Smart offices
A 2017 vision for the future

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Smart offices  
From sci-fi to a site near you

Most real estate professionals and pundits agree: we are now entering the era of the ‘smart’ office. But what exactly does the term mean? How smart is ‘smart’? And what are the benefits for office occupiers?

There’s so much intense focus on the subject of smart offices right now that it is sometimes hard to separate the light from the heat. But dig a little beneath the layers of scientific and technological complexity and the essential user appeal of the smart building is surprisingly simple to grasp.

In essence, the smart office is one that uses cutting-edge, internet-enabled technology to gather data and bring all its key operating systems and services under central control, so that a whole range of different elements work in tandem to create a better, people-centric workplace.

Smart offices can create an enhanced user experience that helps to increase productivity, attract and retain talent, support wellbeing and promote corporate brand values. Smart buildings can also use space more flexibly and efficiently, reducing costs and lessening environment impact.

“A whole range of different elements work in tandem to create a better workplace”
How can they achieve all this? Simply by getting a better handle on occupation, movement and resources in real time and adapting their systems accordingly to optimise the performance of both the building and the people within it.

The smart office is not just tech-smart – it is people-smart.

Indeed, much of the discourse around the clever science of smart buildings misses the point about the rich opportunities it affords to address the very human challenges of productivity, innovation and wellbeing.

British Land and WORKTECH Academy believe that these are the big prizes that smart buildings bring within reach, and the potential of this transformation has profound implications for businesses in terms of the future of their office real estate.

“Much of the discourse around the clever science of smart buildings misses the point about the rich opportunities it affords to address the very human challenges of productivity, innovation and wellbeing”
Smart buildings

A short history

Smart buildings hold the promise of new experiences and new efficiencies. So how did we get here?

Office buildings weren’t always smart; the technological infrastructures of the past 20 years took time to emerge. The first wave of change, from 1996 to 2006, saw the basic foundations of the smart building laid in the course of a tumultuous decade. The rapid growth of the commercial internet, the proliferation of personal devices such as laptops and mobile phones, the advance of building management systems (BMSs) and the standardisation and roll-out of high-speed cable and wireless networks all contributed to the early momentum.

The second evolution, from 2006 to 2016, built on these developments with more sophisticated devices, such as smartphones, and faster connectivity. Technology convergence, open source software, apps and cloud computing further changed the game and brought the full potential of the smart building out into the open.

Now, in 2017, we are entering the third wave of the smart building. This is the era propelled by...
more powerful and inexpensive computational power than ever before, billions of connected devices, faster and more widespread connectivity, and huge volumes of data at our fingertips. We can summarise this development as a progression from the connected building to the intelligent building and, finally, the smart building (see graphic, right).

However, what makes the smart building so potentially significant for occupiers is not so much the smart system integration as the impact on human performance at every level – operational, environmental and strategic. Smart buildings are easier to run, maintain and adapt to change, offering real benefits to office occupiers of every type.
The six key benefits of a smart office

Turn over to discover more about the six ways smart offices will drive future value for occupiers
Smart productivity
A tailored experience for innovation

The smart building can contribute to raising levels of productivity, creativity and innovation because it delivers a tailored experience that can positively influence how work itself is done.

In a task-based workplace, volumes of data can be generated on people, movement and location within the building and used to strategically plan and enable patterns of collaboration and interaction. The workplace can be programmed to understand which people to bring together in the right settings with the right tools to innovate, in support of predetermined corporate objectives.

At MIT, researchers have pioneered the practice of ‘social physics’ in which data from smartphones, wearables and sensors can be analysed to gauge how people share ideas. Wearable sociometric badges record where an employee goes, who they meet and the nature and tone of these interactions within the workplace.

The once mysterious and impenetrable rhythms of knowledge work can now be captured for analysis and modification by smart systems – although it is important to recognise the privacy issues and ‘big brother’ concerns around these technologies. It is not desirable to collect some data, even if it is technically possible.

“
The workplace can be programmed to understand which people to bring together in the right settings with the right tools to innovate”
Case study

MAJUNGA TOWER, PARIS

ENHANCING PRODUCTIVITY

Majunga Tower is an office building at La Défense, Paris, where users wear smart badges that link them to the Building Management System. When they arrive at the building, employees connect to the Majunga service portal, which gives them access to a remote control on their smartphone or tablet and allows them to select a workspace for the day, book a meeting room, control their environment and many other functions that support wellbeing and productivity.
Smart talent

Agile steps to recruit and retain talent

Amid increasing competition for top talent in key business sectors, smart buildings can play a key role in attracting and retaining premium employees by supporting more agile ways of working and enhancing the user experience.

The costs of heavy staff turnover are well documented, with some studies putting the total cost of losing an employee at 1.5 times their annual salary. While real estate location is important, the right welcome and environment once inside the office matters as well. The ability of smart buildings to create a better experience for its occupiers, whether through customised lighting, acoustics and ambient conditions or smarter room booking, is a big card to play.

Workplace apps, which are becoming increasingly prevalent, are important in this context because they give the individual control and choice in relation to both environment and fellow employees. Apps help people to order lunch, reserve space, adjust lights and temperature or track down a colleague. Knowing who’s in, and where they are in the building, turns real estate into a live social network.
THE EDGE, AMSTERDAM

BUILDING TALENT RETENTION
The Edge in Amsterdam, designed for its main tenant Deloitte, promotes a new way of smart-enabled agile working by providing only 1,000 desks for 2,500 Deloitte workers, who interact with the building – from parking to desk allocation, instant locker access, food ordering and much more – through a dedicated app.

The smart infrastructure is powered through 30,000 sensors embedded in an LED lighting system. Talent attraction and retention has rocketed, with a fourfold increase in job applications and 60% fewer absentees.

Absenteeism has fallen by 60%
The potential to support employee health and wellbeing has headed to the top of the occupier agenda, and smart building management systems have the ability to do that. Absence from work through sickness is costly for companies and costly for the economy – to the tune of around £14 billion a year in the UK, according to the CBI. Now a host of smart solutions are at hand.

Smart building sensors can detect changes in indoor air and water quality – which can adversely affect performance and wellbeing – and then autonomously fix the issue. Light and noise levels can be monitored and altered. Ambiance and vibe can be centrally orchestrated with changing colours, circadian lighting systems, spatial layouts and temporary events at different times of the day to counter mental health issues such as depression or disassociation at work.

By collecting and analysing biometric data from wearable fitness devices, the smart building can respond directly to the state of health of its occupants. In an era of demographic change in which the workforce is ageing and there will be more older people remaining at work for longer, this smart sensitivity to wellbeing is especially important.
A HELPING HAND FOR HEALTH
Cisco Canada’s new Toronto headquarters, RBC WaterPark Place, is a showcase for smart buildings technology. Among a raft of measures, the smart, fibre-based infrastructure introduces personal control, enabling staff to use their personal devices to interact with the environment to create personalised comfort settings, including lighting and heating, as part of a strategy to support wellbeing.
Smart brand
Underpinning corporate culture and values™

The tailored, agile and responsive qualities of the smart building can play a key role in helping the occupier to build brand values and strengthen corporate culture.

Interacting physically with a corporate brand starts the moment visitors come into contact with the office building; for example, the building will know who visiting clients, partners and contractors are. Gone will be the days of walking up to a security desk and being made to sign a scrap of paper. In a smart building, clients will be sent a 'boarding pass' in advance of a meeting and, just as with airline check-in, will be able to gain access with a barcode on their smartphone.

In the future, the sensor networks that are part of the Internet of Things (IoT) will even recognise people as they walk into a reception area via their wearable device or smartphone, thus giving the opportunity to highly personalise the 'meet and greet' experience.

Smart buildings will have a 'location layer' – a range of beacons that allow a tailored experience based on proximity.

Curated audio tours of corporate artworks and 'engineered serendipity' (the use of autonomous systems to organise meetings and encounters, and bring people together in a building based on online profiles) are the type of things on the horizon that can help build the brand and underpin corporate culture.
Case study

LE HIVE, PARIS

LIVING THE BRAND

Schneider Electric’s international headquarters near Paris is a living embodiment of its brand values; indeed, its name, Le Hive, is an acronym of the French for ‘hall of innovation and energy showcase’. The building was retrofitted to reflect the company’s status as a specialist in energy management and to act as a showcase for its solutions. For example, energy use for heating, ventilation, air conditioning and lighting has been halved in just three years. All building systems are integrated under the control of an intelligent building management system to optimise general performance, and RFID sensors embedded in ID badges give real-time feedback on occupancy. Employees also have the opportunity to be involved in the continuous improvement of the building’s management and performance through regular events and surveys.
Smart cost control
The clever way to reduce costs

The old saying – if you can’t measure it, you can’t manage it – is reversed in the smart office.

In smart buildings, systems and sensors generate large and continuous volumes of real-time data on the performance of the building and the behaviour of the people inside it. That means real estate professionals can reduce costs in a tougher business climate by clever optimisation of space or the early detection of component faults and prevention of system downtime.

Greater business efficiencies are within reach when building managers are given control software that manages all systems within one visual interface. Meanwhile, large landlords or property managers can compare building performance against corporate objectives across a portfolio of several sites in the same way that a stockbroker looks at how an entire portfolio of shares is performing.

As an example of the way things are going, Milan-based software company CGnal has analysed a year’s worth of data from heating and ventilation units in an Italian hospital to accurately plot when the facility’s heating system might fail. The system predicted 61% of real faults, including 93% where an appliance showed signs of overheating.
Case study

AL BAHR TOWERS, ABU DHABI

SCREEN SAVERS
Al Bahr Towers in Abu Dhabi uses an intelligent building management system and a smart building façade to manage energy costs effectively, despite being situated in an intensely hot climate. In such conditions, 70% of air conditioning is necessitated by direct exposure to the sun; Al Bahr Towers’ external screens, which open and close in response to the sun’s path, have reduced this heat transfer by 50%. The screens still allow natural light through, though, reducing the need for artificial lighting.

Thanks to the screens, as well as solar panels for water heating and photovoltaic panels on the roof, total carbon dioxide emissions have been reduced by 1,750 tonnes a year.
Smart sustainability
Reducing environmental impact

The smart office is set to be more energy efficient as technology monitors and optimises the use of water and electricity.

Finally, better system management leads to considerable reductions in energy consumption, reducing environmental impact through more efficient lighting, thermal and ventilation control.

In an age of strict low-carbon targets set by national governments, there is growing emphasis on smart grids to improve the reliability of supply and realise efficiencies by giving utility companies data on how energy is being used via smart meters, appliances and sensors.

However, there are no smart grids without smart buildings, which is where smarter, more energy-efficient buildings that cut out inefficiencies come into the picture. The next generation of smart buildings could even generate more energy than they consume.

The Edge in Amsterdam has an “outstanding” BREEAM rating for sustainability. It uses 70% less electricity than comparable buildings.
Case study
MICROSOFT CAMPUS, REDMOND, WA

ENVIRONMENTALLY FRIENDLY ENERGY
Microsoft’s 500-acre smart campus at Redmond, Washington is a model of energy efficiency, with forecasted energy savings of 6-10% per year and implementation payback on its smart systems in less than 18 months.

There are more than two million data points in 125 buildings on the wooded campus near Seattle, collecting environmental information through a data-driven software program. Microsoft engineers can get a big-picture view of energy consumption at a glance and also zoom in on one building, one floor or even one piece of equipment.

Energy savings of 6-10% per year are forecast
The core components

Which technologies are driving this new era of smart buildings?

We have become familiar with today’s office buildings having a main BMS that controls critical environmental systems such as heating, ventilation, air conditioning and power. However, all other systems, such as lighting, security, access services and occupancy sensors, run off separate subsystems, each with their own control panels and applications. That means there is no proper coordination between systems. Next-generation, intelligent BMSs, however, change all that. The key systems and services are connected over an open Internet Protocol (IP) network.

And with the open protocols (such as BACnet or LonWorks) that makers of building control systems have begun to adopt, a big barrier to the smart building – a lack of interoperability between different building systems – has been removed. Now, these systems can communicate with each other to positive effect. In an emergency situation, for example, alarms can be sounded, routes closed off, security cameras redirected and cause-and-effect models created to anticipate likely impacts. System integration is enabled by an API software platform.

“A big barrier to the smart building – a lack of interoperability between different building systems – has been removed”
The IoT is the second key element. The term is used to describe a world in which sensors are embedded in billions of connected devices and pieces of infrastructure so they can share information on their current state and environment. Inside the smart building, allied to faster connectivity and cloud computing, the IoT can enable the detection and tracking of presence, light levels, temperature or humidity. Working with devices such as wearable fitness bands, it can even monitor the health and wellbeing of employees.

Not only that, but the abundance of data captured by so many connected devices in a building will allow building managers to accurately predict conditions and adjust the environment to suit, using predictive analytics. The building system itself will be capable of learning and making autonomous adjustments.
Already, in 2017, some of the key pieces of the smart building infrastructure are in place and available on the market. These include intelligent building management systems, location-aware beacons and sensors that interact with mobile apps and RFID chips, smart elevators and, critically, workplace apps. The app-centric workplace is closely allied to the opportunities afforded by the smart building.

Over the next 12 months we are likely to see smart building systems communicating with each other properly for the first time, in a widespread manner, as open protocols come on stream. By 2020, we can expect that the smart devices and wearables that people bring to work will no longer be in search of a smart building to interact with. The physical infrastructure of the building and what people themselves carry or wear will be part of one complete smart system that both generates and acts upon all kinds of data.

The smart office can be described as a journey, not a destination. Smart technologies are evolving all the time and the picture never stands still. But something important is coming into focus right now: the first authentic wave of smart offices is taking shape – and it is not hard to see their appeal.

With a smart workplace that supports productivity and innovation, attracts and retains talent, responds to the wellbeing needs of employees, underpins brand and culture, controls costs and reduces environmental impact, companies can address some of the most pressing hot-button issues in real estate in a way that we could not have imagined even 20 years ago – when smart buildings were seen as something out of a sci-fi movie.
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