ABSTRACT

The launch of the 5G wireless technology was centred on the basic ideology of having a mobile network that serves the purposes of reliability, faster speed, better and uniform user know-how. This paper encompasses the opportunities and challenges as the key inquiry subjects of the 5G technology as it focuses on refining the efficiency and effectiveness of data transmission. Therefore, it is vital to comprehend and address these challenges that blur our brighter future in 5G wireless technology, as individuals, research groups, institutions, countries, and as a universe.

KEYWORDS: 5G, Cellular network, Mobile broadband, Wireless technology, IoT

1.1 INTRODUCTION

Have you ever thought of a broadband network that can deliver information and translate data at a very high speed; let's say multi-gigabits per second (Gbps) and at the same time, be very reliable? Ponder on downloading a 500 MB size of a movie in less than 1 minute. This assumption was based on research conducted when a movie of size about 250 MB was downloaded within the space of 2 minutes with a 4G LTE network; how much more a 5G network? The fifth generation of cellular mobile network, '5G' is a dive into a future where standards of equal prospects and access to assets are set, it's the spring to technological and technical attachment, which revolutionizes and unlocks evolving technologies.

Figure 1.1- 5G: Speed and reliability

(Prableen, 2020)

1.2 5G TECHNOLOGY: OPPORTUNITIES

Below are some of the opportunities that the wireless technology has enabled or can enable, in times to come:

1.2.1 EDUCATION

Educational institutions can now make use of electronic books (e-books), student tracking systems, student ID cards, 3-D printers, interactive whiteboards, actuating wireless key lock systems in classrooms, etc. If these programs can function and thrive over the current 4G LTE mobile network, how much more would 5G, with its ease of use, make these technologies even more effective and efficient, which in turn, will fill the *'homework gap?'*

1.2.2 AGRIBUSINESS

It became imperative for the agricultural machinery firm, 'John Deere', in collaboration with 'Ericsson', to develop and master-mind solutions that helped in solving *'agro-issues.'* With this development, it was projected that as of 2030, the agricultural sector should boast of making 9.6 US billion dollars, all boosted by the introduction of the 5G– IoT technologies such as Cat-M1 and Narrowband IoT.

1.2.3 EVOLVING TECHNOLOGIES

A Capgemini article reported that *"75% of industrial organizations believe that, within the next five years, 5G will be a catalyst for their digital transformation- and they are willing to invest heavily to get it."* Ultimately, the 5G wireless broadband technology can spur a hi-tech revolution in territories such as Virtual Reality (VR), the Internet of Things (IoT), robotics, and Artificial Intelligence (AI).

1.3 5G TECHNOLOGY: CHALLENGES

The research conducted by Telegeography affirmed that; out of a total of about 114 5G viable networks, approximately 30 have gone live universally and are projected to rise by two-fold by December 2021. The course of the deployment of 5G networks has been dealt several blows, arising from the challenges that it has to face.

1.3.1 PUBLIC HEALTH

The innovation of the 5G wireless technology encapsulated the subject of radiofrequency (RF) radiation which to an unknown extent, will be dissipated due to the several antennas to be used. Individuals using the technology stand a risk of getting exposed to the energy discharged by the antennas; ultimately causing cancer, which might lead to death.

1.3.2 COMPLEX NETWORK ARCHITECTURE

The architectural design of a 5G network is not so easy as it seems as they are complex, highly demanding, and challenging. These architectural designs and platforms ensure the deployment of the wireless technology effectively and efficiently, in both the Radio Access Network (RAN) and the core.

1.4 CONCLUSION

(Prableen, 2020) studied the proficiencies, proffered by the 5G wireless broadband, and enumerated the companies operating in the 5G space- Vodafone, China Mobile (CHL), Huawei, Verizon (VZ), Ericsson, Nokia, Cisco (CSCO), etc. This research has presented a validation of the possibility of using 5G technology despite the challenges surrounding it. Statistics have estimated that by December 2021, 5G technology subscriptions would have exceeded 190 million, which owes to the fact that base stations in China are expected to exceed 600,000, and delivery of 5G-enabled devices would surpass 180 million by December. No wonder Donald Trump affirmed to his countrymen: *"Fifth-generation wireless technology, or 5G, will be a primary driver of our nation's prosperity and security in the 21st century."*

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