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## Wireless Communication and the Pandemic: modernized society and environment: A review on prospective technological strategy

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**ABSTRACT:** At this time of the global crisis, telecommunications play an important role in keeping people connected and working. To a large extent, this is largely the basis for streaming media, social media, and video conferencing to a new level of activity. In this article, we will pay special attention to 5G wireless cellular knowledge and ask profounder inquiries about how the technology will work and what new rations this epidemic may inspire in emerging 6G work. We are definitely going to miss something, so you can submit valuable comments. In the survey, it was found that strategies using potential skills will produce better returns, and these technology strategies can formulate a framework to regulator pandemics or support development of the entire society. A pandemic, which in turn helps control the spread of the infection. This research inspired a variety of implemented technologies that can help health system, the government, and the public against COVID-19 in various ways. In addition, rapid technological development during pandemic or its impact on environment and society were also discussed. In addition to technologies already implemented, this work also involves potential untapped skills that have potential prospects for application in pandemic situation control. In addition to various discussions, some suggested solutions are also proposed for certain situations.

Key words –COVID -19, Wireless Network, 5g Technology, Pandemic Environment

### INTRODUCTION

The World Health Organization (WHO) recognizes that COVID-19 is a pandemic or that practically every country in world is precious in some way. Various nations like Italy, Spain, Germany, France or United Kingdom have professed a total or incomplete blockade, and advised people not to dispensation their homes unless required. During this problematic period, UK publicized a list of important jobs that included key people who will continue active or serve the community through blockade. This list take in registrars, druggists, general strength classification workers, law enforcement or safety forces, or telecommunications network engineers / workers. The university is reorganizing investigation schemes to design low-cost fans or data analysis engines to track outbreaks. Everyone asks what help they can provide. Therefore, this article will explore the role of wireless communications so far through COVID-19 pandemic. In view of the fact that many emerging jobs may not be completed in time to help the current outbreak, we also asked about the potential of current non-5G networks to respond to comparable conditions. Despite the medical system, nurses or doctors are at the forefront of fighting the pandemic and protecting patients, while others must stay home or away from society. This means that many people need to use Internet-based technology to work from home. At this point, it can be said that load is mostly concentrated in fixed network that connects the houses. Though, this does not diminish position of cellular networks, but rather emphasizes the key strategy tasks of 5G and its different vertical areas. Figure 1 shows the use of 5G technology in vertical areas such as health, education, and retail in a pandemic condition. In this blocking situation, dependability, readiness or resistance of the cellular network

are very imperative. To better illustrate this point, let's first review the positions of these three key industries / vertical industries during the COVID-19 lockdown period, and then review the related mobile communication technologies.

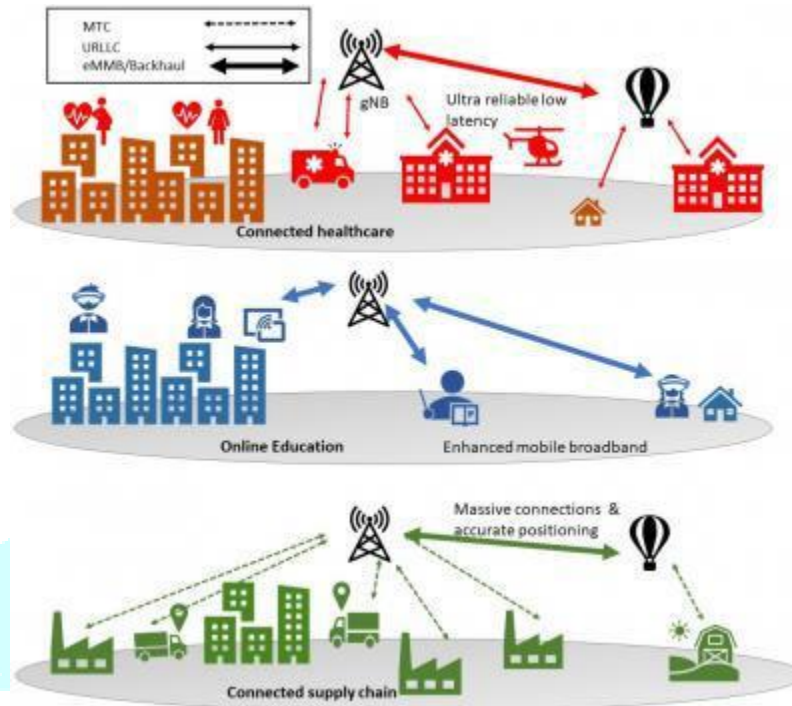


Figure 1: Graphical illustration to show role of wireless communications and their distinguished 5G traits for verticals such as healthcare, education and retail during a Pandemic situation.

**Frame work:** Our journalists obvious to donate to societal response to COVID-19 by investigating many executed skills and potential technologies that can help control pandemics, and then using our survey as a document. We seek direction from medical or technical specialists to identify the topics that will be enclosed in this education. In order to write manuscripts on this different subject, people want to understand what is happening, or tedious research is needed to verify online information from proved foundations and literature surveys to support the feasibility of methods disclosed in online sources.

**Technological strategies:** Technical approaches to regulator pandemics as people, we know how critical technology plays in our daily lives, but from a technical perspective to help alleviate infections and control situations like COVID-19 pandemic is what we should pay attention to. A. Therefore, our authors abstracted various features of the use of knowledge in various strategies to help the epidemic. To overcome the epidemic situation, contributions of various technologies can be determined as direct and indirect effects. Technologies that directly affect technology can help formulate strategies to reduce infections, help medical institutions, and support the overall functioning of society. In a society, the following parts are found: statistics statement, artificial intelligence or machine knowledge, the supply chain is an effective field of technology widely used or discovered, and its submission has actively supported the society in the event of a pandemic.

**Information communication:** COVID-19 is a disease that spreads rapidly, mainly due to interactions between humans, which is why it is in a pandemic state. The necessary information, such as the nature of the disease, the mode of transmission, the risks involved, preventive measures, and government policies are necessary to inform people when appropriate. For this reason, the media and social networks are essential to transfer information from sources to users. All the latest developments related to the pandemic are broadcast worldwide on radio, television, reporters or Internet. Social media is particularly concerned with dispersion news on different stands around the world. Now, there are communication challenges, how to communicate effectively, the degree of risk perception after information is communicated, and the authenticity of the professed information. We will answer these questions from administration side.

**Information communicating challenges:** Persons in a epidemic environment must have a clear consideration of management conclusions, policies, travel bans, confinement periods, and other important informs. Statement must make the public aware of this new infection, and must clearly understand what the health scheme knows, not information round COVID 19. Information should be updated as soon as specialists verify it, or public perception of risk should also be considered based on amount of facts. The challenges can be stunned by carefully disseminating information to community so that information does not growth people's panic. For example, if seclusion period is stretched by another 2 weeks, then information should also include a resolution to address how persons meet their basic needs. This will help reduce people's panic. When inform is small, media can add basic contagion control data or information to promote between people [10].

## WIRELESS TECHNOLOGY AND PANDEMIC ENVIRONMENT

### 5G Verticals and Pandemic

In this sector, we current position of establishing a mobile connection with the health, education or retail segments to support society or economy or obtain socioeconomic benefits during a pandemic like COVID-19.

**Drone technology:** Drones are vehicles powered by smooth services that can be distantly measured or operate separately [13]. Drones are mainly used in army field, or their applications have spread to manufacturing, agriculture, structure, public observing or surveillance, or system checking for any poverty, cargo transportation, and medical uses [13][18]. In this epidemic, it is obvious that persons must stay indoors. If they go out to obtain simple wants, they must firmly follow communal hygiene measures to disruption cable of impurity. Therefore, drones can help in 2 techniques: one is transference of goods or basic necessities through appropriate communication system among public or providers, and the other is investigation.

**Mobile applications:** The progress of material knowledge has produced a wide range of applications in many ways, or is growing quickly in incidence of Internet. Furthermore, smartphones have covered the way for easier admission to these technologies. In today's world, smartphones play an important role because they incorporate high-quality interactive displays, high-resolution cameras, extensive Internet connections, and support for many programs. Mobile application software is essential because they can connect to the world only through portable devices and can achieve many tasks. In a pandemic condition, they can provide help in many ways, from providing mobile medical (M-health) facilities to helping logistics farmers. The mobile medical app can provide clinical assistance anytime, anywhere, thus overcoming the limitations of geological conditions and helping medical staff provide the best service through cellular knowledge (Pinem et al., 2020). As world moves towards 5G cellular communications, M health applications will be widely promoted. Another view regarding healthcare is the provision of treatment, and one revision described use of mobile apps for hand treatment (Valdes et al., 2020). The mobile app can also guide various actions, such as exercising, cooking, observing habits, managing tasks and doing nothing. Mobile application development can effectively improve technology integration in the market, production and supply chain processing, which also affects digitization to some extent. During the pandemic crisis, farmers were mainly affected by logistical problems. With government help, a proper connection to the market can help farmers determine the demand position of their products and meet post-supply chain requirements. All this can be effectively measured through mobile applications [18]. As a progressive submission, use of increased truth is stimulated. During the lockdown period, even purchases can help with use of augmented reality.





**Connectivity for Healthcare:** 5G mobile technologies can dependably attach hospitals, ambulances, or homes, increasing the efficiency of healthcare resources and managing pandemics and normal operations more effectively. Network ambulances can make high-quality video calls with surgeons or hospital experts to care for patients remotely and more appropriately, especially under continuous measures of social alienation. The 5G network can support services such as remote monitoring and diagnosis of AI-enabled patients, so anyone with a medical situation can report directly to their central or local health organization devoid of having to be physically present [1]. This is especially main for persons who live in distant parts. Due to travel restrictions caused by COVID-19 epidemic, many patients and surgeons may have difficulties or it is dreadful to visit hospitals that generally have more equipment in large cities. However, surgery and treatment are still important. Support for remote 5G surgery, or a large-scale abilities interconnection network [2], allows patients to travel to nearby hospitals and receive management / operation from physicians 100 of miles gone. Of development, this wants ultra-reliable low-latency statement anord very high data rates [3]. Robots have been used to execute tasks / events in situations where individuals cannot walk or are life-threatening. These environments belong to the area diseased with COVID-19. Companies like UVD-Robots or Ubibot use robots to sterilize COVID-19. Like robots take used for airport passenger temperature controls (during the day) or ultraviolet fumigation (at night). Positioning and preserving construction used to control robot involves a fast and reliable 5G technology connection link.

Another use of this wireless communication system is to effectively track the whereabouts of probable COVID-19 relations by using cellular system type positioning technology and to provide disease control through joined custom mobile applications. A similar form of location technique can be used to instrument social detachment measurement. In various countries, the government has established temporary hospitals with the help of the military, for example, the British National Health System Nightingale Hospital has suddenly increased the number of patients lacking exhaustive repair. These infirmaries are occasionally located in areas that do not fully meet compulsory cellular capacity requirements, or want to use wireless return technology (such as the use of low-altitude platforms, such as wireless networks) to provide new methods of coverage and capacity [4][5]. Electric vehicles (VE) parked in residential areas during a pandemic can be used to mobilize deposited power or meet vigor needs to operate cellular networks at these provisional sites or to meet new hospital energy needs. To achieve this goal, electric vehicles should use vehicle-to-network (V2G) or vehicle-to-infrastructure (V2I) communication complete 5G technology or route circulated electric vehicles to required energy demand [6].

**Connectivity for Education:** When many nations pronounced fractional blockades, teaching sector was one of the first to be seriously affected as schools and universities disrupted classroom-based classrooms and attempted to make a rapid evolution to online classrooms so that students could remain their instruction. However, many technical, social and economic problems have arisen with this method. Further definitely, apprentices and teachers living in rural areas have restricted quality of service because their immovable broadband or cellular provision construction is much gentler than urban areas. In calculation to this, present broadband or cellular networks have practiced an

increase in network services and may not support the transmission of high-quality video. According to the conclusion of Nokia's network traffic analysis during COVID-19 [7], the cumulative increase is 30% to 50% compared to the maximum "normal" weekend traffic. The observed increase during the week is largely due to the increase in videoconferencing actions through professional times (high bandwidth symmetric traffic), and during weekend this is mainly due to video broadcasts such as Netflix or YouTube. In the United States, since February 1, the growth rate of conferencing applications like Zoom has exceeded 700%. All these procedural problems directly affect the smooth running of the online classroom, thus destroying online learning experience.

In addition to the technical limitations of current infrastructure, when low-income families cannot financially support cable broadband connections in their homes, some socio-economic problems arise that prevent some students from accessing the Internet. 5G mobile technology is auspicious clarification that can solve most of previous shortcomings of today's under wired and cellular systems, thus providing a accurate online teaching skill in such situations. 5G can be used to support software issuing or provide instructive materials concluded virtual certainty augmented reality or mixed reality to enhance the scholarship experience. It can also handle the traffic produced by the online conferencing platform and optimize resources in real time concluded a self-organizing network (SON). In calculation to these stands, universities will also need 5G knowledge to provision classrooms and experiments with applications such as Remote Lab (RL) for integrated applications of science and technology, engineering and mathematics, robotics and the Internet of things (IoT) Immersive experience From the living room. STEM) teaching.

**Connectivity for Retail and Supply Chain:** Panic purchases or hoard chain disruptions caused by staff shortages and delayed delivery have caused food and supply shortages in some areas. Especially in this case, effective order placement and warehouse management systems require precise information on product location and delivery time [8]. Although global delivery systems (GPS) can be used to track delivery trucks, or radio regularity documentation (RFID) equipment can be used for insignificant boxes, environmental backscatter communication technology can be used to accurately track packages bigger. In addition, delivery trucks delivering fresh or frozen produce need recovering route preparation or tracking to prevent food spoilage. To this end, they can also regularly update their products' core infection or status system through IoT and AI-enabled resolutions. This is especially important once giving medications to vulnerable and secluded people. In such a scheme, edge computing can condense cloud load, for example, computing used for isolated situation observing on road unit together with wireless statement can solve various difficulties.

Associated autonomous carriages are one more mechanization knowledge that can greatly help society by automating distribution facilities or sinking number of transfer personnel required. The realization of these skills relies seriously on vehicle-to-infrastructure / vehicle communication based on 5G (V2I / V2V) and edge computing. By using robot and drone based delivery beyond the 5G network, this can move forward. In this system, the smallest and most important packages, such as drugs or blood, can be transported to homes and transferred among hospitals using autonomous vehicles, or drones devoid of human intervention [9]. For these drones to work effectively, a fast connection is required for wireless backhaul, trajectory optimization, or innovative standing and positioning technology.

Next, we will study the machineries in cellular networks that implement the above services and applications.

Table 1: Key communication technologies for different verticals

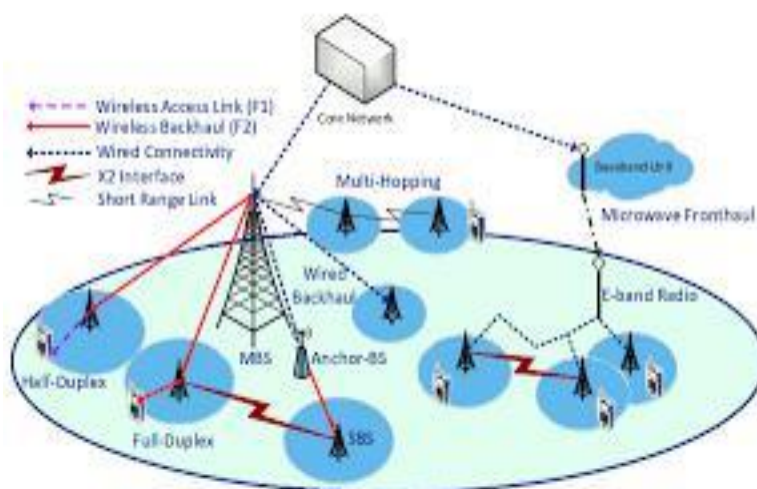
Vertical	Applications	5G Technologies / Requirements
Healthcare	Smart hospital, home patient monitoring, remote surgery, remote diagnosis	eMMB, NBIIoT, URLLC, cloud/edge computing, V2I
Education	Online courses and labs, AR, VR, MR, educational robots.	Cloud computing, multi-access edge computing, IoT
Retail	Food & supplies tracking, spoilage reduction	Enhanced coverage, positioning, URLLC, Edge/cloud computing, Industrial IoT, V2I

## 5G Key Technologies and Requirements

To further study potential of portable connectivity or 5G networks for changed segments during the pandemic, let's evaluation some key 5G technologies. Table 1 summarizes these key statement technologies for changed vertical industries.

### Pervasive Connectivity

Most households in various established states have fixed optical / fast broadband connections, and in various rural and developing countries in these nations, only connection presented is complete a cellular network. Another category of operators in this category are cruise passengers, who may be stranded near the port and cannot disembark [10]. In this pandemic, providing reliable connections to cruise ships in rural or remote areas or stationed near ports allows residents / passengers to use health, government or retail facilities lacking interference. To cope with increased peak traffic and legacy perpendicular submissions, 5G and later networks can use advanced resource scheduling and allocation technologies to redirect traffic through their cellular networks, thereby enhancing existing terrestrial broadband networks. A mixed type of cable / cellular modem (compatible with fiber, cable, xDSL, 4G, 5G) can be a viable resolution, providing broadband services to watch TV, remote work through VPN services, participation in training courses remote, etc. The current terrestrial network may be insufficient to handle traffic in some urban or rural areas in emergencies like these. Additionally, it is able to used to provide added ability when required in medicinal connected cases.



### Self-Organized and Green Networking

During the pandemic period, it is necessary to minimize the number of active employees / technicians of mobile network operators (MNO), leading to the importance of self-organization of the network. The auto repair feature can help the network maintain faulty base station service in the coverage area until the MNO engineer resolves that it may be longer than usual. In addition, network must autonomously promote function of slight cell base positions (for example, turn them off) in dense commercial parts or marketable centers to reduce overall power ingesting



while preserving services in area through of command base positions. Automated networks elsewhere 5G can even foretell probable failures and / or service degradation and proactively avert them.

### Ultra Reliable Low Latency Communications (URLLC)

Ultra-reliable, low-latency statement goals to address severe rations of extreme events or rare events in relations of dependability or latency [11][12]. To meet these requirements, 3GPP has used a variety of technologies, such as squat pack programmer, without authorization mechanism, using space, frequency, and time diversity technology to meet reliability targets 5-9 and 1ms delay [13]. Although this sounds surprising, applications like high-precision robot regulator or independent lorries cannot function in these conditions. For example, factory mechanization involves reliability of 7 to 9 or a delay of less than 1 millisecond [14]. Furthermore, future applications, such as intellectual schemes that implement human-computer interaction in real time, require a reliability of 9 to 9 and a latency of 0.1 milliseconds [15]. The next generation (6G) wireless system proposal will address these stringent requirements. The previous section has described some applications that can take advantage of URLLC. For sample, in health field, haptic response in robot-assisted surgery can be operated using URLLC. This is very main because it will increase surgeon's flexibility while minimizing harm to patient. Equally, in terms of teaching, URLLC can support machineries such as virtual reality, enlarged certainty, mixed veracity, or 3D holography to increase distance education knowledge of undergraduates who have to attend classes at home due to the general blockade of nation. .

### Massive Machine Type Communication (mMTC)

5G uses mMTC technology to collect facts from millions of organized instruments. Concluded mMTC-based knowledge, various vertical fields, counting source chain, smart cultivation, smart city, industry 4.0, can support society or economy through pandemic. The sensors / actuators deployed in cities or ranches use narrowband LTE-m / IoT or LoRa to send / receive data from the center and are helping to further automate basic actions [16].



**Cloud/Edge/Caching:** Today, the importance of centralized fog service area for wireless communications, the Internet of Effects, or web-based submissions or facilities has gained unprecedented importance. With provision of Edge / Cloud Subtracting or use of Big Data analytics, this knowledge can bring enormous benefits to the modeling of human activities and behaviors during the pandemic. In addition, a great sum of data can be evaluated to estimate the popularity of content, or calculated content can be cached at base station for greater user satisfaction and return download [17]. When used for the distribution of video content, this can have a thoughtful impression on system.

**Security, Privacy, and Trust:** The operations of community or private organizations have been severely damaged, not only by blockages, but also because their employees cannot process complex data distantly. 5G networks are essential to afford a truly protected home office experience in traffic management, providing high-speed, low-latency connectivity. However, 5G systems provide opportunities for simulated reconnaissance and steps must be reserved at an early stage to ensure that important infrastructures are not intercepted. It is projected that 5G networks will suffer

more attack routes than preceding 4G networks [18]. In the event that a large number of mMTC procedures are connected to the network, this problem can become very serious. Also, because current public key encryption technology is susceptible to quantum computing, things will become more insecure. Quantum Key Circulation is a knowledge based on quantum behavior used to protect circulation of symmetric encryption keys by agreeing an absolutely secure discussion of encryption keys among 2 remote beings. This key can be used securely using conservative cryptographic algorithms. Moreover, with Quantum Infrastructures, high-density 5G core nodes can be synchronized in a metropolitan area network [19].

During the contagion, large records of citizen evidence will be created, including your financial and health information. Moreover, IoT-based smart devices, cameras or meters are used other frequently than typical, added threatening citizens' secrecy. We requisite emphasize that potential accidental use of this knowledge should be measured, or companies would not over / unreasonably use knowledge offered for pursuing or locating people. In accordance with the requirements of the General Data Protection Regulation data collected during a contagion need be retained safe or damaged in a timely manner. Recently, Google and Apple publicized a corporation to use Bluetooth connectivity to achieve "privacy protection contact tracking" [20]. This machinery will consent every mobile scheme to list other devices it contacts by sharing the encryption key. If device user is detected by COVID19, the scheme will upload list to fog or, in theory, the list can be used to track user contacts or arrange for apposite recommendations on quarantine strategy. The technology won't be available right away, but as we get economies back on track or necessity to closely display the new outbreak, they may be used as a tool later this year.

### **FUTURE POTENTIAL VERTICALS**

One of central educations educated from the COVID-19 pandemic is that general communication systems, especially cellular communication, are the key technical elements of a tough society. They help us continue, stay in contact and reduce economic losses. The above vertical industries and their applications can greatly benefit from network improvements. Because beyond 5G networks they will get smarter using artificial aptitude or machine learning algorithms, they will meet the needs of various other important and innovative vertical applications and industries. This comprises increased mechanization (Industry 4.0) or dispersed self-directed results that can allow major production lines, customer facilities or applications to continue to operate by minimal interference or smart connections. The agricultural sector can take advantage of artificial intelligence and remote condition monitoring and robotics that support machine learning. Tourism is one of industries most pretentious by COVID-19, or outside 5G networks they can use drones and simulated reality on behalf of virtual travel.

### **CONCLUSION**

In summary, we trust that 5G networks play an imperative role in maintaining resilience of society and communities, and should not delay the continuation of 5G deployments due to the economic problems produced by COVID-19. Equally, we consider that investigation or progress beyond 5G systems should continue to provision our agriculture, manufacturing, pr most importantly, our society. The Corona virus 2019 (COVID-19) outbreak has widely affected people around world or has fundamentally different normal purposes of humans. As a species on ground, we must use our talents to combat this new type of corona virus. The use of technology, good governance, health care services, and coordinated public behavior can greatly reduce risks. The provision of equipment in managing this condition is inimitable. Therefore, in this section, we will recapitulate key features of each segment or examine current tasks connected with it. The first part grants technical variations experienced by society or the atmosphere from different features. In order to increase patient intake and improve telemedicine services to decrease burden on hospitals, their medical facilities have been rapidly revised. In this pandemic situation, technical improvements were made to test methods and facilities to diagnose large numbers of test samples. The role of government in society is very important: it can meet the needs of the health care system and, at the same time, it can help the public obtain and control basic needs. Public opinion is to manage by government and correctly follow social isolation or other defensive actions. The industry has come together to help meet the needs of the healthcare system, or in terms of energy, people's electricity consumption during the lockout period has been significantly reduced compared to before the lockout. He discussed other socio-economic perspectives and other ideas about environmental changes related to the decrease in air pollutants.



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