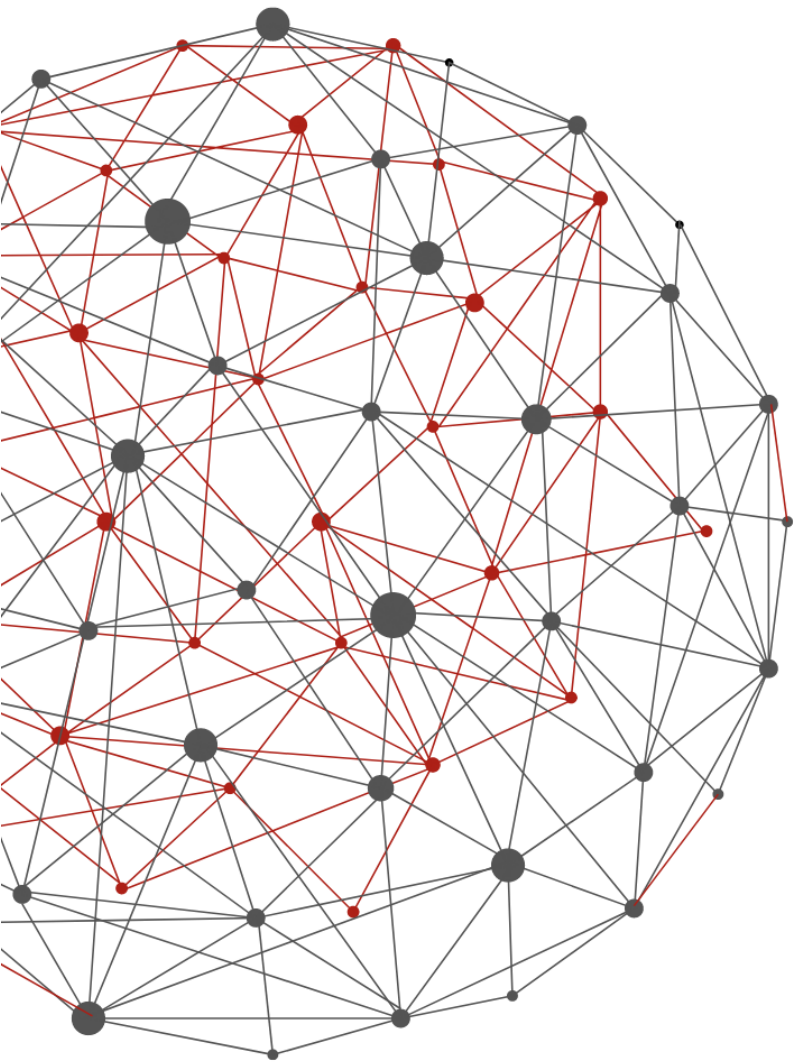


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# The New Age of 5G Technology

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## What is 5G?

Are you an active user of smart devices for the purpose of education, business, entertainment, healthcare, or even just remote-working? Chances are you may have heard of 5G. The news of the 5G network implementation has been circulating and in the works since 2019, and now: It is finally here.

So, what is 5G?

5G is the fifth generation of wireless data and cellular networks. It is up to 100 times faster than the cellular network that most of our devices are currently compatible with, which is 4G. The opportunities that will be available to society as a whole under a 5G network is immense and never-before-seen or felt for all fields and sectors of daily living.

The key changes of 5G are faster connectivity speeds, ultra-low latency, and greater bandwidth. Simply put, industries everywhere will be dramatically enhanced by services that people could once only imagine, such as e-healthcare, vehicles that communicate with each other, and smart infrastructure—5G will catapult our existence into a smarter, faster, safer, and ultimately more sustainable future.

## Faster Connectivity Speeds

People will no longer have to endure a long waiting period to load and access files, programs, and remote applications. The connectivity speed enabled by 5G can load up to 15 to 20Gb per second, whereas with 4G the speed would be halted at 14Mb per second. This will speed up the process of moving from relying on internal memory storage to a more cloud-based storage, where all your files and data can be accessed across multiple devices.

## Ultra-low latency

Latency is the duration of time from when we create an action on our devices up until the action actually occurs. For example: Clicking on an image online to load and view it. With 4G, the image could take up to 100 milliseconds in response delay to show up while 5G would only take as low as 1 millisecond to load the same image. This low latency technology will allow for the control of remote actions in a sense of real time, such as operations of machinery in an industrial site, surgical operations by doctors done remotely, and remote transport systems that run without a driver. In short: Low latency will help people do complicated things even from afar because there is no response delay to cause disruptions.

## Greater Bandwidth

5G uses a new radio technology, which is the part that any wireless device uses to form a network connection. Some of these radio frequencies used by 5G is within a band known as Sub 6; the frequencies range from 600MHz to 6GHz, which is currently also utilised by 4G LTE. The difference between 5G and 4G LTE, however, is the fact that 5G will also utilise a

higher band of radio frequencies—from 24GHz to 86GHz. This greater bandwidth will bring higher data rates at very high-performance levels.

These three key features are only a handful of the changes that 5G will bring to our increasingly technological existence—Figure 1 below depicts several more added features of the 5G cellular network.

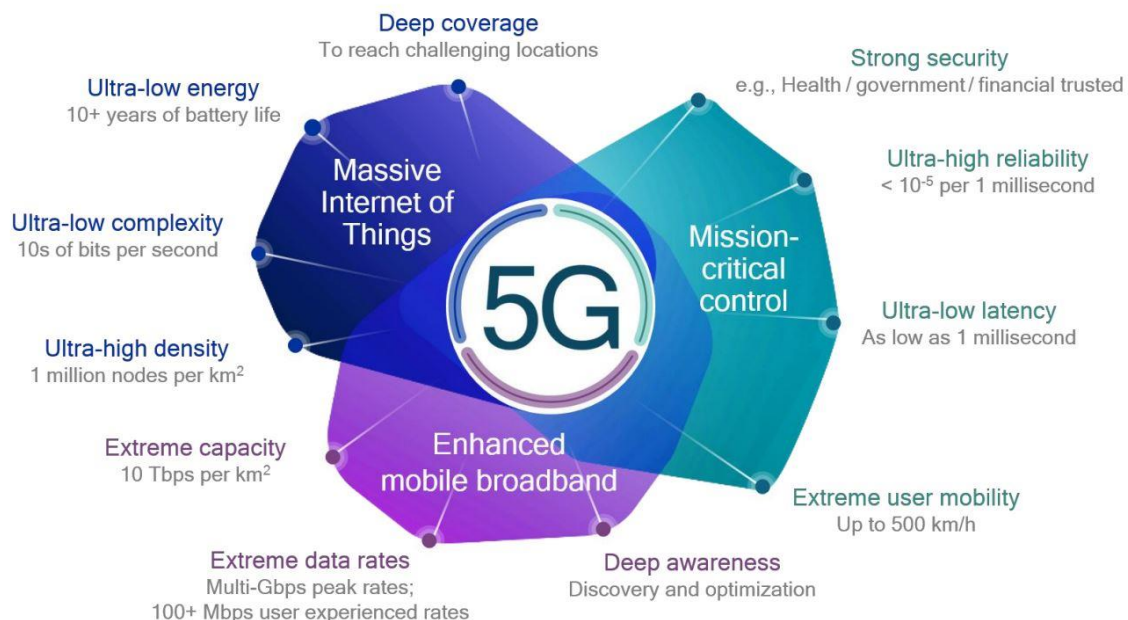


Figure 1: Features of the 5G Network

## 5G on The Economy

Every new technological endeavour on a global scale is a chance and opportunity for companies to invent as well as develop newer technologies, products, and services that align with said new technological endeavour. In this case, the new technological endeavour is the 5G network. There is bound to be a demand for add-on accessories (products and services) to this new 5G network, especially since people have understood the needs of a work-life mid-pandemic. This will accelerate the productivity of invention companies, product makers, and wireless operators from around the globe—all of them striving to live up to the standard of 5G.

The technical solutions to the demands people make because of 5G will be judged by a fundamental process and approach of merit-based consensus-building. This process will garner more than \$1 trillion in economic growth, create multiple new industries, and create millions of new jobs. If you believe that 4G has significantly and positively impacted your life, then 5G will do that tenfold, benefiting whole economies and societies together.

To put it in perspective, the global economic impact of 5G in new goods and services is estimated by the World Economic Forum to achieve \$13.2 trillion by 2035, with a staggering generation of 22.3 million new jobs for people working in the 5G global value chain alone. Linking people with valuable jobs and boosting entire nations' economies—all thanks to a powerful cellular network.

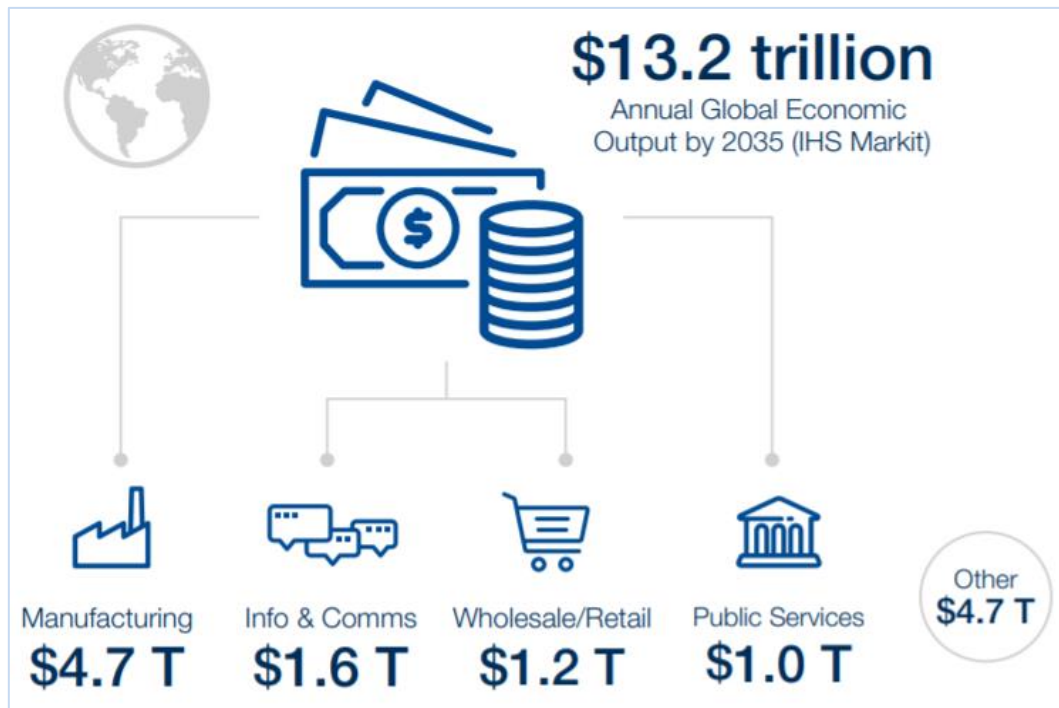


Figure 2 Source: IHS Markit; The 5G Economy: How 5G will contribute to the global economy, 2019

## The Superiority of 5G in Different Industries

We have touched on what 5G is as well as its economic impact, but how will 5G really benefit us as a society? What does faster connectivity, lower latency, and greater bandwidth mean for all of us in carrying out our daily lives?

It means high speed connections for everyone at all times, uninterrupted streaming, browsing, and sharing, and data that will assign itself to everyone adequately so that no one has to suffer from slower Internet. Numerous devices will be connected to the 5G network, and all these connected devices will have access to instant internet connections to the internet. This will allow for real-time and high-speed exchange of information, which is where the Internet of Things (IoT) comes into play.

The IoT will enable the common household to have up to a hundred connected devices sending and receiving information, whereas an industrial plant would have up to several thousands. This ability of connection amongst devices will pave the way to enabling the existence of smart cities, autonomous cars, e-healthcare, advanced education as well as business—these are the use cases of the 5G network.

### Autonomous Car-Smart City Integration

Autonomous cars are driverless cars that drive themselves from point A to point B. This initially sounds dangerous to any layperson, but this is where 5G will undo the fear of self-driving cars. With 5G, autonomous cars will be able to communicate with other autonomous cars,

pedestrians, and city infrastructure to prevent accidents and create a safer driving space on the road for everyone. This is enabled by the IoT; since the connectivity speed of 5G is so fast, vehicles will be able to connect with every 5G employed vehicle or device in an integrated smart city.

How does this work? By placing sensors that autonomous cars will communicate with in strategic parts and locations in the city, most of the city can be observed and monitored to improve the safety and quality of life for everyone. The information shared and communicated by the autonomous cars can also facilitate better routes for driving, reduce the number of accidents, and even to find vacant parking spaces.

Other than that, the use case of 5G in allowing safer and more sustainable cities includes smarter electricity grids to substantially reduce carbon emissions, sensors that are able to detect and give early warnings of natural disasters, and the smart use of drones to aid in emergency situations.

### Engaging Telemedicine in Personal Health

In the healthcare industry, the use case of 5G is a new concept of consultation, also known as telemedicine. The consultation will occur remotely between doctors and patients via mobile devices for relatively simple medical issues over video calls, facilitated by the 5G network's key features (faster connectivity, lower latency, and greater bandwidth). Personal health systems will also be more widely used than they are today with technologies such as Apple watches and FitBit watches.

These devices will be further enhanced by 5G to monitor, diagnose, alert, and treat ailments because they will be collecting and analysing the user's health. This will be especially useful for patients who live in rural and remote areas. Another futuristic advancement of healthcare under the 5G network is remote surgery where doctors will be able to perform surgery by operating high performance devices from far away.

### Hypnotic Experience in Gaming and Learning

Education and entertainment will be more engaging and enticing than we know it. With 5G, we would have lighter devices and greater realism in Virtual Reality (VR), Augmented Reality (AR), and Extended Reality (XR) which will make learning and gaming experiences more realistic. The pandemic has brought about the rise in need of a greater quality of life whilst having to do everything at home; 5G will be able to deliver sensory experiences (like touch!) through devices with more engaging ways of teaching and learning, which also includes virtual meetings being more immersive.

After more than a year of being homebound because of COVID-19, the education sector—schools and higher education—can breathe a sigh of relief knowing that online classes will essentially be livelier and more intuitive. Gamers: Cloud gaming will become the norm for gaming enthusiasts—they will no longer be tied to a console playable only in a specific place, instead, all their games and data will be stored on a cloud, accessible anywhere at any time, made possible by 5G.

## Manufacturing Made Smarter

The manufacturing industry will become more efficient, flexible, and be operated more responsibly than ever before with 5G being the primary foundation. Production lines will autonomously react to supply and demand, industrial machinery will be able to digitally warn you when it is faulty, logistic networks will independently reroute goods and deliveries based on real-time conditions, following timely-relevant standard operating procedures. With 5G, even robotic equipment and machinery for large businesses, for example, a forklift, can be monitored remotely (IoT) post-lease to ensure that the forklift is being used correctly, stored safely, and not mishandled. 5G is great news to entrepreneurs and businesspeople everywhere, especially since the pandemic had such an impact on the working class.

## The Potential Setbacks of 5G

While the deployment of 5G will be seen and felt as useful far and wide, the endeavour of implementing 5G is bound to pose some challenges.

### Spectrum Availability

Even though the 5G network is set to have a phenomenal level of connectivity, the availability and cost of the spectrum band is an issue that network operators will have to face and overcome. Needing investors, bidding of higher spectrum bands of different operators will cause competition amongst operators as they need to consistently build their wireless 5G networks.

### Switching to New Devices

Users will have to make the switch from 4G-compatible devices to 5G-compatible devices, because the existing devices running on 4G will not be receptive to the 5G network. Currently, the number of 5G devices is still relatively scarce in the market due to the technical challenges in production, adhering to 5G technological requirements. Production companies have yet to figure out how to ensure that these devices do not overheat due to high power consumption for higher bandwidths and data rates.

### Security and Privacy

Arguably the most important challenge is protecting user and organisational data and privacy because no one would want their security compromised in the name of any technology. 5G will have to define the parameters of uncertainties regarding security threats to develop emergency plans for the potential breaches of trust, privacy, and cybersecurity—which are spreading rapidly across multiple platforms around the world.



## Final Thoughts

5G is an exciting new development for all of us as a growing technological society. The pandemic caused a global stir that unsettled people and pushed them out of their comfort zones, therefore, it is appropriate that 5G should arrive now. A rise in productive competition where every nation and corporation strives to keep up with the 5G standard and upgrades in the quality of life is to be expected.

The deployment of 5G will see distinctive new advancements in all aspects of life, regardless of field or industry. We have seen the multiple benefits of how 5G will change regular daily processes—remote medical appointments with doctors, learning remotely with AR, VR, and XR technology, atmospheric immersion in games that are cloud-based, self-driving communicating cars, smart cities—and these are only a handful of the progressive technologies in the 5G evolution. In the case of 5G, there are more pros than cons, and the challenges will gradually be effectively overcome with the increasing drive of societal developments in technological expansion.

The 5G situation is the biggest technological change of our time because it is an all-encompassing network, and we have only begun to understand the seemingly endless possibilities that it is capable of. A seamlessly new generation of wireless connections, the technological future is now almost the present.

# Accelerating Digital Transformation

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