



## **5G: The new network arrives**

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### Deloitte Global's predictions

- 25 operators around the world are expected to launch 5G services in at least part of their territory (in cities). A further 26 operators should launch (again with the focus on cities) in 2020.
- In the UK, all four operators (EE/BT, Vodafone, O2 and Three UK) are planning to launch 5G services between 2019 and 2020. However, it will be many years before 5G rollout is complete.
- Approximately 20 handset vendors will launch 5G-ready handsets in 2019.
- Approximately a million 5G handsets (out of a projected 1.5 billion smartphone handsets sold in 2019) will be shipped by year-end. UK 5G smartphone shipments may total about 50,000 units, and in 2020 will range between 2-3 million.
- 1 million 5G modems (also known as pucks or hotspots) will be sold, and around a million 5G fixed cellular mobile access devices will be installed.
- At the end of 2020, we expect 5G handset sales (15–20 million units) to represent approximately 1% of all smartphone sales, with sales taking off in 2021, the first year in which retailers will sell more than 100 million 5G handsets.

### The rise of 5G

Connectivity is the foundation of the digital world in which we live. With 9 in 10 UK consumers owning a smartphone it has become the preferred tool not just for searching and sharing information but also for buying products and services.<sup>1</sup> A fifth of all retail now comes from e-commerce and of that mobile accounts for 64%.

Connectivity is equally critical for businesses. While companies already rely on accessing and transferring information online, the number and complexity of tasks completed online is also increasing rapidly. In addition, in the future organisations are expected to have a more diverse and mobile workforce, and therefore demand for on-the-move connectivity will continue to rise.

With a hundredfold increase in traffic capacity and speed over 4G, as well as lower latency, 5G is expected to enhance connectivity and lead to higher productivity and efficiency. 5G will lead to a new era of smart cities, smart homes and smart retail. A more responsive and higher capacity network means information and data can flow faster.

This can help businesses operate more efficiently through improved connectivity within their supply chain and manufacturing processes. 5G will also help them engage with their customers more effectively.

In 2019 and 2020, 5G wireless technology will have three major applications. First, 5G will be used for truly mobile connectivity, mainly by devices such as smartphones. Second, 5G will be used to connect 'less mobile' devices, mainly 5G modems or hotspots – dedicated wireless access devices small enough to be mobile and on the 5G network and then connect to other devices over Wi-Fi technology. Finally, there will be 5G fixed-wireless access (FWA) devices, with antennas permanently mounted on buildings or in windows, providing a home or business with broadband in place of a wired connection.

#### **Faster connection, better efficiency**

5G will be key for the development of 'smart' manufacturing on a large scale.<sup>2</sup> Often supported by artificial intelligence (AI) and robotics, smart manufacturing relies on fast and constant sharing and analysis of vast amounts of information used to direct the manufacturing process in real time. This requires high speed and high capacity connectivity across the supply chain, from consumers to the manufacturing plant.

Faster connectivity will also continue to improve supply chain efficiency and accuracy. 5G combined with smart technologies will help to identify the precise location of raw materials and goods in a supply chain and the path they take. This will help with ensuring all goods go exactly where they are needed and for the exact provenance of the goods to be known.

5G could also help boost revenues in retail and services by enabling wider use of AI to offer new channels to serve customers. The telecoms operator O2 expects that by 2025 the UK population will spend £1.4 billion using chatbots – a 45,000% increase on 2017's spend.<sup>3</sup>

#### **Richer engagement with consumers**

With 5G, consumer businesses will be able to offer more than new channels, they will also be able to improve the customer experience. 5G may open the door for drone delivery, virtual reality (VR) dressing rooms, and augmented reality (AR) experiences at home or in-store. A faster connection will facilitate the use of VR or AR in online and physical retail as well as in direct marketing. Imagine walking into a store guided by AR to the exact location of your purchase or walking through a virtual store to make your purchase. These new technologies can help remove some of the barriers to online shopping by allowing consumers virtually to 'try before they buy'. Similarly, 'quick try' AR tools, which have already been piloted in in-store clothes retailing, could be used to reduce the hassle of having to use fitting rooms.<sup>4</sup> In retail, a good example is Zara's launch of an AR app experience across 120 stores. Zara's app enables potential customers to hold their mobile device up to store windows or signs to be greeted by models wearing the latest fashion, which can then be purchased through the app. Amazon's AR View, is an app<sup>5</sup> that allows the customer to see how an item will look in their home before they make the purchase.<sup>6</sup>

Alternatively, both AR and VR could be used in pre-purchase marketing to encourage customers to make their next purchase by inspiring them with a real life-like 'taster' of new experiences, for example when booking their next holiday. Of course, more digital interactions with consumers mean more customer data for retailers to collect and use. This will drive the need for customer analytics to respond to customers faster, and with better targeted and personalised messages. The concept of the digital wallet will also evolve and consumers will be able to leave a store without reaching for their wallet as their payment information will be integrated into the retailer's system. It is predicted that by 2021, 5G will add £8.9 billion in revenue for retailers operating mobile-enabled payment gateways.<sup>7</sup>



### Case study

#### 5G makes AR and VR reality for retail

Cimmerce, a Danish start-up, supports retailers with their online channel by offering AR and VR technology that creates realistic interactive 3D virtual models of their products that consumers can view on a web browser on their mobile device or desktop. The technology allows consumers to view the product close up and ‘test’ it virtually in their chosen environment before making the purchase. For example, consumers can view how a painting or a piece of furniture looks in terms of texture and colour, and virtually place it in their living room to see how it fits in. The company believes 5G will help retailers offer their customers a more compelling visual experience with AR and VR, and boost their sales as a result. “With 5G, we will be able to provide the couch, the room and everything in it, toss in a realistic human avatar with AI that walks into the scene and helps the end-user with any information needed to complete the purchase”, said Eric Prince, co-founder & CEO of Cimmerce in a recent interview.<sup>5</sup>

### Smart cities: Fast forward into the future

5G is expected to be a key feature that can help turn the vision for smart cities and the future of mobility and transport into reality.<sup>8</sup> Combined with 5G, AI will become truly transformational. Whether thinking about self-driving vehicles, biometric traveller recognition or smart cities, all will require more network capacity and speed than is currently available.

One key problem with AI is where should the intelligence lie – in the cloud or the device? The device is often referred to as the ‘edge device’ because it is at the edge of the network, while the cloud is at the heart of it. The obvious choice is to keep the intelligence at the edge or as close as possible to it. However, this is not practical because edge devices typically have limited processing power and are battery powered. Therefore, they cannot replicate the prowess of the cloud.

The compromise is to move the intelligence that deals with immediacy towards the edge while keeping the processing-intensive functions in the cloud. 5G enables the ‘edge’ and the cloud to be connected intelligently.<sup>9</sup>

The city of Yinchuan in northwest China has a sophisticated set of technologies in use to monitor and streamline everything from the emptying of bins to air pollution alerts. However, to make these things happen the city had to increase its data handling capacity by constructing an 8,000GB fibre optic network and installing more than 5,000 Wi-Fi access points across the city.<sup>10</sup> Such measures are costly and possibly not feasible in many major cities. 5G should help to overcome infrastructure limitations not only by its increased speed and capacity, but also by enhancing machine-to-machine communication with minimum human intervention – a feature at the heart of the vision for smart cities.



### Bottom line

Over the longer term, 5G will spur further growth in online retail as it opens up opportunities for consumer businesses to develop new channels for customers and enhance their interaction with consumers. Better connectivity can also help optimise the use of transport and other urban infrastructure as more information and data can be instantly shared, analysed and applied in decision-making.

How 5G will either help or hinder consumer businesses’ bottom line will partially depend on how 5G infrastructure develops globally. For instance, the extent to which 5G reduces the need for retail and hospitality businesses to invest in their own Wi-Fi offering for consumers depends largely on the uniformity of 5G standards globally as well as roaming costs. If consumers visiting from other countries are able to connect to and affordably use the local mobile 5G network, businesses might be able to withdraw their free Wi-Fi without affecting customer satisfaction. However, businesses that have already invested in providing faster internet connections, for example through the use of fibre, should consider whether and how they might repurpose that connection in the long term if 5G becomes the norm among their customers.

# Endnotes

1. Global Mobile Consumer Survey 2018: The UK cut, Deloitte LLP, 2018. See also: <http://www.deloitte.co.uk/mobileuk/>
2. Product Definitions for Smart Manufacturing, National Institute of Standards and Technology, 2018. See also: <https://www.nist.gov/programs-projects/product-definitions-smart-manufacturing>
3. The value of 5G for cities and communities, O2, 2018. As accessed on 3 January 2018: <https://d10wc7q7re41fz.cloudfront.net/wp-content/uploads/2018/03/Smart-Cities-Report.pdf>
4. Kinect Virtual Dressing Room At Topshop: Lets Ladies 'Try On' Clothes, Huffington Post, 12 May 2011. See also: [https://www.huffingtonpost.co.uk/entry/kinect-dressing-room\\_n\\_860740](https://www.huffingtonpost.co.uk/entry/kinect-dressing-room_n_860740)
5. <http://www.retail-focus.co.uk/news/3397-zara-to-launch-ar-displays>
6. <https://www.amazon.com/adlp/arview>
7. <https://www.slideshare.net/adobe/adobe-digital-insights-a-mobile-first-world-2018-89090904>
8. The term 'smart city' can be described as the use of a range of technologies to connect their infrastructure and to engage with governments, citizens, visitors and businesses in an urban area in a way that helps them collaborate to make better decisions about how to allocate and utilise their resources and services to achieve a high quality of life.
9. Living on the wireless edge with AI and 5G, Forbes, September 2018. See also <https://www.forbes.com/sites/forbescommunicationscouncil/2018/09/06/living-on-the-wireless-edge-with-ai-and-5g/#7034773a6b6b>
10. 5G in the Smart City, 5G.co.uk, 2018. See also: <https://5g.co.uk/guides/5g-smart-city/>



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