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COMPLETE GUIDE TO 5G

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5-star service

The fifth generation of mobile network connectivity, or 5G as it is more commonly known, is at the very height of its own hype cycle. In short, the newest ultra-wide network promises to provide wider mobile Internet coverage, along with faster data download and upload speeds.

Earlier predictions expected network providers to have 5G fully rolled out by the end of 2020, but big name providers, such as EE, have already launched in select cities across the UK, with other operators due to follow by the end of the year.

As the 5G switch-on comes into full effect around the world, global organizations and consumers are

hopeful that the technology will provide multiple benefits. The current 4G network has already enabled the rise of connected IoT devices, but 5G promises a real step change in the capability of these devices to collect and transmit data, fuelling everything from the IoT, smart cities and autonomous vehicles, to truly immersive next-generation technologies.

In this guide we run through what industry analysts and experts are predicting around 5G deployment, we hear from Huawei and why it's 'not the atom bomb', and how organizations expect to leverage 5G in the future, specifically around the development of smart cities. **Hannah Williams**

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Companies developing 5G in the UK

We reveal some of the top businesses making 5G developments ahead of the expected roll out in the UK

As we celebrate the launch of 5G in the UK, more and more companies around the world are gearing up to roll-out the ultrafast network technology by the end of 2019. EE and Vodafone became the UK's first to launch 5G in mid-2019.

In its latest mobility report, Ericsson predicts that there will be over 10 million 5G subscriptions

worldwide by the end of the year. Cisco predicts that 5G connections will represent over 5 percent of total mobile connections, while accounting for nearly 12 percent of global mobile data traffic.

The main advantages of the fifth-generation network are vastly increased speed, capacity and ultimately better user experience.

Although 5G was not fully expected to roll-out in the UK until 2020, technology giants, including Ericsson and BT, have long been working towards the development of the network, and the public sector has been providing support. Some network providers have begun trials and are taking action to roll-out the new network connection across different locations in 2019.

For example, in October 2018 almost £47 million was awarded by the 32 London boroughs and the City of London Corporation to fund major projects focusing on the digital infrastructure development of the capital.

Other operators, such as Three UK, are expected to roll-out the network by the end of 2019. In fact, Deloitte predicts that UK 5G smartphone shipments will total about 50,000 in 2019, which could jump up to 3 million in 2020.

Here are some of the companies that have been developing 5G tests and trials in the UK in recent years.

1. Ericsson

Swedish telco Ericsson has unveiled numerous enhancements to its 5G platform as it hopes to deploy 5G technology ahead of its competitors. In February 2019, it launched a dual-mode 5G cloud core solution to provide the required access for 5G use capabilities, such as network slicing and edge computing.

The firm also plans to further develop its microwave portfolio to prepare for 5G roll-outs in urban areas. It will also add a new MINI-LINK 6200 family of 5G-ready long-haul solution of up to 10Gb/s capacities. Alongside this, Ericsson will launch nine new dual-band, tri-band, and high-performance Massive MIMO radios to add radio capacity for service providers.

The company is also further developing its partnership with Vodafone UK and Qualcomm to conduct 5G tests using its radio equipment.

“We’re making headway on mobile devices as an integral part of the 5G ecosystem. Ericsson continues to drive the commercial readiness of 5G by future-proofing this ecosystem. Together with Qualcomm, we continue to advance the testing of 5G NR networks with mobile devices and support Vodafone in deploying 5G across the UK,” revealed Thomas Noren, head of 5G commercialization at Ericsson.

2. Vodafone

Vodafone has announced its intentions to switch on its 5G network in July 2019, starting with seven UK cities – Birmingham, Bristol, Cardiff, Glasgow, Manchester, Liverpool and London – with other cities to follow later in the year.

The network provider became the first to test 5G in the UK, using a prototype device in a 3.5GHz spectrum field located in Central London in December 2017.

The telco has also partnered with Qualcomm to run tests of 5G smartphones using the chipmaker’s Snapdragon X50 5G modem. This is to ensure that customers receive the best experience from their phone and Vodafone network when 5G rolls out.

The network has also confirmed that it will rely on equipment from Huawei and other providers, including the Huawei Mate X (5G) and the 5G Gigacube home router set to launch in summer 2019.

Vodafone became the first commercial mobile network to carry 5G traffic across cities, starting with Greater Manchester, Birmingham, Glasgow and London.

In February, it unveiled Manchester airport as the UK's first 5G connected airport. The launch was the first of Vodafone's multiple 5G trials in various travel locations around the UK. The experience gave passengers at Manchester Airport's Terminal One the opportunity to visit Vodafone's 5G 'blast pod' with a free entertainment pass to stream NOW TV.

3. EE

In May 2019, EE announced it will "launch 5G imminently", starting with a roll-out across 16 UK cities by the end of 2019. The first six cities will be London, Cardiff, Edinburgh, Belfast, Birmingham and Manchester. The rest are Glasgow, Newcastle, Liverpool, Leeds, Hull, Sheffield, Nottingham, Leicester, Coventry and Bristol.

In 2017, EE rolled out an end-to-end 5G test network with 2.8Gb/s download speed at its UK mobile lab. It then launched its 5G trials in 2018. The test, which was carried out in partnership with Huawei, saw a link made from the 5G core to the 64x64 Massive MIMO active antenna unit broadcasting 5G New Radio to deliver high speeds.

EE's director of network services and devices Tom Bennett said: "We're using our experience in cutting-edge 4G technologies and our dedicated partnership approach to ensure technology leadership in 5G."

In October 2018, EE announced its first live 5G trial in London's Canary Wharf in partnership with Canary Wharf Group to install next-gen mobile broadband to support businesses and customers. This marked the UK's first live 5G trial. The telco used the new 3.4GHz spectrum it acquired in the Ofcom auction at the start of 2018. Following this trial, EE made another 10 sites live for consumer and business technology trials in East London.

The BT division confirmed at MWC 2019 that it will sell Huawei's recently launched foldable 5G enabled Mate X device. It also announced plans to roll-out 5G in the second half of 2019.

4. O2

UK network provider O2 has confirmed that it will begin the roll-out of its 5G network in 2019 across London, Edinburgh, Cardiff and Belfast, with London being the first city to experience O2 5G. This will be extended in 2020 following the availability of 5G handsets.

The announcement comes after the success of its test beds in 2018, including one at The O2 arena in North Greenwich. The increase in demand will also bring about 5G innovation spaces, which O2 hopes to launch across the UK to provide 5G test environments for businesses in the construction, retail, transport and utility sectors.

In a statement, London's CDO Theo Blackwell said: "O2's decision to bring 5G technology to one of the world's most iconic entertainment venues reinforces London's status as a global leader in digital innovation and investment."

A number of partnerships are also being made with UK businesses to explore various use cases. "5G is a promise of so much more for consumers,

business, industry and public services. O2 is working in partnership with British industry, encouraging businesses, big and small, to engage with the possibilities of 5G technology through both our test bed programme and launch deployment," Mark Evans, CEO at Telefónica UK said in a statement.

5. Cisco

Cisco was granted £4.3 million by the UK government to create a rural 5G test bed system for network trials in 2018. The 5G RuralFirst project, led by Cisco, includes 32 organizations. These will focus on testing innovative approaches and business models to ensure 5G connectivity is accessible in urban areas.

The US multinational has since announced support to service providers. At MWC 2019, the company announced its sustainable wireless connectivity with Google Station, to showcase the support for network providers in different locations.

It also revealed a number of use cases for connected cars, smart communities and Wi-Fi 6, which is a newly improved network that is built on similar lines to 5G. Over 40 service providers are already actively trialling Cisco 5G Now solutions.

Cisco has also confirmed that the BBC will launch live radio broadcasts over 5G mobile networks as part of the 5G RuralFirst project. The trial is set to run until the end of September 2019 in Stronsay, Orkney and will expand to other locations later.

"5G RuralFirst aims to identify practical use cases of how enhanced connectivity will benefit businesses and communities in rural areas across the country. It's about building a business case for 5G roll-outs beyond

urban areas and demonstrating the value of investing in the digital infrastructure serving rural businesses and communities for the benefit of the entire country," Nick Chrissos, Director of innovation, Europe at Cisco said in a statement.

6. Three UK

In June 2019, UK network provider Three UK announced that it will launch a 5G home broadband service in London in August, with plans to roll-out mobile and home broadband offerings across 25 towns and cities around the country by the end of the year.

The telco is currently making network improvements in major cities, including London, Cardiff, Glasgow and Birmingham. According to the firm, network speeds will be two times faster than other network operators, with a more reliable connection and experience for customers.

In 2018, Three UK announced plans to invest over £2 billion as part of wider infrastructure plans towards the launch of 5G in the UK.

In a press release, Three UK CEO Dave Dyson said: "We have always led on mobile data and 5G is another game-changer. Also described as wireless fibre, 5G delivers a huge increase in capacity together with ultra-low latency. It opens up new possibilities in home broadband and industrial applications, as well as being able to support the rapid growth in mobile data usage.

"This is a major investment into the UK's digital infrastructure. UK consumers have an insatiable appetite for data and 5G unlocks significant capability to meet that demand."

The network provider debuted its 5G network at London Fashion Week with the world's first 5G mixed

reality catwalk. The launch, which was put together in collaboration with UK start-up Rewind and its Magic Leap technology, delivers the UK's first consumer-facing 5G installation according to Three UK. **Hannah Williams**

Credit: Ericsson

Ericsson '5G-ready' with network platform

The firm has unveiled several enhancements to its 5G platform, with ease of deployment and increased flexibility the key factors

Global networking and hardware services supplier Ericsson has revealed that it will be expanding its 5G platform as it looks to support service providers evolving their networks.

The Swedish firm recently announced a number of advancements across core platform, radio access and service orchestration, all aimed at widening its existing 5G platform to span a new set of use cases.

"Ericsson is ready for 5G. We are already out with our lead customers, and we have been part of every single commercial launch in the last six to nine months," Arun Bansal, Ericsson's president and head of EMEA said at a press event in London earlier this year.

The firm took the opportunity to unveil its dual-mode 5G cloud core solution, which supports both standalone and non-standalone – meaning they are underpinned by existing 4G networks – 5G deployments. Crucially, it is a cloud-native platform, offering automated features to enable the management of multiple networks.

According to Ericsson, until 5G-enabled devices come to market, operators will need to support a mix of different device types across the network for some years. This means a network that smoothly supports 4G and 5G. "With the new use cases emerging in 5G, there will be a need to ensure that 5G applications get the quality of service that they need," said Erwin Van Rijssen, head of the firm's 5G core programme.

The dual-mode solution also gives service providers the ability to migrate to 5G quickly and easily.

"What we see is that software providers want to launch much more quickly than their competitors, so they were launching maybe once or twice a year previously. But what we're seeing now is that software providers want to do this much more frequently, like once or twice a month," explained Rijssen. "This is effective because software that gets updated more frequently gives customers access more quickly."

Dynamic orchestration

Ericsson is also working on its dynamic network orchestration solution, with AI and automation added

to enable providers to simplify their operations. In 2018, it bought service assurance technology company CENX, which offers closed-loop automation and service assurance capabilities. These have since been built into the Ericsson solution, specifically for hybrid networks that are positioned in multivendor environments. This also includes orchestration for service providers using network slicing.

"It provides services and functionality with embedded AI software, and with that operators can actually monitor the network and automatically optimize," Rijssen revealed. "So when an operator is introducing these network slices they can manage and monitor the quality of the slices, and then, in order to live up to the service level agreements that they have in place, they can automatically do the connections to the network later."

Radio access

As the race to 5G adoption hurries on, Ericsson recognizes that service providers will need to increase capacity and revenue, while lowering costs.

To address this, it will launch nine new dual-band, triple-band and high-performance Massive MIMO (multiple-input and multiple-output) radios with virtualized software, to help providers manage data for multiple users, increase the speed of street-wide and urban area 5G adoption, and provide enhanced flexibility. This will allow service providers to deliver an architecture that includes intelligent data processing in any location.

Ericsson is also introducing an enhanced microwave transport portfolio and a new product family of 5G-ready long-haul solutions to support up to 10Gb/s capacities. It will ensure that service providers can access 5G-ready

transport infrastructure in urban and rural areas around the world, with high-capacity 4G to 5G connectivity.

"As we see that networks are virtualizing, we have a common development in RAN [radio access network] and we have multiple services in order to help the operator leverage 5G and evolve their network into a 5G network," Rijssen added.

Use cases

Ericsson already has a growing portfolio of customers and partnerships around the world, including Vodafone UK, Swisscom and Telenor, to add to the growth of commercial 5G networks in the US, Europe, Asia and Australia. "All the portfolio we have been delivering since 2015 is software upgradable. One of the biggest calls for any software operator is to send a genius to the site to do hardware changes and all, while with Ericsson whatever equipment they have on can be upgraded to 5G by software, and that's a huge cost advantage for our customers," Bansal told us. **Hannah Williams**

Credit: iStock

5G “not the atom bomb”, says Huawei’s Eric Xu

Huawei’s Eric Xu talks 5G security concerns and how discussions with Britain’s GCHQ led to a near total rewrite of its software

Discussions between Chinese technology giant Huawei and Britain’s GCHQ, an intelligence and security organization, sparked a rethink of its foundational code and, ultimately, a near total rewrite of its legacy software, according to the vendor’s ‘rotating chairman’ Eric Xu. This has helped Huawei better align with current standards, and future-proof its product line.

At a wide-ranging press round table at Huawei's Shenzhen headquarters earlier this year, Xu also spoke about what he sees as overt politicization of the 5G security debate. He hit back at claims led by America and Australia that the company is a risk to national security, as well as threats from president Donald Trump to no longer do business with the company.

Xu pointed out that Huawei has virtually no presence in the USA anyway, in either its enterprise, networking or consumer electronics wings, although it did provide connections to rural communities at one point.

US Secretary of State Mike Pompeo went as far as to suggest that Europe's relationship with Huawei could threaten the relationship between the USA and Europe, in comments made earlier this year.

"I think Mr Pompeo's remarks are yet another indication that the US government is undertaking a well-coordinated geopolitical campaign against Huawei," argued Xu. "It's essentially using a national machine against a small company – as small as a sesame seed."

He added that he believed Huawei's customers in more than 170 countries can speak better for "what kind of" company Huawei is.

Xu asked: "Is the recent fixation on Huawei truly about cybersecurity or could there be other motivations?" Are they truly considering the cybersecurity and privacy protection of the people in other nations, or are there possibly other motives? Some other people argue that they are trying to find leverage for US-China trade negotiations. Some other people argue that if Huawei equipment was used in those countries, US agencies would find it harder to get access to information of those

people, or find it harder to intercept their mobile communications... I believe in the wisdom of 7 billion people in the world, and I figure they clearly can see those different types of possibilities."

Xu added that China and Europe have long worked together to create unified global standards both for 5G and for future mobile communications technologies, with the aim of producing greater clarity on security needs and allowing vendors to follow a single set of standards. He also highlighted how "no American company" is in the top-five 5G equipment producers, namely: Nokia, Ericsson, Huawei, Samsung and ZTE.

"But now, some politicians have turned either 5G or cybersecurity into a political or ideological discussion, which I believe are unsustainable," he said. Xu added that he believes "technology is technology" and that it will spend on engineers and scientists to create products around those agreed-upon global unified standards.

GCHQ

While there is currently a raft of controversy aimed at Huawei from some of the Five Eyes countries – the countries whose alliance in spying on the world in a global surveillance dragnet was exposed by Edward Snowden – Huawei has also enjoyed a long relationship with two of those countries, namely the UK and Canada.

In fact, as well as two major deals signed with the British government over the past decade, the former CIO for the British government, John Suffolk, is now global cybersecurity and protection officer. And in Banbury, Oxfordshire, Huawei products are torn apart and the code is closely examined by British national cybersecurity leaders with high levels of clearance.

"I'm not very clear about Huawei's cooperation with the intelligence agencies of the countries you mentioned, but I know Huawei's engagement with GCHQ in the UK," Xu said, responding to a question about this seeming contradiction between the Five Eyes nations. "Huawei's collaboration with the UK, I think, is a constructive collaboration."

Xu added that the UK's approach to free trade based on "clear rules and rational regulation" for addressing concerns has been fundamental to the relationship between the two parties.

A $2 billion legacy rewrite

As mentioned earlier, this collaboration went as far as Huawei offering up its complete source code to GCHQ and the British government.

While the British security services were satisfied that there were not 'back doors' in Huawei equipment, Xu said that the process of increased security scrutiny led to a "fierce" boardroom debate about how the company can protect its current and future portfolios, as well as baking in resiliency from the start. The result will be a five-year commitment to improving software engineering capabilities to the tune of $2 billion.

"So what's going around in a big way in other countries right now about this back door discussion in cybersecurity has long been addressed in the UK," Xu revealed. "And I think this whole discussion around back doors was long addressed when it comes to the UK from the time that Huawei decided we delivered our source code to the UK for testing."

But, he added, the company is aware that the threat environment keeps evolving. He compared defences

alone to being akin to the shell of a coconut – a very firm outer layer but with water inside.

So during the company's work with the British government it was decided that the company will "re-factor" or rewrite its 30-year legacy source code, to create resiliency now and also in the future around these incoming 5G standards and beyond.

"As you can imagine the investment is massive, and this also has [an] impact on the project schedule in terms of functionalities and features we deliver to our customers today in the market," Xu said. "On this specific topic there has been a long, strong debate between Huawei [and the British government] in a sense that we wanted to focus on the incremental, the new code instead of re-factoring all the legacy code."

But because cloud intelligence and software-defined products will only become more prevalent, the company decided that it would need to embark on a comprehensive software engineering transformation programme. This was agreed on last year after "fierce" discussion at the board level.

"This transformation will take three to five years to complete," Xu said. "Essentially, it will take the future standards, future requirements to reboot our processes for software production. And we are going to take those future standards to refactor or rewrite our legacy code."

This is where the additional $2 billion in R&D budget comes in, to be used "primarily for legacy code refactoring, training or retraining of our R&D engineers".

Is the mask slipping?

Finally, we asked if the mask was slipping in terms of the seemingly more overt geopolitical links to the

development of technology – particularly now that the American companies are being challenged.

"Technology has always been really combined with politics. What is politics? People can politicize one thing if they want to, and they can definitely not politicize one thing if they don't want to," Xu answered. "How to address it in the end? I believe humanity has gone through such a long history and such a long journey and there are a lot of people who have the right wisdom.

"For sure technology advancements bring benefits to humankind. Take 5G for example – 5G can certainly bring benefits to the general public in that they can enjoy much better digital experiences. It's certainly not the atom bomb. 5G, in whichever case, will not hurt people."

He went on to talk about the importance of GDPR and the presence of robust privacy protections, "so as long as players follow those standards, then privacy will be adequately protected for people in the UK and across Europe," he said.

"Any company who violates the stipulations in GDPR will be subject to severe punishment. So we appreciate standards and regulations such as GDPR. In a sense GDPR is open, transparent, and non-discriminatory. That applies to all the players. So whether you get praised or punished totally depends on whether you act in a way that's written in accordance with GDPR regulation."

"Similar standards can be set up for cybersecurity if we only look at it from a technical point of view – as long as there are standards on cybersecurity that are open, transparent, and non-discriminatory. I think that would be a clear guideline for all the players. Those who follow, it's okay to keep doing business. Those that violate – they will get punished. As simple as that." **Tamlin Magee**

Credit: iStock

5G and smart city trends

We talk to the experts and reveal their top predictions

The past year has seen major telecommunications and mobile operators rolling out tests and trials of the fifth generation mobile system.

Swedish multinational Ericsson predicts that major 5G network deployments should be expected from 2020, and estimates that there'll be 1.9 billion 5G subscriptions for enhanced mobile broadband by the end of 2024.

We can also expect an increased development of infrastructure and smartphone handsets to match. Deloitte predicts about 1 million 5G handsets will be shipped worldwide by the end of 2019.

Trials

"Despite the first deployments of 5G and the launch of the first 5G-compatible devices [this] year, we don't expect the impact of widespread 5G implementation to be fully felt in 2019," Andrew Fray, managing director at Interxion tells us. "Instead, for many businesses, 2019 will be full of continued investment and focus into rearchitecting existing networks and infrastructure ready to host 5G networks."

As 5G becomes the de facto standard, allowing for new use cases with the industrial Internet, IoT and the sending and receiving of data at much higher speeds, we expect that the rest of the year will see manufacturers future-proofing their devices for the system.

"2019 will be more about the technology becoming fully standardized and tested, and future-proofing devices to ensure they can work with the technology when it becomes more widely available and Europe becomes a truly gigabit society," says Dave Russell, VP for product strategy at Veeam.

Big-names such as Qualcomm and Intel are reportedly working on 5G modems to fit into smartphones, cars and smart home devices.

On the other hand, mobile operators, including EE, Vodafone UK, and Three, have already rolled out a number of trials and development plans across the UK. Vodafone UK claimed to be the first to start its full UK 5G trials across London, Birmingham and elsewhere. EE has launched its 5G network within 16 UK cities, with multiple smartphone partners to support the roll-out.

These are just a few examples, but we expect plenty of other vendors and mobile operators to rise to market in the following year, too. Infrastructure companies

such as Ericsson and Huawei are already delivering the underlying technology that will support the network.

IDC predicts that 5G will be a key enabler of enterprise transformation in 2019, with over 70 percent of all 5G connections to stem from business use cases by 2024.

Market leaders

The growing list of 5G adopters does not yet clarify the market leaders for now, as consumers wait eagerly for the roll-out of fixed wireless before making that judgement. Despite this, a number of mobile operators are holding onto the title of '5G first' as they race to deliver subscriptions at scale.

According to Ericsson, 2019 will be the year that 5G really takes off – with one of the first use cases being FWA (fixed wireless access). "The initial focus of 5G is different in different markets," explains Stewart Lacey, 5G expert Europe & Latin America at Ericsson. "Certainly I think the US is focused on fixed wireless access – connecting 38 million underserved citizens of the US – there's less of a focus on FWA in Europe, as a lot of the focus initially is on mobile broadband."

The Swedish telecommunications firm claims to be the leading provider of 5G infrastructure hardware. Its partnerships include Vodafone UK, Swisscom and Telenor, the majority of which were announced in 2018.

"2019 will see lots of 5G trials and claims of '5G firsts', but there will be no significant handset availability and very few, if any, mobile subscribers," says William Webb, CEO of Weightless SIG. "There might be some fixed wireless subscribers in the US, but that initiative will move less quickly than hoped."

In contrast, CCS Insights reports that China and South Korea have taken the lead for early 5G adoption. Western Europe is lagging behind, and the region is predicted to pass 100 million connections in 2023, compared to 1 billion connections in China by 2025.

"With the UK lagging behind international peers in full fibre roll-out, and only 3 percent of all broadband subscriptions currently enjoying fibre services, 5G wireless home broadband will help accelerate Three's mission to provide superfast Internet to more people across the country," the telecom provider says in a report.

SD-WAN

As the 5G adoption rates boom, the demand for SD-WAN (software-defined networking in a wide area network) is also expected to accelerate this year.

According to IDC, 80 percent of enterprises will have implemented SD-WAN at some sites, underpinned by secure and virtualized edge architectures, by 2020.

"More and more organizations will be embarking on digital transformation journeys in 2019, which means leveraging technology and processes that will transform their business. The rapid proliferation of cloud services and software-as-a-service applications is leading the majority to rethink their traditional approach to networking and remove outdated hardware," says Yogi Chandiramani, technical director EMEA at Zscaler.

SD-WAN is predicted to be an enabler for the implementation of 5G network connections.

"The key decision makers involved in implementing SD-WAN will begin to recognize that it does not mean deploying cheap and cheerful Internet and cancelling expensive private circuits, but that it allows for a smarter

network to be introduced," says Paul Fawcett, mobility product manager at Maintel.

Smart cities

The trend for smart cities, which has evolved from much more than a simple buzzword over the past 12 months, is expected to continue to grow, with a flock of hopeful smart developments on the way.

According to IoT Analytics, smart city projects rank as the largest IoT segment, driven by the hundreds of recent smart city initiatives by vendors and governments around the world.

IDC predicts that over 30 percent of smart city projects will be tested in smaller cities of fewer than 200,000 inhabitants by 2020.

As smart city projects become more mature, we should expect an increase in the deployment of IoT technologies. Public services, transportation, safety, sustainability, infrastructure and integrated smart functions are the main areas expected to see a boom in the rise of smart city use cases and applications, according to iScoop.

Chip designer ARM says in a report: "Expect drivers for smart cities to mature from just cost reductions to better citizen engagement and more revenue streams (e.g. red light violation detection, Wi-Fi hotspot, 5G services, smart towers, crime detection/ analysis, information broadcast) with the help of advanced technologies like computer vision and machine learning."

Leading cities

According to research from McKinsey Global Institute, North America, Asia-Pacific and European countries

are leading the way in the roll-out of smart cities. There have been a number of test pilots and infrastructure developments across these regions over the past year. In fact, London was listed as the top smart city government in the world for 2018/19 by the Eden Strategy Institute.

IDC also predicts that investment in smart city use cases will reach $158 billion by 2022, with the fastest overall growth in the Americas.

Urban ecosystem

Gartner defines smart cities as “areas that combine business, residential and industrial communities which are being designed using intelligent urban ecosystem frameworks, with all sectors linking to social and community collaboration”.

McKinsey Global predicts that by 2025 cities will deploy a range of intelligent mobility applications that have the ability to, for example, cut average commuting times by 15 to 20 percent.

This also includes the development of smarter healthcare, transportation and safety. It is expected that the vast adoption of smart technologies in the next decade could contribute to safer urban environments.

“Our findings show that deploying a range of smart technologies could help to reduce fatalities by 8 to 10 percent and lower crime incidents by 30 to 40 percent,” McKinsey Global says in its report.

What next?

From the above predictions, we can see that the rise of 5G and smart cities are closely aligned with the expected growth in IoT. In fact, over the next decade there will be an increase in the adoption of IoT technologies in

the development of smart city infrastructure and 5G network trials. “One of the most anticipated technology trends in the industry, 5G networks will usher in a new era for IoT, supporting an increasingly interconnected world that will drive IoT innovation further,” DataArt says in a report. **Hannah Williams**