SmartCitiesWorld
Research report

How smart is your office?

The challenges, opportunities and imperatives of creating intelligent working environments

In association with

Signify

Written by

Sue Weekes
News editor,
SmartCitiesWorld

SmartCitiesWorld Research Reports survey a global audience to identify the issues, challenges and trends impacting a specific part of the smart cities industry. We present the findings in an in-depth report and share recommendations and best practice.

In this report, we examine the rise of smart office technology and how it can help to create more engaged and productive workforces as well as healthier and more sustainable buildings.

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The changing workplace

The global pandemic has emptied offices around the globe. Safely returning to any semblance of normality will take time but employers hope that 2021 will be the year in which workforces start to return to their brick-and-mortar premises to enable the recovery to properly begin.

Employers are presented with major challenges, though. Employees still have concerns about returning to their old working life of commuting, using public transport and spending eight hours a day inside an office with other people. This was borne out by the decision made by many to remain working at home between lockdowns, with images of empty commercial districts around the world becoming commonplace.

Moreover, Covid-19 has fueled a working from home (WFH) culture that is proving hard to break. In many cases, the lack of a commute and the ability to design their own workday has given people a better work-life-balance and employers need a competitive offering to entice employees back.

As vaccine programs are rolled out around the world, the hope is of a return to more normal working conditions, but the traditional workplace will have to change with virus transmission likely to remain a concern for many months ahead. In short, employers must rethink their office space and working environments.

They have a powerful tool in their armory to help them though: technology. The smart office movement was already gathering momentum long before the Covid-19 outbreak but will take on more importance in the future. Prior to the pandemic, smart building technology that helps to create optimum working conditions by improving indoor air quality or empowering employees to personalize lighting and temperature was already being employed by forward-thinking companies to improve employee experience as well as increase performance and productivity.

Offering a superior employee experience is seen as one of the key differentiators in the war to win and retain top talent. Smart building technology will continue to be used for this purpose but post-Covid it will become an even more important part of the sell to bring employees back to offices safely and with confidence.

Research carried out by SmartCitiesWorld and Signify demonstrates that Covid-19 has both expanded the suite of smart office applications demanded and accelerated their implementation. The research was carried out between July and October 2020 when many countries were recovering from the first wave of the virus and anticipating its next phase. Technology such as occupancy monitoring, temperature checking and contact tracing were added to the range of applications available, while health and well-being and employee experience were cited as the biggest drivers to creating smarter offices and workspaces. These might have previously been seen as differing motivations, but the pandemic has made them intrinsically linked and very much part of any discussion about the future of work.

The aim of the research was to investigate the current state of the smart office movement and identify not only the most in-demand applications and technologies, but what approaches organizations are taking and what the main barriers are to creating more intelligent workspaces.

Responses reveal that the majority of companies are not taking an integrated approach. Much like a smart city, a smart office benefits from being built on a common connected infrastructure that is able to accommodate different applications and devices as and when required, and that is able to collect and integrate data from these applications and devices. In a smart office or building, a common infrastructure is often implemented on top of a converged IP network. In practice, a connected lighting infrastructure often serves as an ideal entry point for businesses who want to distribute IoT capabilities throughout their workspaces. However, the survey revealed that many are not maximizing the use of connected lighting as a cost-effective starting point for smarter indoor spaces.

In this research report, we aim to show private and public real-estate owners, operators and employers how smart office technology can help to confront the immediate challenges of Covid-19, but also highlight its longer-term value in creating and delivering better, more sustainable and more comfortable spaces in which to work.

Why we need healthier workplaces

Health and well-being was cited as the biggest driver for implementing smart office technology with more than three-fifths (62 per cent) of respondents. Long before the Covid-19 outbreak, sensors, workplace personalization applications and other tools were already being used to make offices not only healthier, but generally nicer places to spend the working day. Without doubt, though, Covid-19 has accelerated the awareness and use of such applications and moved employee health and well-being to the top of the corporate agenda.

Employers have a duty of care to ensure the safety of occupants and employees, but global lockdowns have meant there is also an economic pressure on them to do everything they can to keep people safe and their organizations operating as smoothly as possible. The World Bank envisions a 5.2 per cent reduction in global GDP in 2020, marking the deepest global recession in decades. The economic impact of Covid-19 has highlighted, perhaps more than ever before, the link between health and well-being and an organization's bottom line.

Moreover, even when infection rates decreased after the first wave and employees in some regions were encouraged to come back to the office, the shift to homeworking proved a difficult habit to break. Some employees continue to experience a fear factor about returning to the office while others have simply found working from home less stressful and more productive.

Hybrid workforces
While the prevalence of the virus in many countries means that hybrid home-office workforces will become part of the landscape for some time to come, expensive brick-and-mortar real estate cannot lie empty indefinitely. Smart technology will become part of the sell to employees as businesses try to attract personnel back and convince them of their safety.

The type of solutions that are being implemented confirms this thinking: people counting and occupancy monitoring applications were cited by the largest proportion of respondents for roll-out in the next 12 months (44 per cent), along with environmental monitoring technology and sensors narrowly behind at 42 per cent.

When asked if they planned to roll out any Covid-19-related building applications in the near future, 64 per cent said yes, with many specifying temperature checking via thermal cameras, occupancy-monitoring and safe-distancing technology as well as air purifiers and desk-booking apps.

What are your biggest drivers for creating smarter offices/workspaces?

Driver	
Health and wellness of building occupants	
Optimising employee experience/performance	
Reducing building running and maintenance costs	
Energy optimisation	
Reducing the building's carbon footprint	
Attracting and retaining high-value employees	
Space management	
Environmental monitoring/reporting	
Improved lighting and other asset management and maintenance	
Indoor navigation	

(Horizontal axis: 0.0 25% 50% 75% 100%)

What smart office applications do you plan to roll out in the next 12 months?

Connected lighting	27.3%
Energy management	34.9%
Environmental monitoring/sensors	42.4%
Wayfinding/indoor navigation	16.7%
Security	22.7%
People counting/occupancy monitoring	43.9%
Workspace personalisation (lighting, temp and humidity, etc)	33.3%

Do you plan to roll out any Covid-19-related building applications in the near future (for example, temperature reading in reception areas, physical distancing enablement apps, desk booking apps, occupancy monitoring, or intelligent cleaning)?

No: 36%

Yes: 64%
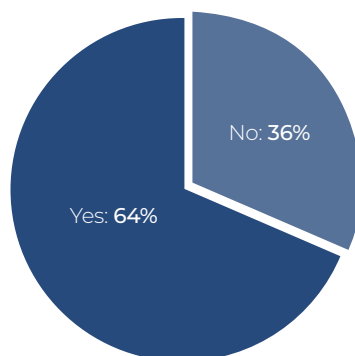
A similar percentage (64 per cent) said their smart office priorities had changed since the Covid-19 outbreak. Respondents commented that temperature reading "is a must now" and "occupancy monitoring" a priority. A number of respondents also stated that health and well-being is "more important and more demanded than ever". Others described how they were reorganizing workspace and highlighted the importance of physical distancing enablement, as well as finding ways to eliminate interaction with common devices such as light switches and other controls.
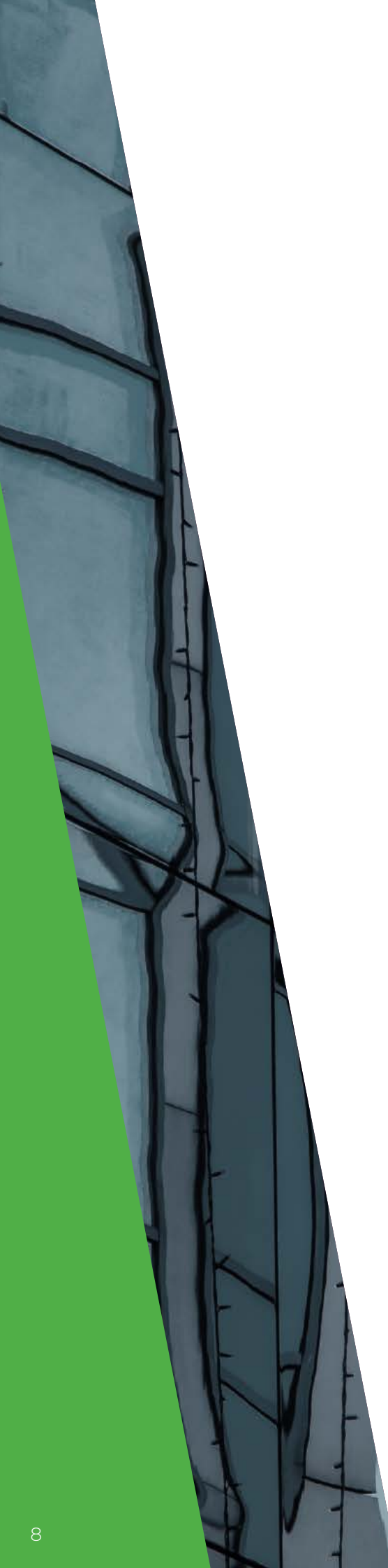
Early adoptors
The survey showed that some organizations had acted swiftly after the first wave of infection hit in many countries, with a relatively high number of respondents (31 per cent) having already installed people-counting and occupancy-monitoring applications. More than a third (35 per cent) have installed environmental monitoring/sensors, though arguably some of the latter may have been installed pre-Covid given that the link between internal air quality and health is well established.

The Indoor Environmental Quality Global Alliance (IEQ-GA) was set up back in 2014 with a mission to provide an acceptable indoor environmental quality (thermal environment-indoor air quality-lighting-acoustic) to occupants in buildings and places of work around the world, as well as make sure the knowledge from research on IEQ is implemented in practice.

It has also been vocal on the subject of Covid-19. The organization was an early proponent of airborne transmission of the virus, and welcomed the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) acknowledgment of this through the aerosols emitted by an infected person. It is, of course, universally accepted that transmission is more likely to take place indoors than outside.

As well as address the immediate and medium-term challenges of the pandemic, implementing smart technology also helps employers put in place a far healthier working environment for the future, one that addresses non-coronavirus health issues such as asthma, allergies, seasonal affective disorder (SAD) and respiratory problems, all of which have a direct impact on absenteeism. The latter already carries a high cost for many organizations. Added to this, sick building syndrome is recognized as a serious problem which can lead to employees suffering from a range of symptoms and requiring days off work (for more on well-being and buildings, download the SmartCitiesWorld and Signify free whitepaper *Buildings are getting smarter: are they also getting healthier?*).

Healthier buildings equal a healthier environment
According to the United Nations Environment Programme (UNEP), construction and operation of buildings account for 36 per cent of energy and process-related carbon dioxide emissions. This places a large amount of responsibility on the shoulders of building owners and operators to play their part in tackling the climate emergency. While climate change may have dropped off the radar in 2020 with Covid-19 changing everyone's priorities, it will be back on the agenda in 2021, and it will come sharply into focus in the run-up to the United Nations Climate Change Conference 2021 (COP26), which takes place in the UK city of Glasgow in November.

The research showed that a lot of good work is already underway when it comes to reducing buildings' carbon footprints but more needs to be done. Energy optimization was ranked fourth as the biggest driver for creating smarter offices (47 per cent) and reducing a building's carbon footprint was fifth (42 per cent). Half have already rolled out energy management applications and a further third (34 per cent) plan to do so in the next 12 months.

Respondents were asked if their smart office goals were linked to wider climate mitigation or sustainability goals, but only just over a third chose to answer the question and, of these, almost half declared a link. In this group, local and global carbon reduction and net-zero goals as well as the United Nations Sustainable Development Goals were all cited as motivations. One respondent said that commitment to Royal Society of Chemistry goals was "the main driver" for its smart office path, while for another bigger picture environmental gains was more an "upside benefit."

Pressure will continue to build on owners and operators to make buildings more sustainable. We can expect more to pursue accreditation that provides an outward badge of their commitment to the environment and helping to tackle climate change. This is likely to include (BREEAM) Building Research Establishment Environmental Assessment Method, the leading sustainability assessment method of individual buildings, and (LEED) Leadership in Energy and Environmental Design, a widely used green building rating system developed by the US Green Building Council. Among respondents, however, only a small percentage said they are working towards an official rating or accreditation. For more information on how buildings can reduce their carbon footprint, download SmartCitiesWorld and Signify's whitepaper, *Smart Buildings and Carbon Neutrality: A race against time.*

> *"Employers need to view their buildings as strategic assets that are central to a more normal return-to-work in the future"*

Smarter offices mean smarter working

Optimizing employee experience/performance was the second biggest driver to creating smarter offices and workspaces, cited by 61 per cent of respondents and only marginally behind health and well-being. The two drivers are considerably ahead of any others, with reducing building running and maintenance costs ranked third (51 per cent). While they might at first appear as different motivations for creating smart offices, they have a synergy and will become intrinsically linked in any discussions about the future of work.

Recent years has seen increased recognition by the human resources function and senior management of the importance of creating a superior employee experience when it comes to attracting and retaining top talent. It has the potential to increase productivity and make a positive impact on the organization's bottom line. Creating optimum conditions in which to work also reduces employee turnover, lowers absenteeism and presenteeism, and increases engagement. Indeed, employee experience has been described as the new battleground in the war for talent, and the importance of employee experience appears to have further heightened since the pandemic. A survey by Gartner found that nearly two-thirds (64 per cent) are prioritizing employee experience more highly than before coronavirus.

Importance of working environments

There is more to a great employee experience than creating a smart office, but there are already examples around the world which prove that the working environment is increasingly a differentiator. For example, Intel's Sarjapur Ring Road Building 3 (SRR3) in Bangalore sets a benchmark for smart buildings in India and empowers employees to personalize lighting and indoor climate conditions. Mark Shaeffer, Intel's head of real estate Asia, said it is positively contributing to increased workplace comfort, job satisfaction and employee retention. Meanwhile, The Edge, a multi-tenanted smart office in Amsterdam, which uses cutting edge IoT technologies, is credited with helping lead tenant Deloitte increase its job applications fourfold.

These are among the buildings that have invested in a connected lighting infrastructure that also allows them to deploy a range of other smart capabilities that help to create optimum working conditions for employees. As implementations proliferate, connected technology will shift from being a nice-to-have to something that is far more expected, and it will become an important part of an employer brand and the employee value proposition. The survey results demonstrate that this is already happening. Two-fifths (39 per cent) said attracting and retaining high-value employees is the biggest driver for creating smarter offices. A third have already rolled out workspace personalization technology such as lighting, temperature and humidity controls while the same proportion said they plan to roll it out in the next 12 months.

Most striking in the results, though, were the benefits that have already been recognized in this area. More than half report improved employee experience (56 per cent), and the same proportion have experienced an increase in employee performance/productivity. Almost a third (30 per cent) said they had benefited from reduced absenteeism, and 18 per cent reported reduced employee turnover. Ten per cent had witnessed an increase in job applications. Given this area of the smart buildings market is at a nascent stage, it suggests that benefits can be derived relatively quickly, which is good news when it comes to return on investment.

The immediate challenge facing many employers is encouraging employees back to offices. As vaccine rollouts gather momentum around the world, the severity of this challenge will vary but it is likely to remain a factor for many organizations in the short- and medium-term. It looks likely that many employers will be managing a hybrid remote-office-based workforce for a period of time. According to Gartner research, almost half (48 per cent) will likely work remotely post-pandemic, as compared to 30 per cent in a pre-pandemic world. Other models being employed include having different teams come into work in the office at different times: team A would come into the office for one week and then work remotely the next when the office space was occupied by team B.

Downsides of working from home
Discussions on whether individuals are more productive at home than at work have become commonplace during the pandemic. Without doubt, the absence of a commute and the opportunity to design your working day around your lifestyle can mean workers get more done. But there are downsides which are likely to be felt more acutely as time passes. For instance, WFH loses opportunities for on-the-job and peer learning, which are invaluable for an individual's development. Remote working makes it much more difficult to foster trust, build and maintain a healthy corporate culture, and continually ensure high levels of engagement.

Some leaders will handle these challenges better than others, but many still struggle with remote management and judging people on output and outcomes rather than being able to see them working. There is also a danger that innovation, the lifeblood of any business, will not flow as freely with a dispersed workforce no matter how good video conferencing and online collaborative platforms are. Finally, even the greatest exponents of WFH have to admit that it simply doesn't work for all personalities or all industries.

Many employers will be concerned about the long-term downsides of a prolonged period of WFH and the danger that it will become the norm. The younger generations who haven't grown up with a psychological contract – the set of expectations, beliefs, and obligations perceived by the employer and the worker – are known for blurring the lines between home and work and may be happy for this to become their new normal. They are also the ones, though, with potentially most to lose in terms of learning and development and acquiring workplace social norms. This, in turn, has serious implications for an organization's medium- and long-term talent management pipelines and strategies.

Employers should only be bringing workers back to the office when they know they can ensure their safety, but when the time is right, delivering a great employee experience will be a powerful tool in their armory. And the opportunity to work in a leading-edge office, in which employees not only feel safe, but where they are empowered to control and personalize their own surroundings to create optimum conditions in which to work, is an important part of the offering to them.

Employers, therefore, need to view their buildings as not just brick-and-mortar premises that have to be managed and maintained, but rather as strategic assets that are central to a more normal return-to-work in the future.

Have you realised any of the following workplace benefits yet?
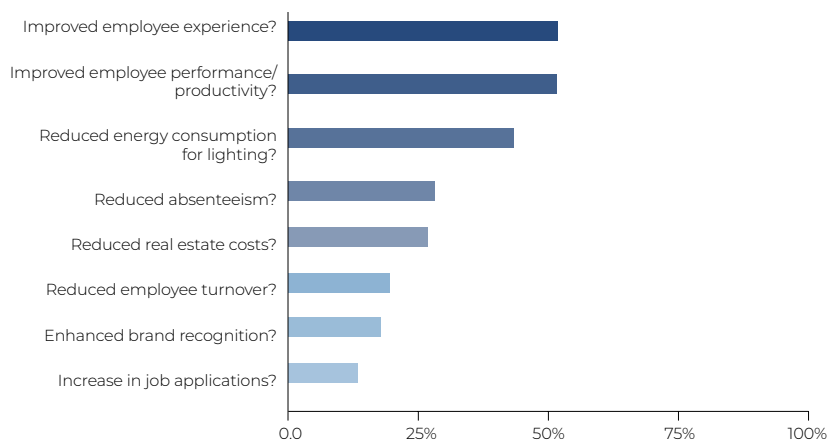
Have your smart office priorities changed since the Covid-19 outbreak

No: 36.4%

Yes: 63.6%
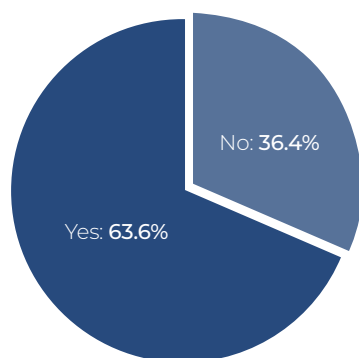
What does a smart office look like today?

While health and well-being and employee experience are the two biggest drivers for creating smarter offices, half of respondents also cited reducing building and maintenance costs, which has always been a selling point for smart technology. Conversion to LED lighting combined with lighting controls, for example, can deliver energy reduction of up to 70 percent, and help to deliver a return-on-investment.[1]

Security is the most popular smart office technology, which isn't surprising given its importance. It also represents one for the most mature areas of technology in the smart buildings market. This was followed by energy management (51 per cent) and connected lighting (43 per cent). Wayfinding/indoor navigation ranked the lowest for both current and planned installations. While it hasn't been identified by respondents as one of those applications that can immediately assist in return-to-work strategies, it certainly has potential for helping to guide people more safely around buildings.

Lack of an integrated strategy
In general organizations seem to be taking a siloed rather than a holistic approach, which isn't unexpected given this is a relatively new concept for many companies.

The research reveals that the majority of respondents do not have an integrated strategy (64 per cent compared with 36 per cent). A parallel has already been drawn with a trend in smart cities and it is worth emphasizing this. Short-term thinking and choices when it comes to technology providers at the start of a smart city journey, can determine how easy or difficult it is to grow and add further applications. A 2020 report by Northeast Group described smart lighting as the "foundational layer" for smart cities which is then used for phasing in other applications.

The same principle applies with an indoor smart lighting infrastructure. And given the research reveals that more than two-thirds either already have a connected lighting infrastructure or plan to install one in the next 12 months, many organizations are missing an opportunity here.
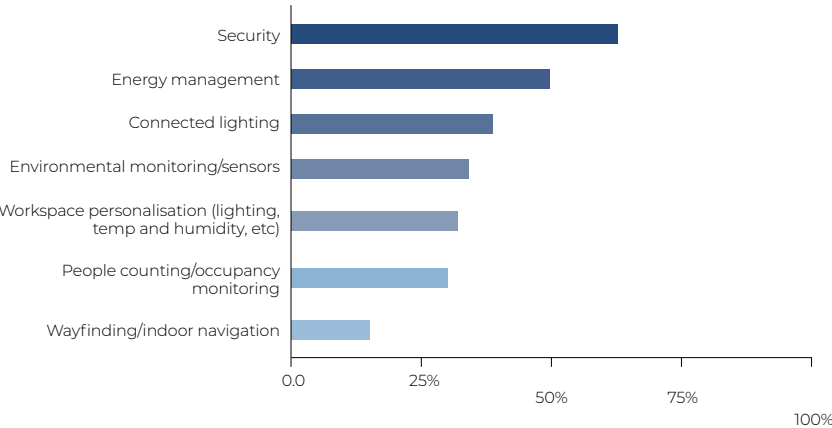
Working example
For instance, using Signify's Interact Internet of Things (IoT) connected lighting system and software, it is possible to run applications and devices that collect data on space utilization, occupancy, temperature and humidity, and more. As a working example, Singapore's number one telecommunications company deployed Interact Office to better control the lighting infrastructure but also used it to gather occupancy data and then apply analytics to better manage meeting rooms. The data is collected via sensors in the connected lighting system and shared with the meeting room system via APIs.

Although this installation was in place well ahead of the Covid-19 outbreak, its applications in the era of physical distancing are clear-cut and, importantly, it also shows how having a common infrastructure in place enables organizations to roll out other applications with relative ease.
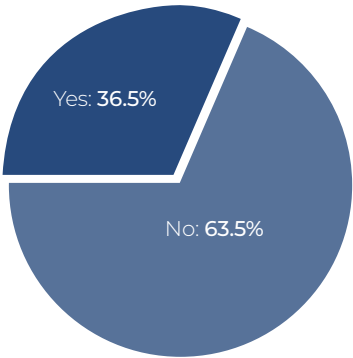
1. *CIBSE Journal, Module 22: Lighting control technologies and strategies to cut energy consumption*

While organizations could be more proactive in this area, the survey revealed that more than a third (35 per cent) plan to roll out more applications on their lighting infrastructure. Respondents listed intelligent cleaning, energy monitoring, security, indoor positioning/wayfinding, occupancy monitoring, HVAC, electrical door systems, and personalization for employees as among the applications they are exploring.

Which of the following smart office applications/technologies have you installed already?

Application	
Security	
Energy management	
Connected lighting	
Environmental monitoring/sensors	
Workspace personalisation (lighting, temp and humidity, etc)	
People counting/occupancy monitoring	
Wayfinding/indoor navigation	

0.0   25%   50%   75%   100%

Do you have an integrated smart office strategy?

Yes: 36.5%

No: 63.5%

Do you plan to use your lighting infrastructure to run any other applications?

YES — 36.7%

NO — 65.3%
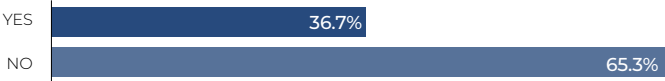
What is getting in the way of smarter offices?

Around 70 per cent of respondents report that their smart office projects have been "very" or "quite" successful. More than 20 per cent described their smart office projects as less successful than they had hoped and a small proportion (five per cent) registered them as unsuccessful, so there is plenty of room for improvement.

Only a minority explained their response, but a number stated they were pleased with the efficiency gains and cost-savings they had made. Negative comments including having over-expectations of the technology, difficulty in fine-tuning it, and being impeded by a having no overall smart office strategy.

It seems organizations are still facing a number of challenges when it comes to implementing smart office technology, and surmounting these would clearly increase success rates. Budget was cited as the biggest challenge by more than half of respondents, followed by finding the right IoT infrastructure (35 per cent) and the right technology partners (33 per cent). Lack of knowledge and skills gaps and allocation of resources were also reported by around a quarter.

Light-as-a-Service
Those building operators and employers for whom budget is a problem could explore a managed service solution, which means no upfront costs and enables the shift from a Capex to an Opex model. Signify's Light-as-a-Service (LaaS) and circular lighting managed services have helped organizations realize annual savings of up to XXXX.

Problems identifying the right infrastructure and partners as well as lack of knowledge are indicative of the smart office market being at a relatively early stage. Progress is also likely to be hampered by the range of disparate devices, platforms, technologies, and standards that are employed, which can lead to challenges in areas such as interoperability. Although a lack of interoperability and open systems was ranked the bottom challenge (by 20 per cent), it is still a significant proportion whose progress is being impeded and the number could grow as more companies progress on their smart office journey.

The lack of an integrated strategy suggests that organizations are prioritizing specific applications (in some cases almost certainly as a reaction to Covid-19) rather than looking at the overall concept of creating a smarter workspace. This is further backed up by the lack of cross-departmental working/mentality cited by a third as one of the biggest challenges. IT seems to be the driver of many smart office projects, with more than 70 per cent reporting that the function has provided input into implementations. There is no doubt that IT must play an important part, especially if applications are run over the IP infrastructure, but there needs to be more cross-functional working.

In the future, overall ownership of projects may shift or be shared with newer functions such as workplace design. Encouragingly, almost half (47 per cent) of respondents said those in workplace design roles are already providing input. This, or a similar function that can straddle a number of disciplines (such as IT, corporate real estate, HR/talent management, health and safety, finance, and procurement), will be more able to devise an integrated strategy as well as build knowledge in the overall area of smart office technology and identify how to address barriers that can get in the way.
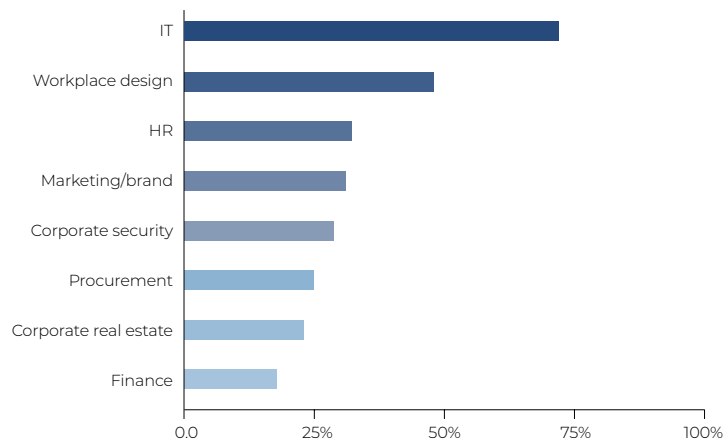
How successful have your smart office installations been so far?
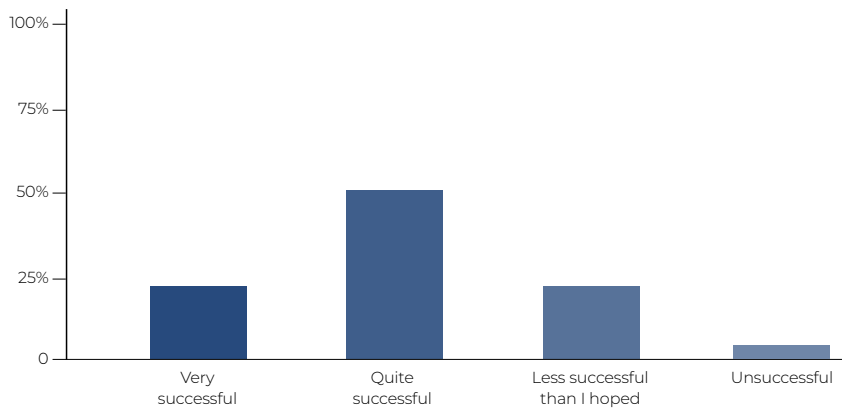
What have been, or do you see, as your biggest challenges to rolling out smart office applications?
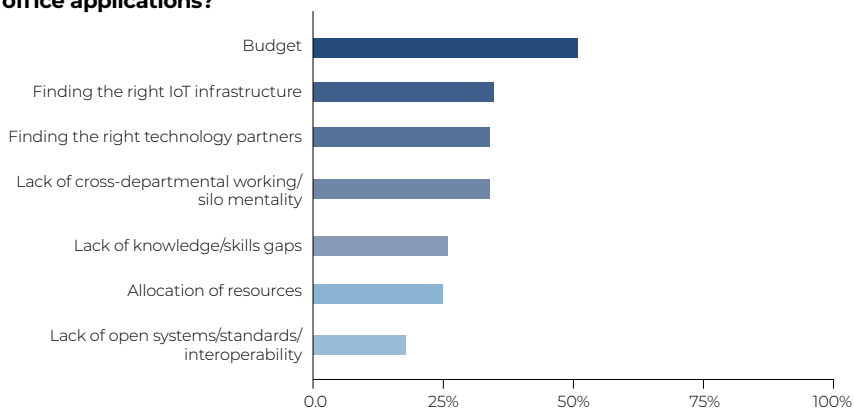
Which departments have provided input?

Recommendations

· Health and well-being and employee experience must be part of the business case to create smarter offices.

· Smart office technology should form a key part of the sell to incentivize employees to come back to the office and build confidence in the Covid-19 era.

· Employers should shift their thinking from their brick-and-mortar premises being viewed as a cost center, to becoming a strategic business asset that helps to improve employee performance and productivity and ultimately positively impacts the bottom line.

· Smart offices must be viewed more like smart cities and allowed to organically grow or react to new priorities and needs by being built on a flexible and scalable architecture. This also requires an integrated strategy.

· More organizations need to recognize that IoT connected lighting systems provide the ideal foundational layer for rolling out other smart office applications.

· Building owners, operators and employers should adopt the "build back better" mindset and use Covid-19 as the catalyst for creating greener, more sustainable, resilient, and comfortable offices and workspaces.

Key statistics

- The biggest drivers for implementing smart office technology and applications are the health and well-being of occupants and optimization of employee experience and performance.

- More than two-fifths (44 per cent) plan to roll out people-counting or occupancy monitoring applications in the next 12 months. This was closely followed by environmental monitoring/sensors (42 per cent).

- Two-fifths cited attracting and retaining high-value employees as the biggest driver for creating smarter offices and workspaces.

- The majority (64 per cent) do not have an integrated smart office strategy.

- The majority of smart office projects are driven by IT.

- Nearly two-thirds of respondents plan to roll out Covid-19 related building applications in the near future.

- Security applications are the current most popular smart office application (63 per cent). This is followed by energy management technology (51 per cent).

- Only 20 per cent of respondents are working towards official rating systems or accreditation.

- The top three biggest challenges to creating a smart office are budget, finding the right IoT infrastructure, and lack of cross-departmental working or silo mentality.

- The majority describe their smart office implementations as "very" (22 per cent) or "quite" successful (52 per cent). Five percent report they are unsuccessful.

- Well over half say that workplace benefits already felt by smart office technology include improved employee experience (both 56 per cent) and improved employee performance/productivity.

About the survey

The online survey was undertaken between August-October 2020 amid the Covid-19 global pandemic. The principal job titles of respondents included: corporate real estate owners/operators; heads/managers of corporate real estate; heads/managers of public sector real estate/facilities/building managers private sector; facilities/building managers public sectors and real estate specialists.

About Signify

Signify is the world leader in lighting for professionals, consumers and lighting for the Internet of Things. Its energy efficient lighting products, systems and services enable customers to enjoy a superior quality of light, and make people's lives safer and more comfortable, businesses more productive and cities more livable.

With approximately 36,000 employees and a presence in over 70 countries, the company aims to unlock the extraordinary potential of light for brighter lives and a better world.