THE GROWTH, EMERGENCE OF 5G NETWORKS AND USE CASES

5G refers to the fifth generation of mobile network technology, along with speed, low latency, and high capacity. It enables seamless connectivity with devices and applications. It will drive the future of IoT (Internet of things), AR/VR(Augmented & Virtual Reality), Smart cities, and other nascent/emerging innovations that by and large, need the underwater infrastructure capability for the conduction of business such as autonomous vehicles and remote surgeries. Enhanced mobile broadband will support high-definition video streaming, gaming, and virtual meetings.

Market Size and Growth

The world 5G market is estimated to reach $667.90 billion by 2026, growing at a Compound Annual Growth Rate of 122.3% throughout the forecast period 2021-2026. The growth is majorly fueled by demand for better internet speeds with a continuous rise in the number of connected devices.

Rates of Adoption

Not only that, in fact, the US together with China and South Korea are leading in initiating that implementation and, therefore, many other countries are speeding up their tariff action strategies. Massive economics alongside innovation is going to result from the adoption of 5G globally.

Long-term Key Developments

Network Slicing: Network Slicing is the process whereby operators can create multiple virtual networks out of one single physical 5G network in order to optimize performance for various applications.

**The 5G Concept**

Think of 5G as a giant pipe. Instead of treating all data the same, the pipe can be "sliced" into independent lanes, each tailored for different traffic types.

Each network slice is an end-to-end logical network that provides specific network capabilities and characteristics.

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| **Slice Type** | **Use Case** | **Characteristics** |
| **eMBB (Enhanced Mobile Broadband)** | **Video streaming, AR/VR High** | **data rates** |
| **URLLC (Ultra-Reliable Low Latency Communications)** | **Autonomous vehicles, remote surgery** | **Ultra-low latency, very high reliability** |
| **mMTC (Massive Machine Type Communications)** | **IoT sensors, smart meters** | **Massive device connectivity, low power consumption** |

**Example Slices**

**Real-Life Scenario**

Imagine a smart city:

1. *Slice* ***A*** *serves regular users with high-speed mobile internet.*
2. *Slice* ***B*** *supports emergency services—police and ambulance—with high-priority, low-latency communication.*
3. *Slice* ***C*** *is for smart sensors in traffic lights and parking meters, needing reliable but low-bandwidth connectivity.*

Each use case gets the performance it needs without interfering with others.

Each slice can be customized independently in terms of:

* Speed
* Latency
* Security
* Reliability
* Number of connected devices

**Benefits of Network Slicing**

* Efficient resource usage
* Tailored performance for specific services
* Better support for industry-specific applications
* Scalable and flexible infrastructure for operators

As 5G continues to unfold, its transformative potential spans beyond faster internet speeds to reshaping how industries, governments, and consumers interact with technology. From enhanced mobile broadband to mission-critical applications like remote surgery and autonomous vehicles, 5G is poised to be the backbone of future innovation. Technologies such as network slicing will ensure optimal resource allocation and performance customization, making it possible to serve a wide range of use cases with unprecedented efficiency. Ultimately, the widespread adoption of 5G will not only boost economic growth but also pave the way for smarter cities, more connected lives, and a digitally empowered society.

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