Comment

Future Technologies: How can architects identify which disruptive technologies will advance our cities’ evolution and which will fall by the wayside?

It goes without saying that as technology progresses and new innovations appear on the AEC circuit, so the role of the architect changes. In recent years we have seen a dramatic increase in the number of futuristic technologies that look to solve the challenges of people movement and this has, in turn, inspired the theme of our annual architecture celebration this year.

In light of demand for innovative design techniques and materials, architecture practices of all sizes have begun to expand their in-house teams to incorporate R&D departments focused on harnessing the latest technological developments. Not only does this benefit the immediate design team given the direct communication channels, but it reduces costs for the client as they no longer need to outsource to specialist consultants.

It appears that interdisciplinary collaboration and open discourse are key to the future development of the industry, be that within a single firm or through a wider network of diverse companies. This move has been reflected in the shift in driverless cars, for example. For David Tickle, Senior Associate at HASSELL, the future lies in a less automated form of people flow.

Tickle considers: “Driverless cars, stacked and automated parking will all dramatically increase the efficiency of movement systems, reducing the distance between moving cars, the size of parking spaces and the footprint of parking structures. However, we shouldn’t see these technologies as a means of creating space for more cars in our cities, or legitimising traditional car-dependent suburban models.

“Cities devote up to 50% of their surface area to cars - highways, streets, service laneways, parking spaces... Imagine if we could repurpose just a fraction of this space for other uses! More pedestrian and cycle space, new public transport routes, green space, areas for housing and jobs - these are the things that will make our cities more sustainable, prosperous, and liveable places.”

It is this focus on pedestrian, cycle, and public transport networks that has seen a surge in recent years, with digital technology playing a key role in many developments. Prime examples of this include smartphone apps that provide timetables and booking options for public transportation, digital bus stops, and Oyster cards.

The breadth of ideas in this arena was clearly displayed in an online design competition last year, where the New York Department of Information Technology and Telecommunications challenged entrants to reinvent the city’s public phone booths. Of the six finalists, five proposed interactive information kiosks and all envisioned that the booths would be equipped with internet access and used for phone calls and emergency response.

UltraRope by KONE. This carbon fibre rope enables elevator travel heights of up to 1km, twice as high as previously possible. The implications for so-called ‘cities in the sky’, i.e. high-rise residential living, are multiplied by this forward-thinking product innovation with high-speed access to the top floors of supertall buildings now possible using a single lift system.

Tapping into other industries can provide a much wider knowledge base for any architect or designer embarking on a new or unfamiliar project, and it is this process of lateral thinking that has generated some of the most innovative new technological developments of recent years.

Looking outside the architecture industry, Morrell considers: “Other technologies, like 3D printing, have the potential to be hugely disruptive by allowing the shape and form of vehicles and other objects to be much more flexible. The Internet of Things and big data will enable intelligent vehicles that can self-monitor and communicate with other vehicles and the wider environment.”

As Morrell suggests, technologies such as 3D printing and advanced communication channels have already begun to impact upon design and construction practices. Forward-thinking innovations such as these also have a wider impact on general society which, in turn, feeds back into issues of people flow and urban regeneration.

It is these challenges that will become the focus of much debate in Shanghai this coming November, as we host World Architecture Day (WAD14) under the theme of urban mobility. From specific product developments that can aid people flow to wider issues of city planning, we will be considering how the industry can prepare for rapidly increasing population density in the most
commercial office design in recent years, with breakout spaces ‘breaking out’ in the majority of new builds and interiors specifically organised to encourage interdisciplinary communication.

For Professor Carlo Ratti, architect, engineer, inventor, MIT lecturer, and WAD14 headline speaker (Day 1), people power will be the leading force in future technologies. Professor Ratti also suggests taking this method one step further to engage the end user in the design process.

“In the implementation of projects, it is vital to involve citizens,” he explains. “I think that the designer has to allow citizens to build a powerful distributed intelligence and contribute to a novel form of activism, giving them the right environment and the right tools to make this possible. I believe in the idea of a ‘Choral Architect’: someone who could enable citizens to manage and design their cities, organising and supervising this action.”

When considering the latest technologies that can impact population movement through urban spaces, it is easy to be distracted by those making the loudest noise; similarly, Marcus Morrell, Senior Analyst in Arup’s Foresight Research & Innovation team, is looking to existing technologies as a marker for future developments. He explains: “The smartphone of 20 years ago didn’t take off as it was missing some vital technological components that were only solved years later, but this doesn’t mean the idea was forgotten. The technology and models were just vastly improved over the next 20 years, having a major impact on society as well as mobility.

“Arup is currently working on wireless inductive charging for buses in Milton Keynes where the buses receive a wireless booster charge from plates set into the road at the start and end of the busy bus route. The 10-minute top-ups allow the bus to complete its entire 17-hour working day on battery power alone. Due to the fact that most vehicle power in the future is likely to be electrified to some extent, this is a technology that could have all sorts of applications in the future.”

A new development that is ready to go is the