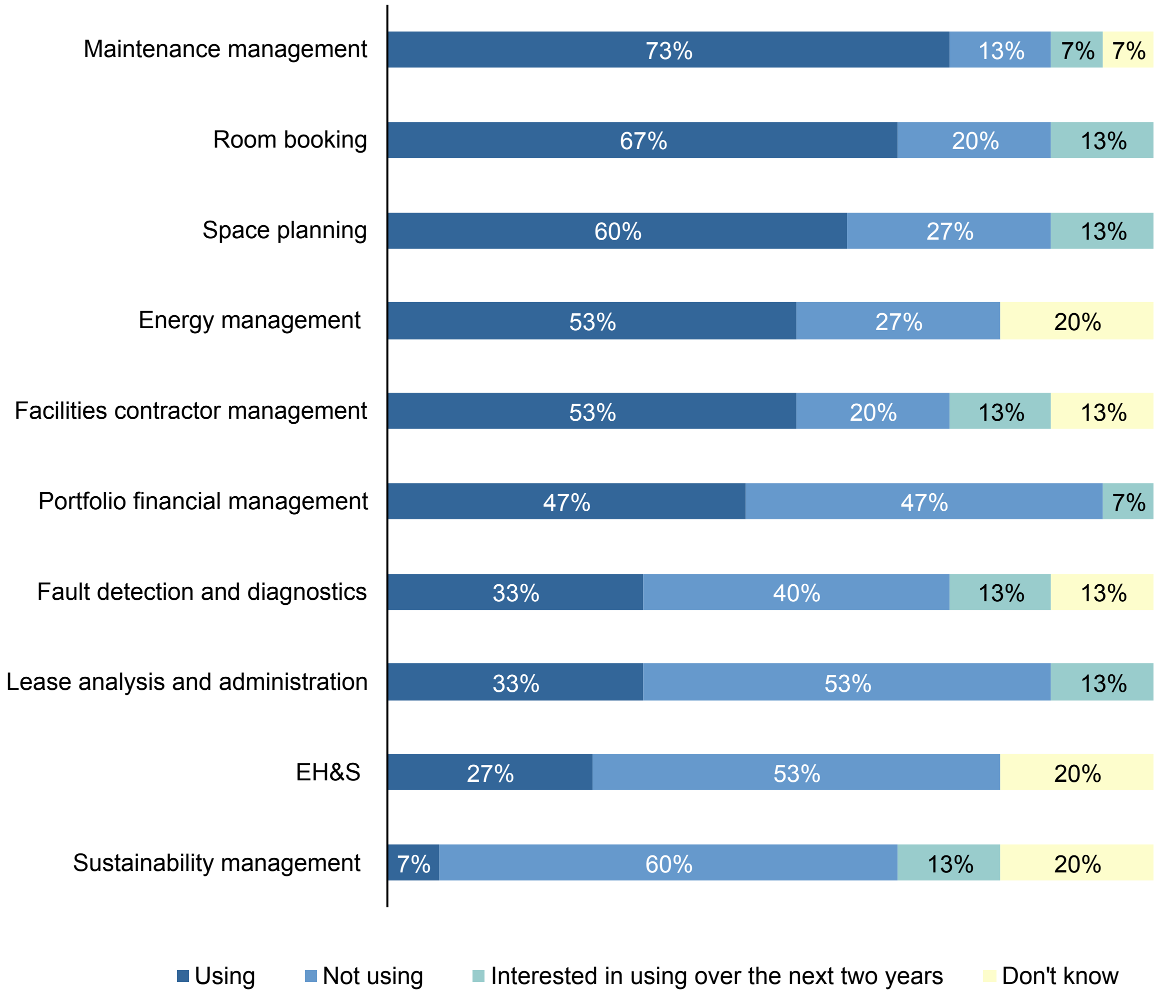
  "We are phasing in our IWMS platform incrementally so that we can test the performance of the solution before expanding it to more areas." (Public sector organization)

- **Commonly use software to manage building operational processes.**
  Our customer panel is widely using software to manage the following operational areas: maintenance management (73% of the customer panel), energy management (53%) and contractor performance management (53%) (see Figure 3). Some of the interviewees told us they are planning to expand existing software deployments for vendor management as they seek to capture more granular data on

FIGURE 3

Usage Of Commercial Software By Real Estate And Facilities Process

"Are you currently using or do you plan to use commercial software for the following processes?"



N=15

Source: Verdantix

contractors to check performance again SLAs. In addition, firms want to gather data that will help them negotiate better contract terms in the future. For firms that are spending millions of dollars on facilities contracts, even a 5% improvement in more effectively deploying workforces leads to big financial gains.

"In the future, we want to be able to provide our contractor with sufficient data for them to provide us a fixed price for their services. Our facilities management contracts are in the tens of millions, so we want more price certainty." (Energy firm)

- **Frequently use commercial software for room booking and space planning.**
  Our customer panel is also using software to manage workplace processes such as room booking (67%) and space planning (60%). While most of the customer panel are already using software for workplace management, they are exploring their options to switch solution provider in these areas. In particular, facilities managers are looking to deploy solutions that enable them to control meeting room bookings

much more tightly. They also want to collect much more granular data on space utilization to improve real estate planning. In the retail sector, site selection is a key part of space planning, from finding the sites with the best customer footfall to finding low-cost locations. Musical instrument retailer Guitar Center is using Tango's platform to help it identify cost-efficient retail spaces to rent to support its expansion strategy.

"We are looking to replace our existing room booking system so we can enforce much stronger rules to reduce the number of meeting 'no shows' and ensure employees book the right size of room. Our meeting rooms are extremely strained resources." (Public sector organization)

- **Are less likely to use software to manage EH&S and sustainability metrics.**
  Our customer panel, comprised of real estate and facilities executives, are less likely to use software to manage EHS data (27%) and sustainability performance data (7%). These results reflect the fact that EHS software is not primarily designed for real estate teams but for EHS directors and heads of HSEQ (see Verdantix Green Quadrant EHS Software 2017). That said, facilities managers do need to keep oversight of the health and safety of maintenance workers and contractors, and any safety hazards in the workplace. FSI offers a 'Hazards & Warnings' module on its Concept Evolution platform that can highlight hazards or warnings against specific assets or tasks, such as asbestos presence or a COSHH warning to signal a hazardous substance.

Firms Still Struggle To Get Value From Siloed Real Estate And Facilities Data

The customer panel is running a multitude of technology strategies for their real estate data, and are primarily using software to manage maintenance, room booking and space planning processes. To get a deeper insight into data management challenges, we asked our panel of 15 budget holders to tell us what information and data challenges they are tackling today. We heard that firms:

- **Lack high-quality data to inform management decisions.**
  We heard that 73% of firms still feel they have insufficient real estate and facilities data to inform management decisions, and 60% lack the required data to inform capital spend planning (see Figure 4). Deeper discussions reveal firms are struggling with disparate facilities data, which impedes the ability of corporate managers to make decisions that are based on the full picture. For example, making decisions on capital planning requires a broad view into lease terms, asset age and condition, maintenance spend and facility budgets. Another challenge is that existing systems can contain outdated and poor-quality data, as staff prefer to keep using spreadsheets, or firms have not allocated enough resources to database management.

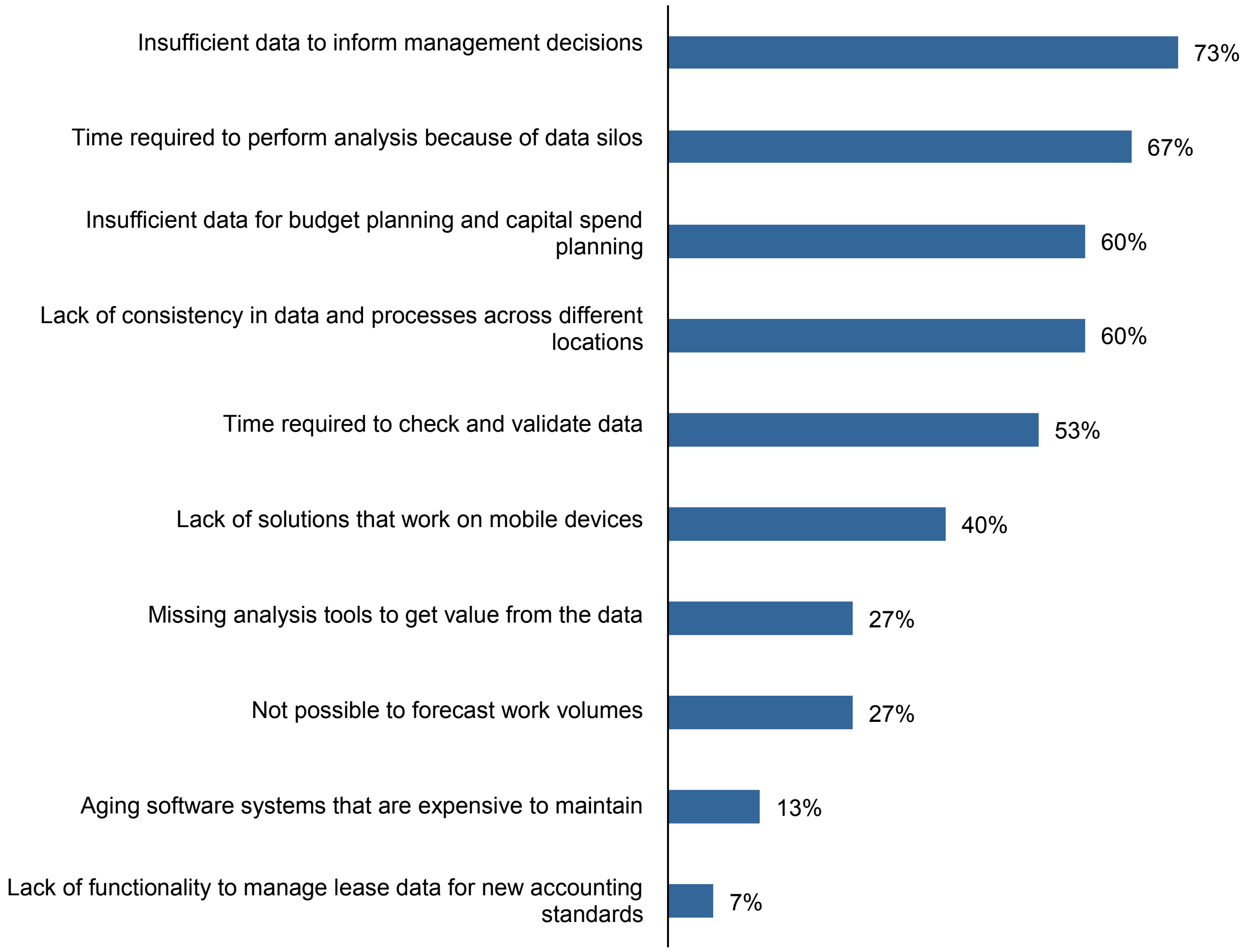
  "We struggle to make space management decisions because we are using four disconnected systems for managing floor plans, room reservations, wayfinding and space usage surveys." (Pharmaceuticals firm)

- **Struggle with lack of data consistency and processes across different regions.**
  Large multi-site firms that are using lots of disparate software solutions to manage real estate and facilities data run into lots of problems. One of the primary challenges comes in trying to maintain tight data quality control; 60% of firms told us they struggle with the lack of consistency in data and processes because their firm uses different systems at the regional level. In addition, using a range of systems means that portfolio-level reporting can become cumbersome as managers need to manually integrate and normalize data from multiple systems. In our survey, 67% of firms told us they are frustrated by the amount of time required to analyse the data because of data silos.

FIGURE 4

Real Estate And Facilities Management Data Challenges

"What are the challenges you face with information management for real estate and facilities?"



N=15

Source: Verdantix

"My biggest challenge is getting real estate data centralized globally – there are not consistent global practices for tracking rent data. This means that as I collect data from different regions, I need to heavily process the data to run reporting." (Insurance firm)

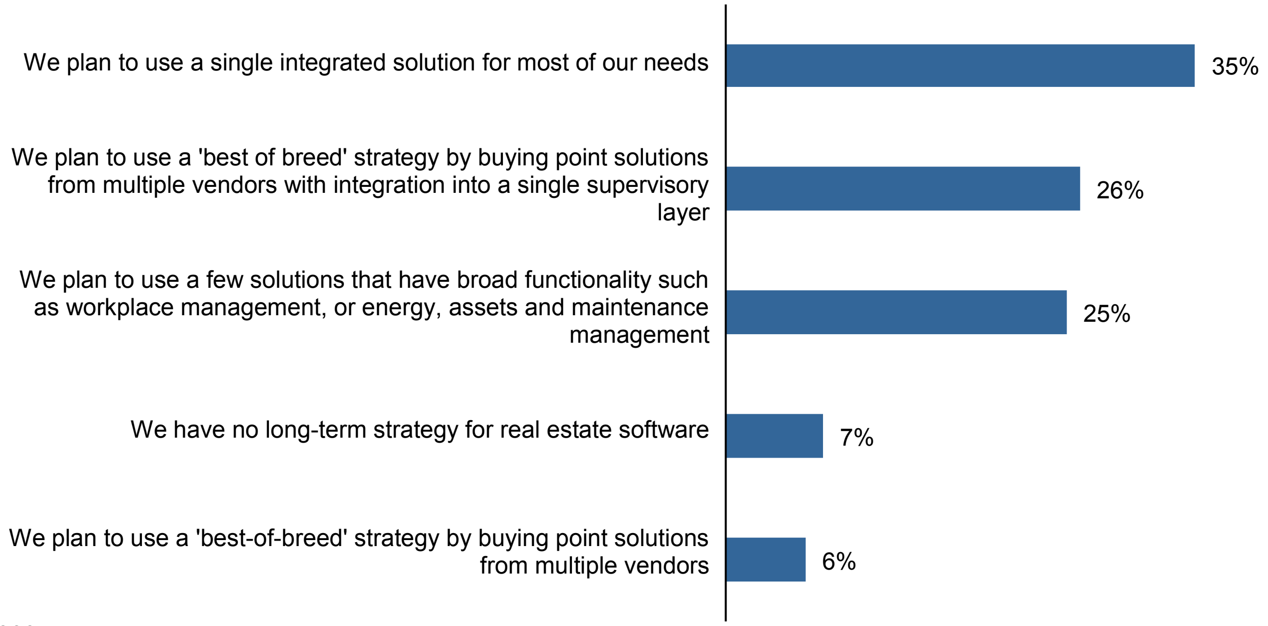
- **Waste time running validation checks on the data and reporting outputs.** One pain point for half (53%) of our customer panel is the amount of time required to run quality checks on the data in systems and reporting outputs. In deeper discussions, real estate executives told us that this was the result of poor-quality data input by team members as well as the lack of sufficient validation checks run by the software. The interviewees found that the time spent running validation of outputs from their facilities' software systems was limiting the value they were realizing from their software.

  "We don't trust the outputs from our CAFM system. We have four people checking and correcting the data for client reports that show our preventative maintenance completions." (Facilities services provider)

FIGURE 5

Real Estate And Facilities Optimization Software Strategies For The Next Five Years

"Which of the following statements best describes your strategy for real estate and facilities software over the next five years?"



N=303

Source: Verdantix Global Survey 2018: Smart Building Technology, Budgets, Priorities & Preferences

- **Lack suitable software functionality for mobile devices.**
  Forty per cent of our customer panel struggle with a lack of mobile-based solutions for real estate and facilities management. Some of the interviewees are not satisfied with the quality of existing workplace and facilities apps, particularly the user interfaces and their usability in offline areas. Other facilities departments were not able to get mobile-based strategies off the ground as they are being blocked by corporate IT teams. For example, one facility manager told us its IT department stymied the facility team's plan to launch a mobile-based work order management app for fieldworks because they were concerned it would increase exposure to cyber-attacks.

  "Our facilities team wants to take digital data out onto the field, but we are being held back by the IT team, who is cautious of such initiatives. The IT team has blocked a mobile strategy because they are concerned about information security." (Energy firm)

Real Estate Managers Prioritize A Vision For Centralized Data Management In The Future

Large organizations are using a range of software strategies to manage real estate and facilities processes and, hence, struggle with siloed data. What are organizations' future plans for real estate and facilities management software? To get a better view into this, we analysed the findings from our global smart building survey with 303 firms. The results show that:

- **One-third of firms want to roll out a single integrated solution for most of their needs.**
  In our global survey panel, there is strong underlying demand for IWMS solutions. We heard from 35% of

firms that they want to use a platform from a single vendor to consolidate all their data and manage most of their real estate needs (see Figure 5). The advantage of running all processes on a single system is that firms can roll out a consistent set of quality controls to all data and avoid maintaining multiple data sets. For example, financial services firm UniCredit is using Planon's IWMS to help it in maintaining a consistent process to monitor maintenance SLAs, costs, quality and efficiency across its building portfolio. Another benefit comes in reducing IT support costs; for example, retailer Canadian Tire, with over 1,000 stores, found that the rollout of the TRIRIGA IWMS enabled it to reduce IT total cost of ownership through systems rationalization.

"We have been using an IWMS for 10 years because we need one real estate solution that can scale globally and bring in all our data. The IWMS also provides a single user interface that supports a better user experience." (Insurance firm)

- **Twenty-six per cent want to use a single supervisory layer with point solutions.**
  Another vision for integrating real estate and facilities data is based on using a single supervisory and reporting layer that brings in data from best-of-breed software solutions. This is the preferred vision for 26% of the global interview panel. These firms see a role for a single reporting layer but also want to use specialist software solutions when they offer more functionality depth.

  "Today there is a tendency for software firms to look to do everything for everyone. I'm cautious about software products that pitch themselves at solving all problems. I'd prefer to use a big hitter with strong functionality." (Facilities services provider)

Buyers Seek Out IWMS Solutions With High-Quality Desktop And Mobile UIs

Large organizations run a wide range of strategies to manage real estate IT, with the majority of firms contending with the multiplication of different point IT solutions for real estate and facilities data management. What do buyers look for when considering the purchase of real estate and facilities software solutions? How do buyers compare vendors during the software selection processes? This section of the report analyses the factors that make up the buyers' business case for software purchases and their top purchase criteria.

Buyers Build Their Business Case For Software Based On Time Savings And Operational Efficiency

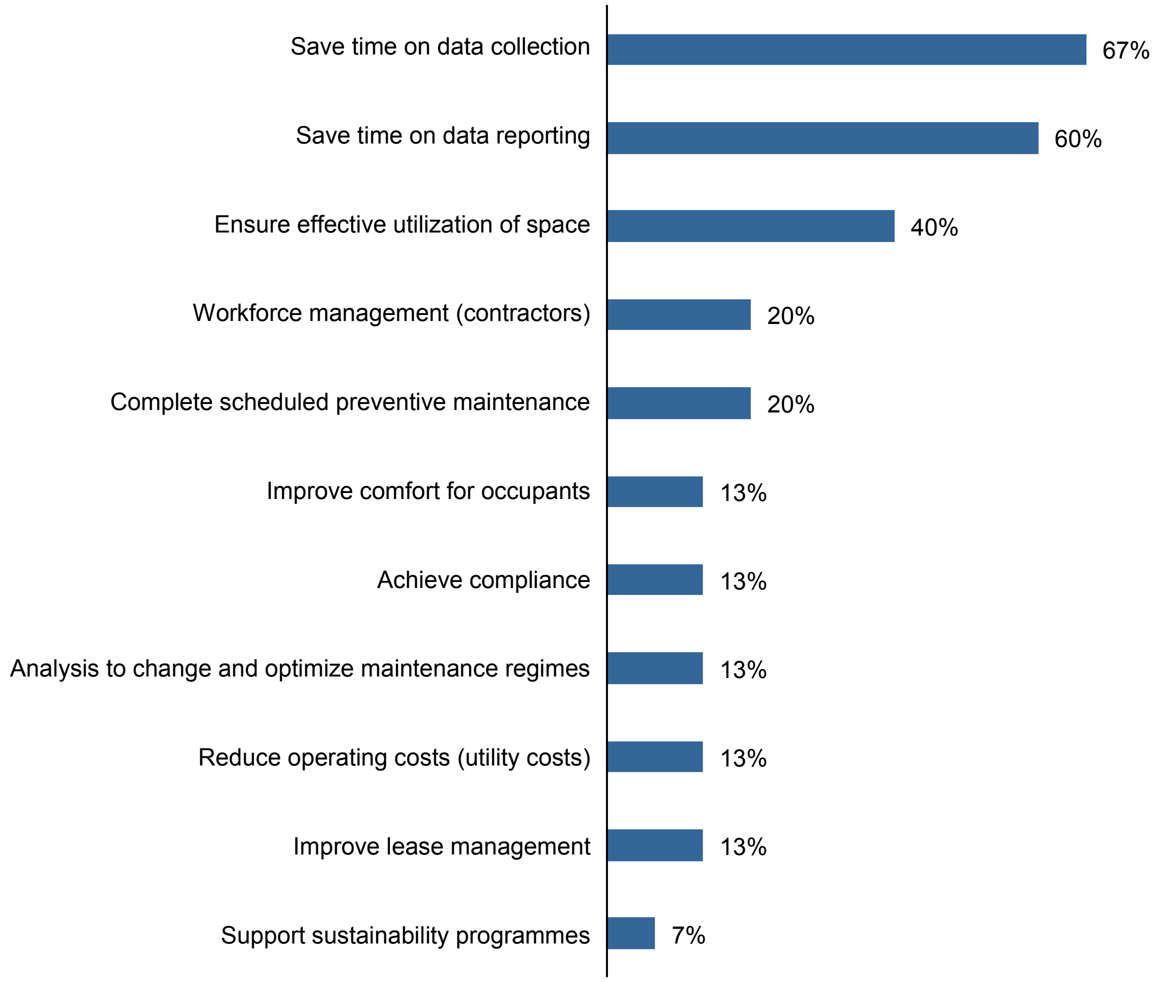
What outcomes do firms want from real estate and software solutions today? To get an up-to-date view, Verdantix asked our panel of 15 budget holders to tell us the three most important factors that shape the business case for real estate and facilities management software. We heard that:

- **Buyers primarily look for software to deliver time efficiency savings.**
  For our customer panel, the key factor to justify new software purchases is the opportunity to gain time savings in data management. Sixty-seven per cent of interviewees identified saving time on data collection as a key factor in the business case, while 60% identified saving time in real estate reporting as a top factor (see Figure 6). How can a software solution enable time savings? Calgary Board of Education cut down on the time required to capture space utilization data across 225 schools by moving from paper-based processes to running online surveys based on the ARCHIBUS platform. BC Hydro replaced 11 property management systems with IBM TRIRIGA, enabling it to speed up and improve the accuracy of reporting across 4,000 properties and 122,000 leases.

FIGURE 6

Top Factors That Shape The Business Case For Real Estate And Facilities Management Software

"What are the three most important factors in shaping the business case for real estate and facilities management software?"



N=15

Source: Verdantix

"The biggest benefit of our IWMS is that it has made management reporting on occupancy costs much more efficient. We can run a report with a touch of a button, but previously we had to spend weeks gathering data on leases, chargebacks and space usage." (Insurance firm)

- **Space utilization is a key part of the software business case for 40% of buyers.** Across our customer panel, 40% of firms identified the ability to drive better space utilization as a top-three factor they would include in the business case for a new software purchase. Firms are looking to gather more granular data on how well space is being used so that they can put forward data-based strategies for hot-desking or site consolidation. Often workplaces can appear well occupied, but the gathering of granular and real-time data can reveal that 40% to 60% of workstations are typically vacant at any given time (see Verdantix Smart Innovators: Space Management). For example, healthcare provider Catholic Health Initiatives used FM:Systems's IWMS to improve its management of space utilization data, which identified the opportunity to release a building, delivering a $10 million saving in annual occupancy costs.

"The facilities team believes that our current building portfolio can absorb a much higher volume of staff. We need to gather the data to convince senior leadership this is possible." (Public sector organization)

- **Buyers want software to improve maintenance management.**
  For 20% of the interviewees, improving maintenance management is a top-three factor to justify spending on a software solution. Firms are running a broad range of initiatives in this area. For example, education facility National Industrial Training Institute in Saudi Arabia implemented FSI's Concept CAFM solution to improve the tracking of maintenance costs, which were previously spread through paper-based and email systems; while Q-Park, a provider of parking facilities, is using MCS (part of Spacewell) to track performance of external maintenance providers across completed planned preventive maintenance (PPM) rates, reaction times and performance against SLAs.

  "We're using our IWMS to speed up the time for generating maintenance work orders. There are 80,000 work orders flowing through the system annually and we are able to automate many of these." (Energy firm)

Quality Of Mobile Apps Emerges As A Top Purchase Criterion

Real estate and facilities executives are building their business case for software based on time savings and operational efficiency. What do buyers look for when reviewing and investing in real estate and facilities software solutions? Verdantix asked the panel of 15 budget holders to tell us the most influential criteria. We heard that:

- **Buyers continue to view the quality of the user interface as a top purchase-decision criterion.**
  For our customer panel, the quality of the user interface is the most significant factor influencing software vendor selection; 80% of the respondents rate it as 'very important' and a further 20% rate it as 'important' (see Figure 7). This was also the finding of the customer panel that Verdantix ran for the 2017 Green Quadrant with a different set of interviewees (see Verdantix Green Quadrant Integrated Workplace Management Systems). In response to this, vendors have been investing to update and modernize their user interfaces. For example, in May 2018, Trimble launched a new version of its software with a restyled UI that is designed to offer much greater simplicity and ease-of-use. Feedback from IWMS users is that more vendors can still do better in this area: specifically, users have found that the complexity of the IWMS user interface can redouble the requirements for training.

  "We selected our IWMS solution primarily based on the fact that it stood out as the most user-friendly in a test environment." (Public sector organization)

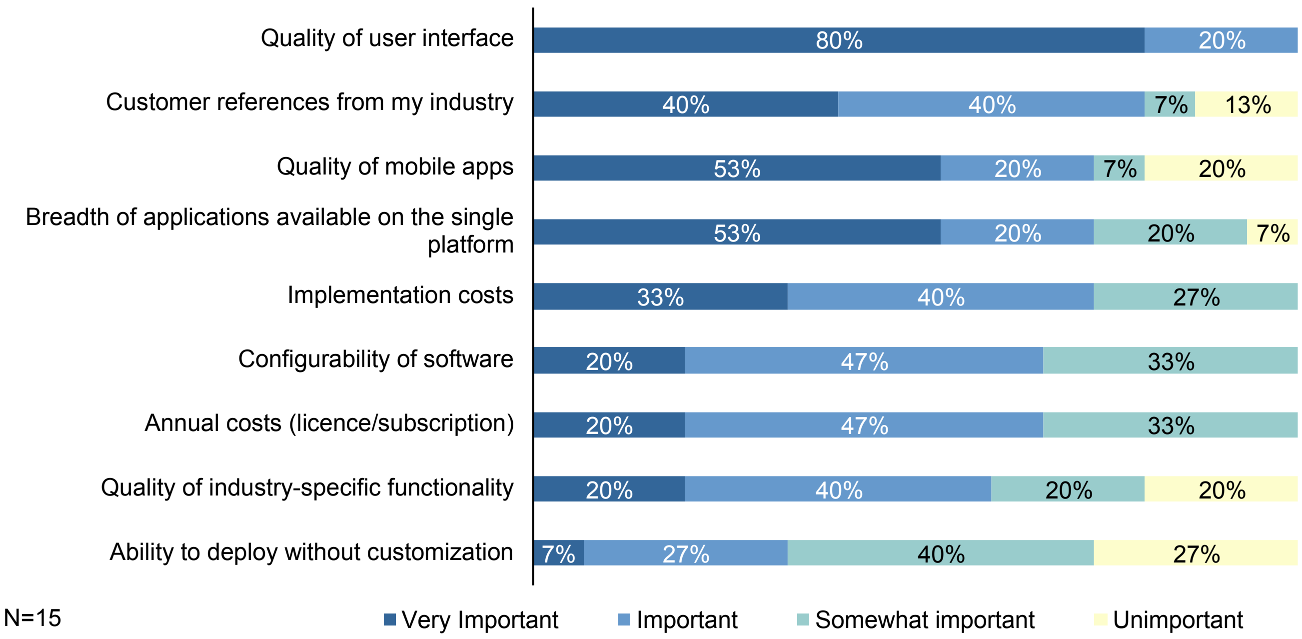
- **Solution breadth is also a priority for buyers.**
  Seventy-three per cent of the customer panel said it was very important or important to have a platform that covers a broad range of real estate and facilities management applications. That said, buyers are not just simply looking for broad platforms, they also want solutions to deliver strong functionality that aligns with their needs. We heard from 80% of the respondents that it is 'very important' or 'important' for a vendor to demonstrate excellent alignment to their firm's usage scenarios during a software demo (see Figure 8).

  "While I see value in an integrated platform, I want a vendor to show me that their platform will meet my specific needs and help me with client engagement." (Facilities services provider)

FIGURE 7

Importance Of Real Estate And Facilities Management Software Purchase Criteria

"When you have evaluated facilities and real estate software applications, or if you did, how important would the following factors be in shaping your purchase decision?"

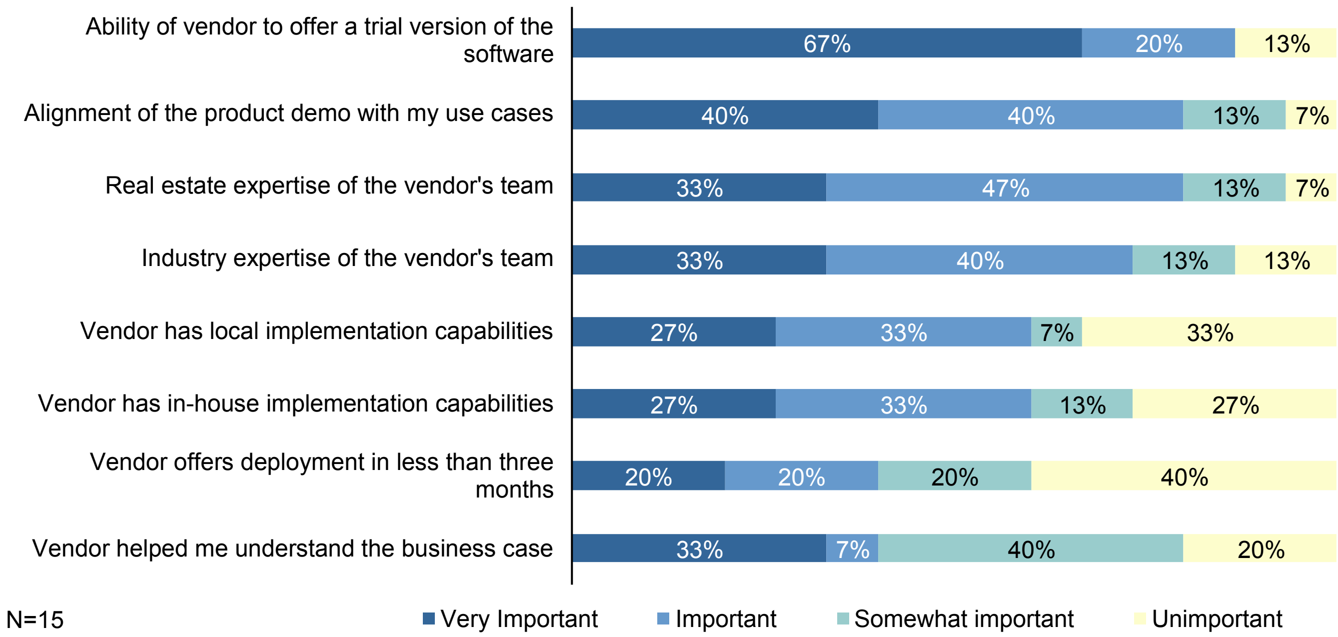


Source: Verdantix

FIGURE 8

Importance Of Vendor Attributes During The Software Selection Process

"When evaluating a software vendor, or if you did, how important are the following factors in shaping your purchase decision?"



Source: Verdantix

- **Quality of mobile app is emerging in importance.**
  The quality and functionality of mobile apps has emerged as an important purchase consideration for buyers today. This reflects the fact that facilities teams are increasingly looking to reduce paper-based processes while technicians are out in the field. For example, the facilities management team at London City Airport has provided technicians with personal digital assistant (PDA) devices that draw on FSI's Concept CAFM solution, so they can receive work orders while on site and also order spare parts. Buyers want their mobile app to not only duplicate the software functionality offered by their desktop solutions: they want all mobile apps to match the ease-of-use offered through popular consumer apps.

  "This quality of mobile apps is now a top criterion for software purchases. We're looking to digitalize all paper-based processes, and this will require us rolling out mobile apps." (Facilities services provider)

- **Buyers hold mixed opinions on the customization options.**
  Often a key factor that will impact software selection is whether an organization wants to customize a software solution to match their existing workflows and processes, beyond what is possible via configuration. In our panel of 15 interviewees, 33% of firms want to be able to deploy real estate software without customization, while 27% of firms rated this as unimportant. Often very large buyers looking to minimize the change management requirements and training efforts following a software implementation will elect to customize an IWMS to match existing workflows. Buyers need to be aware that not all IWMS vendors allow their software to be customized.

  "We wanted to implement the software quickly so opted to use the software out-of-the-box; we recognized that would mean more change management but we were comfortable with this to this extent that many best practice workflows are built into the software." (Manufacturing firm)

Green Quadrant Integrated Workplace Management Systems

Based on the insights provided by the independent customer panel and our in-depth interviews with suppliers, Verdantix defines building IWMS solutions as:

"Enterprise-scale software platforms to help organizations capture and analyse information, manage operations, optimize and report on the management of real estate portfolios including leases, capital projects, facility and space utilization, workplace services, maintenance, energy and sustainability management."

We note that there is also broad range of software vendors that offer a subset of IWMS capabilities, such as software for space optimization or lease management. These solutions fall outside the scope of this study and will be covered in separate Verdantix research. In addition, we note that there are some software vendors offering broad IWMS solutions who continue to describe their products as CAFM, particularly in Europe.

Green Quadrant Methodology

The Verdantix Green Quadrant methodology provides buyers of specific products or services with a structured assessment of comparable offerings at a certain point in time. The methodology supports purchase decisions by identifying potential suppliers, structuring relevant purchase criteria through discussions with buyers, and providing evidence-based assessments of the products and services in the market. To ensure the objectivity and accuracy of the results of the study, the research process is based on the following principles and activities:

- **Transparent inclusion.**
  We aim to analyse all suppliers that qualify for inclusion in the research. For those suppliers that decline our invitation or fail to respond, we aim to include them in the report based on public information where this would provide an accurate analysis of their market positioning.

- **Analysis from the buyer's perspective.**
  We recruit a panel of individuals who have bought or plan to buy the product or service analysed in the Green Quadrant. Their role is to define relevant buying criteria and to weight the evaluation criteria in the model that drives the Green Quadrant graphic.

- **Reliance on professional integrity.**
  Since it is not feasible to check all of the data and claims made by suppliers, we emphasize the need for professional integrity. Assertions made by suppliers are put in the public domain in the Verdantix report and can be checked by competitors and existing customers.

- **Scores based on evidence.**
  To assess the expertise, resources, business results and strategy of suppliers, we gather evidence from public sources and conduct interviews with multiple spokespeople and industry experts. When suppliers claim to be 'best-in-class', we challenge them to present the evidence.

- **Comparison based on relative capabilities.**
  We construct measurement scales based on 'worst-in-class' and 'best-in-class' performance at a certain point in time. A provider's position in the market can change over time depending on how its offering and success evolves compared to that of its competitors. This means that, in some cases, even if a provider adds new modules, makes a strategic acquisition, or receives investment, its quadrant positioning may not move positively because the assessment is relative to what has been going on with the other software providers in the assessment. Green Quadrants are typically repeated every one or two years.

FIGURE 9

Suppliers And Software Assessed

Vendor	IWMS Solution Name
Accruent (part of Fortive)	360Facility, EMS, Kykloud, Lucernex, VFA, vx Maintain, vx Observe.
ARCHIBUS	ARCHIBUS Enterprise
FM:Systems	FM:Interact
FSI	Concept Evolution
IBM	TRIRIGA
iOFFICE	iOFFICE
MRI	MRI Horizon
Planon	Planon Universe
Rapal	IWMS360°
Service Works Global (part of Addnode)	QFM
Spacewell (part of the Nemetschek Group)	Axxerion
Spacewell (part of the Nemetschek Group)	MCS
Tango	Tango
Trimble	Manhattan
VLogic	VLogic
zLink	iDrawings

Source: Verdantix

Inclusion Criteria For The IWMS Solution Benchmark

Globally, there are hundreds of software vendors providing solutions that manage different aspects of real estate and facilities. To ensure the Green Quadrant analysis only compares firms providing a similar breadth of functionality at a comparable level, we define inclusion criteria. The 15 software suppliers here are included in this study because their applications have:

- **Broad real estate and facilities management functionality through an integrated solution.** Reflecting the customer buying trends of integrated solutions for real estate and facilities management, we included only suppliers with applications that can manage a broad spectrum of workplace processes. This eliminated applications that provide only facilities management, or lease management functionality.

- **IWMS revenues exceeding $3 million.**
  This study only compares vendors that generate revenues from IWMS in excess of $3 million annually.

- **Enterprise-scale product architecture.**
  This study only considers applications designed to scale up to multi-site deployments for an enterprise with more than $1 billion in annual revenues.

Based on the inclusion criteria above, this report looks in-depth at 15 IWMS vendors: Accruent, ARCHIBUS, Axxerion, FM:Systems, FSI, IBM, iOFFICE, MRI, Planon, Rapal, Spacewell (Axxerion and MCS), Service Works Global, Trimble, VLogic and zLink (see Figure 9). Fourteen software suppliers included in this study actively participated through interviews, product demonstrations and responses to a 165-point detailed questionnaire. MRI qualified for this study but declined to participate. Firms that declined to actively participate were scored based on publicly available information. In the future, the Green Quadrant IWMS may also include AssetWorks, Causeway Technologies, Glose, Nuvolo, Oracle, ProLease and Rosmiman.

Scope And Methodology Updates For The 2019 IWMS Green Quadrant

Verdantix studies reflect the current state of customer requirements and product capabilities. As such, Verdantix updates the assessment criteria to ensure that they are in line with the current state of the market. Updates to the 2019 Green Quadrant include the:

- **Expansion of the high-level capabilities' criteria from 20 to 25.**
  The 2019 Green Quadrant includes five additional high-level capability criteria compared to the previous study published in 2017. This is a result of entirely new criteria and the reorganization of existing criteria. The notable additions are two new criteria to measure the ability of IWMS vendors to provide specific functionality to real estate investors and facilities management services firms. In addition, we have included new criteria categories for workplace services, occupant wellbeing and engagement and IoT asset monitoring, where there is emerging buyer interest. This 2019 Green Quadrant provides a tougher test to vendors on their ability to innovate to meet the emerging needs of buyers.

- **Deepening of the sub-criteria under functionality and platform capability areas.**
  The 2019 IWMS Green Quadrant builds on the 2017 assessment by deepening the data we gather from vendors on their platform capabilities and software functionality. The most notable changes are that we expanded the sub-criteria under space management from five areas to 10 areas. We also expanded the sub-criteria under asset and maintenance management from four areas to eight areas. Overall, the assessment of IWMS solutions functionality is much more detailed than in 2017.

- **Adjusted weightings to reflect current market trends and customer priorities.**
  The Verdantix Green Quadrant considers the evolution of the market and customer requirements to ensure the weighting of all high-level criteria mirrors the current importance of all software components to users globally. For example, in the 2019 Green Quadrant mobile applications are worth a 5% weighting of the total capabilities score, versus a 1% weighting in the 2017 study. This reflects growing customer interest in mobile apps within software purchase decision-making.

- **More comprehensive assessment of customer momentum.**
  The 2019 Green Quadrant includes two more momentum criteria compared to the 2017 version. This year we also include data on brand preference ranking collected during our global survey with 303 real estate executives, as well as customer time-to-value methodology. There was also an update to the criteria weighting: notably financial resources and growth has expanded from a 30% weighting to 35% of the total momentum score.

- **Deepening of the analysis for different buyer groups.**
  One major update to the 2019 Green Quadrant is the reinforcement of the analysis for the three primary buyer groups of IWMS: building occupiers, facilities services firms and real estate investors. While IWMS solutions have traditionally focused on the needs of building occupiers, the platforms are increasingly being adopted by facilities services firms and property investors. This Green Quadrant contains additional questions to test how well vendors can meet the needs of facilities services firms and also property investors.

Evaluation Criteria For IWMS Solution Providers

Verdantix defined the evaluation criteria using a combination of interviews with practice managers, discussions with 15 customers and existing expertise. The Green Quadrant analysis compares offerings of 16 IWMS solutions using weighted criteria grouped under the following categories:

- **Capabilities.**
  This dimension, captured in the vertical axis of the Green Quadrant graphic, measures each software supplier on the breadth and depth of its software functionality. To assess performance on this dimension, Verdantix collected data on 118 criteria grouped into 25 areas: automated data input, IT systems integration, database design, master data management, mobile applications, business intelligence, configurability, platform core capabilities, implementation options, user interface, application security, data centre security, real estate investment management, real estate, leasing and portfolio management, capital project management, space management, workplace services, occupant wellbeing and engagement, asset and maintenance management, asset monitoring, facilities management services firm operations, energy management, enterprise reporting and breadth of customer focus.

- **Market momentum.**
  This dimension, captured in the horizontal axis of the Green Quadrant graphic, measures each software supplier on a range of strategic success factors including publicly announced customers and internal sustainability performance. We collected 47 criteria grouped into seven areas: brand preference, market vision and product strategy, customer time to value, installed customer base, recent deal volume and size, organizational resources and IWMS revenues.

The evidence provided by all IWMS vendors is captured in a quantitative model that starts with the sub-criteria scores. Each sub-criterion has a percentage weighting that dictates how much of a contribution it makes to the high-level capability score. For example, real estate, leasing and portfolio management is one of the high-level criteria considered in the capabilities section, but is itself composed of five weighted sub-criteria that determine the overall score. All sub-criteria are scored between 0 and 3. Subsequently, each high-level criterion is allocated a percentage weighting which then determines how much that score contributes to the overall score. The combination of high-level criteria scores in the capabilities and momentum sections generates the Green Quadrant graphic. Details on the criteria are provided in Figures 10 and 11. These figures also provide (in parentheses) the weighting allocated to the high-level criteria in the model. Weightings are based on customer survey data regarding what IWMS software functionality is most widely used and analyst views on the broader IWMS landscape.

FIGURE 10-1

Capabilities Criteria For IWMS Solutions

CAPABILITIES	
Automated Data Input (1.5%)	What functionality is provided for integration with sensors, meters and building management systems? What range of indoor positioning systems can the software integrate into?
IT Systems Integration (1.5%)	What functionality is provided to integrate with CAD and BIM? What functionality is provided to integrate with other enterprise systems? What functionality is there to integrate with third-party real estate systems and worker collaboration tools?
Database Design (1.5%)	What scalability can the vendor demonstrate with customer deployments? What functionality is provided to apply data change controls? What functionality is provided to support data audits?
Master Data Management (1.5%)	What functionality is provided to define and/or upload the organizational structure and hierarchy? How are users able to configure and re-configure the organizational hierarchy data?
Mobile Applications (5%)	How many scenario-specific mobile apps does the vendor offer? How many active monthly users are there for the mobile apps?
Business Intelligence (2%)	Does the app have its own BI tool or is it sold with a third-party BI tool? What benchmarking tools are available? What forecasting tools are available?
Platform Configurability (3%)	How can elements such as forms and metrics libraries in the system be changed or reconfigured? How can workflows be changed/added to?
Platform Core Capabilities (4%)	Is the software based on a single code base? How does the vendor maintain code base consistency?
Implementation Options (2%)	Do the implementation options include multi-tenant hosted, single-instance hosted and on-premise?
User Interface (4%)	What is the quality of the user interface for the desktop application and mobile app? What integrations does the vendor offer with digital signage and voice-based user interface options?
Platform Internationalization (3%)	How many user interface languages are provided? What is the multi-currency functionality? How does the software manage multiple time zones? What range of international accounting guidelines can the software manage?
Application Security (1%)	What is the security framework for the enterprise application? What vulnerability assessments does the vendor perform?
Data Centre Security (1%)	What is the SLA for data recovery? RPO (recovery point objectives), RTO (recovery time objectives)?

Figures in brackets represent the weighting given to each criterion in the flexible multi-criteria model that generates the Green Quadrant graphical analysis.

Source: Verdantix

FIGURE 10-2

Capabilities Criteria For IWMS Solutions

CAPABILITIES	
Real Estate Investment Management (3%)	What functionality is provided for real estate transaction management? What functionality is provided to support intelligent site selection for a new office or retail site? What functionality is provided to support day-to-day accounting for investment portfolios? What functionality is provided to analyse the performance of an investment portfolio?
Real Estate, Leasing and Portfolio Management (15%)	What functionality is provided for the management and analysis of real estate portfolios? What functionality is provided for transaction management? What functionality is provided for lease administration and analysis? What are the capabilities to create lease ledger entries compliant with lease accounting standards? What functionality is provided to manage real estate tax payments across different geographies?
Capital Project Management (10%)	What functionality is provided to support capital project planning and analysis? What are the capabilities to help organizations support ongoing, day-to-day management of various capital projects? What are the capabilities to manage the financial elements of capital projects?
Space Management (10%)	What are the tools to import and update facility drawings? What is the functionality to manage the allocation of workers to desks or agile working environments? What is the functionality to manage space chargebacks? What functionality is provided for collecting data on space allocations and space utilization? What functionality is provided for analysing data on space allocation and utilization? What is the functionality for restacking and scenario modelling? What are the capabilities to support move management within organizations?
Workplace Services (4%)	What are the capabilities to provide self-service applications to building occupants for reserving meeting rooms, spaces and workstations? What are the capabilities to enable agile workers to book lockers? What functionality is provided for occupants for real-time wayfinding to locate desks and co-workers? What functionality is provided to support visitor management?
Occupant Wellbeing (3%)	What functionality is there for building occupants to provide feedback on their workspace? What functionality is there to enable building occupants to directly control their workplace in connected buildings? What is the functionality to provide location-based services? What is the functionality to provide amenity booking services? What is the functionality to provide virtual personal assistants? What functionality is provided for analysing data gathered from meters and sensors related to occupant wellbeing? What functionality is provided to support the data collection and reporting to different standards for wellbeing?

Figures in brackets represent the weighting given to each criterion in the flexible multi-criteria model that generates the Green Quadrant graphical analysis.

Source: Verdantix

FIGURE 10-3

Capabilities Criteria For IWMS Solutions

CAPABILITIES	
Asset & Maintenance Management (10%)	What functionality is provided for managing data on facility assets, spare parts and warranties? What functionality is provided to track the life cycle total cost of ownership of assets? What are the capabilities to support for the management of maintenance work orders for scheduled, planned and reactive maintenance? What are the capabilities to support condition-based maintenance and predictive maintenance? What is the functionality for vendor performance management? What are the tools to support asset management and maintenance standards? What is the functionality for EHS management of maintenance workers?
Asset Monitoring (3%)	What are the capabilities to support with condition-based and predictive maintenance? What are the capabilities to enable the automated identification and diagnosis of equipment faults? What functionality is provided to analyse the power factor of a facility or asset? What is the functionality to locate and track assets and equipment in the real-time?
Facilities Management Services Firm Operations (5%)	What is the functionality to support facilities services firms with customer interactions? What is the functionality to produce invoicing for facilities services carried out for a client? How is customer data managed and segregated to enable the management of multiple customers and service providers from one system?
Energy Management (2%)	What is the functionality for energy trend analysis and reporting? What functionality is provided to identify energy efficiency opportunities? What functionality does the software have to help firms measure and verify cost savings? What functionality is provided to automatically optimize the performance of energy-consuming assets? What functionality is provided for utility bill validation and auditing?
Enterprise Reporting (2%)	What functionality exists to create reports for external reporting or benchmarking schemes? Does the software feed in benchmarking data from external benchmarking services such as ENERGY STAR? What is the quality and flexibility of the dashboard to view, chart and analyse data?
Breadth Of Customer Focus (2%)	What is the functionality or out-of-the-box workflows to support the needs of corporates? What is the functionality or out-of-the-box workflows to support the needs of services providers? What is the functionality or out-of-the-box workflows to support the needs of investors?

Figures in brackets represent the weighting given to each criterion in the flexible multi-criteria model that generates the Green Quadrant graphical analysis.

Source: Verdantix

FIGURE 11

Momentum Criteria For IWMS Solutions

MOMENTUM	
Brand Awareness (5%)	Based on survey data collected from the Verdantix 2018 Smart Building Survey which comprised interviews with 303 real estate and facilities managers
Vision & Strategy (10%)	What is the firm's vision for the evolution of customer requirements? What is the firm's strategy to meet the needs of customers? What is the firm's product strategy for the next 2 years?
Customer Time to Value (10%)	What is the implementation methodology to bring forward customer time to value?
Installed Customer Base (15%)	At the close of 2018, how many IWMS customer contracts did the supplier have?
Recent Deal Volume and Size (10%)	How many deals did the supplier make in 2018? What was the total value of these deals?
Organizational Resources For IWMS (15%)	In how many countries does the vendor have offices, provide technical support and host the software? How many employees does the supplier have dedicated to IWMS?
IWMS Revenues & Revenue Growth (35%)	What are the vendor's revenues for IWMS? What percentage of IWMS revenue did the vendor spend on IWMS R&D in 2018? By how much did the vendor's total IWMS revenue grow in 2018 compared to 2017? How much capital did the vendor raise?
Figures in brackets represent the weighting given to each criterion in the flexible multi-criteria model that generates the Green Quadrant graphical analysis.	

Source: Verdantix

FIGURE 12-1

Vendor Capabilities Scores

	Accruent	ARCHIBUS	FM:Systems	FSI	IBM	iOFFICE	MRI	Planon
Automated Data Input	1.4	1.7	1.3	1.9	2.4	1.3	1.0	2.0
IT Systems Integration	1.3	1.8	2.2	1.5	1.8	2.1	1.1	2.1
Database Design	1.0	2.0	1.0	1.0	2.0	1.0	2.0	2.0
Master Data Management	1.3	2.7	1.7	1.3	2.7	1.0	1.3	2.3
Mobile Applications	1.0	2.0	2.0	2.0	2.0	2.0	1.5	2.5
Business Intelligence	1.0	2.3	1.5	1.2	1.9	1.4	1.5	1.6
Platform Configurability	1.3	2.0	1.7	1.3	2.7	1.3	1.0	2.0
Platform Core Capabilities	1.0	3.0	2.8	1.9	2.9	2.7	1.0	2.9
Implementation Options	2.0	3.0	2.0	3.0	2.0	1.0	3.0	3.0
User Interface	1.0	1.0	1.5	2.0	1.5	2.5	0.5	1.5
Platform Internationalization	1.3	2.3	2.0	0.5	2.8	1.0	1.8	2.3
Application Security	3.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0
Data Centre Security	2.0	2.0	1.0	1.0	2.0	1.0	2.0	2.0
Real Estate Investment Management	0.5	1.0	0.5	0.0	0.7	1.0	2.3	0.8
Real Estate, Leasing & Portfolio Management	2.0	2.0	1.3	0.5	2.3	1.0	2.5	2.5
Capital Project Management	2.0	2.0	1.7	1.7	1.7	0.0	1.7	2.0
Space Management	1.4	1.9	2.6	1.1	1.3	1.6	1.1	2.0
Workplace Services	1.9	1.7	1.2	1.2	1.1	2.3	1.1	1.4
Occupant Wellbeing & Engagement	0.9	1.4	1.1	2.1	1.1	1.7	0.4	1.4
Asset & Maintenance Management	1.5	2.3	1.4	2.4	1.6	1.4	1.4	2.4
Asset Monitoring	1.9	1.4	1.4	1.4	1.7	0.7	0.4	1.1
Facilities Services Firm Operations	1.0	1.3	1.3	3.0	2.0	1.0	1.0	2.3
Energy Management	1.3	1.7	0.6	1.9	2.3	1.0	0.4	1.5
Enterprise Reporting	1.0	2.0	1.7	0.7	2.0	1.3	1.3	1.7
Breadth Of Customer Focus	1.3	1.7	2.0	1.7	1.7	1.7	2.3	2.3

Scoring Framework

3	Vendor provides evidence they have market-leading functionalities, supported by a broad set of references to customers
2	Vendor provides evidence they have strong functionalities, supported by a broad set of references to customer examples
1	Vendor provides evidence they have relevant functionalities, with limited references to customer examples
0	No response provided or available publicly, or supplier has a weak offering

Source: Verdantix

FIGURE 12-2

Vendor Capabilities Scores

	Rapal	Spacewell Axxerion	Spacewell MCS	SWG	Tango	Trimble	VLogic	zLink
Automated Data Input	1.0	1.4	2.9	1.0	1.9	1.8	0.7	1.5
IT Systems Integration	1.3	1.3	2.0	1.8	1.5	1.8	0.9	0.7
Database Design	1.0	1.0	2.0	2.0	2.0	2.0	1.0	1.0
Master Data Management	0.3	1.3	1.7	1.3	1.7	2.0	0.7	0.3
Mobile Applications	0.5	1.0	2.0	1.5	1.5	1.5	1.0	0.5
Business Intelligence	1.0	1.1	2.0	1.3	2.4	2.2	1.0	1.4
Platform Configurability	1.0	2.3	2.0	1.7	2.3	2.0	1.3	1.0
Platform Core Capabilities	0.9	2.7	2.8	1.8	2.7	2.9	1.8	1.8
Implementation Options	1.0	2.0	3.0	3.0	1.0	2.0	3.0	3.0
User Interface	1.0	1.0	2.0	1.0	1.0	1.5	0.5	1.0
Platform Internationalization	0.5	1.0	0.8	1.0	2.0	2.8	0.0	0.0
Application Security	2.0	2.0	2.0	2.0	3.0	2.0	2.0	2.0
Data Centre Security	2.0	2.0	3.0	1.0	3.0	2.0	1.0	1.0
Real Estate Investment Management	0.0	1.1	0.5	0.0	1.2	1.7	0.0	0.1
Real Estate, Leasing & Portfolio Management	1.5	1.8	1.3	0.3	2.3	3.0	0.8	0.8
Capital Project Management	0.7	0.7	1.0	1.0	2.0	2.3	0.7	0.7
Space Management	2.0	1.1	1.6	1.4	1.4	2.0	1.4	1.3
Workplace Services	1.1	0.8	1.7	1.0	0.3	1.7	0.7	0.8
Occupant Wellbeing & Engagement	1.4	0.6	1.6	1.3	0.5	0.9	0.0	0.5
Asset & Maintenance Management	1.3	1.5	2.0	2.4	1.5	2.0	1.1	1.3
Asset Monitoring	1.0	0.7	1.6	1.2	0.7	1.0	0.0	0.5
Facilities Services Firm Operations	1.0	1.0	2.3	2.7	1.0	1.7	0.0	1.0
Energy Management	1.4	0.7	1.5	0.9	0.7	1.1	0.2	0.9
Enterprise Reporting	1.3	0.7	2.0	1.3	2.0	1.7	0.3	1.3
Breadth Of Customer Focus	1.7	2.3	1.7	1.3	1.3	2.0	1.7	1.7

Scoring Framework

3	Vendor provides evidence they have market-leading functionalities, supported by a broad set of references to customers
2	Vendor provides evidence they have strong functionalities, supported by a broad set of references to customer examples
1	Vendor provides evidence they have relevant functionalities, with limited references to customer examples
0	No response provided or available publicly, or supplier has a weak offering

Source: Verdantix

FIGURE 13

Vendor Momentum Scores

	Accruent	ARCHIBUS	FM:Systems	FSI	IBM	iOFFICE	MRI	Planon
Brand Awareness	2.0	3.0	3.0	2.0	3.0	2.0	1.0	3.0
Vision & Strategy	1.5	2.0	2.5	1.5	2.0	2.0	1.5	2.5
Customer Time to Value	1.0	1.0	3.0	2.0	1.0	2.0	1.0	2.0
Installed Customer Base	2.0	3.0	1.0	1.0	1.0	2.0	1.0	3.0
Recent Deals (by Size)	0.9	1.0	0.8	0.8	1.4	0.8	0.9	1.5
Organizational Resources For IWMS	2.8	2.5	1.3	1.8	2.5	1.3	2.0	3.0
Financial Resources & Growth	1.8	1.7	1.6	1.4	1.9	1.7	1.3	1.7

	Rapal	Spacewell Axxerion	Spacewell MCS	SWG	Tango	Trimble	VLogic	zLlink
Brand Awareness	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Vision & Strategy	1.0	1.0	2.0	1.0	1.0	2.0	0.5	1.5
Customer Time to Value	2.0	2.0	3.0	2.0	2.0	2.0	1.0	2.0
Installed Customer Base	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Recent Deals (by Size)	1.0	1.2	1.5	1.3	1.3	2.8	0.3	0.4
Organizational Resources For IWMS	1.0	1.8	3.0	2.0	1.0	3.0	1.0	1.0
Financial Resources & Growth	1.6	2.0	1.9	1.6	1.9	2.1	0.8	0.7

Scoring Framework

3	Vendor provides evidence they have market-leading market momentum, supported by significant facts and evidence
2	Vendor provides evidence they have strong market momentum, supported by significant facts and evidence
1	Vendor provides evidence they have moderate momentum
0	No response provided or available publicly, or limited momentum

Source: Verdantix

FIGURE 14

Green Quadrant Integrated Workplace Management Systems 2019

Capabilities	This dimension assesses capabilities for the following: automated data input, IT systems integration, database design, master data management, mobile applications, business intelligence, configurability, platform core capabilities, implementation options, user interface, application security, data centre security, real estate investment management, real estate, leasing and portfolio management, capital project management, space management, workplace services, occupant wellbeing and engagement, asset and maintenance management, asset monitoring, facilities management services firm operations, energy management, enterprise reporting and breadth of customer focus.

Momentum	This dimension assesses strategic success metrics including: brand preference, market vision and product strategy, customer time to value, installed customer base, recent deal volume and size, organizational resources and IWMS revenues.

Source: Verdantix

IBM TRIRIGA Is A Leading IWMS For Buyers That Want A Configurable Platform

US-headquartered global technology firm IBM provides its IWMS solution through its real estate and facilities management platform TRIRIGA, which it acquired in 2011. The IBM TRIRIGA platform provides functionality across real estate, capital projects, facilities, workplace operations and energy management within a single technology platform. IBM targets TRIRIGA at large building occupiers (including owners) from many sectors including airports, healthcare, higher education, retail, financial services, public sector, technology, telecommunications and transportation. The TRIRIGA portfolio, includes the TRIRIGA Building Insights offering, and it sits alongside other solutions in the IBM Watson IoT portfolio including Maximo and the Watson IoT Platform.

Strengths And Differentiators

Based on the Green Quadrant analysis, Verdantix finds that IBM has strengths in:

- **Providing a broad IWMS platform for large building occupiers.**
  IBM achieves a strong overall score of 1.9/3.0 on the capabilities axis and is one of six market Leaders in our Green Quadrant analysis. It achieves an above-average score on many of the core functionalities required by building occupiers such as real estate and portfolio management, capital project management and energy management. IBM also has several proof points of customers benefiting from this breadth of functionality. For example, General Electric uses TRIRIGA to centralize data on 8,500 leases, and manage assets, preventative maintenance and service requests across its global building portfolio. The UK's Defence Infrastructure Organisation replaced over 100 existing legacy systems with TRIRIGA to manage data on real estate, facilities, operations and maintenance, and sustainability metrics.

- **Platform configurability to meet buyers' complex needs**
  IBM attains a score of 2.7/3.0 for its platform configurability capabilities — the highest score in the Green Quadrant analysis in this area. Verdantix hears from IBM customers that the configurability of the TRIRIGA platform to adapt around organizational workflows and processes is a key driver behind their purchase choice. For example, oil and gas firm Woodside Energy stated it selected TRIRIGA because the platform could be configured significantly without changes to the source code.

- **Providing internationalization capabilities and a global support network.**
  IBM achieves a strong score of 2.8/3.0 for the internationalization capabilities of its platform. TRIRIGA supports 22 languages out-of-the-box — one of the broadest language ranges from the IWMS vendors included in this study. It also supports user interactions across multiple time zones by automatically tagging activities with the time zone that is assigned to a user's profile. The global scalability of TRIRIGA has been a key factor behind customer purchases. For example, TRIRIGA customer Airbus has cited IBM's global support network as a top factor underlying its selection choice. Airbus is currently using TRIRIGA to manage maintenance, facilities suppliers, space chargebacks and assets across a global portfolio of 700 buildings.

- **Helping customers capture IoT data from buildings.**
  The broader IBM group offers the IBM Watson IoT Platform designed to capture data from sensors, smart plugs and existing building management systems. The Watson IoT Platform also has applications to manage data on space utilization and energy consumption called TRIRIGA Building Insights. Customers can use Building Insights to help leverage maximum value from granular facilities data.

Improvement Opportunities

Based on the Green Quadrant analysis, Verdantix finds that IBM could improve on:

- **Making its workplace tools more user-friendly out of the box.**
  Over the past two years, many IWMS vendors have been investing to make their user interfaces more user-friendly and employee-centric to engage all building users. This flurry of product innovation is raising the bar for the level of performance customers expect. Feedback from our customer panel indicates that IBM could improve the employee experience of TRIRIGA's out-of-the-box workplace applications, including room booking. One customer panel member reported that they opted to have a third-party IT services firm develop a user interface overlay for the TRIRIGA platform to meet their requirements of a more simplified user experience for room booking.

- **Addressing the market's perception around TRIRIGA's long implementation times.**
  Many market commentators continue to state that IBM TRIRIGA is a slow and expensive IWMS solution to implement. This partially reflects the fact that TRIRIGA has historically been implemented by very large organizations that have opted for significant customization of the solution. However, some customers today are opting to implement TRIRIGA out of the box without any customization, which opens up the possibility for a much speedier time to value. TRIRIGA can be implemented in 12 to 16 weeks when there is minimal solution configuration and the customer opts to use implementation accelerators provided by IBM Global Business Services.

Selection Advice For Buyers

Considering all supplier offerings assessed in the Green Quadrant analysis, we believe that IBM should be included on shortlists by the following buyers:

- **Building occupiers looking for a multi-country IWMS deployment.**
  Given the breadth of functionality and internationalization capabilities of TRIRIGA, billion-dollar-revenue firms seeking an IWMS for a multinational deployment should include IBM on their shortlist. Large IWMS deployments are IBM's focal point – most of its reference TRIRIGA customers are billion-dollar-revenue firms that have complex requirements and the resources to run multi-year implementations. It is reinforcing this positioning by investing in the underlying technology of its solution to address speed issues; it is running a project to improve the underlying performance of the platform, including refactoring the database architecture to speed up queries.

- **Large firms looking to customize their IWMS to meet specific needs.**
  Investing in IT services to customize an IWMS solution pushes up the initial implementation cost and future upgrade fees. However, some global billion-dollar firms prefer to invest more in their IWMS deployment, to make the software map neatly to existing processes so they can cut down on change management and training efforts. IBM is frequently deployed by customers on a customized basis. For example, the World Bank Group is using a version of TRIRIGA that has been customized by eCIFM to match the bank's complex organizational hierarchy and existing workflows across 30 sites. The University of Massachusetts is using a version of TRIRIGA that has been customized to meet its service request and purchasing workflow requirements.

VERDANTIX CAPABILITIES

RESEARCH, ADVISORY & EVENTS

Through our research activities and independent brand positioning we provide clients with:

Research relationships based on an annual research subscription

Confidential advisory services such as commercial due diligence

Thought leadership studies for brand building and lead generation

Executive summits, roundtables and webinars

Advisory workshops to rapidly increase your sector knowledge

Multi-country and complex customer survey projects

Marketing campaign support with analysts and content

VERDANTIX MARKET COVERAGE

Environment, Health & Safety

Focuses on the software and services markets that enable corporations to improve their performance across environment, health and safety including compliance, risk and performance.

Operational Risk

Focuses on consulting markets that enable corporations and public sector organizations to achieve regulatory compliance, mitigate risk, and improve health, safety, and sustainability.

Smart Buildings

Focuses on software, intelligent building technologies and consulting services that enable real estate and facilities executives to optimize the value and performance of their building portfolios.

Industrial Wearables

Focuses on wearable devices for vital signs monitoring, location tracking and musculoskeletal enhancement. Includes analysis of virtual reality and augmented reality deployed on HMDs and smartphones.

WHY VERDANTIX?

Verdantix is an independent research and consulting firm with a focus on innovative technologies that optimize business operations. We have expertise in environment, health, safety, quality, operational risk, as well as smart building technologies.