Thinking Smart: How the foundations of the UK will be defined by smart buildings.

The power behind **your mission**

Johnson Controls

"Right now, the priority for organisations will be ensuring that their buildings are safeguarded against the continued threat of COVID-19. However, longer-term, attention will undoubtably shift towards sustainability and energy efficiency goals, while cost efficiency will always be an area where people strive for improvement.

How possible will it be to achieve these goals without integrated smart technology?"

Andy Ellis

Vice President & General Manager
Johnson Controls UK&I

Executive summary

By Andy Ellis, Vice President & General Manager, Johnson Controls UK&I

Is my building offering everything it can to its occupants? How can I make it as safe as possible without compromising the comfort and productivity of the occupants? What is the benefit of smart technology in all of this? How can I have it all? In April 2021, Johnson Controls commissioned research to answer these very questions.

As a smart technology provider, we know the importance of smart technology in buildings – but we decided to let the people who spend time in, work in, and manage the buildings we live, work and play in give their thoughts instead. The response was resounding.

Almost every single respondent – or, to be exact, 99% of them – saw the advantages to smart buildings. Some went even further, claiming that smart buildings will underpin their future working practices. These findings came from 100 facilities decision-makers, stretching across central government, healthcare, pharmaceutical, higher education, office buildings and other commercial real estate, such as retail and banking.

However, despite the perceived importance, there is still a significant lack of investment in smart buildings in the UK & Ireland. As a result, we are seeing organisations operate from buildings which are not sustainable in the longer term, and in some incidences incur excess OpEx costs to maintain. For the senior leaders of these organisations, this poses a question. Not only are they costing more than they should, but with sustainability and energy efficiency regulations becoming tougher, their hands may be forced in the future to make the necessary improvements needed to meet these objectives.

Smart buildings can help senior leaders in: operational efficiency, sustainability, and occupant experience. However, as the research reveals, there is still some way to go with getting senior leaders on-board for the journey. Therefore, it is incumbent on technology providers to both educate the market on the future of what can be achieved by smart buildings and demonstrate the tangible benefits their budget investment can yield along the way.

Ultimately, smart buildings will play its part in both the immediate and future success of UK organisations. We now know, that during the pandemic, some of the UK's most important buildings used smart technology to stay open and, without it, couldn't have continued business as usual or offered life-altering care, education or services. The longer-term targets of UK businesses and organisations, which will have Environmental, Social and Governance (ESG) initiatives engrained into them, will similarly rely on the infrastructure they operate out of. Without some investment in smart technology, these goals and aspirations will become very hard to achieve.

The current state of smart

With every day that passes, smart buildings are slowly getting smarter. Today, technology exists which helps to ensure a constant flow of clean air into buildings, controls the temperature of a building, and can be used to monitor the flow of people in and out. These individual capabilities merely touch the surface of smart technology's potential, though – and building decision-makers know it. When asked how important smart technology is to performing their role, almost every respondent (99%) saw the value of smart technologies, with one in ten (12%) seeing it as critical to their day-to-day role.

So, what exactly are these benefits that decision-makers see so clearly? Well, nearly two-thirds (63%) said that smart technology creates more energy efficient buildings; over half (54%) said that the technology made buildings more environmentally friendly; and half (51%) said it helped to drive down building costs.

Main barriers to smart technology adoption in buildings

Barriers	Respondents that labelled this a top three barrier to adoption
Budget constraints	64%
Lack of support from senior leaders	42%
Lack of staffing to implement new building technology	37%
Expect buildings to be permanently closed/given up	30%
Expect permanent shift to online-only interactions	28%
Lack of government support	24%
Don't see the benefits for my building	10%

This is perhaps, no surprise. These decision-makers are tasked with making improvements in these exact areas. Asked to define the current priorities in their role, half (52%) said cost efficiency was a key objective, while over a third (41%) said the same about energy efficiency and a quarter (27%) have been tasked with creating a more sustainable building. These are all objectives which will become harder to achieve without the assistance of smart technology.

The proof of this is already beginning to show. When asked what percentage of their buildings they considered to be sustainable, the response was just 35%. Many businesses and organisations will be looking to become carbon net-zero by 2030. As things stand, this looks to be a difficult target to meet. Added to this, the same buildings are proving costly to run.

On average, nearly a third (30%) of respondents are paying between £1 million and £2 million per year to manage each of their buildings, with nearly a tenth (8%) spending over £2 million per year.

"Many of the buildings in question are large buildings for large enterprises, so we'd expect operating costs in the millions. This doesn't mean there isn't room for improvement though. By driving down energy usage and operating more sustainably, annual costs can be reduced significantly. Many of the decision makers in this research have been tasked with doing exactly that, but they need the tools and technologies to help them achieve these goals.

For example, enterprise management tools can be used to monitor, analyse and optimise energy usage, space utilisation and the health and comfort of occupants, across an entire portfolio of infrastructure. Meanwhile, companion apps can be used to provide a personalised experience for each occupant, enabling them to reserve space, control temperature and enter and exit the building with ease. When it comes to occupant experience, operationality and sustainability, smart technology is the solution."

Eamonn Hughes

VP & General Manager, Digital Solutions
Johnson Controls EMEALA

Cost efficiency, sustainability and energy efficiency are all familiar focusses for senior leadership teams. And rightly so. As respondents to the survey told us, smart technology presents an excellent opportunity to address all these areas, and more. However, when proposing a technology solution to a business problem, return on investment (ROI) must inevitably be considered. While 15% of respondents said that they are seeing a higher than anticipated ROI from their smart technology, and 53% are seeing the expected results, a further 15% said the ROI was lower than expected. It's important to remember that the industry is still at a relatively early stage of its 'smart' journey. And as a result, decision makers must not only present a compelling business case to senior leaders for investment, but they must also help educate them about the broad range of benefits that can be achieved with a smart technology strategy.

Naturally, it will become easier for senior leaders to back further smart technology investments if they're already seeing a consistent return on existing technologies, however in practice, this isn't always possible yet. It's worth noting, though, that there will be additional, external drivers supporting the case for change. Government pressures and regulations will add yet further weight to the growing need for 'smart'.

15% of respondents said that they are seeing a higher than anticipated ROI from their smart technology

53% are seeing the expected results

15% said the ROI was lower than expected

"Inconsistent results make it difficult for decision makers to make a strong case for further investment in smart technologies. In practice, it's not that the technology is ineffective, rather a case of smart technology solutions being implemented as point solutions, rather than as part of a wider connected strategy.

Building decision-makers need to not only choose the best technology for their building, but ensure that these smart solutions are working together.

When technologies talk to each other, they provide a broader, more holistic picture of how the building runs and how occupants use it, meaning decisions can be made more quickly and effectively. This also helps make efficiency gains – for example, if flow sensors say the third floor is empty, the lights can be turned off, temperature adjusted, and doors locked, thereby improving energy efficiency and security."

Jamie Cameron

Director, Digital Solutions
Johnson Controls UK&I

What smart can already achieve

For every generation, the places we live, work, and play are at the heart of our lives. The very foundations of our societies and economies rely on these places. The COVID-19 pandemic put this under threat. Almost overnight, restaurants closed, bars were boarded up, and for gym-goers, exercising outdoors became the only option.

For some organisations, however, building closures simply weren't an option. During the toughest lockdown restrictions, hospitals were treating millions of patients, and schools, sometimes catering to thousands of pupils, were intermittently asked to open. In a quest to survive, restaurants, bars, retailers and gyms reopened as soon as they could – often at great financial loss. We saw that even in the most challenging of circumstances, these places were where we all wanted to be – and organisations had to find ways to operate safely to give us what we wanted.

Unsurprisingly, the vast majority (95%) of respondents were forced to change how they managed their buildings during the pandemic. A fifth (18%) admitted that almost everything about their building and its operations changed during the pandemic.

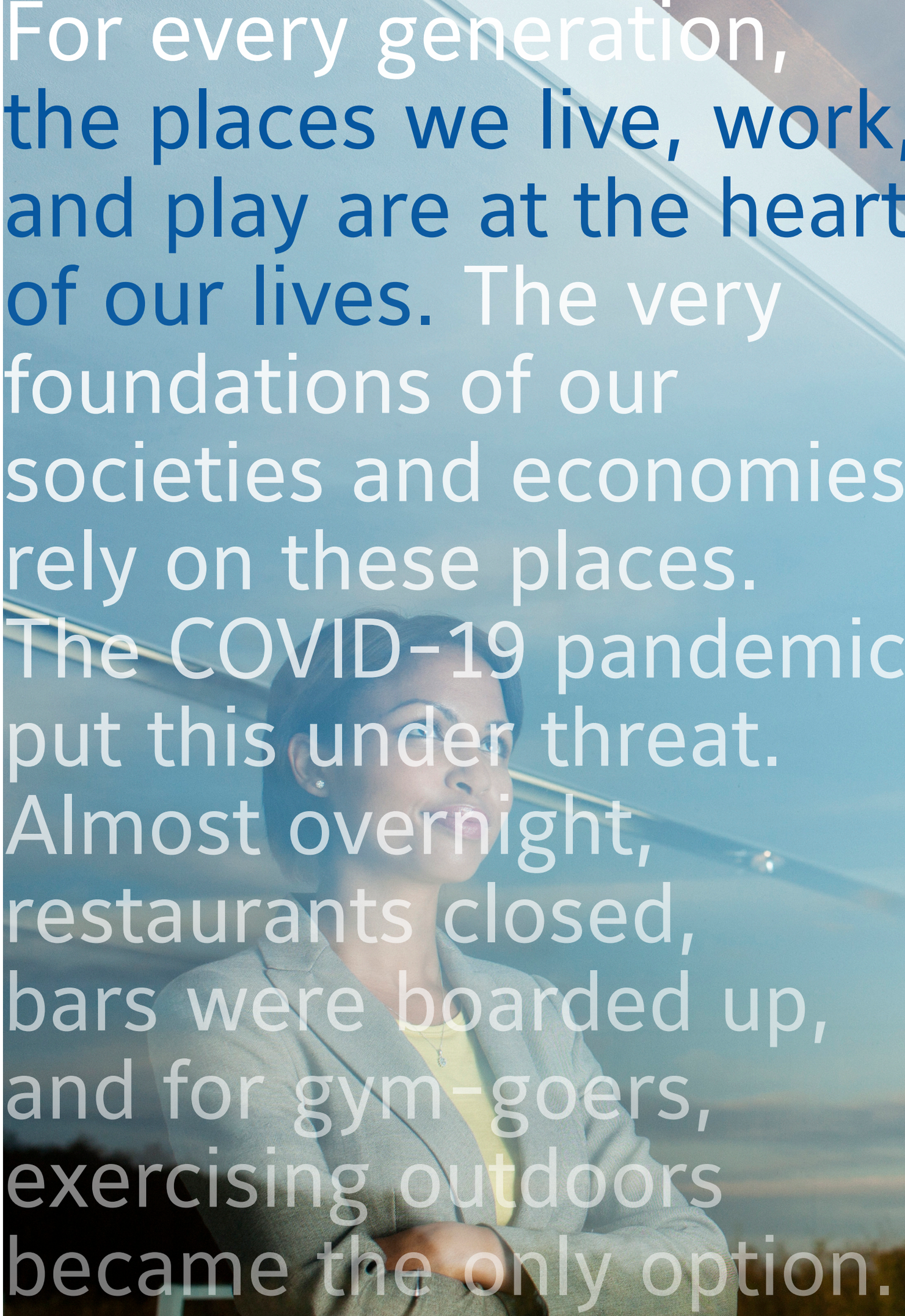
The importance of smart technology in keeping these buildings open during this turbulent time cannot be overstated. A huge 87% of respondents said they would have found it harder to keep their buildings safe without smart technology. Meanwhile, over a third (37%) said that the technology was either critical or essential to keeping their buildings open.

"As businesses continue to welcome more and more people back into their indoor venues, it's critical that they do so safely.

The more people that are inside a venue, the higher the health risks involved, and not just when it comes to COVID-19. Maintaining a consistent circulation of clean air and monitoring capacity numbers help mitigate the risks of viral infections, while having smart and compliant fire safety and security technologies in place remain crucial to the safe management of buildings. Smart technologies provide an opportunity to take the pressure off business leaders by providing both visibility and control."

Mark Bouldin

Digital Solutions Business Development Manager
Johnson Controls UK&I


For every generation, the places we live, work, and play are at the heart of our lives. The very foundations of our societies and economies rely on these places. The COVID-19 pandemic put this under threat. Almost overnight, restaurants closed, bars were boarded up, and for gym-goers, exercising outdoors became the only option.

56% used technologies that helped make quick adjustments to things such as air flow and social distancing

56% used technology which allowed them to monitor and control capacity and occupancy levels

34% relied on smart technology to provide clean air in their buildings

59% of respondents labelled occupant health and safety as a short-term priority

And it's no surprise: capacity management systems helped to maintain a safe number of people in buildings; flow systems kept people moving in and out of buildings, while adhering to social distancing guidelines; and clean air solutions ensured that the air people were breathing was safe. When describing the role of smart buildings in keeping the UK economy and its fundamental infrastructure in operation during the pandemic, 'essential' really is the operative word.

Looking at the specific technologies enabling them to keep their buildings open, over half (56%) leveraged solutions that helped make quick adjustments to things such as air flow and social distancing. A further 56% used technology which allowed them to monitor and control capacity and occupancy levels. When we look at the provision of clean air in buildings however, we saw fewer companies (34%) making use of smart technologies. Three-fifths (59%) of respondents labelled occupant health and safety as a short-term priority, but without the consistent circulation of clean air to help limit the spread of airborne viruses, this will be nearly impossible to achieve.

How important was smart technology in keeping buildings safe during the pandemic?

Could you have kept your buildings safe without smart technology during the pandemic?	Respondents who agreed with the statement
Yes, easily	13%
Yes, but it would have been more difficult	24%
Yes, but it's less efficient/safe without the aid of technologies	24%
Unlikely, they have been critical	21%
Absolutely not, they were essential	16%

The budget abyss

Owing to the success of smart technology during the pandemic, two-thirds (64%) of building decision-makers are either more likely to invest in smart technology or have concrete plans to invest. This will be crucial as things continue to open up, and as offices and workplaces start to welcome remote staff back more regularly and in greater numbers.

Decision-makers labelled budgetary constraints as a key roadblock to smart technology, but our research found it's not always about the money, but also how you use it. On average, respondents said they needed a budget of £2 million to drive value from their smart technologies – but most businesses are working with a budget of significantly less. Evidently, the answer is to use the budget you do have in the most effective and cost-efficient way – investing in the right technologies at the right time, to create the most value.

Commercial organisations are operating on half the budget they need to derive full value from their smart technologies

Commercial and office space and higher education organisations must go above and beyond to be smart with how they spend their budget. For commercial organisations, their required budgets are as high as £2.7 million, while they must operate with budgets of £1.3 million. For higher education, £1.8 million is needed to drive value, while organisations only receive a budget of £1.5 million.

With such big deficits, and no signs of an injection of cash (two-thirds said budget constraints are a major barrier) it's no wonder organisations are falling behind on sustainability and energy efficiency goals, and are unable to deliver on the promises of smart.

Meanwhile, government and healthcare organisations are operating on higher budgets to drive value from their smart technologies. On average, government organisations are operating on a budget of £2 million, while healthcare organisations have £2.3 million to make use of. Our research found that these budgets were sufficient and, as a result, we're seeing these organisations adopting smart technology at a faster rate. In fact, when it comes to the smart technology needed to create a healthy building, 52% of organisations have implemented the necessary solutions. Currently, these organisations are therefore better able to drive efficiencies within their buildings.

Bigger budgets for smart technologies are helping healthcare and government organisations drive greater efficiencies

It's evident that decision-makers must carefully plan which smart technologies will be needed and when, in order to achieve both their short and long-term objectives. As many businesses have benefitted from reduced expenditure due to building closures and travel restrictions, they will need to find new and efficient ways of keeping costs down going forward. The problem many businesses are having today is finding the budget and use-cases to justify the investment in smart buildings. The topic is broad and the ROI is hard to quantify.

We can't expect decision-makers to come up with the solutions all by themselves, especially when battling budgets and boardroom decisions. This is where the expertise and advice of smart technology experts will become essential. Understanding how technology can optimise energy usage, improve the occupant experience and make operational savings will be critical to proving smart technology's worth to the rest of the organisation.

Let's talk. Click here to speak with our experts.

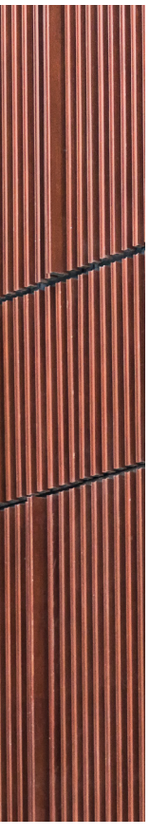
Looking to the future

Asking these questions after a year of lockdowns means the short-term goals of building decision-makers come as no surprise. In the next year, the majority (59%) of respondents said that occupant health and safety was a top priority for them, while 40% called out employee experience.

However, the longer-term objectives look very different. For businesses, organisations and, more widely, the nation, our goals and ambitions will revolve around ESG. Our research reflects this. Looking at the priorities for building decision-makers in the next five years, energy efficiency comes out on top, with 58% labelling this a priority. Cost efficiency (44%), operational efficiency (42%) and sustainability and net zero targets (37%) follow close behind. Looking even further ahead, in ten years' time, sustainability and net zero targets are the top priority for half (49%) of respondents. This is in line with many organisations' commitments to be carbon net zero by 2030 or 2035.

Johnson Controls, and its customers, are leading the way on this front. Reducing emissions intensity by more than 70% since 2002 and helping its customers to save more than 30.6 million metric tonnes of CO2 and $6.6 billion through guaranteed energy and operational savings, Johnson Controls was one of just 300 companies selected for the prestigious Financial Times European Climate Leaders list.

To comply with the Government-imposed regulations around ESG, organisations will have to make changes across the entirety of their business, or risk facing penalties. From the perspective of the buildings they operate from, a failure to comply with regulations could result in them having to move into a new building or being unable to sublet their current real estate. When it comes to ESG, that is how high the stakes are and, once you reach that point, there is no quick fix. That's why it's crucial that organisations and building decision-makers start implementing solutions now. It won't be long before buildings that are sustainable and energy efficient go from being a 'nice-to-have' to a 'must-have'.



"Buildings in the UK & Ireland will need to undergo some changes if they're going to help their occupants reach energy efficiency and sustainability goals. Smart technology can provide some instant improvements, and it can also help to inform longer term strategies.

The data gathered from the technology can help building decision-makers understand where improvements need to be made, and ensure that occupiers are getting the same level of comfort in their buildings as they are used to at home. They can then either change the settings of existing smart technology or implement new, targeted smart technology to make these improvements.

These insights will only be generated if the smart technologies installed are integrated across a connected platform and able to communicate with each other. This will give decision-makers a more holistic view of the building and its operational deficiencies, so they can make immediate improvements when and where necessary."

David Lloyd

General Manager, Connected Building Technologies
Johnson Controls UK&I

The short, medium and long-term goals of building decision-makers

List of priorities for building decision-makers	Respondents labelling this a priority in the next year	Respondents labelling this a priority in the next five years	Respondents labelling this a priority in the next ten years
Occupant health & safety	59%	32%	32%
Regulatory compliance (e.g. fire, health & safety)	42%	28%	26%
Employee experience	40%	34%	37%
Operational efficiency	39%	42%	36%
Energy efficiency	38%	58%	37%
Cost efficiency	37%	44%	31%
Security	34%	32%	29%
Sustainability and net zero targets	17%	37%	49%
Profits	16%	21%	22%

The future is hypersmart

The possibilities of smart buildings extend beyond energy efficiency and sustainability. If implemented correctly and strategically, smart technology has the power to have a direct, tangible impact on the places we live, work and play. For example, finding people and specific locations within a building has always been a struggle for occupants unfamiliar with a building's layout. With Wayfinding applications, they can navigate their way through buildings, finding colleagues, recreational spaces and meeting rooms with ease, even if it's their first visit.

As office spaces open back up, they must provide the comfort, safety, and security that employees have become accustomed to in their own homes. Smart buildings can help achieve this by creating environments that are always the perfect temperature; have a constant flow of clean and fresh air; and are underpinned by impenetrable security systems and impeccable fire safety measures. They can also identify when communal spaces and meeting rooms are in use and by how many people, helping businesses to adhere to the latest occupancy regulations and guidelines.

Meanwhile, in the last five years, the world's awareness and understanding of the need for sustainability has massively increased. There is a decarbonisation movement gaining pace around the globe. It's a trend seen at a local level too though, current and potential employees increasingly want to work for organisations with strong 'green' credentials. With humans spending 90% of their time inside buildings and 40% of the world's carbon generated by buildings, technology must be used to drive down energy consumption.

This is a defining moment. To reach a future where smart buildings are more than just a few flashy gimmicks, and smart technologies have a positive impact on both our lives and livelihoods, there are several crucial steps that every building decision-maker needs to take.

With the help of Johnson Controls, One Albert Quay, an office building in Cork, transformed into one of the most impressive pieces of infrastructure in the country. The challenge, which was completed in just 16 months, was threefold:

1. To create a smart environment with longevity
2. To create a collaborative space for a workforce of 500
3. To ensure a secure physical and operational site for all the building's tenants

Using a suite of Johnson Controls products, including Building Management Systems (BMS), Access Control and HVAC equipment, One Albert Quay was able to deliver on its ambitious vision. As a result of powerful insights gathered using smart technology, it centralised coffee docks and breakout areas to provide a more open space for greater productivity and creativity. Meanwhile, the installation of smart technology also helped ensure the health and safety of the building's occupants.

To provide the ideal temperatures which are conducive to the health and well-being of the team, 150 vents manage 21,000 litres of conditioned air per second, while 150 fire extinguishers, 100 smoke detectors, 15 fire panels and two suppression systems protect occupants from the risk of fire.

Finally, using Johnson Controls' Distributed Energy System, the building is smart enough to automatically reduce energy usage and be more sustainable. Around 2,000 lights are controlled from one central management system, illuminating 170,000 square feet as and when needed. On top of this, the building has six smart lifts, which open automatically to take occupants to their designated floor, saving 11 kilowatt hours of energy. This is how One Albert Quay became the smartest building in Ireland and, with ever-evolving technology at its disposal, it can only get smarter.

Five steps to create a smart building with real purpose

1 Whether its sustainability, energy efficiency or user experience, identify areas of weakness in the operationality of your building. There will always be opportunities to improve and, ultimately, to push you closer to your overarching business goals.

2 Have a clear picture of what you want your building to offer and provide, thinking strategically about the audience you will be catering for. Sustainability, energy efficiency and safety will be the bare minimum, but there is an opportunity to think bigger and smarter.

3 Make an assessment of the smart technology currently in use within the building and the impact it is currently having. This will help you to understand if improvements can be made to how the technology is currently being used and what new technology could be implemented to complement the existing smart solutions.

4 Create a plan to present to the wider organisation. It's important to be clear about how your building is currently benefitting from smart technology, how it could benefit from further implementation in the future and the partnerships you could strike to get full value from these technologies. This will help your business to maximise its return on investment and reach its business objectives.

5 Finally, you need to deliver on this plan. This might be your one chance to prove how integral smart technology is to the performance of the building and how you yourself perform in your role. Therefore, make sure you manage the project as smartly as the technology you deploy. This means sticking to budgets, referring back to the core objectives of the project and constantly communicating the results that the technology is reaping.

If buildings are going to earn their place on the map again, a committed and unified approach to smart technology is a must. Organisations must go beyond occasional, isolated implementation of technology to materially improve the performance of a building. A tactical approach, in line with the wider business goals and the direction of the country as a whole in terms of ESG, is key. Every piece of smart technology installed must be part of a wider plan to create a building that feels tailormade for every occupant. That is the difference between a smart building and a building fitted with smart technology. Only the former will be enough to prevent your building from becoming a relic in the modern world.

About this research

This report was commissioned by Johnson Controls in April 2021 to uncover how smart buildings helped the UK & Ireland through the COVID-19 pandemic and how smart technology would be used to help organisations and the country reach its goals in the future. The survey was conducted among 100 building decision-makers across the UK & Ireland. Industries covered include central government, large scale healthcare, pharmaceutical, higher education and wider commercial real estate, such as retail and banking. All respondents came from organisations with 500+ employees. The interviews were conducted in conjunction with Sapio Research via an online survey.

For more details, please contact:

e: **OpenBlueUK@jci.com**
w: **www.johnsoncontrols.co.uk/openblue**
t: **0800 804 6229**