



O<sub>2</sub>  
business

5G

A new kind of connectivity

How 5G will transform UK plc – and your business

*Telefonica*



# We've all seen the news – 5G is happening.

Many people are eagerly looking at 5G to change the way they connect on the go, downloading TV series in minutes or talking to their friends through high-speed video calling. But the biggest opportunity for 5G isn't what it will do for consumers, it's how it will transform business.

On our journey to 5G, that's where we started. With a customer-led approach, talking to FTSE 100 companies and customers, wanting to understand how it could unlock possibilities that just aren't achievable today. That customer-led focus continues, as we open up 5G innovation spaces across the UK, including in our Wayra start-up accelerator academies. This will provide 5G test environments to fuel ongoing innovation. It's our belief that 5G can't be regarded as just improved connectivity. It can change the way your business operates and open up new ways for you to serve customers and for your people to work.





The possibilities of 5G are endless, but rest assured, we'll implement a balanced rollout and continue to upgrade our 4G network across the country. We listen to our customers, and according to YouGov, while only 11% of consumers think network operators should prioritise the rollout of 5G, 31% would prefer improved 4G connectivity and fair tariffs to be a higher priority<sup>1</sup>. That's why 4G remains the backbone of the O<sub>2</sub> network.

As we roll out 5G, our intelligence-led strategy is driven by data and insight to identify where customers will benefit from 5G the most – and throughout its rollout, we'll work with you. As you look at 5G and its potential for your business, I know our dedicated business teams will be with you every step of the way. Do talk to us and find out what you could achieve with 5G, and get a head start on your competitors.

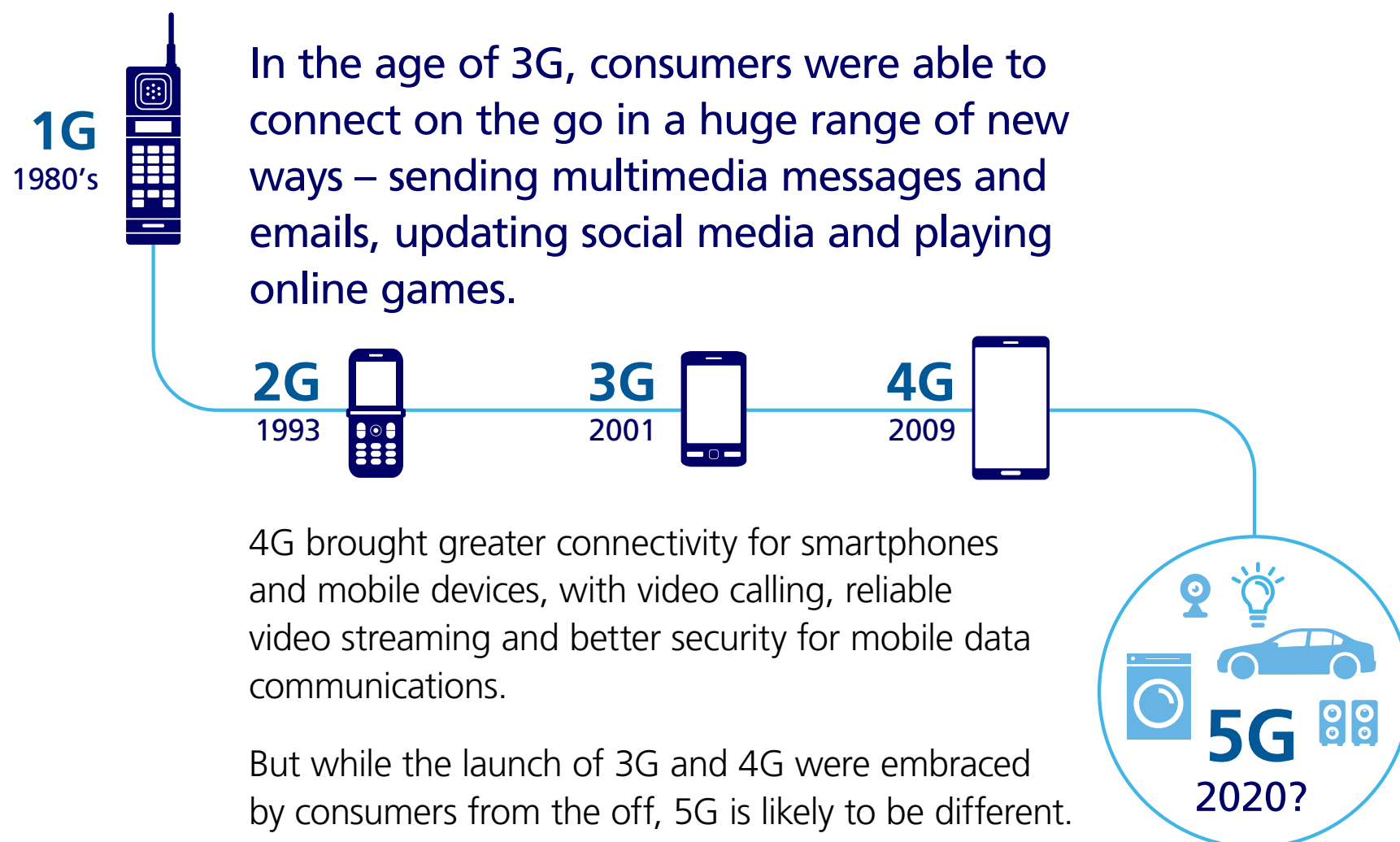
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Chief Technology Officer, O<sub>2</sub>

<sup>1</sup><https://news.o2.co.uk/press-release/o2-announces-october-5g-launch-prioritising-areas-where-customers-will-benefit-most/>





# A new kind of connectivity



## Can we start using 5G today?

Just like previous mobile network evolutions, 5G isn't going to happen overnight. 5G's radically different network architecture will be built over time, supported by continued investment as it evolves and you'll need 5G-compatible equipment to connect to it.





# More than just an upgrade

Many think 5G is simply the next step up from 4G – but it's much more than just an upgrade. 5G is set to change the way we work, and will kick-start the 4th Industrial Revolution.

**With over 1000x the data capacity of 4G, 5G will be able to:**

- **Handle thousands of Internet of Things (IoT) devices**, compared to just over 100 on 4G
- **Provide 10x higher data speeds** than 4G
- **Connect one million personal devices** per square kilometre, compared to 200 on 4G
- **Provide ultra-reliable low latency**, 5x better than 4G
- **And enable battery life of up to 10 years** on machine-type devices

These capabilities will enable us to transmit and process information faster, connect our workforces more efficiently, and completely change the way we work. They have the potential to transform every sector – from travel and transportation, to healthcare, retail, public services and every other.





5G will introduce smart factories that completely change everyday operations. These factories will use robotics, big data analytics and Augmented Reality (AR) to predict when tools are in danger of breaking down, optimise factory floor processes and even control machines from remote locations. Overall, manufacturing will become more efficient – enabling better cost management and improving stock control.

“5G presents a world of opportunity for small business owners. It’ll give them a chance to do things a little faster, seek new income and revenue opportunities, and take their business further than ever before.”

Emma Jones, Founder of Enterprise Nation



## Powering the 4th Industrial Revolution?

**The 4th Industrial Revolution**, also known as Industry 4.0, is a hyper-connected, intelligent world of autonomous vehicles, smart robots, remote surgery, and even genetic editing.

Some of these concepts are closer than others, and some are even possible today, but Industry 4.0 marks the next big shift in technology advancements.

And 5G is set to be the network that powers it all.



# What makes 5G different?

With ultra-low latency, faster speeds and new capabilities, 5G is completely different to anything we've seen before. It has the potential to transform the way your business operates, the way you engage and empower your people, and the way you serve your customers.

## Operate in new ways

The ultra-low latency of 5G means virtually zero delay across the entire network, which is why it introduces new possibilities for businesses.

From remote maintenance of equipment in the field, to accurate monitoring of your workforce and operations, ultra-low latency will enable real-time communication between IoT devices across your business. And with real-time data processing, drones will even be used for surveying worksites and unmanned deliveries of goods. Even in industries regarded as more traditional, such as agriculture, farmers will use drones to assess their crops and determine the need for fertilisers, cutting costs.



As ultra-low latency of 5G starts to enable greater use of robotics, they will be used across a wide range of industries. In fact, **5GRuralFirst** are already applying the technology to agriculture, with robotic arms used for planting, growing and harvesting crops – all controlled from a remote location.



And it extends even further. As the first network to support Massive Machine Type Communications (mMTC), 5G will support large-scale IoT deployments – enabling your business to deploy thousands of sensors, tracking devices and meters on the same network.

To support the rise of IoT and automation, 5G will also enable businesses to create private networks in the future, with highly secure, resilient and dedicated bandwidth for completing key functions.

“5G has a vast amount of potential to change the way digital infrastructure works in the UK, and it’ll create new market opportunities for fast growing businesses to thrive.”

Irene Graham, CEO, ScaleUp Institute



5G will introduce the new possibility of Network slicing – which enables businesses to create virtual networks, with dedicated bandwidths and ultra-low latency. This will be critical for use cases such as emergency services communications, as well as connected sensors in autonomous cars.



## Giving power to the people

With much higher speeds than 4G, 5G lets you do everything you can now, but faster.

Enhanced mobile broadband will improve communications between remote workers through seamless HD video conferencing – as well as introducing new possibilities such as 3D holographic calls and augmented, assisted or virtual reality to support, educate and inform your people in exciting new ways.

And with high-capacity connectivity even in the busiest areas, your people will benefit from fast and secure connections for document collaboration, high-speed downloads and more – removing the frustration of slow download speeds and intermittent connectivity.

Safeguarding the workforce is also a priority for every business, especially those that involve lone workers completing jobs in potentially hazardous and remote areas. Using body-worn sensors or cameras, organisations will be able to continuously track the safety and wellbeing of their staff.



Transport for London is exploring how 5G can help maintain its network and improve the safety both of staff and passengers, including how the technology could be used in real-time to control cameras and access sensors across the city in the future.



## Transform your customer experience

On top of ultra-low latency and faster speeds, 5G introduces exciting new ways to engage your customers.

Its high-speed connectivity can enable you to create immersive experiences with AR and Virtual Reality (VR) – whether it's showing a customer what a sofa looks like in their living room, or even allowing them to try on an outfit from the comfort of their home.

And 5G will also enable greater use of mobile edge computing, where data is processed and stored closer to where it's needed. When data doesn't need to travel across a network to be processed, it significantly reduces the time it takes to create a response – and in most cases, responses happen in real-time.

Driverless cars have been on the news for a while, and 5G brings every day use far closer. Fast responses are critical for use cases like autonomous vehicles, as they need to respond to other vehicles as well as constantly changing driving conditions, such as weather hazards, obstructions in the road, and even pedestrians. Intelligent transport will also proactively identify faults, such as potholes or point wearing on tracks.

“As 5G makes it easier to work remotely – while remaining secure – it will completely change the way we balance work and our personal lives.”

CIO, Government Advisory



With consistently faster speeds, easier connectivity, smaller space requirements and carrier-grade security, 5G will even become a superior alternative to standard wifi.





5G will have a huge impact on every sector it touches. Here are just a few ways 5G will be used, what they could do for your business, and our customers who are already showing what's possible.





## Predictive maintenance

Whether it's a fault on the assembly line, a problem with a vehicle's engine, or a pothole in the road, predictive maintenance will make it easier for businesses to fix assets before they break down.

5G will enable sensors in equipment and infrastructure to communicate their status in real-time, so any problems can be fixed fast. That won't just save time; it will also save costs by allowing assets to be deployed for their full usable life rather than being replaced on a regular cycle.

### Breakdown prevention

We're working with **Bosch** – the multinational engineering and technology company – to test 5G's capability for predictive maintenance in factories.

Using 100 remote sensors connected to an ultra-fast, low latency network, engineers can measure key indicators on machinery such as sound, temperature and humidity to accurately determine if a machine will need maintenance.



### Sectors this will impact:

- Manufacturing, supply chain and logistics
- Transportation and travel
- Cities and infrastructure

### Key benefits:

- Lower costs
- Less time spent on maintenance
- Longer usable life of assets



## Monitoring and asset tracking

The large-scale IoT enabled by 5G will empower businesses to take a strategic approach to asset management and workforce safety.

Using devices connected to a Low-Powered Wide-Area Network (LPWAN), businesses will be able to track and monitor valuable tools and assets from an easy-to-use central hub. And in high-risk environments, sensors can identify when someone is in danger and help to avoid future risks.

5G can deliver real-time tracking and traceability of a product within a supply chain. 5G-enabled IoT sensors attached to products (either inside or outside packaging) could provide more than just real-time location data. They could also report moisture, temperature, pressure and other parameters providing feedback in real-time about the status and condition of the products, enhancing quality and customer satisfaction.

### Legacy technology made smarter

**Munich Airport** is already using a LPWAN to monitor over 1000 legacy electric meters. On-site cameras connected to the network record readings from the legacy meters, and the images are processed by Artificial Intelligence (AI) to deliver the readings in digital form.



### Sectors this will impact:

- Manufacturing, supply chain and logistics
- Transportation and travel

### Key benefits:

- Simpler asset management
- Greater safety for your workforce
- Improve the usability of legacy assets



## Automation and robotics

As 5G enables greater use of edge computing, businesses will be able to control robots and automated systems remotely from a central interface.

These robots will be controlled over low-latency private networks, and will enable advances like lights-out manufacturing, automated asset maintenance and even remote surgery where operations could be carried out by surgeons located thousands of miles from the patient.

### Connected and Autonomous Vehicles

We're working with the European Space Agency on 'Project Darwin' – an ambitious four-year trial programme to test new technology and end-to-end connectivity solutions. The project is set to pave the way for Connected and Autonomous Vehicles (CAVs), using 5G and satellite communications to make self-driving vehicles a reality.



### Sectors this will impact:

- Manufacturing, supply chain and logistics
- Transportation and travel
- Health and services sector
- Cities and infrastructure

### Key benefits:

- Accelerated supply chains using automation
- Major cost savings
- Remote maintenance capabilities



## Immersive AR and VR

With faster speeds and ultra-reliable low latency, 5G will enable customers and employees to benefit from seamless AR and VR experiences.

In high-risk jobs, virtual, augmented and assisted reality could be used for off-site training, creating realistic settings that provide workers with practical experience without sending them into a real-time hazardous environment.

There are benefits in the field too – off-site team members will be able to use VR to share problems with colleagues back at base. This will enable them to resolve the task in real-time, reducing the need to return to the job for a second time to fix it.

And for customers, AR is set to transform activities like shopping and travel by creating immersive experiences. These may include taking a tour of a hotel before booking a room, or picturing how a new sofa would look in your living room before you buy it.

### Remote engineer support

At Northumbrian Water Group, the ability to quickly install, fix and maintain complex infrastructure is a priority. That's why they're currently exploring the use of 5G-enabled AR headsets that allow real-time support, with instructions overlaid in field engineer's vision.



### Sectors this will impact:

- Manufacturing, supply chain and logistics
- Transportation and travel
- Health and services
- Cities and infrastructure
- Retail and hospitality

### Key benefits:

- Effective training with improved safety
- Remote support from off-site team members
- Immersive experiences for customers



## Passenger experience

The high-capacity connectivity of 5G will create new experiences for passengers across a wide range of transport services.

With low-power sensor networks, travellers will be able to get fast and secure connectivity even in the busiest areas, such as train stations and airports.

And as 5G moves us closer towards the reality of connected autonomous vehicles, a sharing economy will develop that encourages ride sharing with people on similar routes.

### High-speed connectivity on the go

In Talavera de la Reina, Spain, Telefónica, O<sub>2</sub>'s parent company, created a test environment to provide a stable 500mbps to a bus, enabling rich media consumption for its passengers. And in the UK, Network Rail is exploring how 5G can help manage increasing passenger numbers and create seamless journeys.



### Sectors this will impact:

- Transportation and travel

### Key benefits:

- Reliable connectivity in busy places
- Environmentally friendly sharing economy
- Greater experiences during commutes



## City life and smart grids

5G-enabled smart grids will support more efficient models of energy consumption and increase the liveability of our cities. Smart grids use digital communications technology to monitor energy usage, and adapt services based on the data they collect.

Using 5G-enabled infrastructure, we will be able to get better data on how our public services are used and use it to respond to people's changing behaviour.

Whether it's through smart urban lighting, connecting public transport or even enabling new waste collection services, smart grids will change the way our cities work.

"5G will play a crucial role in enabling smart utility operation. It will unlock new energy service markets and business models for a low carbon economy."

– Jane Gray, Utility Week

### Intelligent traffic flow

Working at the 5G testbed network at Millbrook Proving Ground, we're using the low latency and high capacity of 5G to enable real-time transmission of large amounts of data. We're using the vehicle-to-vehicle communications to help manage traffic effectively, and create better passenger experiences, easing congestion, and ensuring autonomous vehicles know where each other are to avoid accidents.



### Sectors this will impact:

- Cities and infrastructure
- Transportation and travel

### Key benefits:

- Smarter citizen management
- Cheaper, and more environmentally friendly utility models
- More effective public services



## Health tracking and monitoring

Using 5G-enabled sensors and low-powered networks, the health sector will be able to offer convenient new services for patients and customers.

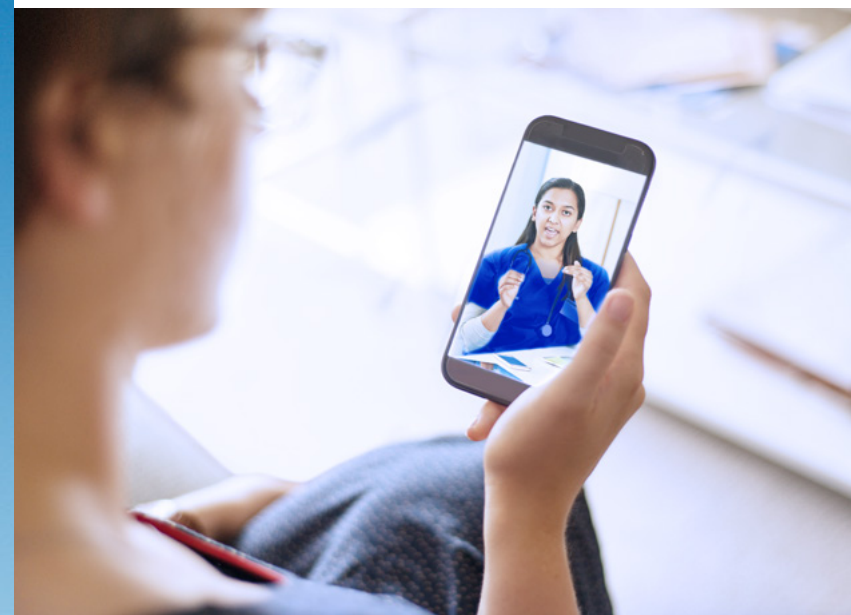
These advancements will enable doctors to manage chronic conditions without patients having to go into the surgery – providing services that fit around our lives.

From video consultations to real-time health monitoring, 5G will advance the concept of e-health, and potentially cut hospital re-admissions by 30% due the ease of access to services.

### Remote health services

**Juniper** estimates that the NHS could free up 1.1 million GP hours a year by facilitating tele-health video conferencing and real-time remote health monitoring.

5G will support continuous monitoring and processing of sensory devices, which could support the continuous health monitoring of patients – presenting huge positive implications for social care.



### Sectors this will impact:

- Health and services

### Key benefits:

- More convenience for doctors and patients
- Potential to cut re-admissions by 30%
- Greater access to healthcare services



# Why O<sub>2</sub>

As a customer-led business, we're excited about the possibilities that 5G offers to transform business. With our comms expertise and award-winning network infrastructure, we're confident we'll be able to provide the support you need to drive change in your organisation.

## At the heart of the UK plc

Our existing network is fundamental to infrastructure of the UK plc, and that won't change when 5G arrives – it'll only get better, as we continue to refine and improve, investing more than £2 million each day to improve customer experience.

With support spread across almost every sector, from the UK's emergency and public services to retail and transport, we've got a strong grasp on how 5G will unlock new value for businesses of all sizes.

From improving the way your people work, to bigger changes like introducing new business models, 5G will enable you to transform your business in exciting ways.





## A space for innovation

We realise that 5G isn't about the technology – it's about the possibilities for your business and your customers.

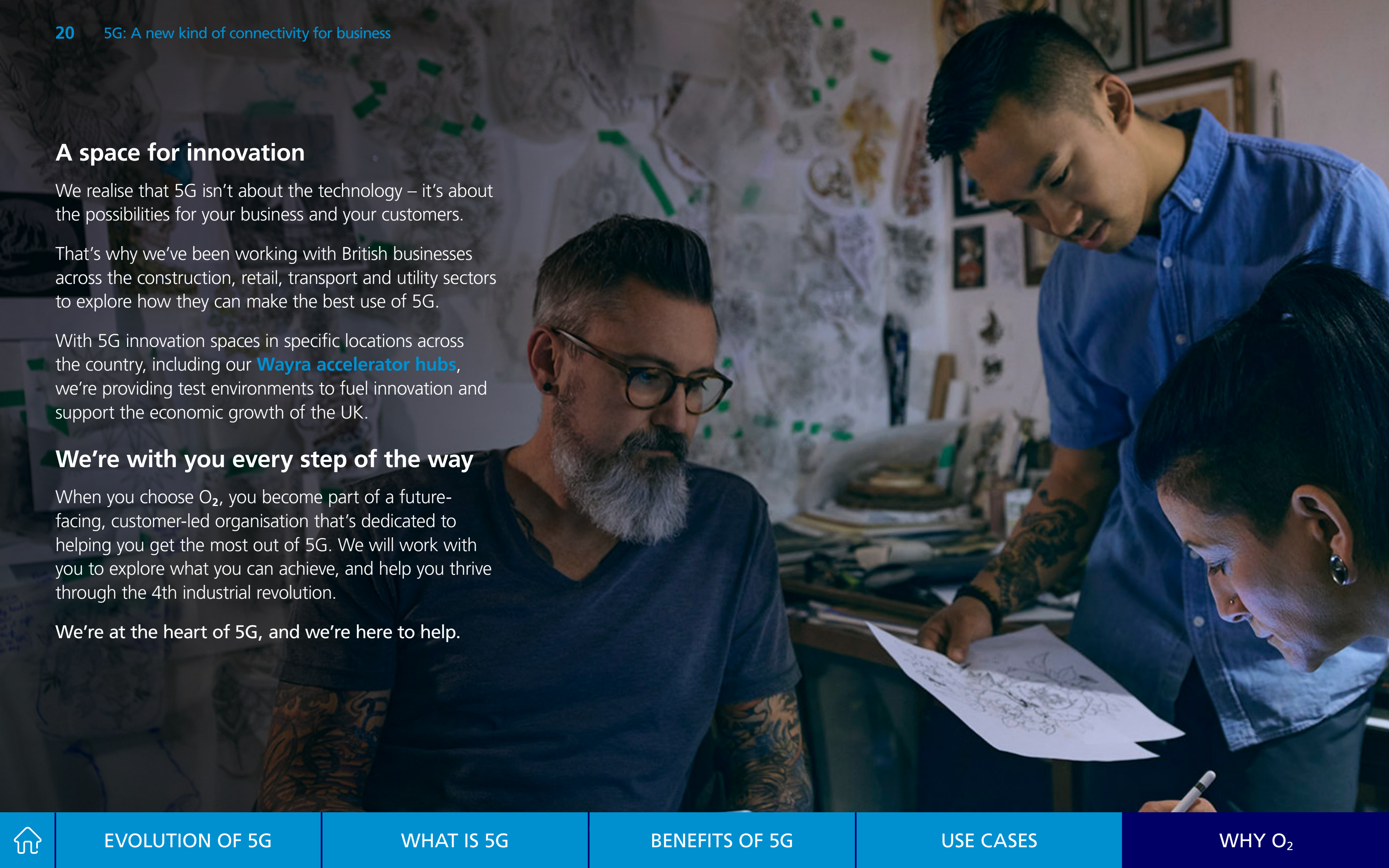
That's why we've been working with British businesses across the construction, retail, transport and utility sectors to explore how they can make the best use of 5G.

With 5G innovation spaces in specific locations across the country, including our [Wayra accelerator hubs](#), we're providing test environments to fuel innovation and support the economic growth of the UK.

## We're with you every step of the way

When you choose O<sub>2</sub>, you become part of a future-facing, customer-led organisation that's dedicated to helping you get the most out of 5G. We will work with you to explore what you can achieve, and help you thrive through the 4th industrial revolution.

We're at the heart of 5G, and we're here to help.





**Want to learn more about how 5G could  
help the success of your business?**

**Get in touch**

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