

5G Wireless Technology

How 5G technology will transform digital experience?

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Imagine a true Digital world that has Autonomous Cars riding on the street, Smart Homes protecting itself from the intruder, City streetlight, and traffic signal/diversion controlled using a machine learning algorithm. Well, it looks very untrue and imaginative future world from SCI-FI Hollywood movies. The reason, we feel this is so untrue is because – we envision the current digital world in the 2D view of computer monitors, TV screens, mobile screens, etc. The only alternative digital 3D intelligent object we have experienced and visualized is the Robots. Even the experience from the Virtual/Augmented Reality headset is more of immersive technology.

But here we are in 2020 and the technology advancement mankind has made in the field of

cloud computing, big data analytics, machine learning, cognitive technology, and Virtual/Augmented reality to name a few. All these technologies combined - points us to the direction of embarking the journey to move toward the digital world – free from the clutches of the 2D computer monitor. I feel we are on the verge of creating the true PHYGITAL world – a term coined by Amanda Wills of Holiday Virgin in 2013.

The digital world of today was possible because of the innovations in the field of computer technology, WWW internet platform, and wireless technology (1G / 2G/ 3G/ 4G). Each phase of the technology advancement has helped to shape our digital world. Now we are on the verge of experiencing 5G technology.

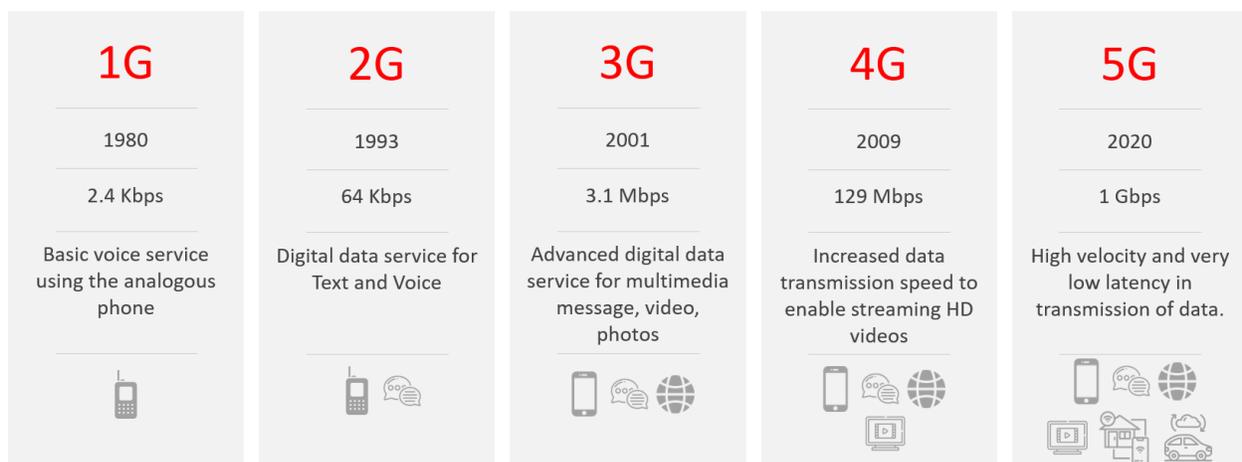


Figure 1: Wireless Technology Evolution

With the anticipation of 5G wireless technology going mainstream in 2020, we are on the verge of creating the foundation for the major disruption to our physical world. The 4G technology made the possibility of streaming HD videos but there is always the issue of latency, connectivity failures, and unpredictable

WIFI performance. But with 5G, the latency and connectivity issues will be the things of the past. It is all too early to say, exactly when we will reap the benefits of the 5G. But as per the early predictions – the true applications of 5G will be seen somewhere in 2025. So, how is 5G going to revolutionize our world?

\$6.4B

NUMBER OF ACTIVE MOBILE BROADBAND SUBSCRIPTION
WORLDWIDE 2019

\$1.3B

FORCAST NUMBER OF 5G SUBSCRIPTIONS WORLDWIDE 2023

51.5%

SHARE of 5G-ENABLED SMARTPHONE SHIPMENTS 2023

Source: [Statista 5G Statistics & Facts](#)

What are the early predictions of 5G applications?

The 5G wireless technology promises to transmit data at a very high velocity and low latency. To put this in a tangible perspective, we will be able to download an HD movie video file in approximately 1-2 seconds (theoretically).

With every wireless technology adoption, we have seen its applications that have transformed our lives. Right from the 1G mobile phone which helped us to talk to anyone anywhere to the 4G wireless phase where we can stream HD video on our smartphone and TV. Even in the 4G network, we sometimes do encounter issues related to connectivity and data-transfer speed; which is often termed as bad-user experience. But 5G wireless technology will open a new digital world where the internet is ubiquitous. This opens a new door for innovative applications and solutions which will be transforming our everyday life.

Some of the anticipated application of 5G are:

- Memory card not required on smartphones
- Faster and optimized integration with cloud storage in real-time
- Streaming of HD 8K photo/video will be faster
- HD Wireless Surveillance capabilities
- Virtual Event/Show streaming
- Perform real-time medical procedures
- High quality/High-velocity streaming for Augmented/Virtual Reality
- Autonomous Cars

The real benefits of the 5G wireless technology can be broadly visualized in 3 categories:

- Smart Cities
- Smart Cars
- Smart Homes
- Smart Media

Smart Cities

As per The World Bank - [Urban Development](#) report – 55% of the world population i.e. 4.2B people live in cities and this trend is on an upward movement. Efficiently managing the needs of such large cities infrastructure through manual efforts will be difficult. Automation is required to manage and control the city infrastructure:

\$189.5B

SMART CITY SPENDING
WORLDWIDE 2023

Source: [Statista 5G Statistics & Facts](#)

- Smart Traffic light and traffic diversion system
- Parking spot availability
- Smart City transportation
- Electric grid control
- HD video surveillance system
- Smart Waste management
- Smart Water metering

The city of Chattanooga, TN has installed Smart Grid technology which has reduced the power outage by 50% and saving around \$1.4M in operational cost for just 1 year.

Smart Homes

Managing and controlling the various electric and electronic home devices and appliance is another concept that will become mainstream in the 5G era. We have already seen the evolution of IoT in a light bulb, Thermostat, Garage Door Opener, Surge protector, Doorbell with the camera, etc. But currently, some of these devices use WIFI or Bluetooth for connectivity. The 5G technology promises to by-pass WIFI by using LPWAN (“Low-power wide-area-network”) protocol which will reduce the burden on the home network and stabilize connectivity – which is normally subject to the unpredictable WI-FI performance. A truly Smart-Home is far from reality at this movement. But as the technology is adopted and tech companies apply the design thinking approach for new products/services; it will be interesting to see how 5G technology will be integrated into the electric and electronic appliances to make the house – Smart Home.

\$174B

SMART HOME DEVICE
MARKET BY 2023

Source: [Forbes Smart Home Trends](#)

- Smart Automated Tube light, Windows Blinds, Video Doorbells
- Smart Irrigation
- Smart Smoke and Carbon monoxide detector
- Multi-room audio system

Smart Car

The talk of the self-driving car has been in the news for the past 6+ years – thanks to Google, Telsa, and Uber. A truly autonomous car will require high-velocity and low latency wireless networks which will help the car computer in real-time communication and processing of data. 5G technology promises to bridge this gap. The autonomous car will be able to communicate in real-time wirelessly with other cars on the road for sharing information about their position, negotiate turns and lane changes, give warning for the collision. The potential approaches for communication methodologies are:

76.3M

NUMBER OF CONNECTED
CARS WORLDWIDE 2023

- Vehicle to Vehicle
- Vehicle to Infrastructure (Traffic Light / Parking etc.)
- Electric grid control

Source: [Statista 5G Statistics & Facts](#)

We can see the prototypes of these working car models all over YouTube and social media videos. But there is still a huge investment required in terms of machine learning model, interpretation of traffic signals, communicating protocol with the other cars, and other city infrastructure. But one thing is for sure- autonomous cars will be our future.

Smart Media

The rollout and wider adoption of 5G technology will disrupt the media industry AGAIN. With the promise of a faster download speed of 10 Gbps – a full HD quality movie will be downloaded in a second or two. This will enhance the user-experience for watching HD video, upload/download of social media content like Photo/Video. The stable network and connection will help in streaming the 4K/8k video content with less friction. The low-latency communication will boost the way we watch real-time live streaming of the Games and Events. The gaming industry has an upside potential by providing more interactive and immersive experience without bandwidth and latency issue. As per the 5G Economics of Entertainment Report, average monthly traffic per 5G subscriber will grow from 11.7GB in 2019 to 84.4GB/month by 2028.

\$335B

WIRELESS MEDIA REVENUE BY
2028

- Enhanced Mobile Media
- Immersive AR and VR Experience
- Increased Home broadband & TV usage
- Cloud Gaming
- Live Streaming of Games/Event

Source: [5G Economics of Entertainment Report](#)

My Opinion

The widespread adoption of 5G wireless technology will revolutionize the way we engage with digital technology. We are slowly moving into the environment where the internet is ubiquitous. But to reap the benefits of the 5G technology - Telecom companies, and local government will have to work closely to build infrastructure which is estimated to cost around \$2.7T by 2020 globally as estimated by [Disruptive Asia](#). Secondly, we are thinking of automating everyday objects like Home, City Infrastructure, Car which are governed by the existing Government laws. A significant change needs to be implemented in the local legislative laws and regulations –to make the concept of Smart Home, Smart City, Smart Car a reality. And everyone knows that the government lawmaking must undergo a huge bureaucratic process. There are of course the impact discussed around the job-loss due to advanced smart technology and automation. But on the other side, there will be new jobs created which we have not envisioned yet. When the 3G and 4G wireless technology was commissioned, we saw the usher of companies like Uber, GrubHub, AirBnB, Spotify, WeWork which created job and industries which we had never imagined.

The other major concern will be around network security. It is predicted that most of the physical appliance/ device/ components will be redesigned as an IoT device, which is like a potential entry gate on the network node. Threat around cyberattack on Smart Car and Smart device which could be life-threatening. A significant amount of work needs to be implemented to make the technology security and free for cyberattacks.

We might not see the immediate benefits of 5G technology. But surely by mid of 2025, we should be starting to envision the new digital world, and which is more integrated. The potential from 5G technology is huge and it will make the concept of the internet as ubiquitous. It is a far-fetch idea but we could consider the Internet as the 6 elements of life i.e. – Either, Earth, Fire, Air, Water + Internet

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