

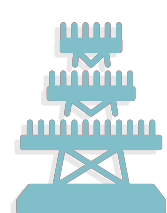
Your automated future

Our real-time 5G network

The future of manufacturing with 5G and Internet of Things (IoT)

Today, the UK is the world's eighth largest manufacturing nation – and it will break into the top five by 2021. By then, 5G will be available across the country and beginning to take the assembly line – and the manufacturing industry as a whole – far beyond what has previously been possible.

5G is the next generation of cellular network. It's supported by several emerging new technologies that, together, will unlock the potential of businesses across the country:



Massive MIMO

The number of antennas will increase more than ten-fold, which means more signal paths for sending data to customers faster



Edge computing

Data is being processed closer to the end user in local networks and devices rather than in the cloud, making response time faster and millisecond decision-making possible



Network slicing

Capacity of the 5G network can be allocated to match requirements, meaning simple devices and data-heavy demands have the right sized network slice

Time-saving machine learning

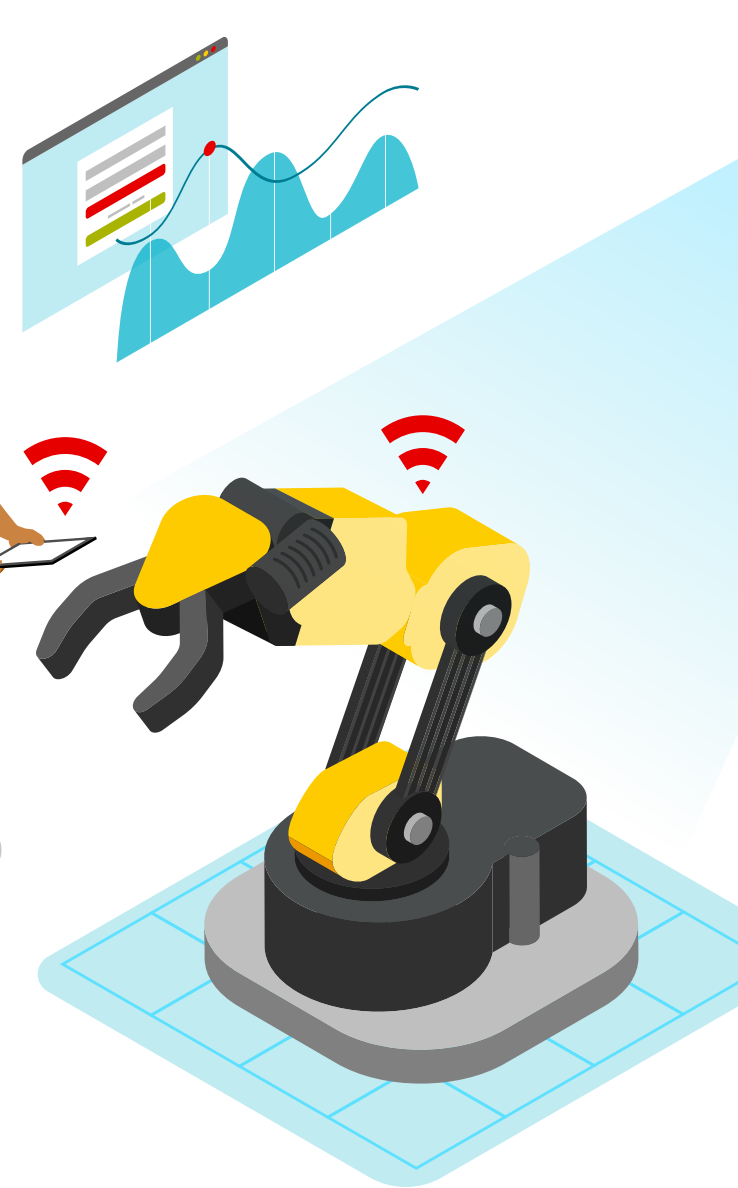
With 5G, robots will share knowledge across the assembly line, between factories and around the world, pre-empting mistakes before they happen

Reduced lag time

Ultra-low latency makes it possible to control machines in real-time, improving the quality of production

Automated processes

Moving to automated machining and pressworking on a production line, for example, allows for higher output at lower cost



Cost-saving quality control

With 5G, robotic 3D-scanning will be possible on a mass scale, meaning tiny flaws are found before they become expensive recalls

Intelligent network allocation

5G provides dedicated connectivity to the machines and devices that matter most to keep production going

Simple scalability

With 5G, there is the capacity to connect lots more devices as production increases, without interference

Not all of this is possible yet – but it's not far off.

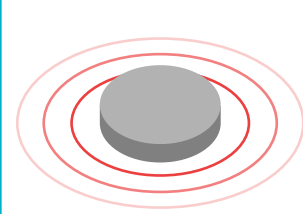
Vodafone are rolling out 5G across the UK this year, bringing 5G connectivity to manufacturing plants, workshops and small-scale units, transforming the production line

A lot of what makes this technology tick comes from IoT – and is available now:



Connectivity

In order to communicate with users and with each other, smart devices need an internet connection. This could be 4G, 5G, over Wi-Fi or with Narrowband-IoT. No matter where the devices are, there's a connection available almost anywhere.



Sensors

Sensors are the "what does it do?" part of IoT. They can take the temperature of something, measure speed and sound, detect gas and monitor vibrations.



The cloud

Made up of a huge, interconnected network of powerful servers, the cloud can be public or private, and is safe and secure. With the cloud, activity takes place over an internet connection rather than on the device itself.



IoT platform

A central platform allows for the remote management of smart devices, 24/7. What's more, with third party integration, real-time analytics can be dissected to reveal patterns and trends and identify any performance issues.

These IoT building blocks are transforming manufacturing in all kinds of ways. Examples include:

Predictive maintenance

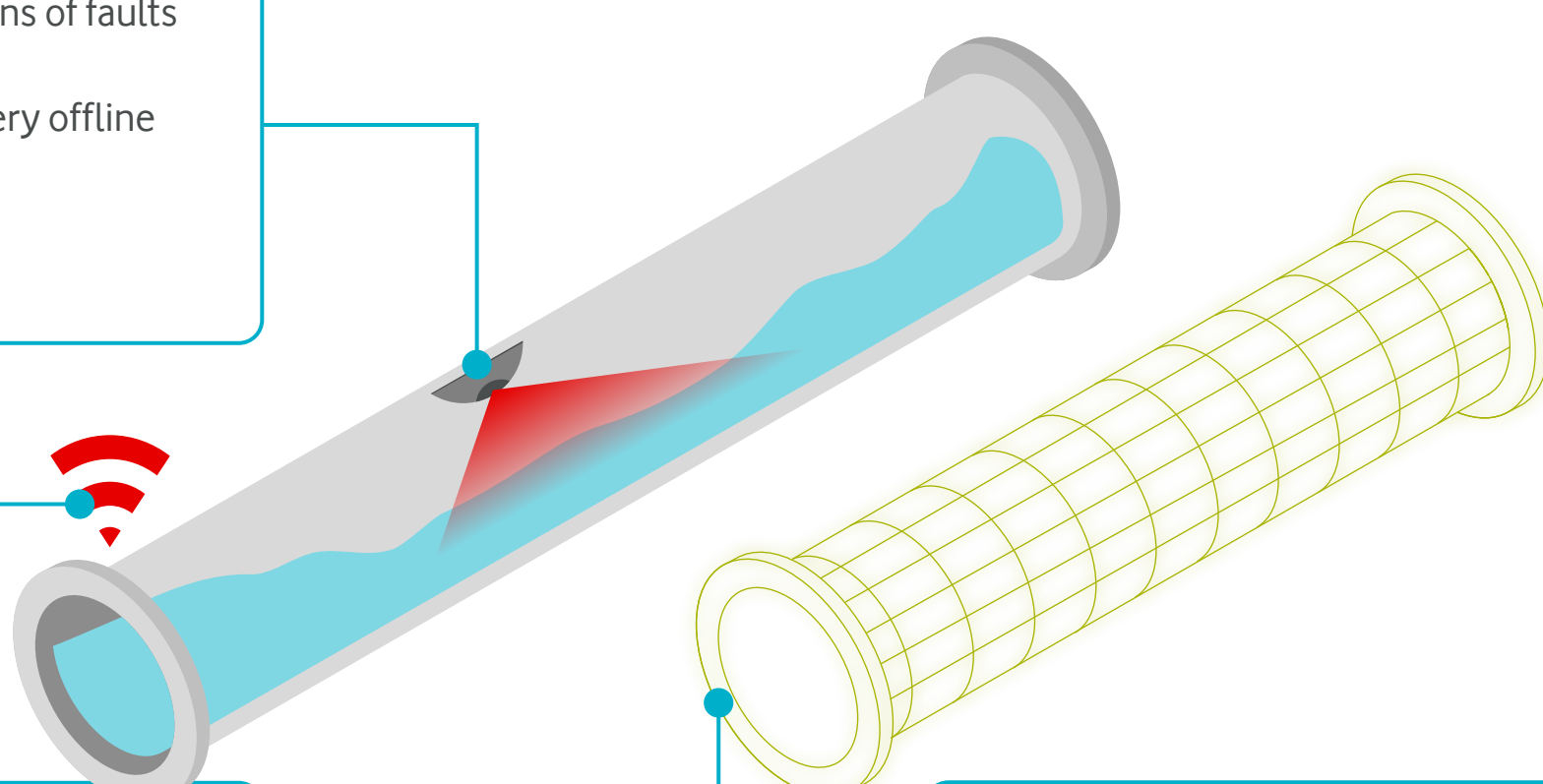
- Sensors spot warning signs of faults about to happen
- No need to take machinery offline to check for faults
- More cost-effective than age-based checks

Smart pumping

- Industrial water withdrawal is particularly high, used for processing, washing, diluting and cooling
- Real-time performance data collected to improve water regulation
- Water wastage is minimised for a more efficient factory

Digital twins

- Sensors can be placed throughout the manufacturing process, collecting data to improve product lifecycle management
- Performance data applied to digital twins inform product innovation and R&D
- Digital twins can be embedded into physical products for earlier fault detection



Manufacturing and IoT today

Vodafone's 2019 IoT Barometer report has found:

39%

of manufacturing companies are using IoT

$\frac{2}{3}$

are using IoT to improve business efficiency

92%

of the industry's IoT solutions are considered to be very sophisticated

The future of your business

5G is here, unlocking the potential of businesses across the UK.

Discover how 5G can take your business beyond limits at vodafone.co.uk/business/why-vodafone/5g-for-business

The future is exciting.
Ready?

