

5G - The Road Ahead: RSTV - Big Picture

Rajya Sabha TV programs and discussions are very insightful and informative from a UPSC perspective. In this article, we provide a gist of the RSTV Big Picture debate on the road ahead for 5G in India. This topic is important for the economy section under the [UPSC syllabus](#).

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Participants:

1. Lt. Gen. Dr. S.P. Kochhar (Retd.), Director-General, Cellular Operators Association of India
2. Dr. Mahesh Uppal, Telecom Consultant

Context:

The process of conducting 5G Trials has begun in India. Telecom service providers have been asked to conduct 5G trials in rural & semi-urban areas as well. 5G technology is expected to deliver greater spectrum efficiency and better download speeds. A global telecom industry body expects India to have 920 million unique mobile subscribers by 2025, which will include 88 million 5G connections.

Background:

- **1G - Voice Only**
 - Cell phones began with 1G technology in the 1980s. 1G is the first generation of wireless cellular technology. 1G supports voice-only calls.
 - 1G is analog technology, and the phones using it had poor battery life and voice quality, little security, and were prone to dropped calls.
 - The maximum speed of 1G technology is 2.4 Kbps.
- **2G - SMS and MMS**
 - Cell phones received their first major upgrade when their technology went from 1G to 2G. This leap took place in Finland in 1991 on GSM networks and effectively took cell phones from analog to digital communications.
 - The 2G telephone technology introduced call and text encryption, along with data services such as SMS, picture messages, and MMS.
 - The maximum speed of 2G is 50 Kbps.
- **3G: More Data, Video Calling, and Mobile Internet**
 - The introduction of 3G networks in 1998 ushered in faster data-transmission speeds.
 - It introduced video calling and mobile internet access facilities.
 - The maximum speed of 3G is around 2 Mbps.
- **4G - The Current Standard**

- It supports gaming services, HD TV, video conferencing and other features that demand high speeds.
- The max speed of a 4G network when the device is moving is 100 Mbps. The speed is 1 Gbps for low-mobility communication such as when the caller is stationary or walking.
- **5G**
 - 5G technology rollout is currently on trial.
 - 5G promises significantly faster data rates, higher connection density, much lower latency, and energy savings, among other improvements.

Significance of 5g technology:

- India's progress in communications technology in recent years has been rapid. Increased affordability, propensity to spend, and lower internet tariff rates have all helped the communications sector boom in India. This has put India on the verge of rolling out 5G technology-based services.
- One would be able to download a High Definition (HD) film in a few seconds.
- Video buffering during a streaming session would virtually disappear as data transmission would happen at lightning speeds on a 5G network.
- The high-speed 5G technology will transmit data at least 10 times faster than the current 4G system. This is going to be a significant step towards revolutionizing the tech world in the near future.
- The impetus to new tech like the [Internet of Things](#). With all our devices being smart and connected to the internet, we would be able to look at Smart Homes that are energy-efficient, save time on housekeeping and shopping, and enjoy safer and more efficient public and private transportation. Besides, it also enables new approaches in education, healthcare, transportation, energy, and entertainment.
- 5G also uses shorter wavelengths, which means that antennas can be much smaller than existing antennas while still providing precise directional control.
- We'll be able to beam ultra-fast data to a lot more users, with high precision and little latency.
- It could be applied in robotic surgeries, edge computing, cloud computing, streaming services, etc.
- Huge boost to the digital economy.

Challenges:

- Fast internet also increases the vulnerability of cyber systems and the dangers of data theft.
- There is little domestic R&D on 5g technology.
- Most of the super-high frequencies of 5G networks work only if there's a clear, direct line of sight between the antenna and the device receiving the signal. What's more is that some of these

high frequencies are easily absorbed by humidity, rain, and other objects, meaning that they don't travel as far.

- Opposition to Chinese forays into 5g technology due to the fear of snooping.
- It might enhance the [digital divide](#) as the technology will be rolled out in urban areas initially.

Way forward:

- The emergence of the 5G ecosystem in India will depend on telecom operators' ability to invest in the network which requires support on policy and regulatory fronts.
 - The government should encourage capacity building in Indian companies for "5G deployment services" such that Indian talent can be used across the world.
 - We need to develop new applications of 5G that are most relevant to India's social development such as health, education, agriculture, transportation, and water. These solutions can also be exported.
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