

Time for cities to get smart

With governments backing the concept of smart development, urban projects that integrate technological advances with the physical and digital realm are moving off the drawing board to become reality

Developers, designers and government are bringing the digital and physical realms together to improve sustainability, efficiency and liveability in smart cities across the world.

A smart city is one that has digital technology embedded across all city functions and which uses the internet of things – the networking of physical devices from traffic lights to refrigerators – to deliver improved public services, transport, traffic management, energy, healthcare, water and waste. For example, sensors in rubbish bins can allow a city's waste management department to prioritise collections.

"Smart city guidelines are encouraging developers to take a broader approach to development," says Paul Priest, director and head of architect Benoy's Middle East & North Africa studios.

"Traditionally developers construct projects as individual schemes; now the emphasis is being placed on considering better ways of providing urban services and connectivity between developments. It's an approach developers want to drive as they can see the benefit of working collectively in improved logistics and interactivity in their own schemes."

Bandung takes the lead

Bandung, the third largest city in Indonesia, is emerging as the nation's leading smart city. Last year, the city launched the Bandung Command Centre, a state-of-the-art facility which monitors and manages city operations.

The Command Centre provides visibility on various aspects of the city, collecting and analysing data from street CCTV networks. A GPS tracking system is used to assist municipal agencies to monitor

traffic, or track assets such as public buses, ambulances or fire trucks.

The city has developed an online reporting system, which allows citizens to report municipal problems through Twitter or SMS. The report is assigned to the relevant department and the time taken to resolve the issue is used as a performance metric.

It is not just fast-growing developing cities which are getting smarter. Last year, Juniper Research named Barcelona the world's top smart city, for its efforts in use of elements such as smart grids, smart traffic management and smart street lighting.

Similarly, existing developments are taking on board technological advances to remain relevant. Canary Wharf is piloting a series of ideas aimed at taking its status as the UK's "original smart city" to the next level, says John Garwood, group company secretary at Canary Wharf Group.

These include installing solar panels at bus shelters to power electricity in its existing retail centre, as well as benches where people can charge their phones. In addition, the developer is now working on a route mapping application that helps organise the way construction traffic arrives.

A new residential and office phase is being developed at the financial district in London's Docklands, with more of a community feel and a broader range of uses than might be expected at a primarily office development.

Garwood says: "We're trying to look ahead to see what the future might mean for residential and office development. Why spend hours commuting? People want to live, work and relax in one place."

A key element of smart cities is the use of information-gathering and co-ordinating



Luxury Kuala Lumpur residential scheme 8 Conlay will include a media wall offering news and information customised to residents' day-to-day life, aimed at enhancing the sense of community, says developer KSK Land

technology to integrate sectors including energy, transport, information and communication technology.

"It's a multi-sector approach, so whereas traditionally, infrastructure and service provision has been siloed, smart cities think about what customers want – whether in energy, health, transport or education – rather than about specific sectors," says Jonathan Spear, a technical director at design and engineering consultancy Atkins in Hong Kong.

Designing in linked data systems

Servicing the built environment through linked data systems and other infrastructure is determined at the design level. For example, if a developer is promoting the use of electric cars as a mode of transport, the first thing it must address is provision of charging points around town.

The integration of energy and transport requires intelligent management, by introducing peak and off-peak tariffs, in this instance. As technology improves the way energy is stored, vehicles will be able to feed energy into powered household appliances or back into the electricity grid.

An important development in the near future will be autonomous transport. Widespread use of shared driverless vehicles would require less road space and fewer parking facilities.

"That space could be given over to more green space or saleable development," says Spear. "The design of a building might warrant 80% less parking bays than before, allowing developers to put in more apartments or retail space."

Automated transport is being incorporated into the design of a development being planned as a new city on a greenfield site outside of Seoul, in Songdo, while Singapore is to be the first city to trial a driverless taxi system.

However, "smart" does not just mean "digital". "Alongside moves towards integrated technology and data, transport, the importance of urban connectivity and improved walkability has characterised urban planning in the Emirates over the past five years.

Dubai has undergone retrofitting to accommodate public transport in wider developments, with metro stations feeding into tram lines and bus systems becoming fully integrated, says Priest.

"There is also more focus on communal spaces and sustainability, driven partly by

policy, but also by the fact that people are more conscious of environmental issues and want to be actively involved in making a positive change," he adds.

In the Middle East, the majority of spaces are enclosed, air-conditioned environments; however, there is now greater focus on embracing the outdoors and creating connected realms.

As part of the Abu Dhabi 2030 vision, the city is seeking to improve integration between districts as well as to improve the quality of the city environment through green and civic spaces.

The Sheikhia Fatima Bint Mubarak Park project (see p12) is a new-concept civic space which introduces a renewed approach to public realm design.

Created by Benoy as an urban forest of tropical trees with an amphitheatre, cycling track, play areas and fitness zones, "we've taken the existing offer of a traditional park format and tried to create something more stimulating and engaging for the entire community", Priest says.

"Sometimes, the spaces between buildings and developments can be overlooked. The design for this park is a great example of how to fill the gaps to unite the city grid."

In a similar vein, Malaysian developer KSK Land's reading of the smart cities concept is that "it's not about developing just a residential or commercial building, but understanding the social and lifestyle needs of today's consumers", says managing director Joanne Kua.

"Developers are experimenting with how to leverage design and innovative technology to develop products that promote a better quality of life from a convenience, sustainability and engagement standpoint, while factoring in efficient energy supply, transport systems and essential social amenities," she says.

A good example of how the digital and physical realms could interact in the future is "wayfinding". While a static directory map allows people to work out where they are, digital versions feature a computer screen that directs people with interactive "this is where you are" and "this is where you want to go" markers.

"This is becoming more popular because developers understand people like to receive instant feedback," says Jannene Atkin-Day, a divisional director at Benoy with a background in branding and new media.

A step on from that is directional signage:



Canary Wharf in east London has been a pioneer of smart city features and aims to take the integration of technology to a new level in its latest residential phase

"THE EMPHASIS IS BEING PLACED ON CONSIDERING BETTER WAYS OF PROVIDING URBAN SERVICES AND CONNECTIVITY BETWEEN DEVELOPMENTS. IT'S AN APPROACH DEVELOPERS WANT TO DRIVE AS THEY CAN SEE THE BENEFIT IN THEIR OWN SCHEMES FROM WORKING COLLECTIVELY"

Paul Priest, Benoy

messaging that gets people from A to B with the potential to focus personalised messages towards specific users. But for now, the high cost of these limits their use.

"Static directories are controllable – you might have 10 in a scheme and this will be sufficient," explains Atkin-Day.

"With the next generation of digital options, for example facility signage telling

you how many washrooms are available, these would have to be employed on a more integrated and intensive level. That can raise costs substantially."

With people becoming more familiar with augmented reality, as evidenced by the Pokemon Go phenomenon (see panel below), and wearable technology increasing in popularity, new digital services will become more and more commonplace over the next 10 years, Atkin-Day anticipates.

A natural extension of that could be the wider use of smart glasses that allow signs to appear in front of the viewer.

Integration improves livability

The digital element is just one factor developers must get a handle on. "As far as developers are concerned it makes good sense to ensure that projects are integrated:

a lifestyle element enables people to be connected, making the most of a bigger social gesture," Priest says.

Smart cities continue to progress at a varying rate globally – aggressively in new towns or cities of advanced economies in the Middle East and Asia, for example; more gradually elsewhere, in cities which are historically older and where the turnover of legacy infrastructure is slow.

"Most smart cities lie in the future," believes Priest. "There are great initiatives happening all over the world and as the smart city revolution gains momentum, we'll be experiencing this movement on a much larger scale in the years to come."

However, with world leaders firmly committed to the concept, developers must keep pace with the evolutionary process that leads to the creation of smart cities.

LEARNING FROM POKEMON GO UPS DEVELOPERS' GAME

The success of Pokemon Go is proof that the virtual world is increasingly accessible and developers are becoming aware of the need for further digital investment to capture the next generation of users.

The popularity of the smartphone game, which encourages players to explore their environments to find and catch virtual monsters, reinforces the fact that "customers are incentive-driven", believes Jannene Atkin-Day, a divisional director at Benoy.

This notion can be applied to retail, driving the future incarnations of loyalty programmes by motivating customers to visit and explore certain locations to discover rewards.

Another feature of games such as Pokemon Go is a sense of community. The fact that people are assembling in certain places to play tournaments suggests that there is demand for people to express what they are doing in a digital setting.

Encouraging a sense of community Atkin-Day believes developers are finding new ways to support community-building. "There are ways for people to communicate with each other throughout a scheme; for example, an interactive display people can send comments or thoughts to."

Malaysian developer KSK Land is



planning such a display for its 8 Conlay development of luxury apartments and serviced hotel suites in Kuala Lumpur, which will feature a media wall customised to residents' day-to-day life, including the latest news and traffic information. Users might also be able to post relevant information to the wall via social media.

"By doing so, we hope to encourage dialogue among end users, something that's lacking in city living," says KSK managing director Joanne Kua.

Particularly in Asia, developers recognise the importance of touch screens and the fact that users expect feedback, although

integrated digital services that work on many different levels – not just signage, but experiential apps and add-ons – are typically less well understood.

"At the moment it comes down to what the communications strategy is and what connection developers want to have with their audience," argues Atkin-Day. "There is still a concentration on the physical environment; the industry needs to move further towards engaging people, both visitors and potential customers, through digital channels."

Ultimately developers will need to think of the bigger picture, bringing together online with offline to deliver an inclusive experience, she believes.

"The evolution of digital infrastructure within developments is still in its early stages," says Atkin-Day. "The hurdle is with developers, as they compare the expected results to the high cost of investment. We are witnessing the growing enthusiasm for implementing an integrated, customer-centric experience hub in our meetings with developers, but we are yet to see this realised."

"There is always the perceived risk of being a first mover in the market, but it will be worth it. The pay-off will be seeing these destinations really put themselves on the map and revolutionise the industry."