WORDS PAUL TOSTEVIN, DIRECTOR, & ERI MITSOSTERGIOU, DIRECTOR, SAVILLS WORLD RESEARCH

HOW TO BUILD A SMARTER CITY (DON'T FORGET THE HUMANS)

While data, artificial intelligence and the internet of things are the brains of a smart city, we need human-centred solutions to create sustainable cities for the future

Until recently, the concept of a smart city was primarily of a place where services were made more efficient and responsive for the benefit of its inhabitants. It referred to a framework, composed of the internet of things and cloud computing that collects, manages and analyses data.

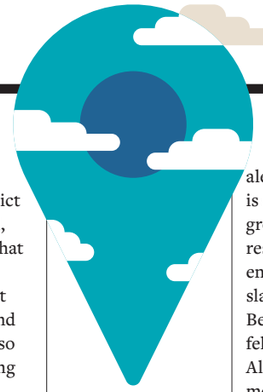
Now, the smart city agenda is broader than ever. For one, there is an elevated focus on the wellbeing of individuals and social value for urban communities. The health crisis has coincided with an increase in extreme weather events, such as wildfires, storms and floods, that have focused the need to deal with climate change. This has heightened awareness of the threats to our lifestyle and the realisation that we need to imminently change habits to minimise our negative impact on the environment.

In response, today's smart cities employ technology that embraces sustainability, liveability, inclusivity and resilience. Supporting this is a drive from people demanding that policymakers, technologists and urban developers deliver improvements to the cities they manage and build.

REAL-TIME DATA KEEPS CITIES MOVING

The potential applications of smart-city tech are varied. Some use real-time data to monitor and manage traffic flows, air quality, streetlights or waste collection. This technology can be crucial to creating solutions, as a study by McKinsey reported: cities that use technology improve quality of life indicators by between 10% and 30%, helping them make progress towards the UN's Sustainable Development Goals.

Today, the ability of tech to provide intelligence on environmental conditions is being applied across the globe, allowing cities to use real-time data that highlights problems so they can be addressed.



Take Las Vegas, for example. Earlier this year, a digital twin was launched for a 7 sq km section of the city's downtown district to support its move towards greater sustainability. This virtual, computerised model uses street level, real-time data to show what is happening in the city at a given point in time. It logs data to measure air quality, noise and carbon emissions – a process that will help the city make more precise and directed policies around climate challenges, as well as fix issues quickly. The data will also be shared with building and business owners to reduce operating costs and emissions.

TECH THAT MAKES CITIES LIVEABLE AND RESILIENT

Technology is also helping urban regeneration projects be more social, vibrant, diverse and resilient. Low-traffic areas, green civic spaces and mixed-use quarters where walkability, cycling and scooters are prioritised are central to this, but technology supports the creation of safer and healthier spaces.

"We need to think hard about how we use the limited space available in cities," says Giles Bailey, director of Stratageeb, which works with organisations on transport and information. "The starting point should be a consideration of what makes a space pleasant to be in, safe to walk through. How we make cities better, cleaner and less carbon intensive needs to begin with the question of the human experience: what makes a good place?"

Argent, the developer at King's Cross in London, answered by dedicating 26 of the site's 67 acres to traffic-free streets, parks, gardens, water features and open public spaces. It includes Bagley Walk, a park built on a former railway viaduct filled with seasonal plants, much like the High Line on Manhattan's West Side.

Supporting the value of those green spaces is a network of sensors that continuously monitor the air quality around the King's Cross estate. They report hyper-local air quality data street-by-street to map levels in real time, measuring a wide range of airborne particulate matter and toxic gases. The data generated will help the public to map their walking routes through less-polluted spaces and transform public health in urban spaces.

While ground-up projects have the scope to create wholesale solutions, technology is also helping existing cities. Smart street lighting in Paris allows light levels to be adjusted to meet public safety needs, while traffic management and smart parking systems in Egypt's New Administrative Capital aim to reduce stress, improve air quality and support greater use of public transport.

Detroit is trying to reduce its carbon footprint through its Smart Parking Lab, which has been set up as a test site for emerging parking technology to help smart infrastructure and mobility companies deliver better parking technology, driven by the fact that parking issues can account for up to 30% of vehicle emissions.

In Taiwan, app technology is helping to resolve a chronic waste issue. Once known as Garbage Island, Taiwan now has an integrated waste management system that includes 4,000 pickup spots in Taipei. Mobile apps allow users to track pickup trucks and alert them when one is nearby. Technology is supporting a 'trash-doesn't-touch-the-ground' system that makes each person responsible for their consumption and has enabled the Taiwanese government to slash daily household waste accumulation. Between 1997 and 2015, waste generation fell by 31% according to Rapid Transition Alliance. Taipei now has one of the world's most efficient recycling systems.

CLEVER AND THOUGHTFUL

The ability to quantify and measure progress is the holy grail for those involved in more socially orientated urban design and development, as it is for the people that use cities daily.

Mobility data offer significant benefits to urban planners as they show where people are going and why. Data providers such as Huq Industries can gather information on how long people stay in one place, and how quickly they are walking. Not only does it show how spaces are being used, it could also provide a way to measure social value. The data sets can tell if people are finding pleasure in their surroundings, and if placemaking strategies are working.

Chris Choa, urban strategist and founder at OUTCOMIST, explains: "Sometimes we need to define and measure proxies of values we are interested in. If I claim that a new neighbourhood is socially engaging, how can we prove that? If mobile phone signals show that people are walking slower in a certain place, we can understand that something has caught their attention; perhaps they are looking at the public art we have installed, trying out the new shops we have opened then chatting more and enjoying themselves. That's proof of engagement and suggests that investment has paid off."

Thus far, the concept of a smart city has been hard to pin down, but with shifts in how we create spaces of the future – and as technology comes on stream to better communicate what humans actually want and need – that simple feedback loop has the potential to change the definition of a smart city from a place that is not just clever, but thoughtful too.

Supporting the value of those green spaces is a dense network of sensors that continuously monitor the air quality around the King's Cross estate

Climate change is a wide-ranging problem. So we need to include everyone in the task, otherwise we only come up with partial solutions

DIVERSE TEAMS, SMARTER DECISIONS

NICKY WIGHTMAN,
DIRECTOR OF EMERGING TRENDS, SAVILLS

Diversity, inclusion and social value are now part of how to re-imagine cities and the way to create smart solutions – tech-driven or otherwise

The real estate industry is engaging more widely with communities impacted by development. This cultural shift is underway at Grosvenor, where Andy Doyle, innovation director, Grosvenor Property UK, has been working to embed employee-led innovation. "It is about a culture of curiosity across the whole business, questioning, evolving and pursuing new thinking as the industry rapidly transforms," says Doyle. "Our staff know us best, they know all our pain points and the challenges of daily life faced by those we support – retailers, residents, office workers, visitors. They can help us decipher the problems and find better ways to work with our customers, partners and stakeholders."

This decentralisation of problem-solving has led to a change to staff appraisals. "It is important not to regret something we try out," says Doyle. "We trial things at low costs and are not afraid of it failing because that helps us improve next time. That is a massive change for people."

This philosophy has prompted Grosvenor Group into new ventures. "For example, we are working with Demand Logic to obtain greater insight into the energy consumption of our buildings and to provide actionable insights that allow us to change how those buildings operate and ensure they are as energy efficient as possible." The 340-year-old Grosvenor Group is also working on ways to channel renewable energy from solar farms to its London Estate tenants and exploring opportunities in early-stage businesses that directly benefit the portfolio and help accelerate attainment of its business goals.

Illustration The Project Twins / Synergy Art

"We can't achieve our environmental goals on our own; we need others to get there and help us change things for the better," says Doyle.

Diversity and inclusion is also baked into the founding principles of Carbon13, established to help build start-ups that address the climate emergency. Nurturing diverse teams is fundamental to its mission to create 200 ventures that will have the combined capacity to reduce carbon emissions by 400 million tonnes – or 1% of global emissions.

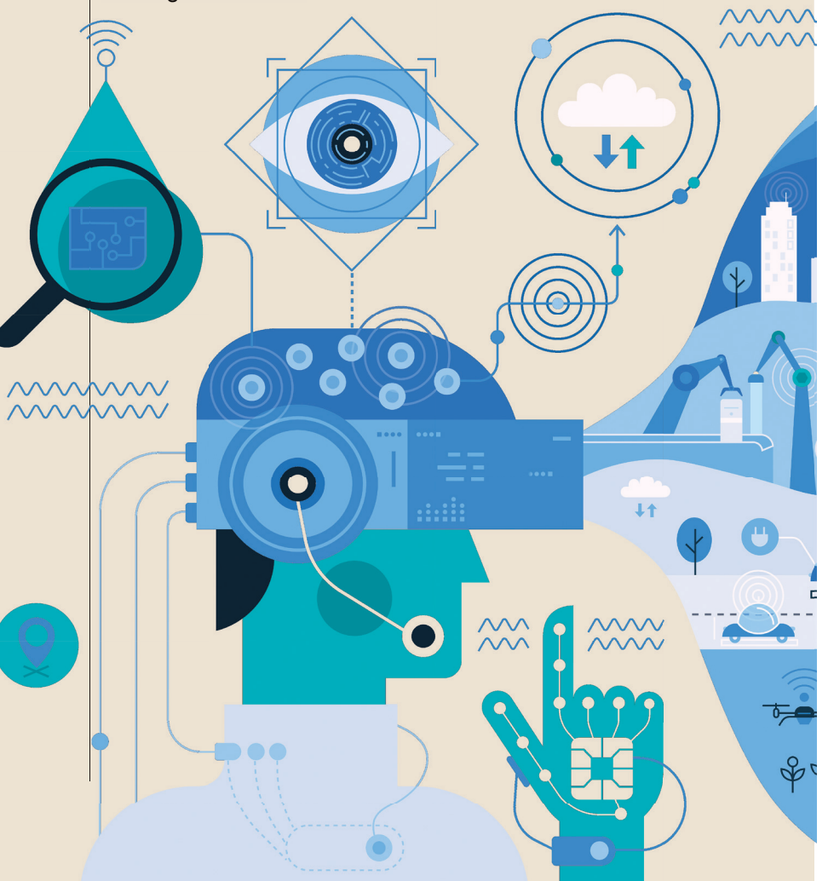
The brainchild of CEO Liv Andersson, BioZeroc uses biotechnology to create carbon-neutral construction materials. It's one of many female-led businesses being supported by Carbon13.

The venture builder is also working with innovators who are tackling food waste, clean energy, green supply chains and urban street safety. And, as well as gender, Carbon 13 is striving for a more inclusive approach to other under-represented groups.

"The design flaw in many of the solutions being proposed around the challenges we face, not just in cities but globally, is that we are not talking to everyone," says Dr Nicky Dee, co-founder and chief sustainability and innovation officer at Carbon13. "Climate change is a wide-ranging problem, so we need to include everyone in that task," she says. "Otherwise, we only come up with partial solutions."

SMART CITY TECH

From self-sufficient energy systems and solar parks to superfast digital infrastructures and gamified street mapping, cities are driving innovation



MAKING CITIES MORE RESILIENT

THE HUDSON YARDS MICROGRID, NEW YORK

The developers of Hudson Yards, the largest private real estate development in US history, have provided large commercial tenants with a microgrid – a self-sufficient energy system that can operate independently from the wider grid. Related Companies and Oxford Properties are supplying heat and power at Eastern Rail Yards from one energy source, known as a cogeneration plant. The system also has breakers that will open to isolate Hudson Yards from the rest of the grid in the event of a power failure, delivering power directly to the buildings.

Cogeneration power plants are between 50% and 70% more efficient than single-generation facilities. The other advantage of this solution is that it can account for the variety of energy demands across the commercial, retail and residential spaces: office buildings peak in the afternoon, residential buildings peak in the morning and evening, and the retail and cultural facilities are busiest over the weekend.

CITIZEN CLOUD PLATFORMS, SHANGHAI

The Smart Shanghai – People-Oriented Smart City project developed digital infrastructure, e-government services, and a City Brain – an AI system that uses data to solve transport, security, construction and urban planning issues.

Its Suishenban Citizen Cloud platform provides access to over a thousand services, with around 10 million people – half the city's population – using the system to register births and marriages and access social security, medical treatment, legal services and transportation.

The city has also stolen a march in 5G coverage across key districts and is rolling out a broadband gigabit network. A dual gigabit city infrastructure is providing extremely fast download speeds, enabling high-definition video streaming and applications such as augmented reality and virtual reality. It will also improve the operation of IoT technology and enable remote working and public Wi-Fi networks.

Illustration Getty

In Shanghai, a dual gigabit city infrastructure is providing extremely fast download speeds, enabling high-definition video streaming and applications such as augmented reality and virtual reality

MAKING CITIES MORE MOBILE

TECHNOLOGY FOR A CAR-LESS CITY, SEOUL

The Hopeful Seoul Monitoring System is a public-private partnership that involves a city-wide monitoring system that tracks vehicle and pedestrian traffic around the city to help prevent traffic congestion. Free public bicycle programmes and attractive public transport services are helping Seoul evolve into a car-less city, with aims for private car ownership to be unnecessary by as soon as 2030.

Meanwhile, Seoul Innovation Park is a social innovation platform where people develop creative initiatives to solve social problems and help build a "safe and sustainable" society. Across 100,000 sq m, there are 235 organisations, companies and cooperatives and 1,200 innovators doing social experiments covering fields such as social economy, art, culture, education, human rights and fair trade. There are also spaces where citizens can collaborate, as well as experience virtual and augmented reality.

CYCLISTS AND SMARTPHONES MONITOR STREETS, HELSINKI

In 2021, Helsinki called on its residents to map out 300km of cycling paths to identify and repair any damage to them. Cyclists attached a smartphone loaded with a specialised app to their handlebars to gather the data. The app, Crowdchupa, is a game for crowdsourcing data collection that navigates cyclists via objects to "collect". Each item collected translates into money that is paid to the cyclists.

Cycling is an important part of the city commute in Helsinki, with 1,500km of well-maintained cycling paths to support it; biking's modal share of city traffic is 11%. Health benefits accrued from this have resulted in a €3.6 billion gain for every €1 billion invested in the pathways, according to a 2021 study released by Handshake, an EU initiative that is pioneering cycling infrastructure across European capitals.

MAKING CITIES MORE GREEN

THE WORLD'S LARGEST SINGLE-SITE SOLAR PARK, DUBAI

The Mohammed bin Rashid Al Maktoum Solar Park is a single-site solar park in Dubai that aims to be the largest in the world. It has planned production capacity of 5,000MW by 2030, with a mission to save more than 6.5 million tonnes of carbon emissions every year.

The project is part of Dubai's strategy to increase the share of clean power in its energy mix over the short term, and fits into the UAE's desire to become carbon neutral by 2050, with clean and renewable energy investment worth DH 600 billion planned over the next three decades.

The first phase became operational in 2013 and has already contributed to a major reduction of carbon emissions. The project is made up of 153,000 photovoltaic cells and covers a surface area of 280,000 sq m.

HIGH-SPEED, SOLAR-POWERED TRANSPORT, RIYADH

Virgin Hyperloop is currently developing a freight transportation system that will dramatically cut land-based travel times. The solar-powered transport system, which uses vacuum tubes and magnetic railways, could potentially transport passengers at speeds equivalent to that of an aeroplane within a decade. Top speeds are estimated to be 1,123km/h (760mph), with average speeds ranging between 800 and 965km/h.

The company has recently announced it is focusing on a freight-only version of the technology to better respond to global supply chain challenges. Its first route, which it aims to deliver in four years, may be a link between the western port city of Jeddah with Riyadh and beyond to the Gulf states on the east of the Arabian Peninsula.

Virgin Hyperloop is the only company to have completed a successful test run with passengers using the technology. With zero direct emissions and very little noise pollution, the system has potential to move 45 million passengers per year around the Gulf.