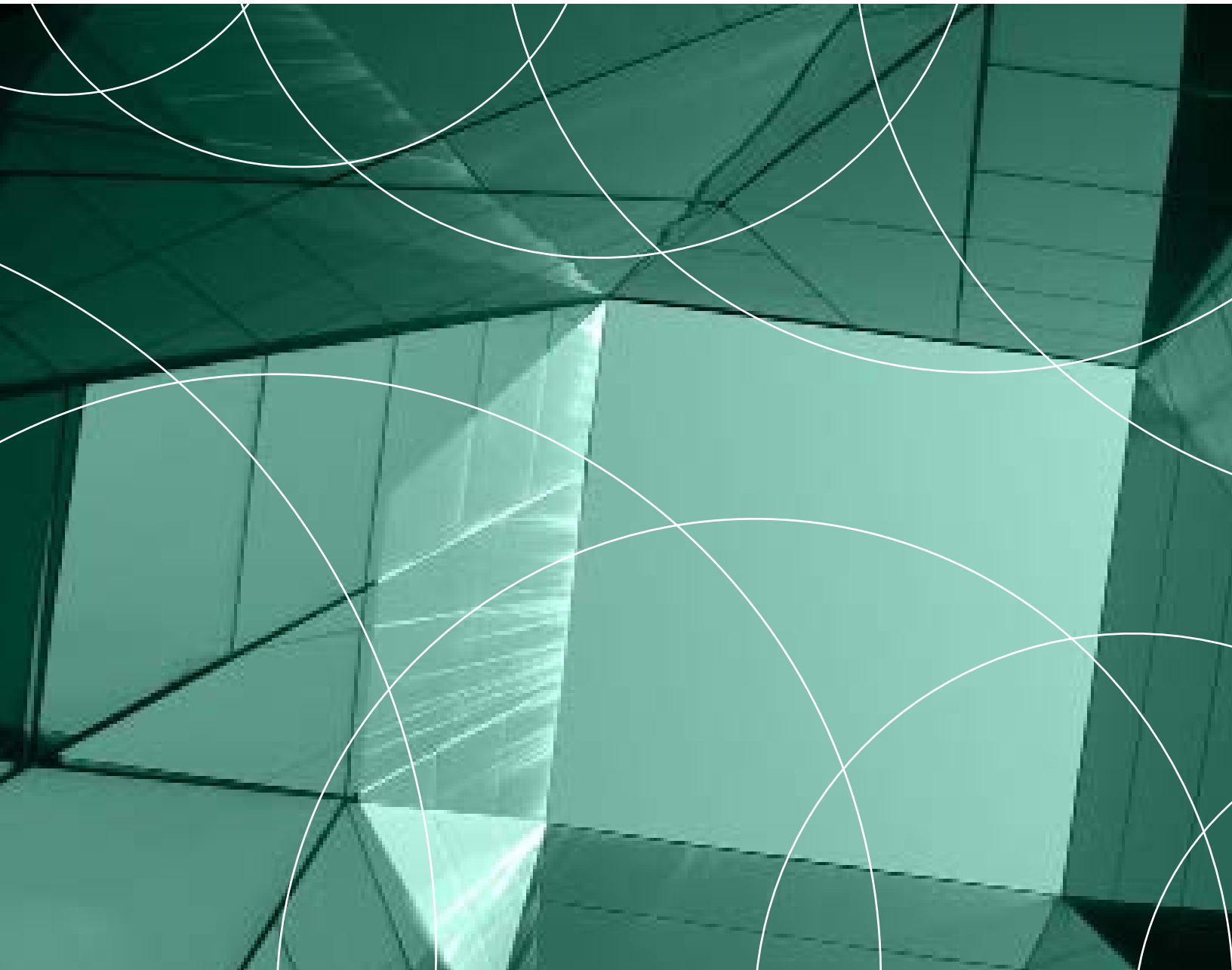
FORRESTER®

Smart Buildings Enable Efficient Spaces That Foster Health, Well-Being, And Productivity

Technical And Strategic Partners Are Needed To Fill Integration And Expertise Gaps

A FORRESTER CONSULTING THOUGHT LEADERSHIP PAPER COMMISSIONED BY JOHNSON CONTROLS, FEBRUARY 2024

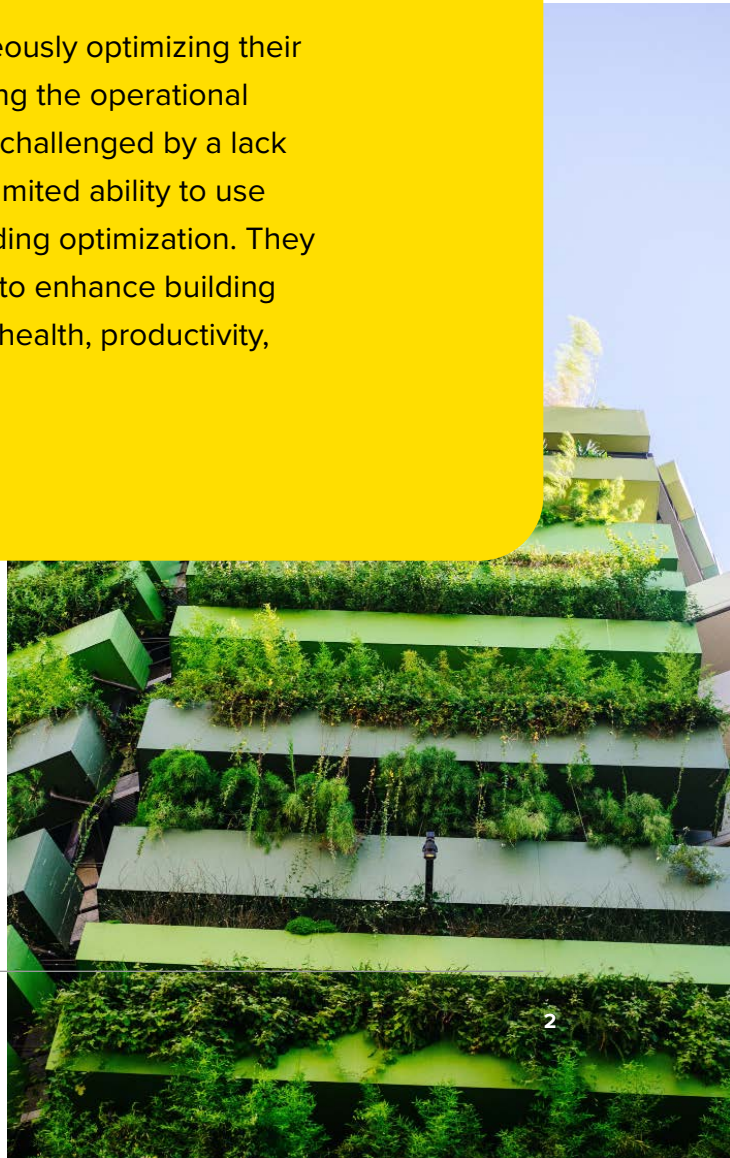


Executive Summary

Building environment systems play a critical role in reducing carbon emissions. Cumulative spend on the green heating and cooling transition alone will reach $24 trillion by 2050.[1] The use of energy efficient heating and cooling equipment like heat pumps will need to nearly double by 2030 to align with global climate agreements.[2] And this is just the tip of the iceberg — the need to improve building environmental factors like indoor air quality have also become critical.

In August 2023, Johnson Controls commissioned Forrester Consulting to evaluate the state of smart buildings. Forrester conducted an online survey with 3,445 leaders responsible for their organization's smart building strategies. This spotlight focuses on a subset of 1,548 of those leaders responsible for the systems regulating their organization's building environments (e.g., HVAC, lighting, sound, indoor air quality [IAQ], asset/space utilization, etc.) in owned or leased spaces.

We found leaders have a dual purpose of simultaneously optimizing their organizations' building environments while improving the operational efficiency of critical building systems. Yet many are challenged by a lack of building system and equipment integration and limited ability to use collected data to derive actionable insights for building optimization. They need partners to fill integration and expertise gaps to enhance building efficiency and sustainability and improve occupant health, productivity, and well-being.



Key Findings

Smart buildings optimize building environments, operating efficiencies, and sustainability. They accelerate digital transformation of building systems, a foundation necessary to optimize building environments and efficiencies. They unify buildings systems, enhance collaboration across the organization, and provide improvements to occupant health, well-being, productivity, and building efficiency, while reducing carbon footprints.

Leaders must improve their organizations' building environments, while concurrently increasing operating efficiency and sustainability. Operating efficiently while also improving occupant health, wellness, and well-being are top priorities for building leaders. Initial action items include improving energy efficiency, improving physical security, optimizing/designing flexible building operating models, and improving indoor air quality (IAQ).

Optimizing building environments requires unified building systems and insights. A lack of integration is preventing cross-functional leaders from easily accessing insights needed to achieve their goals. Only 11% of leaders say their building systems and equipment are fully integrated today, and 67% struggle to use generated insights to optimize their organization's systems and achieve their top goals. This lack of integration is costing them time, people, and money.

Technical and strategic partners are critical to fill expertise gaps. Leaders rely on partners to help with integrating IAQ infrastructure into digital building systems to enable analytics, reporting, and interoperability between IAQ infrastructure and building management systems. Partners also help leaders stay on top of changing air quality standards and certifications.

Smart Buildings Optimize Building Environments, Operating Efficiencies, And Sustainability

Smart buildings provide leaders a clearer picture of what's going on inside organization operated spaces, helping them better manage, renovate, and create new spaces to be more efficient, sustainable, healthy, and safe. For the purposes of this study, we defined smart buildings as converging information from various connected systems in a facility (e.g., HVAC, lighting, security, etc.) that provides data-driven insights and measurable information that can be shared across multiple operational technology (OT) and information technology (IT) systems.

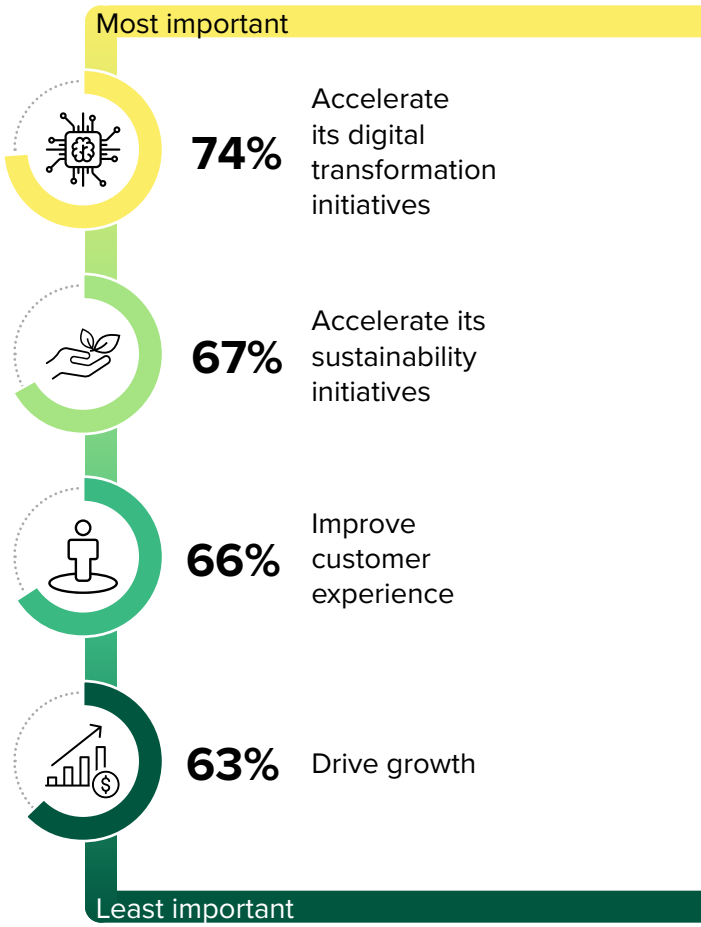
Finding the right smart buildings partners to accelerate an organization's building digital transformation and create a unified building system for the entire organization helps leaders deliver efficient, productive, and healthy outcomes. We found that:

- **Smart buildings accelerate digital transformation initiatives and are a vital foundation for optimizing building environments, operating efficiencies, and sustainability.** Building leaders report that smart buildings are most vital for meeting top business goals, such as accelerating digital transformation, accelerating sustainability initiatives, and improving customer experience (see Figure 1).

FIGURE 1

Importance Of Smart Buildings Initiatives To Meet Top Business Priorities

(Showing "Important" and "Critical")



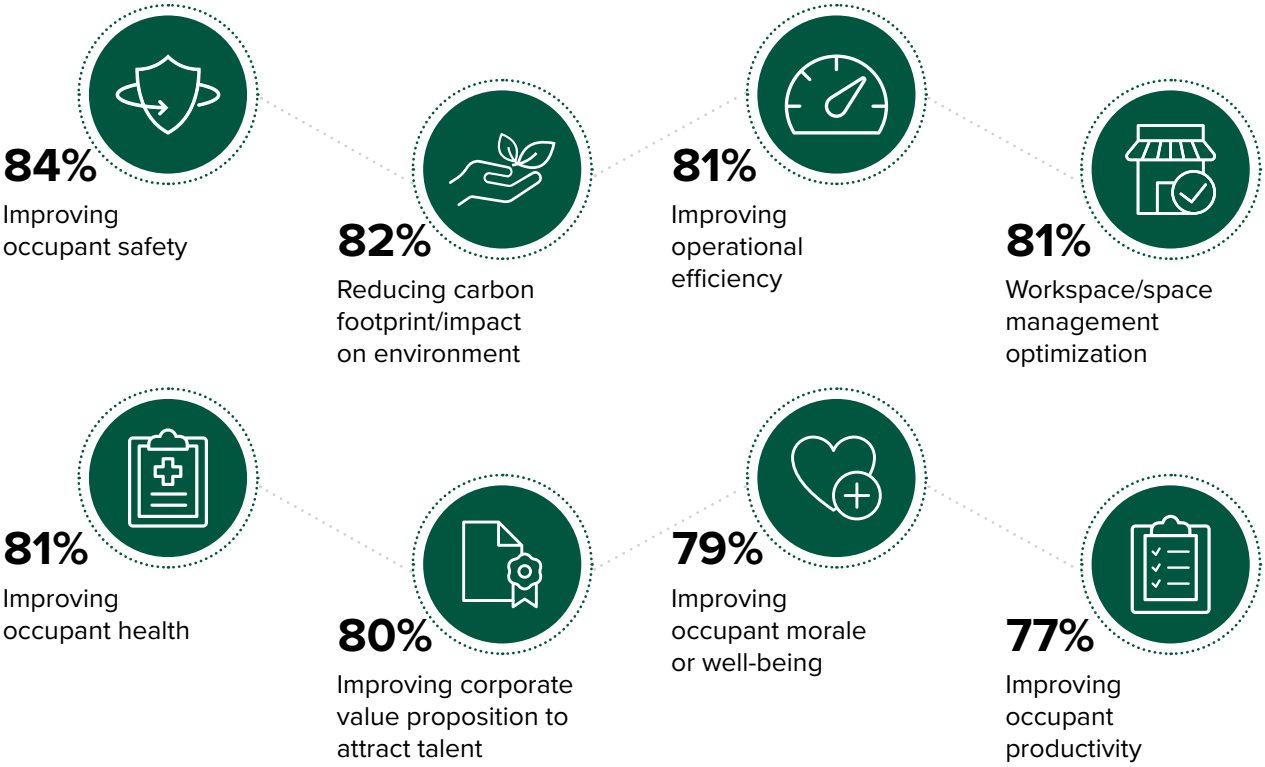
Base: 741 to 1,166 smart buildings decision-makers at the director level or higher for building environment systems at global enterprises
Note: Showing top 4 business priorities
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

- **Smart buildings improve occupant health and well-being, increase productivity, improve building efficiency, and reduce carbon footprints.** Smart buildings initiatives enable firms to address building environment and operating efficiency goals. Leaders have achieved or expect to achieve many benefits including enhancing occupant safety, reducing their organization's carbon footprint, improving operational efficiency, optimizing building spaces, improving occupant health, improving corporate value propositions to attract talent, improving well-being, and improving occupant productivity (see Figure 2).

FIGURE 2

Benefits Of Achieving Smart Buildings Goals

(Showing "This is a benefit we have already realized" and "This is a benefit we expect to realize" combined)



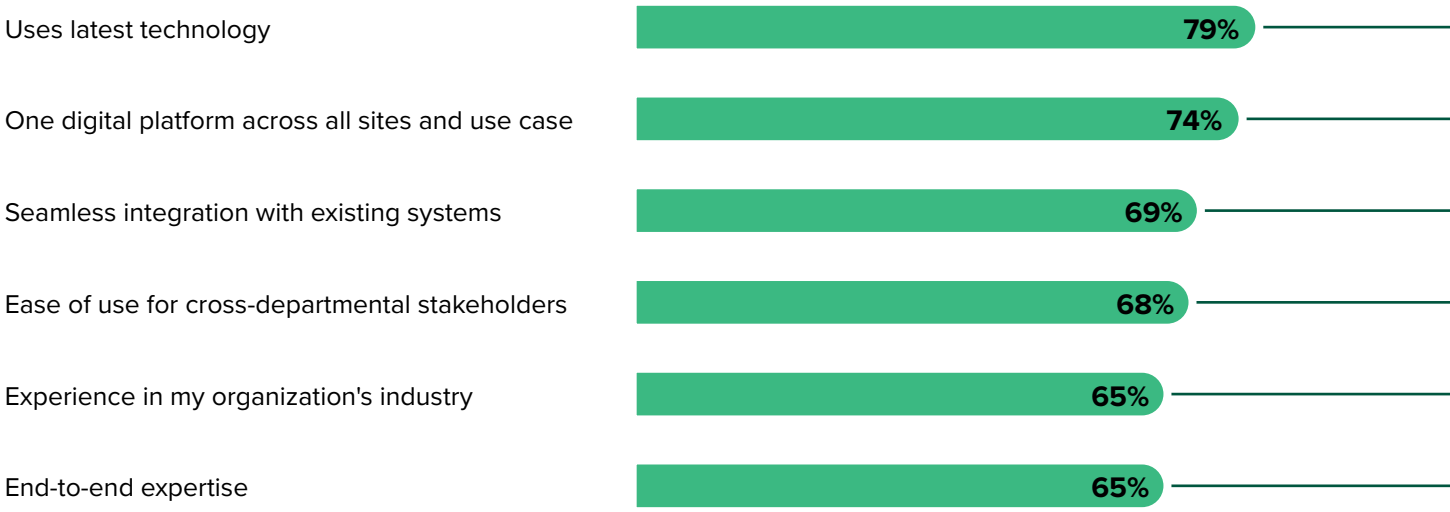
Base: 1,548 smart buildings decision-makers at the director level or higher for building environment systems at global enterprises
Note: Showing eight responses
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

- **A unified smart buildings platform can unify stakeholders across the organization.** The ownership of various building environment systems is spread across multiple departments. This distributed ownership highlights requirements for strong cross-department collaboration to optimize building systems. Leaders need a single source of truth for standardized reporting on shared metrics and goals across departments. Surveyed leaders seek partners who use the latest technology, provide one digital platform across all sites and use cases, provide seamless integration into all building systems, offer a platform that's easy to use for cross-departmental stakeholders, demonstrate experience in their industry, and have end-to-end expertise (see Figure 3).

FIGURE 3

"How beneficial are each of the following when choosing a smart building solution provider?"

(Showing "Valuable" and "Extremely valuable")



Base: 1,548 smart buildings decision-makers at the director level or higher for building environment systems at global enterprises
Note: Showing six responses
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

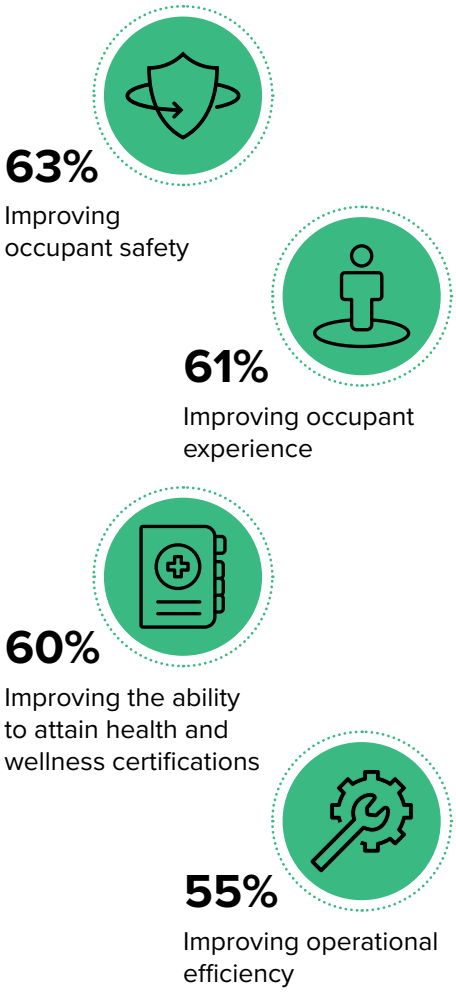
Leaders Concurrently Focus On Improving Building Environments And Operating Efficiencies

As the urgency to address building system efficiency and optimize building environments increases, the stakes are high for leaders to successfully execute. In surveying 1,548 leaders, we found that:

- **Enhancing occupant health and well-being while also improving operational efficiency are top priorities.** Many building leaders recognize that a one-dimensional focus on either improving the environment or enhancing the efficiency of their buildings is not sufficient. Now, they must focus on addressing both types of priorities concurrently (see Figure 4). Tying building environment improvements together with improving operational efficiency enables leaders to improve occupant health and well-being while also improving building efficiency and reducing their organization's carbon footprint.
- **Improving energy efficiency is the top action leaders take to meet building environment system priorities.** To concurrently optimize building environments and achieve operational efficiencies, many leaders focus on improving energy efficiency; improving physical security; optimizing or designing flexible building operating models; and improving indoor air quality (IAQ) (see Figure 5).

FIGURE 4

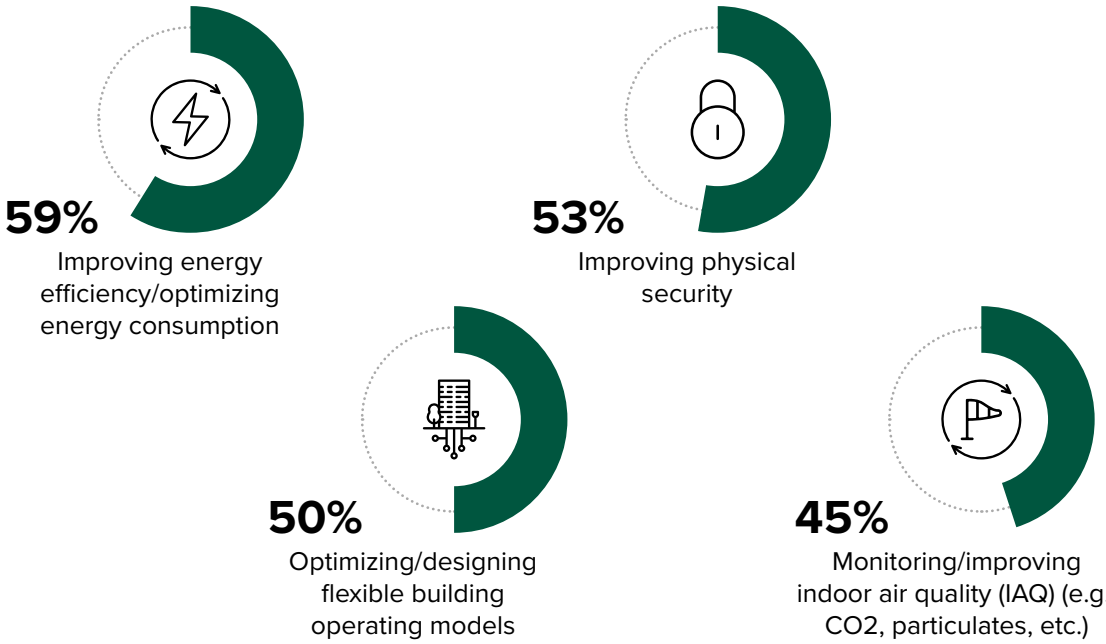
Top Building Environment System Priorities



Base: 1,548 smart buildings decision-makers at the director level or higher for building environment systems at global enterprises
Note: Showing top 4 responses
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

FIGURE 5

Top Actions Leaders Are Taking To Meeting Building Environment System Priorities



Base: 1,548 smart buildings decision-makers at the director level or higher for building environment systems at global enterprises
Note: Showing top 4 responses
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

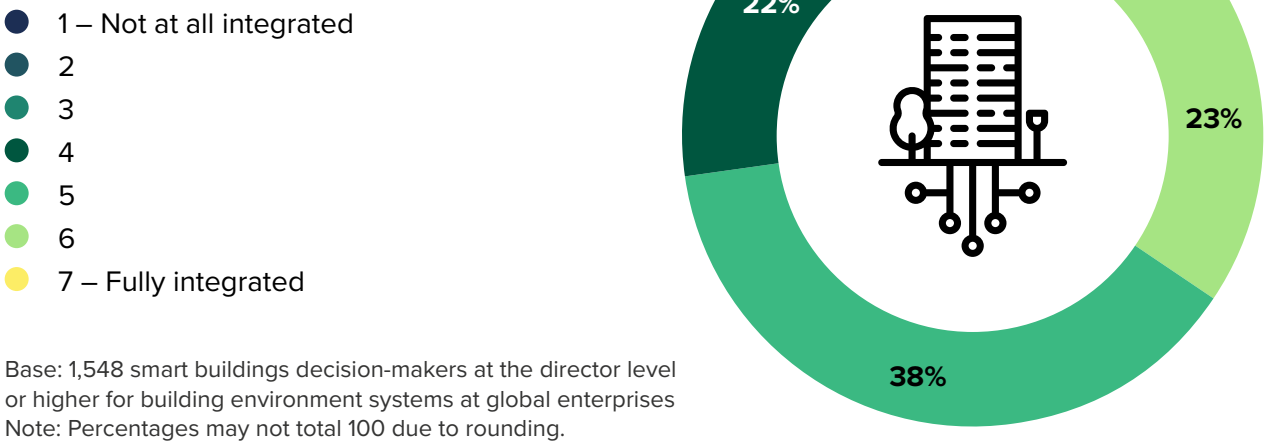
Connected Building Systems Are The Foundation For Improving Health, Well-Being, Productivity, And Building Efficiency

Connected building systems reduce cross-departmental data and strategy silos and facilitate the ability to collectively work toward improved building outcomes in occupant health, well-being, productivity, and building efficiency. However, leaders working to implement and optimize the infrastructure and equipment needed to attain these outcomes are often stymied by an inability to connect these systems and equipment together. We found that:

- **Few leaders indicate their organization's systems and equipment are fully integrated today.** Only 11% of building leaders report their organization's systems and equipment are fully integrated today (see Figure 6). In addition, managing the many partners involved in building systems is complicated. Approximately two-thirds of leaders work with multiple partners — each specializing in different types of

FIGURE 6

"How well integrated are the digital systems, solutions, services, and connected equipment in your organization's buildings?"



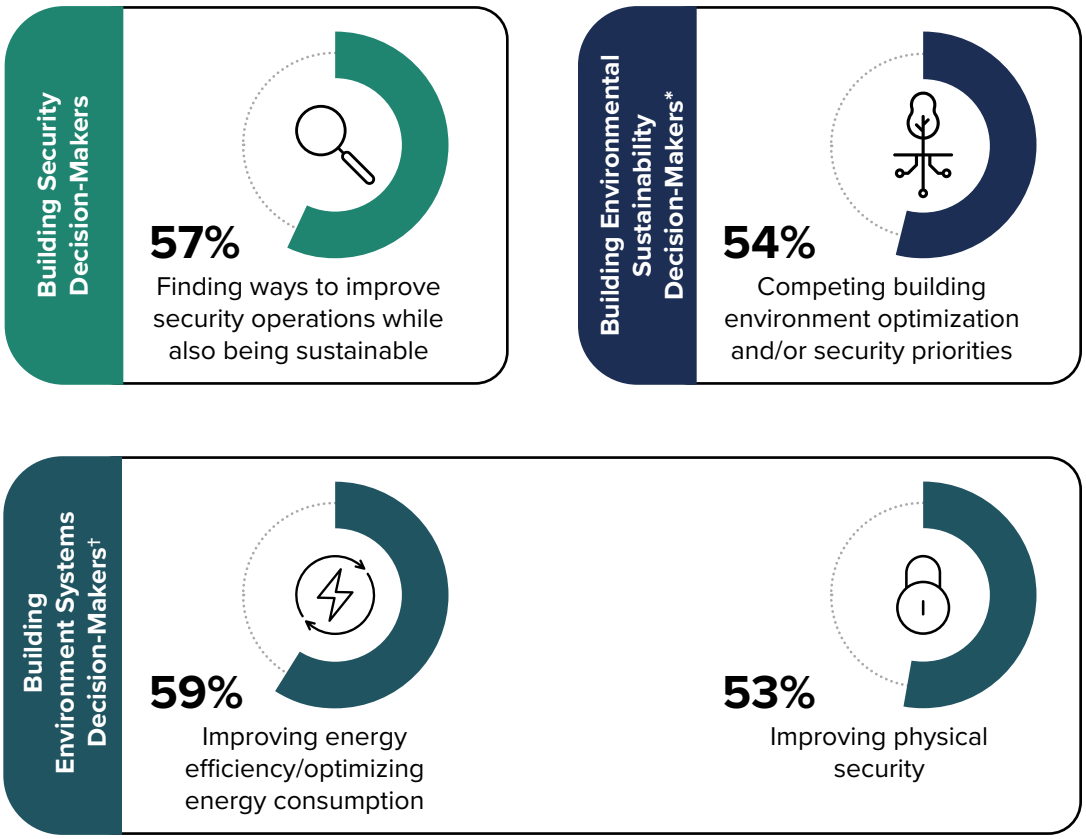
Base: 1,548 smart buildings decision-makers at the director level or higher for building environment systems at global enterprises
Note: Percentages may not total 100 due to rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

building systems — to leverage expertise and insight needed across their portfolio of buildings. Most leaders also face misalignment between their partners (54%) and often struggle to get accurate and useful information from them (59%). In addition, 67% of leaders struggle to optimize their building systems and achieve their top goals from insights generated.

- **Collaboration with sustainability and physical security leaders enables execution on joint building goals.** We found that many building environment, sustainability, and security leaders have overlapping goals. However, siloed data and strategies are hindering collective progress across these teams. When comparing goals of decision-makers in security, sustainability, and building environment, we found they all focused on improving efficiency in operations and doing so securely and sustainably (see Figure 7). These priority similarities highlight an opportunity for addressing them in a joint manner. Breaking down these silos will require better collaboration between teams and standardization of the building systems they rely on.
- **This lack of buildings data integration costs time, people, and money.** The inability to connect and integrate all building systems and use collected data for actionable insights impacts corporate operations, revenues, and brand perception. For example, many leaders say their organizations face decreased operating efficiencies (66%), decreased customer loyalty (60%), increased regulatory penalties (59%), decreased revenue (51%), and decreased brand reputation (46%).

FIGURE 7

Building Decision-Makers Have Overlapping Priorities



Base: 1,175 smart buildings decision-makers at the director level or higher for secure buildings at global enterprises
*Base: 1,537 smart buildings decision-makers at the director level or higher for environmental sustainability at global enterprises
†Base: 1,548 smart buildings decision-makers at the director level or higher for building environment systems at global enterprises
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

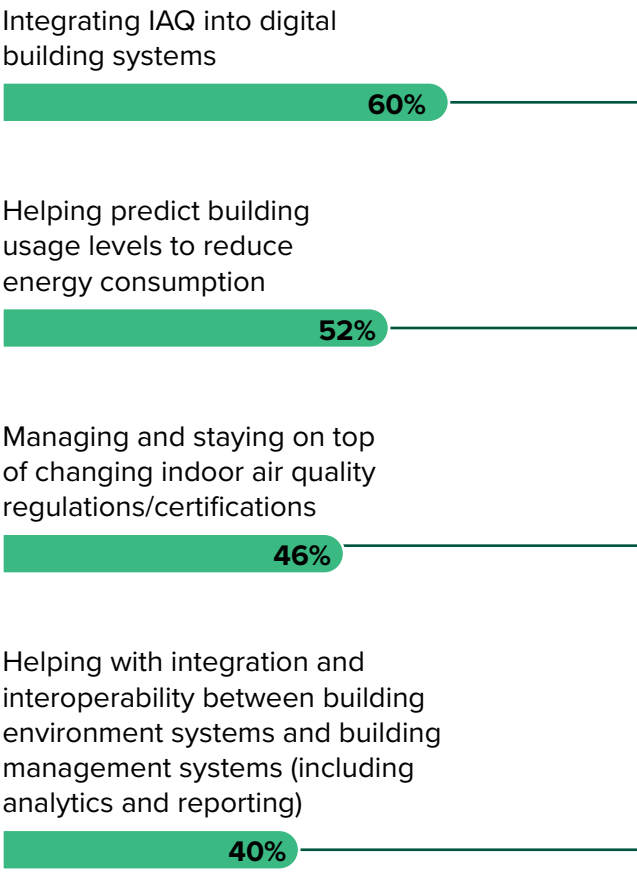
Leaders Need Technical And Strategic Partners To Improve Building Environments And Operating Efficiencies

Many leaders report their organizations are working on upgrading equipment and infrastructure to improve occupant well-being, health, productivity, and enhance efficient building operations. Yet fewer leaders report their organizations are actually able to control and regulate their existing systems. We found that:

- **Optimizing asset efficiency and monitoring air quality are top challenges.** Leaders indicate their organizations are most challenged with optimizing asset performance/efficiency (30%), monitoring outdoor air quality (25%), and monitoring and improving IAQ (25%). To optimize building environments, leaders need actionable insights from critical building systems that are connected and integrated with each other.
- **Leaders need help monitoring and improving air quality and predicting fluctuating building usage levels.** Organizations need the most help with integrating IAQ monitoring into their digital building systems. In addition, they need assistance predicting building usage levels that can fluctuate by the day to reduce energy consumption. Many also need help tracking the changing IAQ regulations and certifications. Integration and interoperability of reporting and analytics between building environment systems and building management systems is also an area where leaders need assistance (see Figure 8).

FIGURE 8

Most Important Building Environment System Capabilities Companies Rely On External Partners For



Base: 1,548 smart buildings decision-makers at the director level or higher for building environment systems at global enterprises
Note: Showing top 4 responses
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

- **Ownership of building environment system priorities is spread across various departments.** For example, IT is most often identified as owning initiatives to improve occupant productivity; HR is the most common owner of improving occupant morale or well-being; and environmental health and safety departments are commonly identified as owners of improving occupant health and safety and reducing carbon footprint. To ensure generated insights are relevant and useful, organizations should tailor analytics and reporting to address the needs of specific departments, while also standardizing reporting on shared metrics and goals.

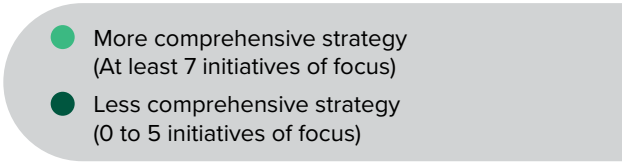
Comprehensive Building Environment Strategies Focus On Improving Health, Well-Being, Productivity, And Energy Efficiency

We compared building leaders at organizations with comprehensive strategies related to the optimization of their organizations' building environments (i.e., those pursing seven or more initiatives focused on this area) to those with more limited strategies (i.e., those pursing five or fewer initiatives). Examples of the initiatives those with comprehensive strategies are focusing on include improving energy efficiency, improving physical security, optimizing and designing flexible building models, and monitoring/improving IAQ. Those organizations with more limited strategies are focusing mainly on tracking and improving energy efficiency, along with improving physical security.

Survey results show that priorities like improving occupant health and well-being, enhancing operational performance, reducing occupant distractions, and improving corporate value propositions to attract talent are more likely the drivers of building environment optimization strategies at organizations with comprehensive remits. Leaders at these companies are not tackling these priorities alone — they are more likely to rely on the help of external partners to execute these priorities. Key areas where they are more likely to seek partner assistance include integrating IAQ infrastructure into digital building systems; integrating analytics and reporting; enabling interoperability between building environment systems and building management systems; and staying on top of changing indoor air quality standards and certifications (see Figure 9).

FIGURE 9

Characteristics Of Organizations With More Comprehensive Building Environment System Strategies



BUILDING ENVIRONMENT SYSTEM PRIORITIES

Improving occupant health
44%
36%

Improving operational performance
47%
39%

Improving occupant morale or well-being
33%
27%

Reducing impact on the communities near our facilities
26%
20%

Improving occupant experience
62%
57%

Reducing occupant distractions
25%
20%

Reducing carbon footprint/impact on environment
40%
35%

Improving our corporate value proposition to attract talent
33%
28%

PARTNER CAPABILITIES RELIED ON

Integrating IAQ into digital building systems
65%
48%

Helping with integration and interoperability between building environment systems and building management systems (including analytics and reporting)
42%
37%

Managing and staying on top of changing indoor air quality regulations/certifications
47%
42%

Managing IAQ 24/7 remotely, reducing staffing resources required on building sites
39%
36%

Helping predict building usage levels to reduce energy consumption
52%
50%

Advising the organization on ways to optimize its environment systems for improved health and wellness in its buildings
34%
31%

Base: 1,548 smart building decision-makers at the director level or higher for building environment systems at global enterprises
Note: Sorted by greatest delta between “more comprehensive” and “less comprehensive” strategies
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

Key Recommendations

Smart buildings environments are equipped with advanced technologies and interconnected systems that monitor and optimize critical building systems (e.g., lighting, power, HVAC, indoor air quality, occupancy, etc.) to enhance occupant health, well-being, and productivity; streamline operations; provide intelligent automation; and address efficiency and sustainability initiatives. Smart buildings environments can significantly improve operations in virtually any kind of facility, including government and commercial offices, financial service branches, retail sites, and healthcare facilities.

An in-depth analysis of 1,548 building leaders responsible for the systems regulating their organization's building environments yielded the following recommendations:

Assess opportunities for smart buildings to address a range of energy efficiency, health, well-being, productivity, and sustainability priorities.

Smart buildings can address a range of corporate priorities. These initiatives include enhancing the operational efficiency of critical lighting, power, and HVAC systems; improving sustainability; enhancing occupant well-being; and improving occupant safety. A common focus of many firms is on energy efficiency and monitoring critical lighting, HVAC, and power systems. Proactive firms also use smart buildings technologies to enhance the health, well-being, and productivity of occupants by monitoring and managing IAQ, security, and optimizing space and asset utilization.

Facilitate collaboration across stakeholders to identify and leverage smart buildings insights.

Stakeholders from many departments and operational processes benefit from building system data and insight. Building leaders must proactively engage with key stakeholders spanning processes, including security, operations, employee experience, compliance, sustainability, and facility

management, to identify opportunities for improvement in occupant health, well-being, productivity, building efficiency, and sustainability across critical organizational processes.

Establish a roadmap of near-term to long-term strategic smart buildings initiatives.

Organizations must establish a roadmap of smart buildings priorities and initiatives to optimize critical building systems and processes. Initially, many firms focus on smart buildings use cases to optimize energy efficiency, improve operations, and address environmental sustainability initiatives. Evolving to a more proactive approach by extending the organization's smart buildings initiatives beyond these initial priorities can enhance building occupants' well-being, health, productivity, and overall experience by improving physical security, indoor air quality (IAQ), and space/asset utilization.

Seek partners to assist with capturing relevant building system data and insight.

Many firms are challenged with insufficient building system and equipment integration as well as limited ability to use captured data to derive actionable building insights. Partnering with third-party providers with demonstrated ability to seamlessly integrate building, security, and IAQ systems; manage asset and space utilization; create dashboards highlighting key building insights; and the ability to deploy optimized building operations solutions can help level-up of your firm's capabilities. Other characteristics of partners should include demonstrated technical expertise, a single digital platform that can span all sites, and an interface that's easy for all stakeholders to access and operate.

Appendix A: Methodology

Forrester conducted an online survey of 3,445 smart buildings strategy decision-makers, including 1,548 building leaders responsible for the systems regulating their organization's building environments (e.g., HVAC, lighting, sound, indoor air quality [IAQ], asset/space utilization, etc.) in owned or leased spaces at organizations in 18 industries across 25 countries. Survey questions asked leaders to evaluate the current state of building system integration, data connectivity, and the ability to share and leverage data collected across the organization for building system optimization. In addition to high-level questions about their organizations' smart buildings strategy, building leaders were asked questions about their organizations' building environment strategy, goals, and related challenges. The study was conducted in a double-blind fashion.

To read the full results of the 2023 study, please refer to the Thought Leadership Paper commissioned by and developed in collaboration with Johnson Controls titled, "Cracking The Code: Unleash Your Smart Buildings Strategy With The Power Of Facility Data."

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Appendix B: Demographics

REGIONS	
North America	**32%**
Central Europe	**12%**
United Kingdom and Ireland	**9%**
Australia and New Zealand	**6%**
Southeast Asia	**5%**
Latin America	**5%**
Middle East and Africa	**5%**
Japan	**5%**
China	**4%**
Singapore	**4%**
South Korea	**4%**
India	**4%**
Hong Kong	**4%**

DEPARTMENT	
Facilities (e.g., energy management, procurement, real estate, environmental health and safety)	**36%**
IT	**14%**
Employee experience (e.g., HR, workplace experience)	**11%**
Operations	**10%**
Governance/risk/compliance	**8%**
CEO/office of president	**8%**
Finance/accounting	**6%**
Sustainability	**5%**
Customer experience	**3%**
Sales/marketing	**1%**

INDUSTRY	
Healthcare	**9%**
Energy, utilities, waste management	**8%**
Government	**8%**
Education	**7%**
Mixed use residential/ commercial real estate	**6%**
Financial services/insurance	**5%**
Travel and hospitality	**5%**
Electronics	**5%**
Consumer packaged goods	**5%**
Manufacturing and materials	**5%**
Media and leisure	**5%**
Business/professional services	**5%**
Transportation and logistics	**4%**
Agriculture, food, beverage	**4%**
Construction	**4%**
Retail	**4%**
Chemicals/metals	**3%**
Data centers	**3%**

ORGANIZATION SIZE	
2 to 499 employees	**2%**
500 to 999 employees	**28%**
1,000 to 4,999 employees	**36%**
5,000 to 19,999 employees	**24%**
20,000 or more employees	**11%**

TITLE	
C-level executive	**11%**
Vice president	**27%**
Director	**62%**

BUILDING RESPONSIBILITY AREA	
Building environment systems and strategy	**100%**

Note: Percentages may not total 100 due to rounding.

Appendix C: Supplemental Material

RELATED FORRESTER RESEARCH

"The Top 10 Trends In Edge Computing And IoT, 2023," Forrester Research, Inc., December 8, 2023.

"IoT Solutions Transform Smart Buildings Into Strategic Productivity Assets," Forrester Research, Inc., August 2, 2021.

"Planning Guide 2023: Technology Architecture & Delivery," Forrester Research, Inc. August 23, 2022.

RELATED FORRESTER RESEARCH

Michele Pelino, Alexander Soley, "The Top 10 Edge Computing And IoT Trends That Matter In 2023," Forrester Blogs.

Appendix D: Endnotes

[1] Source: "Green Market Revolution Forecast, 2023 To 2050 (Global)," Forrester Research, Inc., June 23, 2023.

[2] Source: Yannick Monschauer, Chiara Delmastro, Rafael Martinez-Gordon, "Global heat pump sales continue double-digit growth," IEA, March 31, 2023.