Are cities smarter than people?

With cities becoming smarter on a near-daily basis, are the UK's networks up to the challenge of supporting mass digitalisation?

As cities become increasingly congested, attention has shifted towards building more efficient infrastructure and service offerings with Internet of Things (IoT) technologies. Smart energy and water systems are creating a more reliable and cost-effective ecosystem for consumers and government alike, while waste, traffic, lighting and heating management are becoming more sustainable.

According to Statista, the UK's projected revenue in the smart cities market is expected to grow at a compound annual growth rate of 11.59% over 2024-2029 to reach US$2.63 billion. A great opportunity for sure to make the UK greener and more

efficient - but does the UK really need bins more intelligent than (some) people?

Smart city living

Apparently so: "the benefits of smart cities are becoming increasingly evident as both the government and local authorities follow through on the investment necessary to deliver digital transformation across the UK," says Matt Rees, Chief Technology & Operator Officer at Neos Networks. "One of the most universal benefits they bring is the wealth of data they can unlock via increased connectivity. Some smart cities have already demonstrated this by implementing the IoT for several use

cases such as public transport where it can be used to provide real-time updates benefitting both local authorities and citizens alike."

According to Jason Legget, Public Sector and Enterprise Solutions lead at Connexin, "smart cities, or 'smarter places' as we refer to them, have the potential to significantly benefit governments, the economy, and citizens if designed and implemented effectively."

"Alongside this is the boost to the economy through increased productivity and tourism," says Tom Hayden, Head of Engineering at Ontix. "The population increasingly rely on technology from cashless payments and route finding with

online mapping tools, whilst councils and governments are increasingly moving to technology solutions for their citizen engagement. Moving to an online economy and engagement model will provide a step change to the way people and councils/governments interact with each other."

Networks: ready, steady… go?

Reliable networks featuring a combination of technologies are required to provide the foundations for the UK's smart cities. And, while the country has made strides in developing digital infrastructure,

several gaps remain.

"While fibre FTTP access is improving, some areas still lack reliable connectivity which means that they can't handle the increased bandwidth demands and low latency necessary for applications like IoT devices, real-time analytics, and autonomous systems," confirms Rees.

Hayden believes that too much focus historically has been given to coverage: "the issue in cities today is not 'will I have coverage,' but more 'will I be able to use the service in the way I expect.' The expected user experience, especially for the data services that a smart city will rely on, outstrip the delivered service - especially at peak user times. Focus needs to be given to densification and capacity infill to ensure the required user experience is met – autonomous taxis can't only work at off peak times when the network loads are low enough to support."

Recent years have seen 5G deployments accelerated, and a clear digital strategy that includes fostering innovation in AI, IoT, and other technologies critical for smart city growth. However, rural areas and smaller cities still lack comprehensive coverage, and aging infrastructure in older cities limits the implementation of smart technologies. Moreover, budget constraints at local government levels are delaying implementation of large-scale projects.

Holistic, coordinated efforts and public-private partnerships are needed to ensure the UK's networks and infrastructure can fully support the cities of the future. Legget recommends that local authorities look to low power wide area networks (LPWAN) industry best practice to create effective and consistent approaches to smarter infrastructure.

"The widespread deployment of smart city infrastructure requires the economic installation and management of millions of small, energy-efficient devices that can wirelessly transmit data to gateway devices," outlines Legget. "4/5G cellular connectivity works in some cases, but at scale, it becomes cost-prohibitive, so LPWAN are the ideal solution."

Neutral host infrastructure will also help unlock smart city development, opines Hayden, providing cheaper, more cost-effective solutions for both coverage and capacity infill solutions.

"Multi operator neutral host deployments in targeted high foot fall areas allows all networks to have the best possible coverage and capacity and reduces the clutter at street level, removing the need for four deployments for the same area," says Hayden. "This becomes even more important as redevelopments change the look and feel of our high streets and public spaces. Councils working with neutral hosts can implement day 1 multi-operator coverage solutions that meet the demands of the city planning departments, reduce clutter and provide to the mobile network operators (MNOs) the capacity and coverage that their customers demand."

A smarter future

With millions of connected devices coming into play for smart city projects, data generation is booming.

"Data is the lifeblood of a smarter place, enabling real-time decision-making and optimising urban services, while evidencing service innovation," says Legget. "Without a data strategy, it is practically impossible to effectively deploy smarter solutions ensuring they monitor and manage the public infrastructure and services more efficiently."

Looking ahead, the UK's smart cities will need sophisticated, AI-driven management solutions and robust cloud infrastructure to handle demands. Indeed, AI is set to have a transformative impact on smarter city developments, driving city-wide automation, real-time decision-making, and personalised services across public services, transportation, energy and healthcare.

"AI is having a significant impact everywhere, and smart cities are no different," asserts Rees. "Whether smart cities are using machine learning (ML) algorithms to analyse data or automating public services with AI, increased data centre capacity and connectivity are essential."

"To maximise AI's potential, data processing needs to occur closer to the source, necessitating local and regional data centres to reduce latency," adds Legget. "Currently, the UK faces challenges in scaling data centre capacity to meet growing demand, particularly with the expansion of cloud computing and edge processing. Investment in energy-efficient data infrastructure will be key to supporting the future growth of AI-driven smart cities."

However, "with sites dispersed widely across the country, increased connectivity at high bandwidths is essential to handle the demands of AI and meet the required data transfer speeds," warns Rees.

"The UK's smart cities will need sophisticated, AI-driven management solutions and robust cloud infrastructure to handle demands. Indeed, AI is set to have a transformative impact on smarter city developments, driving city-wide automation, real-time decisionmaking, and personalised services across public services, transportation, energy and healthcare."

"Capacity is a challenge that the UK has overcome but increased investment may be required to ensure that connectivity is not the next challenge…" ∎