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5G Mobile Technology, Huawei and India



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It is nearly 30 years since the world's first GSM system rolled out. 5G is the fifth generation cellular network technology. In 2012 the International Telecommunications Union (ITU) launched an activity addressing an International Mobile System beyond 2020. In 2014 there were announcements coming out of China, Korea and Japan about investments into 5G. The first fairly substantial deployment of 5G was in April 2019 in South Korea.

Different from other Mobile Technologies.

The previous generations of mobile technology introduce a single novel feature for users. 1G enabled a user to walk and talk, 2G introduced sending texts, 3G allowed users onto the internet and 4G let the users to do streaming. 5G promises a whole set of improvements as it uses entirely new wireless infrastructure.

5G devices. Samsung Galaxy S10 5G, the world's first smartphone able to connect to 5G networks. The Global Mobile Suppliers Association (GSA) identified 23 vendors who have confirmed the availability of forthcoming 5G devices with 33 different devices including regional variants. There

Key Points

1. 5G promises a whole set of improvements as it uses entirely new wireless infrastructure.
2. 5G systems is being designed to mainly operate in Ka Band (millimetre wave).
3. 5G will allow massive device connectivity, providing immediate and uninterrupted ultra-low latency communication.
4. The fastest growing company dealing in 5G and having the biggest footprint in the world is Huawei of China.
5. China's dominance in the 5G field has raised the concerns of Western counterparts.
6. India is already at least three years behind in adopting 5G technology as it is yet to make a start.

The Centre for Land Warfare Studies (CLAWS), New Delhi, is an independent think-tank dealing with national security and conceptual aspects of land warfare, including conventional and sub-conventional conflict and terrorism. CLAWS conducts research that is futuristic in outlook and policy-oriented in approach.

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were seven announced 5G device form factors: phones, hotspots, indoor and outdoor customer-premises equipment, modules, Snap-on dongles and adapters and USB terminals. In the 5G Internet of Things (IoT) chipset arena, as of April 2019 there were four commercial 5G modem chipsets and one commercial processor/platform, with more launches expected in the near future. GSA had identified 224 operators in 88 countries working on 5G related technologies.

Frequency and Data Speeds. 5G systems are being designed in two frequency bands. In the first lower band, around 3.5 GHz (S Band), the maximum channel bandwidth is 100 MHz, due to the scarcity of continuous spectrum in this frequency range. In the second upper band, which is now in focus, 24/26/28/39 GHz (Ka Band), the bandwidth range is between 50 to 400 MHz (substantially higher). The higher the frequency, the greater the ability to support high data transfer speeds (up to 100 times faster than 4G) without interfering with other wireless signals or becoming overly cluttered. Due to this, 5G can support approximately 1,000 more devices per metre than 4G. It promises to almost eliminate the processing delays due to much higher upload (2.5 GBPS) and download (1.25 GBPS) speeds. 5G is about both enhanced capacity and its revolutionary applications in the short and medium term. The disadvantage is that because of 5G's higher frequencies (millimetre wave), small cells become critical to its networks, as 5G's radio waves can neither travel long distances nor are able to penetrate objects; this requires the installation of antennas every few hundred metres. The 5G antennas are much smaller in size and therefore, can be installed at much faster pace as compared to 4G. However to cover a given area, the number of 5G antennas required is far greater due to line-of-sight requirement. This makes it a tiresome and time-consuming process. To counter this and for better connectivity, phased array antennas are being used.

Revolutionising the Work Culture. 5G will improve IoT, since it is designed to connect billions of machines, appliances and sensors at low cost without draining their batteries. It simply means that electronic devices which are embedded in firmware, trackers and sensors are expected to offer advanced connectivity of devices and systems. This will further enable to collect a significant amount of information efficiently. Beyond mobile operator networks, 5G is also expected to be widely used for private networks with applications in industrial IoT, enterprise networking, and critical communications. Indeed it will be an end-to-end ecosystem for data communication. It will also have implications far beyond the technological dimension. A few aspects of 5G are highlighted as follows:

- 5G will allow massive device connectivity, providing immediate and uninterrupted ultra-low latency communication. One benefit of 5G is the convergence of multiple networking functions to achieve cost, power and complexity reductions.
- It will enable fast functioning of 'smart cities' and 'smart farming', telesurgery and virtual reality. As an example, a 3 GB movie which would take an hour plus using 3G, and 40 minutes using 4G to download, would take only 35 seconds using 5G.
- 5G on economic front would ensure significant competitive advantages in the short and medium term. It will generate huge cost benefits as well as high-end jobs worldwide.
- On the flip side, 5G will lead to security and privacy concerns. As autonomous vehicles, health or industrial processes become more reliant on wireless connectivity, they will also become more exposed to cyber-threats. Risks such as remote sabotage of medical devices or automotive cyberattacks could turn into a reality.
- **Interference issues.** The Ka band frequencies being used in 5G are also being used by remote sensing satellites (weather and Earth observation). There will be thousands of 5G cell towers radiating

these frequencies and this would lead to significant interference. This interference would cause poor quality weather prediction capability using satellite data.

- **Health.** 5G radiations cause adverse health effects due to heat generation because of millimetre waves and high-powered antennas. Health concerns related to radiation from cellphone towers and cellphones are not new. Electromagnetic hypersensitivity cause effects such as headaches and neurasthenia and it has been claimed from 4G and Wi-Fi. Some research on high-powered Ka band has warned of health impacts such as brain cancer and infertility.

Companies dealing with 5G. Presently seven companies are marketing 5G hardware and systems for carriers: Ericsson, Nokia, Huawei, Zhongxing Telecommunication Equipment (ZTE), Samsung, Datang Telecom, and Altistar. All these companies are members of the Global Mobile Suppliers Association (GSA); it is a not-for-profit industry organisation representing companies across the worldwide mobile ecosystem engaged in the supply of infrastructure, semiconductors, test equipment, devices, applications and mobile support services. However, the fastest growing and having the biggest footprint in the world is Huawei of China. Huawei is the lead company in all matters related to telecom. In 2018, it surpassed Apple as the second largest seller of smartphones, and it is set to overtake Samsung's market share by 2020.

China Racing Ahead in 5G Experimentation and Implementation. Beijing is throwing everything at getting there first. Fangshan district in southwest Beijing is part of a mobile revolution enveloping cities across China (which is going to be the world's biggest roll-out of 5G technology). In 2018, 'China Mobile', fitted a 10 km stretch of road with 5G cell towers. Since September 2018, companies are using this 'test bed' to check wireless communications between stand-alone vehicles and their surroundings. Here's what it means.

The 5G network transmits data from sensors on cars and roadside, and video cameras installed above the road to a local data centre. The data centre in turn analyses the information and sends it back to the vehicles to help them navigate. According to China's Ministry of Industry and Information Technology (MIIT), 5G will be commercially available in China by 2020.

China's Huawei and 5G. Huawei is now playing a central role in China's bid to be leader in 5G technology. The company already provides 5G wireless infrastructure across the world. In fact it is aggressively bidding for 5G roll-out in India. Huawei is showcased as a private company, but for sure it will closely cooperate with the state intelligence agencies as per Chinese Intelligence laws. Huawei is continuously investing in 5G, and accordingly patented technologies and hired international experts. It is aggressively participating in defining standards and interoperability laws in international forums which suit itself. Wherever possible, it is always in the forefront to garner patent rights, in this expanding field, to generate royalty payments.

Concerns over China's (Huawei) Domination. China's dominance in the 5G field has raised the concerns of Western counterparts. The US has put an embargo on American companies from selling or transferring US technology to Huawei. US intelligence believes Huawei is backed by the Chinese military and that its equipment could provide Beijing's spy agencies with a backdoor into the communications networks of other countries. Because of espionage fears on foreign users by Chinese equipment vendors, several countries have taken actions to restrict or eliminate the use of Chinese equipment in their respective 5G networks. The US has also convinced its closest allies to **reject Huawei technology**. Australia, New Zealand, UK, France, Germany, Poland and the Czech Republic have all voiced their concerns and they are considering banning Huawei. The US, in fact, has started resorting to political and judicial vendetta. In January 2018, US

actions led to criminal charges for conspiracy against Huawei and its Chief Financial Officer (CFO), Meng Wanzhou, was arrested in Canada in December 2018. The indictments claimed that Huawei violated sanctions and stole intellectual property rights. On the other hand, Huawei insists that neither the Chinese Government nor intelligence officials ever give instructions or data requests.

Ultimate Winner. China perceives these bans as an attack on its national strategic interest, as the exclusion of Chinese network suppliers from key advance markets will affect its economic interest. The countries wanting to ban Huawei are so dependent on China in many fields, China may take graduated retaliatory measures against these countries without hurting its own interest in other fields over the short and medium term. It has already conveyed its intention to Canada and may follow suit for European-China scientific cooperation and place restrictions on Australian coal companies. No matter what, China is adept at playing games patiently as it continues to spin a web around these countries to say “YES” to Chinese technology. China is going to come out on top with a time delay as it did with ‘the ban on older iPhone models as part of a patent lawsuit between Apple and Qualcomm’. Other countries also know that the ban on Chinese technology could also lead to higher costs from alternative vendors and lack of economies of scale. Besides, at a later date they will have to get China onboard and then again they may face problems of interoperability and higher costs of separate transactions.

India and Huawei. India is already at least three years behind in adopting 5G technology as it is yet to make a start. Huawei is one of the bidders for 5G roll-out in India. The Huawei quote is expected to be so competitive (15 to 20 per cent cheaper) that it would put India in a bind. On the one hand is the US diktat of ‘not to deal with Huawei’ and on the other is the high cost of US and South Korean firms.

Allowing Huawei 5G in India is like acceding to China’s Belt and Road Initiative (BRI) project. India has been refusing to be part of BRI as it perceives it to be hurting its economic and security concerns. Consider this: the Chinese made mobile phones are selling in India like hot cakes and their penetration is too deep to ignore. If Huawei presence is there in Pakistan, Nepal, Myanmar, Bangladesh, Sri Lanka and of course the Tibetan plateau, with high-powered transmitters placed there, it will be a matter of time that handsets will find ways into India with online recharging facility (Huawei presence in India is presently limited to 4G and approximately 6,000 employees. Vodafone-Idea and Airtel are using Huawei gear). Besides 5G will function in Ka band, there will be a requirement of hundreds and thousands of cell towers. No Indian company is geared up to invest and implement 5G roll-out on such a large scale. The infrastructure required will take a lot of time to establish pan-India. If India has to forge ahead in 5G technology, the intelligence agencies have to gear up. It is for these intelligence agencies like National Technical Research Organisation (NTRO) to think two steps ahead and find ways to deal with the impending technology invasion. Alternatively as US Secretary Pompeo said that US-Japan-India should join hands to counter China in 5G technology. Meanwhile Jio is buying 5G equipment from South Korea and would be a safer bet.

Conclusion. From super-ultra-fast broadband, to smart and autonomous cars, to enormous networks of IoT, 5G could be the catalyst that brings about a much smarter and more connected planet. Indeed, 5G is the technology of the future and India cannot miss the bus. It has to act fast. Huawei has achieved significant advancements in 5G technology but as of now it is not a monopolist. Its competitors are Intel, Nokia, Eriksson, Samsung and SK Telecom. They are also contributing to defining the current Information and Communication Technology (ICT) landscape. It is

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for the rest of the world to ensure and initiate steps to maintain information security. As for China, it will surely seek a bigger role in this field and no matter what, it will dominate the world in this field too. It

is for India either to invest heavily and develop 5G technology of its own and provide it to its subscribers at a competitive cost in a short time frame or fall prey to China's ICT hegemony.

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