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Cracking The Smart Buildings Code: A Spotlight On Education

Results From The November 2023 Thought Leadership Paper, "Cracking The Code: Unleash Your Smart Buildings Strategy With The Power Of Facility Data"

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

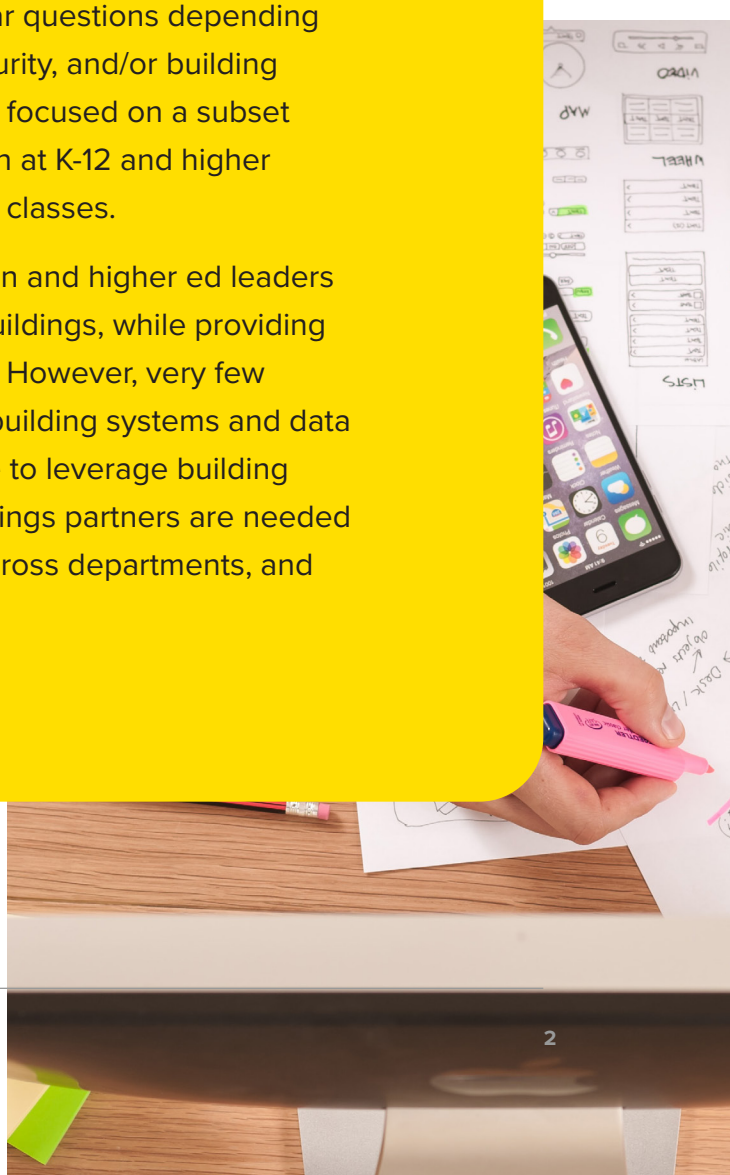
Executive Summary

Education leaders are at a critical juncture in time. They must continue to deal with the COVID-19 learning gaps, manage the budget impact of the depletion of emergency COVID-19 funding, deal with increasing extreme weather events, increasing cyber and physical security threats, and decreasing levels of enrollment — all while managing increasing carbon emissions reduction regulations.

To improve the student learning experience despite these challenges, education leaders must find ways to save money by operating more efficiently and improving the environmental sustainability of their buildings, while also focusing on improving the health and safety of their students.

In August 2023, Johnson Controls commissioned Forrester Consulting to evaluate the state of smart buildings. Forrester conducted an online survey with 3,445 smart buildings leaders who were asked high-level smart buildings strategy questions and then more granular questions depending on their level of responsibility for sustainability, security, and/or building environmental systems. For this spotlight, Forrester focused on a subset of 237 smart buildings decision-makers in education at K-12 and higher education (higher ed) institutions offering in-person classes.

We found that smart buildings enable K-12 education and higher ed leaders to improve the sustainability and security of their buildings, while providing an environment for improved student performance. However, very few institutions operate smart buildings today, as their building systems and data are not fully integrated and many lack the expertise to leverage building system insights. Technical and strategic smart buildings partners are needed to help fill expertise gaps, increase collaboration across departments, and reduce operating costs.



Key Findings

Smart buildings offer a path to improved student outcomes. Smart buildings not only help education leaders attain sustainable, secure, and efficient outcomes, but also improve student performance. They also improve student outcomes, the experiences of faculty, school campuses, and the greater surrounding community.

Only 11% of higher education leaders and 9% of K-12 leaders say their building systems and equipment are fully integrated, and it's costing them time, students, and money. While many leaders use some building insights, their decisions are rife with risk due to a lack of integration of existing platforms and limited data painting an incomplete picture. For education leaders, a lack of integrated data and insight is reducing efficiencies, increasing regulatory penalties, and decreasing student retention.

Building insights are increasingly vital to achieving sustainability, security, health, safety, and optimization goals for higher ed and K-12 education leaders. We found that many departments (e.g., security, sustainability, facilities, experience teams, CEO) rely on building data to inform decisions.

Higher ed and K-12 leaders seek smart buildings partners that offer deep integration abilities, the most advanced technology, and easy-to-use platforms. Smart buildings solutions unite data from all systems and equipment, and automatically alert and adjust environments for safety and efficiency. These solutions also make it easier to leverage captured insight to guide decisions and recommendations. Selecting a third-party partner with enhanced integration, technology, and platform expertise is often needed for seamless enablement.

Building Insights Are Vital For Education Leaders, But Many Struggle To Use Them

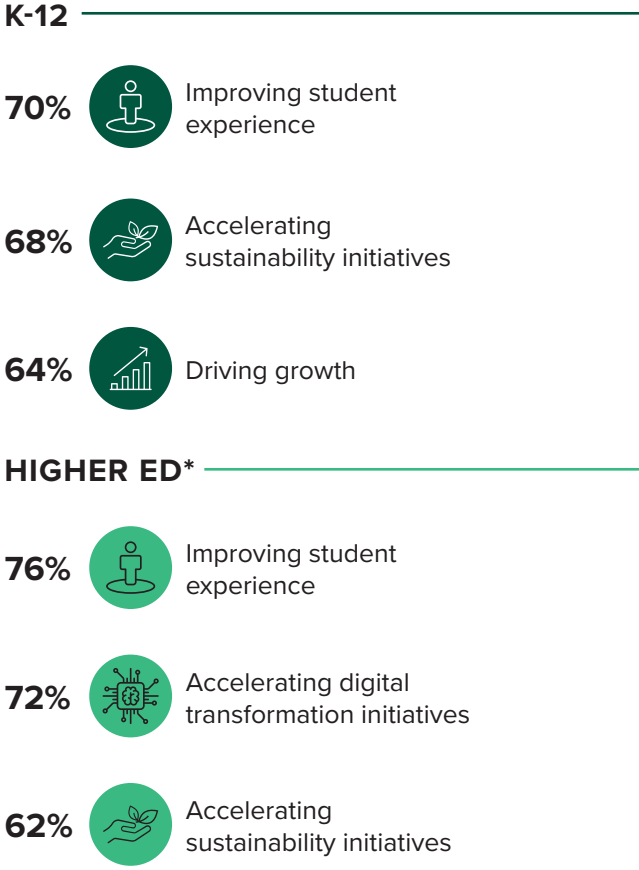
Smart buildings provide education leaders with a clearer picture of what's going on inside their facilities, helping them better manage, monitor, and create an efficient, sustainable, healthy, and safe environment for students and staff. For the purposes of this study, we defined smart buildings as those that converge information from various connected systems in a facility (e.g., HVAC, lighting, security, etc.) to provide data-driven insights and measurable information that can be shared across multiple operational technology (OT) and information technology (IT) systems. In surveying 237 smart buildings strategy leaders in education, we found that:

- **Smart buildings help accelerate digital transformation and sustainability initiatives and improve student outcomes.** For both higher education and K-12 leaders, accelerating digital transformation and sustainability initiatives are top drivers behind smart buildings initiatives. Higher education leaders indicate that improving the student experience and K-12 leaders report driving growth are also top factors (see Figure 1). For both higher education and K-12 leaders, these initiatives are especially important for attracting new students.
- **Security, space optimization, and resiliency are top smart buildings investment drivers.** Education leaders identified multiple drivers propelling investments to make their buildings smarter. Top drivers for both higher education

FIGURE 1

Importance Of Smart Buildings Initiatives To Meet Top Business Priorities

(Showing "Important" and "Critical")



Base: 59 to 91 smart buildings decision-makers at the director level or higher in K-12 education
*Base: 51 to 90 smart buildings decision-makers at the director level or higher in higher education
Note: Showing top 3 business priorities
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

and K-12 leaders include improving security operations and physical security. For K-12 leaders, optimizing space management is also a top priority, while maintaining resiliency from climate change also comes to the top for higher ed leaders.

FULL BUILDING SYSTEM INTEGRATION

9%
Average for K-12

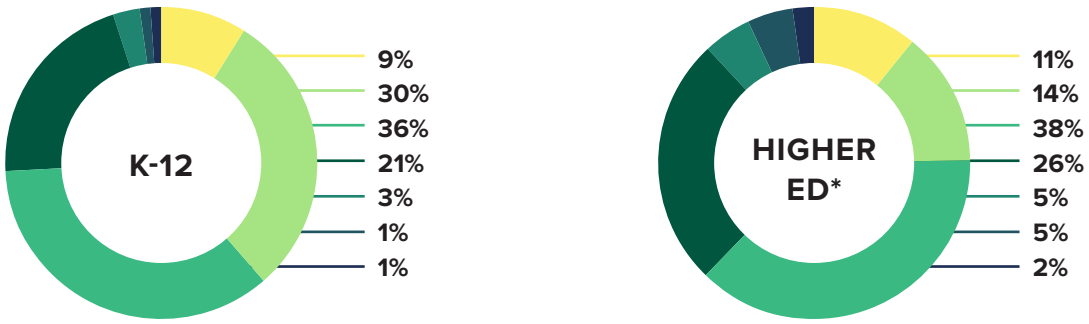
11%
Average for higher ed

10%
Average across all 18 industries surveyed

- **Only 11% of higher education leaders and 9% of K-12 education leaders say their building systems and equipment are fully integrated.** A smart building is only as smart as the infrastructure that supports it. Comprehensive smart buildings connect all relevant systems and data. However, due to the diverse array of connected building systems, managing many partners and achieving necessary technology integration is challenging. On a scale of 1 (not at all integrated) to 7 (fully integrated), only 11% of higher ed leaders and 9% of K-12 leaders report their systems and equipment are fully integrated today (see Figure 2).

FIGURE 2

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



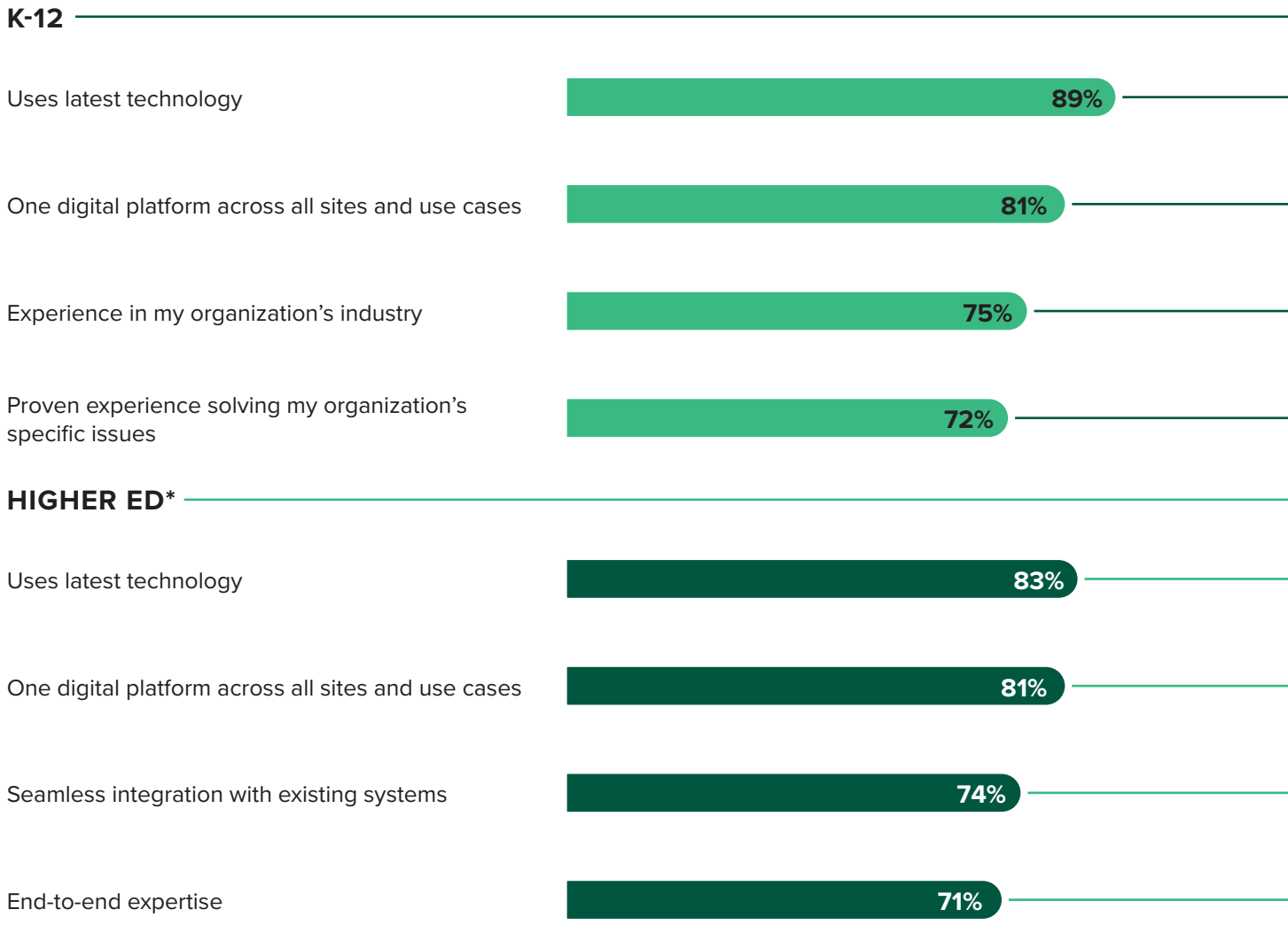
Base: 126 smart buildings decision-makers at the director level or higher in K-12 education
*Base: 111 smart buildings decision-makers at the director level or higher in higher education
Note: Percentages may not total 100 due to rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

- **Managing the many partners involved with education facilities is also complicated.** Approximately two-thirds of higher ed and K-12 leaders work with multiple partners — each specializing in specific types of building systems — to get required insight into their education facilities. Many higher ed and K-12 leaders also face misalignment between their partners or struggle to get accurate and useful information from them. In addition to working with a diverse array of partners, most of higher ed and K-12 leaders also struggle with using captured insights to optimize their building systems and achieve their top goals.
- **Lack of facility data integration is costing education institutions time, students, and money.** Gaps in captured building data and integrated building systems have negative impacts on operations, the ability to attract and retain students, and regulatory penalties. For example, many higher ed and K-12 leaders say their organizations face decreased operating efficiencies and increased regulatory penalties. Higher ed leaders report this is also hurting their revenue, while K-12 leaders report students are going elsewhere as a result.
- **Education leaders need smart buildings partners with breadth and depth of expertise.** Deploying a smart building often requires engaging with partners that have a breadth and depth of expertise to advance smart buildings initiatives. Higher ed and K-12 leaders in this study seek partners that use the latest technology and offer one digital platform across all sites and use cases. Higher ed leaders also seek partners who offer seamless integration with existing building systems and offer end-to-end expertise while K-12 leaders also seek partners who have experience in the K-12 sector and have proven experience solving their specific issues (see Figure 3).

FIGURE 3

Importance Of Smart Buildings Partner Attributes

(Showing "Valuable" and "Extremely valuable")



Base: 126 smart buildings decision-makers at the director level or higher in K-12 education
*Base: 111 smart buildings decision-makers at the director level or higher in higher education
Note: Showing four responses
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

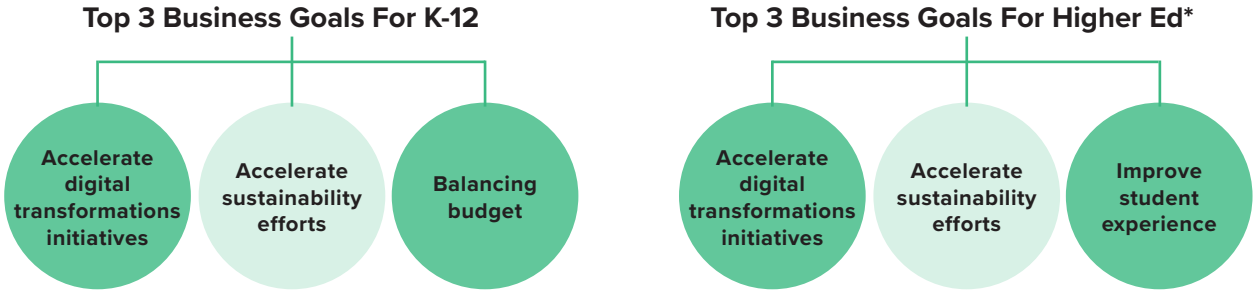
Sustainability In Education Requires Technical And Strategic Smart Buildings Partners

When it comes to energy use, few categories of organizations use more energy than schools. In the United States alone, schools make up the third largest sector of commercial building energy use.[1] What's more, beyond teacher salaries, energy costs are the second largest expense for American K-12 schools, with an estimated $8 billion spent on energy each year.[2] Smart buildings can help education leaders advance building sustainability goals while helping them achieve healthier building environments and more efficient building operations. We found that:

- **Urgency to address sustainability in education continues to accelerate.** Improving sustainability and digital transformation initiatives are top priorities for both higher ed and K-12 leaders. Higher ed leaders are also focused on improving the student experience, while K-12 leaders are focused on balancing their budgets (see Figure 4). Comparing the 2023 higher education survey respondent results to higher ed results from the 2021 study commissioned by Johnson Controls shows that sustainability remains a top business priority in this sector.[3] Although the

FIGURE 4

Top Business Goals For K-12 And Higher Ed



Base: 126 smart buildings decision-makers involved with environmental sustainability at the director level at global enterprises in K-12 education
*Base: 111 smart buildings decision-makers involved with environmental sustainability at the director level or higher in higher education
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

higher education sector currently faces a more volatile economic and political climate across the globe, there continues to be an urgency to accelerate sustainability efforts. This momentum is driven by regulatory pressures and efficiencies realized from prior sustainability efforts. Achieving 2030 carbon reduction goals is also driving sustainability momentum among education institutions for both higher ed and K-12 leaders. The 2023 study shows 60% of leaders from higher ed institutions, and 73% from K-12 schools set their organization's building carbon reduction goal to above 75% by 2030.

2030 CARBON REDUCTION GOAL OF 75%+

73%
Average for K-12

60%
Average for higher ed

64%
Average across all 18 industries surveyed

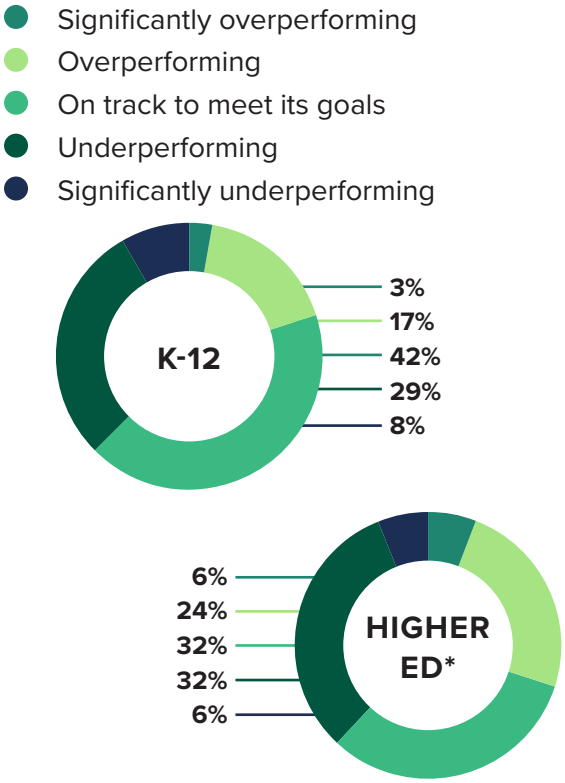
- **Siloed data and a lack of operational integration threatens to derail progress toward sustainability goals among education institutions.** Roughly six in 10 education leaders are on track to meet their aggressive 2030 carbon reduction goals, but approximately another four in 10 worry their organization is underperforming on the path towards meeting these goals (see Figure 5). While we don't have a large enough sample to analyze at the industry level, in the broader study, we found there are also discrepancies between stakeholders participating in these sustainability initiatives. While 49% of respondents with a sustainability title say their organization has a carbon reduction goal of 75% or more across their portfolio of buildings, 80% of IT leaders and 67% of CEOs report the same. These significant differences indicate there is a lack of a single source of truth for many organizations when it comes to visibility of this high-level sustainability goal, let alone more granular sustainability metrics.

- **Education stakeholders demand progress and transparency in reporting.** Study results show that student/stakeholder-required reporting and supply chain compliance reporting are among the common reporting for both higher ed and K-12 leaders. Higher ed also commonly uses

public reporting, while K-12 institutions commonly use country-regulation-related environmental, social, and governance (ESG) reporting. However, many leaders at higher ed and K-12 institutions can only measure and report on carbon emissions once a year or quarter, which limits reporting of incremental progress (see Figure 6). Measuring carbon emissions in near real time is key to identifying accurate recommendations ROI to optimize building systems or to adjust processes to reduce carbon emissions.

FIGURE 5

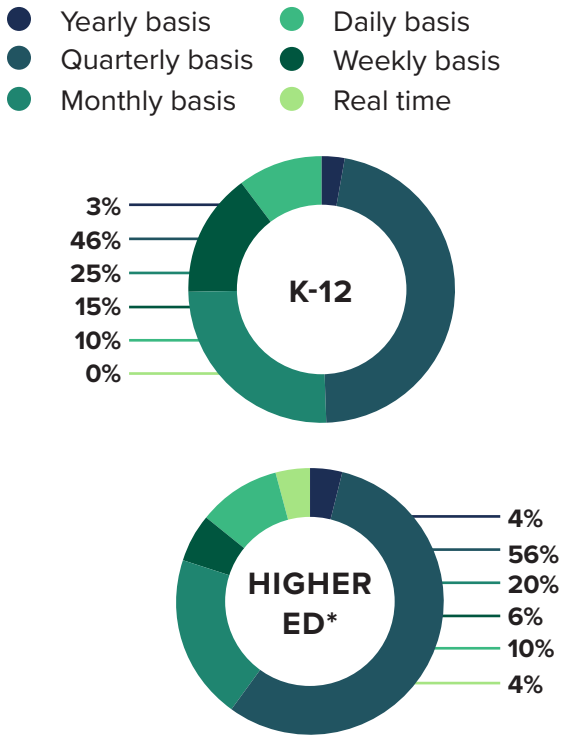
Performance Toward Meeting 2030 Carbon Emissions Reduction Goal



Base: 59 smart buildings decision-makers at the director level or higher involved with environmental sustainability in K-12 education
*Base: 50 smart buildings decision-makers at the director level or higher involved with environmental sustainability in higher education
Note: Percentages may not total 100 due to rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

FIGURE 6

Carbon Emissions Reporting/ Measurement Cadence

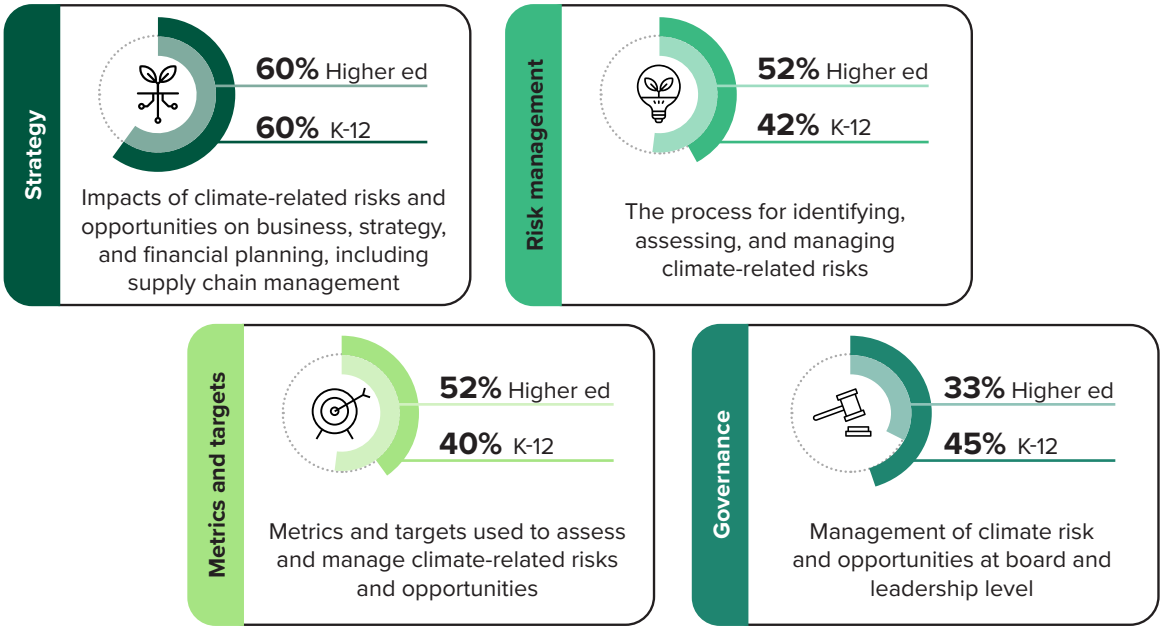


Base: 59 smart buildings decision-makers at the director level or higher involved with environmental sustainability in K-12 education
*Base: 50 smart buildings decision-makers at the director level or higher involved with environmental sustainability in higher education
Note: Percentages may not total 100 due to rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

- **Environmental impact reporting in education is fragmented and lacks a commonly used standard.** Higher ed and K-12 institutions use many different types of reporting options. The Sustainability Accounting Standards Board (SASB) is most common for higher ed while the International Integrated Reporting Council (IIRC) is most common for K-12. Among higher ed and K-12 institutions with climate transition plans in place, only 4% of higher ed and 0% K-12 institutions can report on all four Task Force on Climate-Related Financial Disclosures (TCFD) areas of governance; strategy; risk management; and metrics and targets (see Figure 7). This result shows reporting is far from standardized and remains fragmented.

FIGURE 7

"Which of the following does your company report on/ plan to report on relating to its climate transition plan?"



Just 4% of respondents from higher ed institutions say their organization reports on all four categories.

No respondents from K-12 schools say their organization reports on all four categories.

Base: 55 smart buildings decision-makers at the director level or higher involved with environmental sustainability in K-12 education with a climate transition plan in place
*Base: 48 smart buildings decision-makers at the director level or higher involved with environmental sustainability in higher education with a climate transition plan in place.
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

- **Technical and strategic partners are often needed to help fill expertise gaps.** Seventy percent of higher ed and 59% of K-12 sustainability leaders say their institutions lack the technical expertise to optimize building systems using insights collected, and 30% of higher ed and 34% of K-12 leaders lack internal skills to measure their organization's environmental impact. Other top challenges for both higher ed and K-12 institutions include struggling with competing priorities and high cost. To digitally transform buildings successfully and achieve sustainability goals, education institutions need partners to fill internal expertise gaps and strengthen their foundation and roadmaps to reduce carbon emissions.
- **High-impact sustainability initiatives in education often start with upgrading, digitizing, and automating systems to improve efficiency.** Sixty-two percent of higher ed and 68% of K-12 leaders say smart buildings are important to accelerate their firm's sustainability initiatives. Education leaders indicate replacing old equipment to improve efficiency and cost savings; adding/upgrading building automation controls and digital technologies; and upgrading air-quality/emissions monitoring equipment have significant impact on their institutions' ability to improve sustainability of owned or leased spaces. Many institutions start their smart buildings sustainability journeys by upgrading old equipment to improve efficiency and enabling air-quality and emissions monitoring. With the foundation in place, artificial intelligence (AI) insight can be used to drive further efficiency and give leaders access to more actionable sustainability insights. Thirty-two percent of higher ed and 34% of K-12 leaders say their institution currently invests in AI for predictive maintenance, and 30% of higher ed and 42% of K-12 leaders say their institution invests in a holistic view of resource use to accelerate their progress toward carbon reduction goals (see Figure 8).

FIGURE 8

Upgrading, Digitizing, And Automating Systems Set The Foundation For Smart, Sustainable Buildings

K-12

63%
Upgrading old systems to improve efficiency

53%
Adding/upgrading building automation controls

47%
Upgrading air quality and/ emissions and water infrastructure monitoring equipment

42%
Energy, emissions, water, and waste analysis using AI/ML technology that learns from operational data to recommend actions and/or model energy use under different scenarios

34%
Predictive maintenance using AI/ML technology that prevents downtime and optimizes efficiency

HIGHER ED*

72%
Adding/upgrading building automation controls

60%
Upgrading air quality and/ emissions and water infrastructure monitoring equipment

56%
Upgrading old systems to improve efficiency

32%
Predictive maintenance using AI/ML technology that prevents downtime and optimizes efficiency

30%
Energy, emissions, water, and waste analysis using AI/ML technology that learns from operational data to recommend actions and/or model energy use under different scenarios

Base: 59 smart buildings decision-makers at the director level or higher involved with environmental sustainability in K-12 education
*Base: 50 smart buildings decision-makers at the director level or higher involved with environmental sustainability in higher education
Note: Showing five responses
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

Optimizing Building Environments In Education Requires Smart Buildings Partners

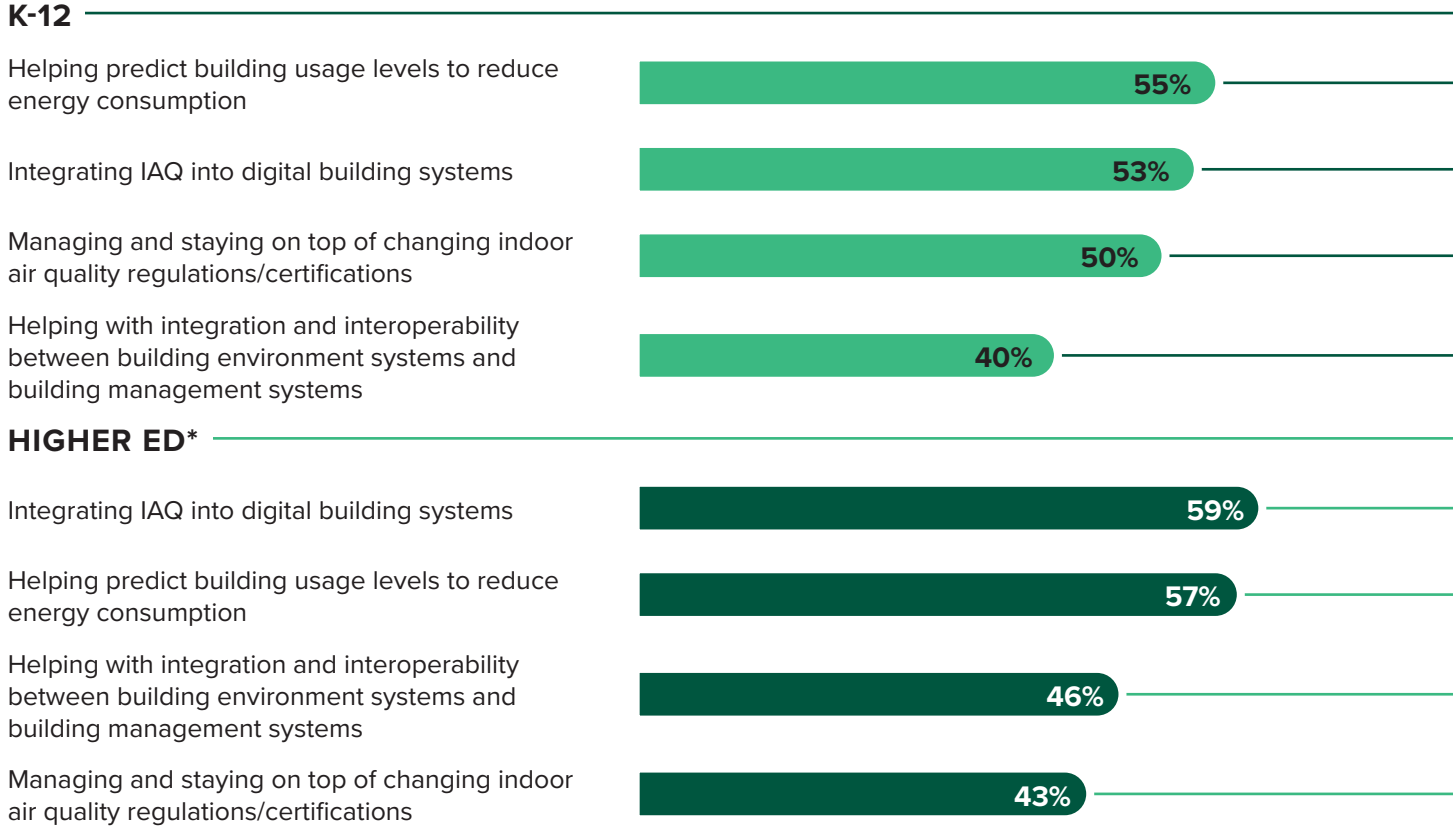
Enabling healthy and safe learning environments is vital for improving student outcomes. Yet optimizing building systems (e.g., replacing/adding HVAC/ventilation systems, optimizing IAQ, upgrading lighting, optimizing spaces for specific use, etc.) remains a barrier for many education leaders, and climate change is only making things worse. At the most basic level many K-12 schools still lack full ventilation systems — an estimated 36,000 schools in the US lack adequate air conditioning.[4] What's more, just 34% of American K-12 school districts have made or are in the process of making HVAC replacement/upgrades, and just 51% have continuous movement of air supply/airflow in most schools in their districts.[5] Smart buildings partners can help education leaders address many of these challenges by helping to manage and optimize the indoor environments of their facilities. We found that:

- **Improving student safety, attaining health and wellness certifications, and optimizing operational efficiency are top higher ed and K-12 building environment system priorities.** To address these priorities, higher ed and K-12 leaders are most focused on initiatives to improve energy efficiency, address physical security, design flexible building operating models, and monitor/improve indoor air quality (IAQ). Higher ed leaders are also focused on monitoring environmental factors in their buildings, while K-12 leaders are also focused on improving remote operations ability.
- **To meet their goals, education leaders need help monitoring and improving air quality and predicting building usage levels.** Higher ed and K-12 institutions particularly need help integrating IAQ into their digital building systems and predicting building usage levels to reduce energy consumption (see Figure 9).
- **Ownership of building environment system priorities in education is spread across departments, requiring tailored analytics and standardized reporting on shared metrics.** Different parts of academic institutions own different building systems initiatives. For example,

IT and operations departments are common owners for improving operational performance and student experience in both higher ed and K-12 facilities. In higher ed, environmental health and safety is most likely to own improving student health and building carbon footprints, while compliance and safety owns these priorities in K-12 education. To ensure insights are relevant and useful, institutions should tailor analytics and reporting to accommodate department needs and standardize the reporting on shared metrics and goals to encourage cross collaboration and streamlining of departments.

FIGURE 9

Capabilities Organizations Rely On External Partners For



Base: 58 smart buildings decision-makers at the director level or higher involved with building environment systems in K-12 education
*Base: 54 smart buildings decision-makers at the director level or higher involved with building environment systems in higher education
Note: Showing top four responses
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

Smart Buildings Help Secure Education Facilities

While physical security precautions have increased over the last several years in areas such as controlling access to buildings, education leaders must now contend with an even more sophistical threat landscape of both physical and cyberthreats to their facilities and infrastructure. Smart buildings can help security leaders gain visibility, manage, and respond to both cyberthreats and physical threats directed toward their facilities. We found that:

- **Integrated security operations centers (SOCs) and systems are needed to better detect and respond to threats against education facilities.** Cyberattacks are multidimensional, yet roughly half of higher ed and K-12 security teams lack visibility into all those dimensions. Physical and cyber teams often report to different parts of higher ed and K-12 institutions. In fact, approximately half of higher ed and K-12 leaders say their organization lacks 24/7 visibility into all security systems. This leads to many issues with getting information from all necessary systems, often preventing appropriate understanding and response to facilities threats (see Figure 10). Both physical and cybersecurity insight is needed because attacks may target both systems. For example, disabling cameras before breaking into a building, or stealing or copying an employee's badge, using it to enter an education facility, and planting malware on a machine or using a USB drive to steal data off a system.

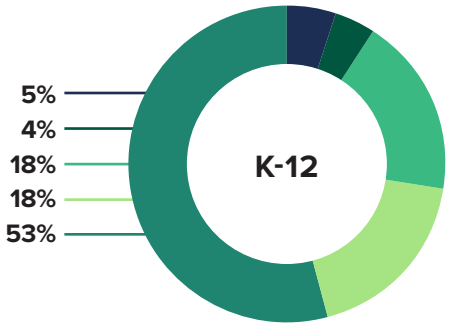
- **Smart buildings can help higher ed and K-12 security teams improve operations in a sustainable manner.** A significant gap exists between security and sustainability. Improving sustainability is a higher ed and K-12 institution goal; however, only 33% of higher ed and 22% of K-12 security leaders collaborate with sustainability teams today (see Figure 11). To address this gap, 60% of higher ed and 53% of K-12 security leaders say they must collaborate more with sustainability stakeholders. Sixty-eight percent of higher ed and 45% of K-12 leaders also say they must find ways to improve security operations while also being sustainable. Smart buildings can help these stakeholders achieve these goals. Smart lighting and motion sensors can drive energy efficiencies, while improving

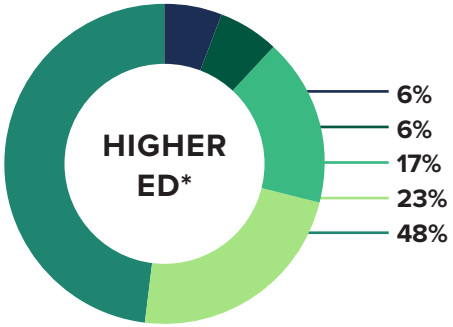
threat deterrence and detection. Mass notification systems that are integrated in smart buildings can allow for proactive and immediate communications. More broadly, physical security systems can provide occupancy data insights; if institutions know where people are spending time in a building, they can manage the use of energy, power, and lighting in a sustainable manner. Participating in enterprisewide smart buildings and sustainability objectives can help education security leaders get the funding and resources necessary to protect their facilities, students, and staff.

FIGURE 10

Most Organizations Lack 24/7 Visibility Into All Security Systems

- The team does not have access to alerts/monitoring from building systems
- The team has access during business hours to alerting/monitoring from most building systems, but not all
- The team has access during business hours to alerting/monitoring from all building systems
- The team has 24/7 access to alerting/monitoring from most building systems, but not all
- The team has 24/7 access to alerting/monitoring from all building systems





K-12 **HIGHER ED***

82% 65%

My organization often struggles with getting information from all necessary systems for full context of security threats.

K-12 **HIGHER ED***

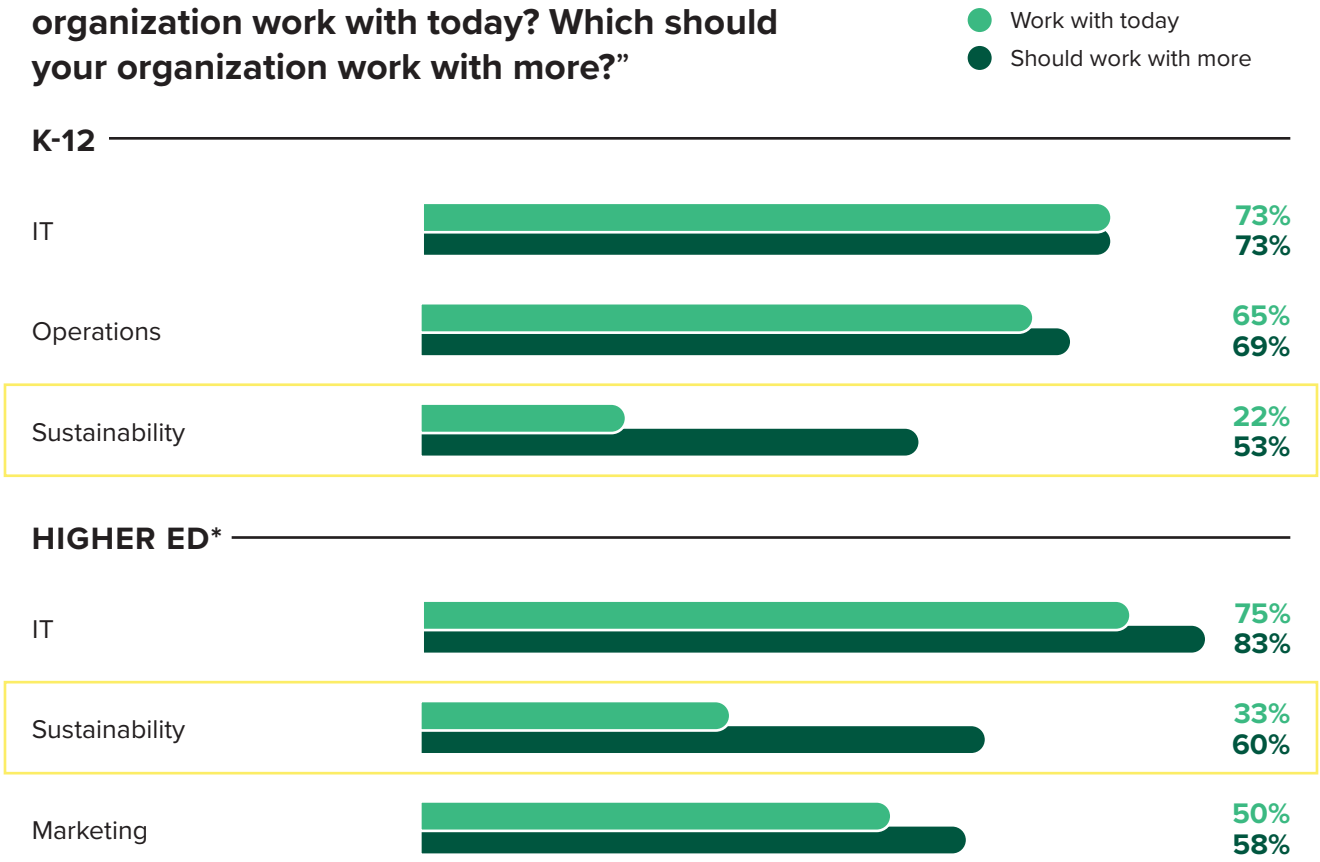
47% 60%

My organization's security teams struggle to understand the full context of threats/risks to facilities.

Base: 55 smart buildings decision-makers at the director level or higher for secure buildings in K-12 education
*Base: 52 smart buildings decision-makers at the director level or higher in higher for secure buildings education
Note: Percentages may not total 100 due to rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

FIGURE 11

"Which department(s) does your security organization work with today? Which should your organization work with more?"



Base: 55 smart buildings decision-makers at the director level or higher for secure buildings in K-12 education
*Base: 52 smart buildings decision-makers at the director level or higher for secure buildings in higher education
Note: Showing top three responses for "Should work with more"
Source: A commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, August 2023

Key Recommendations

Smart buildings solutions enable K-12 schools, colleges, universities, and academic institutions to enhance building automation and maintenance and provide students and educators with a productive, differentiated environment to facilitate optimal learning. Smart buildings systems can also enhance energy efficiency by adjusting temperature and lighting to minimize energy waste, along with increasing student performance and experience.

Forrester's in-depth survey of 237 smart buildings leaders in education about their building initiatives and priorities, including sustainability, security, and building environmental initiatives, yielded several important recommendations:

Treat smart buildings as strategic assets to help address education institution priorities.

Smart buildings offer academic institutions a range of benefits to differentiate and personalize learning environments. Indoor air quality applications can enhance the health of students and academic staff in buildings, and security solutions can ensure their safety in classrooms or on campus. Smart buildings can also enable education institutions to reduce energy usage or enhance facility management functions. These initiatives contribute to the cost-efficient management of building operations. Each academic institution must evaluate the role of smart buildings in addressing critical priorities and strategic initiatives.

Ensure stakeholders across many roles identify opportunities to capture and leverage smart buildings insights.

Stakeholders from many departments benefit from building system data and insights in education institutions. Proactively facilitate collaboration between IT, security, facilities managers, and educators. Focus on identifying opportunities to enhance student, faculty, and educator experiences as well as address critical technology and sustainability goals. It is essential to

establish a comprehensive plan to address the unique needs and priorities of each school.

Create a roadmap of near-term to long-term strategic building initiatives for the academic institution.

Academic institutions must establish a roadmap of smart buildings initiatives aligned with strategic priorities. A starting point often includes lighting monitors and temperature control to create a comfortable learning environment that can enhance student concentration and experience in classrooms. Optimizing indoor air quality and enhancing physical security in academic facilities are also becoming important initiatives to ensure student safety, well-being, and health. Focus on identifying immediate versus more long-term needs to create a roadmap that is aligned with the specific needs and goals of your institution.

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

Integrating smart buildings data into actionable insights is complex, requiring seamless integration across buildings systems and security processes as well as dashboards to highlight relevant insight and intelligence to automatically optimize key operational processes. Look for partners with demonstrated building technology expertise in the education sector, a single digital platform spanning all sites, easy-to-access insights for stakeholders, and seamless integration into all building systems.

Appendix A: Methodology

In this study, Forrester conducted an online survey of 3,445 decision-makers at organizations in 18 industries across 25 countries, including 237 education decision-makers (126 in K-12 education and 111 in higher education) 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. Survey participants must have indicated decision-making authority in smart buildings in addition to building environmental sustainability, building security, and/or building environment systems. Questions provided to the participants asked high-level smart buildings questions and then asked more granular questions depending on the leader's level of responsibility for building sustainability, building security, and/or building environment systems. Respondents were offered a small incentive as a thank-you for time spent on the survey. The study was conducted in a double-blind fashion. The study began in July 2023 and was completed in August 2023.

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	**40%**
Central Europe	**9%**
United Kingdom and Ireland	**9%**
Singapore	**7%**
Japan	**5%**
Southeast Asia	**5%**
India	**4%**
Latin America	**4%**
South Korea	**4%**
Middle East and Africa	**4%**
China	**3%**
Hong Kong	**3%**
Australia and New Zealand	**3%**

INDUSTRY	
Primary (K-12) education	**53%**
Secondary (college/university) education	**47%**

ORGANIZATION SIZE	
2 to 499 employees	**3%**
500 to 999 employees	**32%**
1,000 to 4,999 employees	**33%**
5,000 to 19,999 employees	**22%**
20,000 or more employees	**11%**

DEPARTMENT	
IT	**46%**
Facilities (e.g., energy management, procurement, real estate, environmental health and safety)	**22%**
Operations	**7%**
Governance/risk/compliance	**6%**
Sustainability	**5%**
Finance/accounting	**5%**
Employee experience (e.g., HR, workplace experience)	**4%**
CEO/office of president	**3%**
Customer experience	**2%**

TITLE	
C-level executive	**23%**
Vice president	**29%**
Director	**48%**

BUILDING RESPONSIBILITY AREA	
Building environment systems and strategy	**47%**
Building environmental sustainability strategy	**46%**
Building security systems and strategy	**45%**

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.

ADDITIONAL RESOURCES

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

Appendix D: Endnotes

[1] Source: "Getting to Zero in Schools," New Buildings Institute, 2023.

[2] Source: "Partnering to Share Pathways and Solutions: Progress Report 2023," US Department of Energy, 2023.

[3] Source: "The Race To Decarbonization," a commissioned study conducted by Forrester Consulting on behalf of Johnson Controls, November 2021.

[4] Source: Sequoia Carrillo, "As classes resume in sweltering heat, many schools lack air conditioning," NPR, August 28, 2023.

[5] Source: Miguella Mark-Carew, Gloria Kang, Sanjana Pampati, Kenneth R. Mead, Stephen B. Martin Jr., Lisa C. Barrios, "Ventilation Improvements Among K–12 Public School Districts — United States, August–December 2022," CDC. April 7, 2023.

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