

# SMART BUILDINGS 2022

**WHAT ARE SMART BUILDINGS  
AND WHAT IS THEIR PLACE IN  
THE REAL ESTATE SECTOR?**



**CUSHMAN &  
WAKEFIELD**

# INTRODUCTION

## SMART BUILDINGS HAVE INCREASED IN PROMINENCE IN THE PAST DECADE DUE TO A CULMINATION OF CHANGING WORK BEHAVIOURS AND AN INCREASE OF INFORMATION TECHNOLOGY AVAILABLE WITHIN BUILDINGS.

It might distress many designers, planners, and architects to hear this but since the first purpose built office building was constructed for the Lords of the Admiralty in London in 1726, most office workers would probably agree that, in essence, we haven't seen fundamental changes in offices and how they are used. We've experienced cubicles, open plan, hot desks, hybrid working and this has very much been in line with an ambition to make office layout more conducive to task, thought, or collaborative needs. However, we haven't seen the office telling us how it could better be used, this is a wholly new experience.

Since the early 18<sup>th</sup> century there have been several waves of innovation that have paved the way for the 21<sup>st</sup> century modern buildings.



**THE ELECTRIFICATION OF BUILDINGS:** our buildings began to connect to the grid, providing the ability to power new appliances and machinery



**THE DEVELOPMENT OF BUILDING SERVICES:** technologies such as HVAC networks and lifts enabled us to build bigger and better and house an increasing volume of workers



**THE EVOLUTION OF BUILDING CONTROL SYSTEMS:** another milestone was the evolution of building control systems with the invention of the electric room thermostat in the 19th century. The continued development of the building control systems allowing for greater improvements in building service delivery



**THE DAWN OF THE INFORMATION AGE:** the primary driver that has facilitated and is synonymous with smart buildings

# THE INFORMATION AGE

## THE WAVE OF INNOVATION THAT HAS MOST CHARACTERIZED THE ADVENT OF SMART BUILDINGS HAS BEEN THE REVOLUTION IN COMPUTER AND INFORMATION TECHNOLOGY.

To understand the technological progress that has led to where we are today, it is essential to understand how The Information Age and computer revolution started. As a result of this, we must also consider the specific technology trends that over the past decade have made it possible to deliver smart buildings.

- The Information Age began in the mid-20th century and is characterized by the shift to an economy based on computer and digital technologies.
- We can see that the line between digital and physical is becoming ever more blurred. Computing and information technologies have diffused into our material world. Our buildings (smart ones that is) need to be as confident in the digital world as they are in the physical realm.

- While much of the technology that underpins smart buildings has existed for some time, this catalogue of technological infrastructure has been sewn together by an additional layer of wireless technology, sensors and data analytics. As such, smart buildings are now able to exist by a linkage of systems, which highlights how the importance of connectivity has grown.

Indeed, the ability to communicate, rising from the internet, has proven to be integral to the success of any building built this century. The internet has matured from individuals connecting to one another to literally more than 10 billion devices all being able to 'speak' with one another and critically to share information. From a single computer connecting to another to a state where we have everyday objects linking via sensors and actuators via the Internet of Things (IoT). It is these critical points of connection that have created the inflexion points that bridge physical space, the bricks and mortar, and cyberspace, the interconnected web of information, fiber, light and microprocessors.

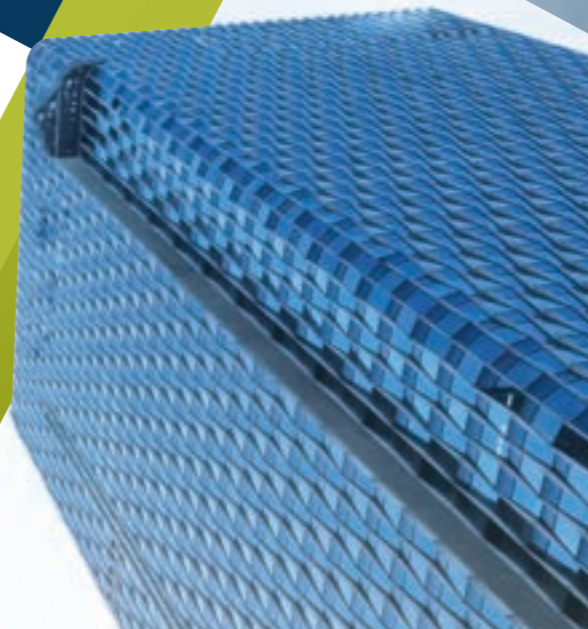
This volume of data that is being shared (a near 50x increase since 2010) has shifted the way we store and enable access. The internet has been turbocharged by the advent and proliferation of cloud computing. The delivery of processing and storage 'on demand' has been a game changer. It decouples an organization's or building's computing demands from the ability to be able to build local computer facilities and services to meet surging demand. When combined with IoT control networks, building owners can collect all the data they need and run key analytics without the need for local storage.

## WHAT DOES THIS MEAN FOR BUILDINGS?

IoT gives a building the ability to use a mass of different data points to inform and make decisions. Linking this to the operating model via cloud computing allows for on-demand management of the building from anywhere and at any time. We are now able to visualize data in a much more user-friendly manner to allow decision making to be more informed and to offer more clarity.

## BUT WHAT ACTUALLY IS A SMART BUILDING?

- WiredScore defines a smart building as one that delivers outstanding outcomes for all users, through digital technology, to exceed their evolving expectations.
- This definition of a smart building diverges from a lot of the previous literature that focused on specific technology solutions. WiredScore does not believe in technology for technology's sake.
- The outcomes of smart building:
  - An inspirational experience, a workplace that attracts and delights, with flexible and personalized services.
  - A sustainable building through a reduced whole-life carbon footprint by using technology to operate the building more efficiently.
  - Cost efficiencies are created by optimizing the building's performance.
  - Future-proof by design and able to adapt to new demands.
- To deliver user functionalities reliably, robustly and consistently, a smart building needs firm technological foundations. This is a combination of infrastructure, technological architecture, governance and policy.
- Technological foundations are critical to ensuring the success of any smart building through reliable technology, strong governance framework. They mitigate the risks associated with smart buildings while maximizing the outcomes.



# THE INFORMATION AGE

## WHY DOES A SMART BUILDING MATTER?

Tackling the climate crisis is the global imperative of our time. The built environment and associated emissions contribute nearly 40% of all carbon emissions globally, creating mounting pressure on real estate to provide a green path forward. As such, there is a major focus on sustainability and an increased awareness of the role the built environment has on our levels of greenhouse gas (GHG) emissions. The appetite for any tools or knowledge that can help to mitigate the GHG emissions that come from our buildings is increasing exponentially.

Smart buildings offer a critical link to the decarbonization of our buildings. The ability to capture how a building operates and highlight what needs to change to reduce emissions is where the focus should be. How this data is digested and optimised is crucial. Alongside the unchallenged benefits smart buildings offer to support our environment, they are also recognized as offering an improved experience to the user. Higher levels of productivity, increased comfort and critically, well-being.

While there will be an onus on landlords to commit capital to new infrastructure, ultimately, the return on investment will be visible through the increase in efficiency of their assets.

As smart buildings have evolved so too have their operations and cost efficiency. They offer reduced operating expenditure through better ability to predict maintenance needs and they can support a reduced overhead via increased automation of facilities management.

Technology has matured as the breadth of possible outcomes has expanded. This is no longer just about optimising existing systems, it's about increasing the experience to users, including their productivity, so can be much more focused on the specific occupants of a space.

### ARE ALL SMART BUILDINGS NEW BUILDINGS, OR INDEED ARE ALL NEW BUILDINGS SMART BUILDINGS?

It's a natural inclination to assume that only new buildings can be smart. With something like **80%** of the 2050 building stock already built it is critical that we not *only build new buildings with smart technologies but equally* retrofit our existing built assets to improve their performance with digital technologies.



# THE IMPORTANCE OF RETROFIT

**WHILE CONSTRUCTING BUILDINGS IS A CARBON INTENSIVE PROCESS, SO IS THE UPKEEP OF AN EXISTING BUILDING - ESPECIALLY IF IT SEES ONGOING UPGRADES THROUGH THE DISPOSAL OF OLDER SYSTEMS.**

Nevertheless, connecting old building systems to Internet-enabled analytics and smart building technologies can inject new life in their performance, maximising and extending their use. Until sectors further down the development ecosystem, such as the manufacturing sector, commit to net-zero to facilitate carbon neutral buildings, the net-zero quandary will continue to rumble on.

There is a balance between what is optimum for a best in class building to one where lower levels of investment may be appropriate but there is still a need to improve the intelligence of the building systems and platform.

- Predictive maintenance can detect trends that indicate when a building system may become faulty and allow operators to take proactive steps to maintain and subsequently extend the lifespan of that system.
- Analytics may also reveal where an old building is performing worse in certain areas and enable property owners to make strategic decisions.
- Asset owners can start to think about smart technologies in old buildings but connecting existing building systems to new software analytics.

**WORSHIP SQUARE** is HB Reavis' first fully net zero carbon scheme in both construction and operation. Located in London's tech district with 140,000 sq ft of workspace, this is a place that promotes wellbeing with a fitness studio, private and communal gardens, state-of-the-art end-of-journey amenities, a destination restaurant and a ground floor plant-filled lobby.

Sustainability and user experience are the drivers behind the smart systems at **Worship Square**. Fault detection reduces inefficient operating plant and live monitoring of building performance through HB Reavis' smart workspace platform, **Symbiosy** results in the most efficient energy consumption. User experience is enhanced through the proprietary building app which provides seamless access, space management, and a concierge and hospitality service.

Having successfully engaged with **WiredScore** on previous HB Reavis projects, taking a more structured approach to the smart features in **Worship Square** and the messaging around them was achieved by having the **Smartscore** matrix and model to follow. As with any accreditation, **SmartScore Platinum** will enable potential tenants to understand that **Worship Square** is best in class when it comes to smart features. Tenants can easily compare **Worship Square's** features that are important to them against other developments.



SKANSKA'S 17XM TOWER in Washington D.C. is the first building in North America to have achieved SmartScore certification, having reached the highest score of Platinum.

In the 334,000 sq ft office building, Skanska has created a foundational backbone to facilitate a seamless access control experience for tenants and visitors utilizing contemporary and future digital technologies. It allows tenants to engage the smart building network and attributes to fit their needs and increase productivity and connectivity.

The ability to connect various building systems (e.g., illumination, thermal comfort, air quality, physical security, sanitation, and more) in an integrated, dynamic, and functional way can allow the building to intelligently reduce environmental impact and improve efficiency over time.



## WHILST WE RECOGNIZE THE VALUE OF A SMART BUILDING, WE ALSO RECOGNIZE THE BARRIERS TO ADOPTION

The ability to be able to work through the change that adapting or developing a smart building is critical. Without the buy-in and support of the need to change and recognition that there will likely be a different way of working as a result, the advantages to be gained will not be as great as they should be.



### CHANGING ROLES & RESPONSIBILITIES

- Smart technologies are disrupting the traditional roles associated with the operations of a building. A typical building operations team consists of facilities managers, IT departments and office managers. With information technology and elements of the building increasingly converging and requires a new mindset to understand roles and responsibilities.
- In order for smart buildings to reach their full potential, industries outside of commercial real estate will need to engage. For example, by equipping a lift with detailed analytics you should be able to save the cost and emissions associated with a 6 monthly engineer site visit and still get much better information on what needs maintaining when. However, if you want to be insured then irrespective of this you'll still need someone to come to site every 6 months. As such, these industries are constraining innovation within real estate.



### FINDING THE RIGHT PARTNERS (INTERNAL & EXTERNAL)

- Procuring and operating smart building technology often requires working with new partners and individuals. There is a constellation of exciting technology start-ups that operate within the smart building space, which can be hard to navigate for new developers and landlords getting started in smart buildings.
- Internally, new skills are needed to manage smart building projects.



### BUILDING THE BUSINESS CASE

- In a world of value engineering, it is often hard for procurement teams to justify additional spend on smart technology despite the fact those technologies may reduce the overall costs associated with constructing and operating a building. For smart buildings to be successful it is no longer good enough to just assess costs but critical to assess costs weighed against benefits to calculate a true return on investment spent.



### PACE OF CHANGE

- The real estate industry is notoriously slow to adapt - the way houses are built, and the way investments are planned and financed have not really changed in generations.
- This is in part driven by slow feedback cycles from customers: while lease lengths are coming down, they are still years in length, meaning that it takes a long time for those with their hands on the tiller to see strong feedback that things need to change.
- Against this, the world outside is moving faster than before, and the danger is that by the time the industry sees the evidence that change is necessary, it's too late and huge numbers of buildings become obsolete and uninvestable.
- Decision makers need to be steering therefore for what is out of sight, over the horizon, not waiting for the signals to be clear and right in front. To steer this change, the industry as a collective will need to push harder, faster, and sooner - not waiting for the evidence to be conclusive.

## THE FUTURE OF SMART BUILDINGS

We've progressed a long way since the office came into use in the 1700s. Even taking into consideration the changes to how we interact with our workspaces as a result of the pandemic, there is potentially no greater change than the one we forecast around the use and value of a developed smart building. The key is going to be the ability to link in smart systems and intelligence with the ability to make fundamental change that secures an environmental advantage. The buildings will of course be more efficient and effective but the most pressing factor is how any building is able to perform better as a result of using the knowledge it captures for environmental considerations. Legislation is demanding ever greater changes in building efficiency and GHG emission reduction and a smart building has such an important role to play. The smartest building is a sustainable one.

# ABOUT WIRESCORE

WIRESCORE IS THE ORGANISATION BEHIND THE WIRESCORE AND SMARTSCORE CERTIFICATIONS: THE INTERNATIONALLY RECOGNISED DIGITAL CONNECTIVITY AND SMART BUILDING RATING SYSTEMS FOR REAL ESTATE, HELPING LANDLORDS DESIGN AND PROMOTE BUILDINGS WITH POWERFUL DIGITAL CONNECTIVITY AND SMART CAPABILITIES.

WiredScore was founded in New York in 2013 by leaders in real estate, technology and telecommunications, with an endorsement from Mayor Bloomberg, to improve the city's technology infrastructure, and support its entrepreneurs who are driving technological advances and creating jobs.

Following success in the US, WiredScore launched in the United Kingdom in October 2015 after winning the Greater London Authority's tender to be the official Mayor of London Digital Connectivity Rating Scheme. International demand for the digital connectivity rating system has since seen the company expand operations across North America and Europe. Since then, over 700 million square feet (65m sq m) of commercial and residential space has been committed to WiredScore certification, impacting 7 million people across 23 countries. For more information on WiredScore, SmartScore or to find WiredScore and SmartScore certified buildings, visit: [www.wiredscore.com](http://www.wiredscore.com)



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