COVID-19 PANDEMIC: DIGITAL TECHNOLOGY USAGE AND ASSOCIATED SOCIO-TECHNOLOGICAL CHALLENGES

Ajeet JAISWAL*

ABSTRACT

COVID-19 is a worldwide epidemic that has already claimed the lives of thousands of people, i.e., caused hundreds of thousands of infections and deaths, with several thousand more expected. COVID-19 has caused a global pandemic, a coronavirus disease detected in 2019. It has a genetic resemblance to the SARS coronavirus, which was responsible for the SARS outbreak in 2002; COVID-19 is caused by a virus known as SARS CoV-2, or severe acute respiratory syndrome coronavirus 2. In COVID-19, coronaviruses that were originally circulating among bats, a natural animal reservoir, changed and eventually started causing sickness in people. The pandemic started in China and has since spread throughout the globe. Covid-19 has changed healthcare delivery and the entire public-health strategy. At this point, the traditional healthcare system would be unable to function. By implementing numerous efforts internationally to reduce the lethality and transmissibility of the deadly virus throughout populations, technology has played an essential part in reducing the effects of this pandemic. New technologies were used for various goals, including prevention, contact tracing, surveillance, and medical support at home. The pandemic has an impact on socio-cultural, religious, and psychological realms. Technology has altered our social and professional lives, but it has also presented new problems. The current study examines the growing digital technologies used during the COVID-19 pandemic and its problems and drawbacks, using PubMed and Google Scholar databases. This paper's primary goal is to identify current technology and the issues they provide.

Keywords: Pandemic, Covid-19, Artificial Intelligence, Digital Technology.

Citation: JAISWAL, A. (2022). "Covid-19 Pandemic: Digital Technology Usage and Associated Socio-Technological Challenges", *HABITUS Journal of Sociology*, (3), 233-249.
Atıf: JAISWAL, A. (2022). "Covid-19 Pandemisi: Dijital Teknoloji Kullanımı ve İlişkili Sosyo-Teknolojik Zorluklar", *HABITUS Toplumbilim Dergisi*, (3), 233-249.
Başvuru / Received: 12 Şubat 2022 / 12 February 2022
Kabul / Accepted: 18 Şubat 2022 / 18 February 2022
Derleme Makale / Review Article.

INTRODUCTION

SARS-CoV-2-caused Coronavirus Disease 2019 (COVID-19) was initially detected in Wuhan City, Hubei Province, China, in December 2019 and has since spread to other world regions. There was no specific therapy for the sickness during the early phases of the pandemic, and scientists were working to identify and prevent the symptoms. The only preventive methods available at the time were surveillance and containment. By encouraging less physical contact, technology has proven to be a significant aid in resolving this issue. Among the rising themes were geospatial technology, artificial intelligence (AI), big data, telemedicine, blockchain, smart apps, the Internet of Medical Things (IoMT), 5G technology and robotics (Mbunge et al. 2020).

* Dr. Ajeet Jaiswal, Associate Professor, Dept. of Epidemiology and Public Health, Central University of Tamil Nadu, Tamil Nadu, India. E-mail: rpgajeet@gmail.com ORCID Number: 0000-0003-0891-2672.

The epidemic has had a significant impact on public health, infrastructure, businesses, schools, and the economy. COVID-19 has demanded the adoption of cutting-edge technologies (O'Leary 2020).

The pandemic has implications for the design, development, and usage of information systems and technology. It has paved the way for advancement in technology-based solutions and focused on research and practice in areas like information management, work practices, and technology design and use (Sein 2020). The fast adoption of telemedicine, telework, and online education in reaction to the coronavirus serves as a reminder that digital technology offers several benefits and can assist in managing and reducing the risks connected with the lockdown, both during and after the pandemic (Richter 2020).

The relevance of information systems and information technology (IS/IT) in healthcare, clinical decision support, emergency/crisis response, and risk management is well-known (He et al. 2021). Many COVID-19 detection technologies have arisen, with RT-PCR serving as the gold standard for detection for quite some time. Other approaches can also be used for on-the-spot diagnostics (Han 2021). Newly created apps for contact tracing or diagnostic testing kits, on the other hand, quickly revealed basic flaws by producing false-positive tests and failing to discover asymptomatic patients. Technology's primary goal should be to help people, i.e. fulfil people's needs rather than market needs (Taylor 2021). Advanced and efficient technology is required to address the problems that have emerged due to the pandemic's size in the public health systems (He et al. 2021; Javaid et al. 2020). During the COVID-19 epidemic, this article examines the utilisation of developing technology and the accompanying socio-technical or human behavioural difficulties.

In The Fight Against COVID 19, Artificial Intelligence and Big Data Are Being Used

One such technology is artificial intelligence (AI) that could help track the virus's spread, identify high-risk individuals, and control infections in real-time. By thoroughly assessing the patients' history data, it may also forecast mortality risk. By offering population screening, medical aid, notification, and infection management advice, AI can help us fight this virus (Vaishya et al. 2020). People will understand the problem more rapidly if AI and machine learning techniques are used to locate critical data. The COVID-19 outbreak is being combated through artificial intelligence (Mbunge et al. 2020). Artificial intelligence can help in COVID-19

diagnosis and risk prediction. A cloud-based AI-assisted Computed Tomography (CT) service in China detects COVID-19 pneumonia patients. Using this technology, the cases were separated from other lung diseases, speeding up the diagnostic procedure (Whitelaw et al. 2020).

The epidemic has prompted research and artificial intelligence (AI) to fight the new threat. Using lung computed tomography imaging, AI technology was used to assist doctors in quickly diagnosing coronavirus pneumonia. During the pandemic, an AI-based chatbot was essential in responding to people's emotions and providing online consultations to help them cope with mental problems. Some Indian chatbot software saw an upsurge in users during the outbreak, demonstrating this tendency (Bao et al. 2020). Artificial intelligence (AI)-driven machine learning, image recognition, and deep learning algorithms can be used for early infection detection and diagnosis, as well as speedier drug discovery for developing new treatments (Brohi et al. 2020). 3D printing technology can create face masks and other Personal Protective Equipment (PPE) for healthcare workers. COVID-19 testing with 3D printed rayon wrapped Markforged and Neurophotometrics have developed nasopharyngeal (NP) swabs. The swabs are easy to make and can collect a lot of virus particles in less than three minutes (Markforged's 2020).

Big Data Analytics can be utilised to find out persons who need to be isolated based on their travel history, predict the COVID-19 curve, speed up the development of antiviral medications and vaccines, and enhance understanding of the COVID-19 spread through time and geography (He et al. 2021). Individuals in China are assessed and directed to appropriate resources using free web-based and cloud-based solutions. High-performance infrared thermal cameras are used in Taiwanese airports to collect thermal images of people in real-time, swiftly diagnosing those with fever. In Singapore, people's temperatures are taken at the entrances to businesses, schools, and public transit. The thermometer data is analysed and used to identify emergent sickness hotspots and clusters where testing might commence (Whitelaw et al. 2020).

Technology-Assisted Contact Tracing and Monitoring: Arogya Setu, a contact tracing app, has aided in tracking the COVID-19 outbreak. Technology has also helped notify people about the situation and remind them to take the necessary precautions. Telecom companies, including BSNL, Jio, Airtel, and others, have used caller tunes to promote awareness about the pandemic (PN 2020). Face recognition technology has allowed persons to be identified even when

wearing masks. It aided in the tracking of the movements of isolated individuals. CCTV cameras with facial recognition skills have been used to identify infected people who break the law by leaving their homes when isolated (PN 2020). Big data and artificial intelligence (AI) have contributed to COVID-19 preparations and tracking, hence the spread of disease in numerous countries. Machine learning models were constructed to collect real-time data on people's positions, utilising data from migration maps, mobile phones, mobile payment apps, and social media. This information was utilised to estimate regional SARS-CoV-2 transmission dynamics and direct border checks and surveillance.

As soon as China reported the epidemic, Taiwan began conducting health inspections for travellers flying out of Wuhan, merging data from immigration records with its centralised, real-time national health insurance database. Because of this integration, healthcare facilities may evaluate patients' travel histories and identify individuals for SARS-CoV-2 testing and tracking (Whitelaw et al. 2020). Furthermore, the use of consumer-grade wearables was elaborated; the increased interest in these wearables aids in the early diagnosis of symptoms and the monitoring of physiological indicators from the comfort of one's own home. Continuous monitoring with these technologies creates possible hurdles in data analytics and management due to the extremely high volumes and variety of health information collected by each device. As a result, these sensor systems require scalable data backends capable of securely transferring, storing, processing, and making patient data available in a HIPAA-compliant manner.

Furthermore, the need to connect these data to other disparate sources, such as electronic health records, to increase information content drives the development of interoperability designs. The issue is that digital health data is housed in proprietary formats and on incompatible platforms, resulting in silos that are fragmented. Data sharing methods that span consumer wearables and medical-grade devices must integrate these disparate data sources (Jeong et al. 2020).

Social Media Usage / Mobile Devices/ Apps: Smartphone apps and video-conferencing technology can be used to follow people's activities, alert them of COVID-19 hotspots, and provide other useful information, help doctors diagnose patients via video services and telemedicine/telehealth and help individuals with online shopping, e-learning, online meetings, and telework (Marr 2020). A range of phone and network-powered apps have been developed to assist healthcare providers and common people in this situation.

For example, in the United States, the National Science Foundation awarded Princeton University researchers a grant to develop a technique for sending a software upgrade to mobile phones that allows health officials to follow their position. To safeguard users' privacy, the key to the proximity data would be kept on the phone itself, and it could only be unlocked if the phone's owner freely provided it to health officials. Assume someone tests positive for a disease such as COVID-19. In this case, health officials may use the technology to track down all other cell phone users within a certain radius of the infected person for a set period. Health specialists could estimate the time and distance based on their situation knowledge. Healthcare departments can contact anyone who has come into contact with the illness, who will be informed of the exposure and instructed to get tested for the disease and, if necessary, self-quarantine (He et al. 2021; WHO 2020). Video-based communication services such as Zoom, Facetime, and WhatsApp are the most used technologies in the healthcare industry. Other synchronous and asynchronous remote services, such as a computer or mobile applications, information and datasets, social media, email, and chest x-ray, could be used to give synchronous and asynchronous support for COVID-19 patients and those in need of other traditional healthcare services. (Keesara et al. 2020; Vargo et al. 2021). Zoom, WebEx, Facebook Messenger, and Google Hangouts, for example, have either become the "teaching and working assistant" to prompt digitally safe and effective conferencing or have built bridges must maintain social connection in everyday life throughout this unique period, not just in the healthcare sphere, but also in education, work, and other areas and everyday life use. (Vargo et al. 2021). As a result of the pandemic, health training institutions are closing. People can stay active at home by employing different ways for continuing their health and fitness training. New alternatives have been introduced through health and fitness applications.

Many health and fitness companies have begun to provide online workouts and yoga sessions via social media platforms and mobile apps. This approach of keeping people moving during the pandemic proved to be effective (PN 2020). Many health and fitness trainers have turned to digital platforms to keep their companies afloat by providing their clients with online training and sessions. People may avoid going to marketplaces during lockdowns due to increased online delivery of essentials via apps and lower delivery charges.

Robots are included: COVID-19 has demonstrated the importance of human relationships in making things work. Food, retail, logistics, and manufacturing businesses were all badly hit by

the pandemic. COVID-19 has sparked a major push to put robots to work and advance robotics development. Cleaning sick areas and delivering food to persons who have been isolated are now done by robots (PN 2020). COVID-19 instances are rapidly increasing, and the number of people who need medical help is putting a huge demand on healthcare services worldwide. Remote-controlled robots are employed in a few countries to assist medical practitioners with duties, including collecting mouth swabs for virus detection tests, doing ultrasound scans, etc. (PN 2020).

Drones are employed for various tasks, including food delivery, population tracking, delivering medical supplies, patrolling public places, tracking non-compliance with quarantine laws, hauling test kits, spraying disinfectants, and delivering medicines to quarantine zones, among others (He et al. 2021). Robots have been used to battle the coronavirus outbreak. Robots, for example, are used in hospitals to convey food and medicine, as well as sanitise rooms and other hotspots, all without requiring direct human interaction. According to a CNN storey, doctors in Seattle used a telepresence robot to treat the first confirmed patient in the United States who tested positive for coronavirus (Chavez and Kounang 2020; He et al. 2021).

The Internet of Medical Things (Iomt) and 5G Technology Are Used

The Internet of Things includes functional components such as data collecting, transit, analytics, and storage. IoT sensors on mobile phones, robotics, and health monitors can all collect data. The sensor data would then be sent to a cloud server for processing, analytics, and decision-making. IoT can be used to track whether patients follow quarantine regulations, for example. IoT can also be used to take remote patient temperatures and transmit the data to clinicians via mobile devices for monitoring, tracking, and warning, reducing the risk of coronavirus infections (He et al. 2021).

In the health and medical sectors, interconnected medical equipment, smart health applications, and smart sensors are utilised to apply Internet of Things (IoT) concepts, technologies, and principles (Swayamsiddha and Mohanty 2020). It also comprises smart software and wearable devices to aid in healthcare delivery. The IoMT impacts how healthcare services are delivered during the COVID-19 pandemic due to its limited mobility, shifting from physical touch to remote health service delivery. This is demonstrated by several IoMT apps integrated into health systems to reduce the burden on healthcare systems. 5G technology is beneficial for sharing big volumes of data and real-time communication. It provides the fastest internet speeds and a

large amount of bandwidth. Although 5G technology is contentious in many countries, it has been employed in China to address issues such as containing the spread of Covid19 by placing smart cameras and smart thermometers connected to 5G technology, high-speed broadcast, and intelligent robots for taking swabs, to name a few (Mbunge et al. 2020).

Blockchain Technology's Application

Blockchain technology has handled the friction and trust concerns between protecting the privacy and addressing public health needs, such as tracking infected patients, in the fight against COVID-19. It's built on a distributed, scalable, secure, privacy-preserving, and immutable record-keeping platform with the ability to change the way people trust, exchange value, and deal (Khurshid 2020). For example, a smartphone app based on blockchain technology and AI was developed to fight against the coronavirus epidemic. The software employs blockchain technology to create a "digital identity" for each member, protected by a private key that allows a digital replica of government-issued certificates. These enable healthy people to leave the house searching for food or employment (Sinclair 2020). Using blockchain, unauthorised parties have been prevented from interfering with the data. During the pandemic, a Chinese payment processor and financial services organization using blockchain technology to track claims processing and payouts (Pressgrove 2020; He et al. 2021). It has been suggested that colleges and research institutions engage with industry and business to develop and put strong use cases for blockchain applications to the test. These partnerships will help expand the usage of blockchain technologies in health care due to their widespread adoption (Khurshid 2020).

Telemedicine/Online Mental Health Tools

Telemedicine has been used to give mental health support. Because of the lockdowns, social distance, and fear of the virus spreading, the pandemic increased demand for its use. It has put an end to traditional face-to-face appointments in hospitals and clinics, easing the pressure on doctors and reducing their anxiety of coming into contact with infected patients. In addition, to help minimize the stress caused by Covid19, helpline numbers and other online platforms have been built, particularly for frontline employees (Hawkins 2020). Telemedicine has been in high demand since the onset of the pandemic. As clinics worldwide stopped physically treating infected patients, they turned to internet consultations (Hawkins 2020). Telemedicine has been in high

demand since the onset of the pandemic. As clinics worldwide stopped physically treating infected patients, they turned to internet consultations (Hawkins 2020). Several apps and virtual care platforms have been developed to reach out to infected patients and provide support via video conferencing and digital monitoring to decrease patient exposure to healthcare workers and professionals. It immediately restricted the introduction of the COVID- 19 virus into healthcare facilities. There has been a noteworthy swing in the way healthcare is delivered by using telemedicine due to the COVID-19 outbreak. Due to this rapid development, individuals without access to digital tools are left behind, which exacerbates inequality on several fronts. Long-standing challenges to digital inclusion include education, poverty, internet availability, information-seeking abilities, and rural domicile, all of which may impact e-Health adoption (Khilnani et al. 2020).

Education and the Use of Technology

Due to the outbreak, a large percentage of the population was forced to study remotely to comply with the worldwide stay-at-home directive. Most teachers and students prefer to continue using video-based devices and platforms. As a result of the pandemic, the epidemic has become the second-largest group of digital technology users. Teachers must react to the fast speed of online teaching by devoting more time to preparing for online courses, innovating, creating lessons, and patiently changing students from passive recipients to engaged learners (Vargo et al. 2021). Distance learning uses augmented reality, 3D printing, virtual reality, and artificial intelligence-enabled robot teachers, among other technologies. GitHub, Blackboard, Coursera, and other platforms for knowledge distribution can be used to deliver online educational lectures. One example is teaching remotely via a video-based technique, such as Voice Thread to record short films conveying the lesson's subject (Gewin 2020). Email, online surveys, Google Sheets, and other telework technologies employ digital information to exchange virtual services at work. Furthermore, tools and programmes like Google Trends and Geographic Information Systems and social media platforms like Twitter, Instagram, Facebook, and YouTube assist in tracking, finding, and analysing epidemics in everyday life (Vargo et al. 2021).

Self-Isolation and Quarantine

In several nations, indiscriminate lockdowns for infection control have resulted in significant economic losses. Digital technology can be used to separate those who have been

exposed to or infected with the virus, while other residents are subjected to fewer limitations. By asking citizens to complete a symptom evaluation and record their temperature, China's quick response (QR) code system allows authorities to monitor health and restrict movement. Individuals with green codes can go wherever they wish, but those with red codes must self-isolate for 14 days. China also monitors and restricts public gatherings with AI-powered surveillance cameras, drone-borne cameras, and portable digital recorders (Whitelaw et al. 2020). Upon arriving in Australia, international visitors were confined to hotels, with those from Wuhan being held off the Australian mainland. According to new regulations, individuals who break quarantine will be obliged to wear tracking devices, with fines levied for further offences.

In Taiwan, government-issued GPS-tracked mobile phones assist in the electronic monitoring of home-quarantined individuals; in the event of a quarantine breach, this so-called digital fence sends messages to the individual and assesses fines. In South Korea, people in self-isolation must download a mobile phone application that alerts authorities if they leave their isolation zone. People in Hong Kong who are subject to self-isolation must wear a bracelet that connects to a database via cloud technology and alerts authorities if the quarantine is breached. Iceland has created a smartphone app to track COVID-19 patients and ensure they remain in self-isolation (Whitelaw et. al 2020). People can circumvent mobile phone solutions for quarantine enforcement if they leave their quarantine zone without their phones. Like the ones used in QR code systems, self-reported surveys are only meaningful if people are sick and can accurately explain their symptoms. However, such technological advancements may be advantageous (Whitelaw et al. 2020).

In The Event of a Pandemic, Technology Can Be Used for Entertainment

During a pandemic, lockdowns and social distancing have also shut down the entertainment industries, changing the way content is created, distributed, and streamed on top platforms like Amazon Prime Video, Hotstar, Netflix, Zee5, Voot Select, and others, which cater to a wide range of audience interests and provide diverse content all over the world. For live streaming shows and concerts, the use of these Over-the-Top (OTT) Media Services platforms has skyrocketed. Film studios have begun to release their films on various platforms as well. On these platforms, people can now readily view the material. Lockdown has altered people's ability

to watch their favourite shows daily. The number of app downloads and subscribers on OTT platforms has increased significantly. Many games, such as PubG, Ludo, Amongus, and others, have grown in popularity and user base in India. The gaming industry has seen significant expansion, and the amount of time spent playing games during lockdown has increased. People are turning to games as a stress reliever and passing the time during long days (PN 2020).

Application For Data Storage in The Cloud

CCE is a system that combines application, IT infrastructure, and network services. It makes use of shared data centre (DC) resources made possible by virtualization technology. In this case, on-demand, elastic, or instantaneous services and prices are applied. To assist employees in executing their jobs swiftly and efficiently while working from home, cloud computing (CC) tools are frequently used. Cloud computing has increased the volume, velocity, and variety of data generated every minute by a wide range of services and applications worldwide. The generated data may be structured, semi-structured, or unstructured. Because of the high volume of data that is being moved, it is stored in various forms that are difficult to combine at such a fast pace (Alashhab et al. 2020).

Issues With Current Technologies

Apart from the lack of prior training data, social media and other Internet traffic have contributed noise to large data sets, potentially leading to over-fitted or "lucky good fit" models. This noise must be filtered before dependable patterns and predictions can be recognised. Each AI forecast's accuracy, validity, and dependability should be assessed (Whitelaw et al. 2020). However, some digital media is plagued by inaccuracy, a lack of guidance, and data leaking. We advocate for greater use of digital media in facility-based settings, emphasising the importance of building trust, establishing social solidarity, reducing chaos, educating the public on prevention measures, and reducing medical costs (Bao et al. 2020). When employing technology to battle the disease, challenges such as security, privacy, biases, ethics, and the digital divide arise (He et al. 2021). To better understand the rising epidemic and make joint decisions on addressing it, public health specialists, epidemiologists, and government officials must be connected via integrated systems with corresponding data. Because people are so crucial in the fight against COVID-19, it's critical to leverage cutting-edge technology to connect, coordinate, and support a wide range of stakeholders (He et al. 2021). Information systems and technology Scholars can also identify

best practices for adopting responsible data collection and processing and striking a balance between privacy and new technology usage (He et al. 2021).

1. Human behaviour toward technologies: As more COVID-19-related technologies are developed, integrated, and used by governments, businesses, and individuals, it is vital to understand human behaviour in the development, creation, and use of technologies. Many efforts to combat the pandemic use new technology developments and methods for integrating multiple systems and technologies (Whitelaw et al. 2020). We have access to a great amount of information through social media, which has become a significant source of concern. The World Health Organization (WHO) claims that (WHO) social media is producing an infodemic, which is described as "an overabundance of information—some accurate, some false," making it difficult for people to find reliable sources and help when they need it.

Additionally, greater usage of video conferences and meetings produces a new phenomenon: tiredness, anxiety, or worry due to increased use of virtual video-conferencing platforms. Video calls' technological shortcomings—delays, lack of eye contact, and limited nonverbal cues—exhaust a person's energy considerably more than face-to-face meetings, leading to technological tiredness (Riva et al. 2020). To combat the pandemic, material reaction, behavioural modification, and human capability have all been demonstrated to be effective (Taylor 2021). Rather than automating human decision-making, AI technologies would augment and enhance human intelligence and advance decision-making processes beyond what either humans or machines can do on their own (Marjanovic et al. 2021). Marriages, birthday celebrations, family functions, and other events are also streamed live online. Many people lose track of details due to a lack of connection, and they are unable to read body language or keep eye contact with peers. The importance of "event borders" in memory formation and cognition has been described by psychologists Gabriel Radvansky and Jeffrey Zacks (Technosolutionism 2021).

2. Digital Technology's Negative Effects / Risks: Higher-income countries resorted to technology for a miracle since they lacked protective material resources, the human capacity for contact tracing, and understanding of the disease. People have lost faith in contact tracing apps and diagnostic approaches because of false-negative outcomes, and the slowness of tracing asymptomatic cases has exacerbated this. Technology is necessary for pandemic response, but it

must serve as support rather than a leader (Taylor 2021). Digital health efforts can reinforce socioeconomic inequality and lead to disparities in healthcare. The internet and mobile phones are common examples of digital technology. Even though 4 billion people globally accessed the internet in 2019, usage in high-income areas was disproportionally higher than in low- and middle-income areas (82 per cent in Europe vs 28 per cent in Africa). In high-income countries, vulnerable groups may lack access to broadband signals, cellphones, or wearable technology such as smartwatches in low-income neighbourhoods or distant locations. Interventions should be customised to the target regions to adopt digital technology effectively; Broadband connectivity demands technical and infrastructure investment from both the public and private sectors. Subsidized cell phone plans, loaner devices, free Wi-Fi hotspots, and training programmes could all be quick answers to these geographical differences. Automated apps and devices that do not require constant network access should be explored in places with insufficient infrastructure or finances to enable cellular and data coverage (Whitelaw et al. 2020).

3. Lack of trust, awareness, and accessibility: Social media platforms can augment emergency alerts, crisis response actions, information gathering and dissemination, donation collection, and hierarchy-free collaboration. At the same time, social media communication may hurt meaning construction and decision-making because they personalise information, haphazard stimulation of convergence behaviour, and facilitation of anti-social behaviour. In the case of COVID-19 epidemic management, one of the most important principles for virus containment is social separation.' It is, however, a social practice that is based on the trust and responsibility of individuals who take action and disturb their daily lives. It also relies on culturally relevant communications (including language translation) to ensure that everyone is aware of the implications of social distancing. In Australia, however, it was postponed because the social distancing message was not as successful as it could have been (Mirbabaie et al. 2020). As with any emerging technology, a fundamental disadvantage of telemedicine is a lack of user comprehension of its availability, services, and cost. A lack of education about the efficacy and safety of telemedicine in light of current circumstances, patient preferences for seeing their provider rather than someone with whom they have no established relationship, a lack of understanding of how to obtain telemedicine visits, and a lack of telemedicine visits have all been identified as barriers to telemedicine. Older people who live in distant places have less education,

have more chronic illnesses, are less likely to utilise the internet than their peers (Kichloo et al. 2020).

4. Data Privacy Concerns: A significant amount of data was generated during the Covid 19 pandemic. For healthcare, data on patients, the virus genome, pharmaceutical and clinical studies, social media, and even facial recognition data are collected (Alashhab et al. 2020). Algorithms, cloud computing, and information openness all have ethical implications critical for the current societal shifts brought on by digital technology, although these implications are small and unequal in reality (Nicolescu et al. 2018). Several digital health treatments, particularly those that track persons and impose quarantines, could be infringing on people's privacy. Surveillance and control by the government can instil fear and jeopardise civil freedoms. To achieve a balance between the need for contact tracing and privacy, European officials have proposed that data be maintained for only 14 days, the length of time it takes a virus to spread, and that non-essential digital safeguards be relaxed after the pandemic is finished. A smartphone tracking scheme with anonymized data, no central database, and no information from the Global Positioning System (GPS) is employed in several European countries. Allowing a restoration to a normal routine without recurrence of infections may alleviate privacy and data security concerns (Whitelaw et al. 2020).

5. Economic Inequality or Expensive Technology: The problem has disproportionately affected people with the lowest incomes and educational attainment. This will aggravate the difficulties of attaining inclusive growth and widening wealth disparities (Willcocks 2020). COVID-19 is more vulnerable to rising automation than small and medium-sized enterprises, as well as communities of colour. Many countries cannot use systematic screening technologies because they are expensive and require skilled personnel (Papadopoulas et al. 2020).

Digital technologies that monitor vital signs or self-report symptoms are ineffectual due to the extended incubation time and relatively high prevalence of asymptomatic illness compared to other infectious diseases. Because of these characteristics, researchers at the European Centre for Disease Prevention and Control expect that most passengers from Chinese cities will be overlooked by screening (Whitelaw et al. 2020). If they develop symptoms that could indicate the onset of the virus, economically disadvantaged Americans with household incomes of $40,000 or

less are far less likely to use telemedicine to seek medical attention; instead, they are far more likely to seek care at an ER or other facility where they may be at risk (Khilnani et al. 2020). IT infrastructure expenditures have risen due to the COVID-19 epidemic, as employees use teleworking and students enrol in online programmes. It's important to comprehend the rise in IT infrastructure's hard expenses due to rising demand. As the epidemic worsens, IT infrastructures must be enhanced to allow workers to carry out their duties safely and healthily (CISA 2020).

CONCLUSION

During the COVID19 epidemic, technological advancements proved to be extremely beneficial in controlling the hazardous situation in a systematic and timely manner. During the COVID19 pandemic, society's reliance on technology increased, resulting in social and vocational changes that may continue much beyond the current crisis. As a result, making intelligent and intentional judgments about using technology to improve our lives, reduce stress, and promote mental health is crucial. Different countries' approaches to COVID-19 management and technological amalgamation are unique in flattening the incidence curve and maintaining a low fatality rate. Human resources are needed to create and develop more efficient technical breakthroughs and integrate these technologies into the healthcare system. The use of technology has resulted in a massive volume of online data. Transparency and management of massive data on a single platform, which should be easily accessible for using AI models to develop novel pandemic management strategies, are critical. Researchers should also consider the negative effects of technology and privacy concerns. Every citizen of the country should use technology without budgetary constraints or a lack of awareness. Immediate technical steps to prevent the pandemic are critical for safety and risk management when considering human behaviour patterns.

The competing interests-The author declares that there are no competing interests.

Conflict of Interest –No conflict of interest

Funding- Self.

Availability of data and materials- The data set will not be shared to protect the participants' identities

REFERENCES

Alashhab, Z. R., Anbar, M., Singh, M. M. et al. (2020). Impact of Coronavirus Pandemic Crisis on Technologies and Cloud Computing Applications, *Journal of Electronic Science and Technology*, 19(1).

Bao, H., Cao, B., Xiong, Y. et al. (2020). Digital Media's Role in the COVID-19 Pandemic, *JMIR Mhealth Uhealth*, 8(9).

Brohi, S. N., Jhanjhi, N. Z., Brohi, N. N. et al. (2020). Key Applications of State-Of-The-Art Technologies to Mitigate and Eliminate COVID-19, *TechRxiv Powered by IEEE.*

Chavez, N., Kounang, N. (2020). A Man Diagnosed with Wuhan Coronavirus Near Seattle Is Being Treated Largely by A Robot. https://edition.cnn.com/2020/01/23/health/us-wuhan-coronavirusdoctorinterview/index. html.

CISA Releases Version 3.0 of Guidance on Essential Critical Infrastructure Workers During COVID-19. (2020). United State of America: Cyber Security & Infrastructure Security Agency. CISA Releases Version 3.0 of Guidance on Essential Critical Infrastructure Workers during COVID-19, CISA.

Garfin, D. R. (2020). Technology as A Coping Tool During The COVID-19 Pandemic: Implications and Recommendations, *Stress and Health*, 1–5.

Gewin, V. J. N. (2020). Five Tips for Moving Teaching Online as COVID-19 Takes Hold, 580, 295-296.

Han, T., Cong, H., Shen, Y. et al. (2021). Recent Advances In Detection Technologies For COVID-19, *Talanta*, 233, 1-10.

Hawkins, L. (2020). Top 10 Benefits of Technology for Healthcare During Covid-19, Healthcare Global.

He, W., Zhang, Z., Li, W. (2021). Information-Technology Solutions, Challenges, And Suggestions for Tackling The COVID-19 Pandemic, *International Journal of Information Management*, 57, 1-8.

Javaid, M., Haleem, A., Vaishya, R., Suman, R., Vaish, A. (2020). Industry 4.0-Technologies, And Their Applications in Fighting, COVID-19- Pandemic, *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 14, 419-422.

Jeong, H., Rogers, J. A., Xu, S. J. S. A. (2020). Continuous On-Body Sensing for the COVID-19 Pandemic: Gaps and Opportunities, *Science Advances*, 6(36), 1-4.

Keesara, S., Jonas, A., Schulman, K. (2020). Covid-19 And Health Care's Digital Revolution, *The New England Journal of Medicine*, 382, e82.

Khilnani, A., Schulz, J., Robinson, L. (2020). The COVID-19 Pandemic: New Concerns and Connections Between ehealth And Digital Inequalities, *Journal of Information, Communication and Ethics in Society*, 18(3), 393-403.

Khurshid, A. (2020). Applying Blockchain Technology to Address the Crisis of Trust During The Covid-19 Pandemic, *JMIR Medical Informatic*, 8(9), e20477.

Kichloo, A., Albosta, M., Dettloff, K. et al. (2020). Telemedicine, The Current COVID-19 Pandemic And The Future: A Narrative Review And Perspectives Moving Forward In The USA, *Fam Med Community Health*, 8(3), 1-9.

Marjanovic, O., Cecez-Kecmanovic, D., Vidgen, R. (2021). Algorithmic Pollution: Making the Invisible Visible, *Journal of Information Technology*.

Markforged's Response to COVID-19. (2020). https://markforged.com/resources/blog /markforged-covid-19-efforts#swabs (Accessed 15.05.2021).

Marr, B. (2020). Coronavirus: How Artificial Intelligence, Data Science and Technology Is Used to Fight the Pandemic. https://www.forbes.com/sites/bernardmarr/2020/03/13/coronavirus-how-artificial-intelligence-data-science-and-technology-is-used-to-fight-the-pandemic/.

Mbunge, E. (2020). Integrating Emerging Technologies Into COVID-19 Contact-Tracing: Opportunities, Challenges and Pitfalls, *Diabetes & Metabolic Syndrome: Clinical Research & Reviews,* 14(6), 1631-1636.

Mbunge, E., Akinnuwesi, B., Fashoto, S. et al. (2020). A Critical Review of Emerging-Technologies for Tackling COVID -19 pandemic, *Human Behavior and Emerging Technologies*, 3(1), 25-39.

Mirbabaie, M., Bunker, D., Stieglitz, S. et al. (2020). Social-Media in Times of Crisis: Learning from Hurricane Harvey for The Coronavirus Disease 2019 Pandemic Response, *Journal of Information Technology*, 35(3), 195-213.

Nicolescu, R., Huth, M., Radanliev, P. et al. (2018). Mapping the Values of IoT, *Journal of Information Technology*, 33(4), 345-360.

O'Leary, D. (2020). Evolving-Information Systems and Technology Research Issues for COVID-19, and Other Pandemics, *Journal of Organizational Computing and Electronic Commerce*, 30(1), 1-8.

Papadopoulas, T., Baltas, K. N., Balta, M. E. (2020). The Use of Digital-Technologies By Small And Medium Enterprises During Covid-19: Implications For Theory And Practice, *International Journal of Information Managemen*, 55.

PN, B. (2020). Role of Technology in the Era of COVID-19-Pandemic. https://news.cleartax.in/role-of-technology-in-the-era-of-covid-19-pandemic/4992/.

Pressgrove, J. (2020). Blockchain Emerges as Useful Tool in Fight Against Coronavirus. https://www.govtech.com/products/blockchain-emerges-as-useful-tool-infight-against-coronavirus.html.

Richter, A. (2020). Locked-Down Digital Work, *International Journal of Information Managemen*, 55.

Riva, G., Mantovani, F., Wiederhold, B. K. (2020). Positive Technology and Covid-19, *Cyberpsychology, Behaviour, And Social Networking*, 23(9), 581-587.

Rosen, C. (2020). Technosolutionism Isn't the Fix. https://hedgehogreview.com/issues/america-on-the-brink/articles/technosolutionism-isnt-the-fix.

Sein, M. K. (2020). The Serendipitous Impact of COVID-19 Pandemic: A Rare Opportunity for Research and Practice, *International Journal of Information Managemen*, 55.

Sinclair, S. (2020). Spanish Researchers Working to Curb Coronavirus Spread with Blockchain App. https://www.coindesk.com/spanish-researchers-working-to-curb-coronavirus-spread-with-blockchain-app.

Swayamsiddha, S., Mohanty, C. (2020). Application of Cognitive Internet of Medical Things for COVID-19 Pandemic, *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 14(5), 911-915.

Taylor, L. (2021). There Is an App for That: Technological-Solutionism as COVID-19 Policy in the Global North, in *E. Aarts, H. Fleuren, M. Sitskoorn & T. Wilthagen, The New Common* (209-215), Springer.

Vaishya, R., Javaid, M., Khan, I. H. et al. (2020). Artificial Intelligence (AI) Applications For COVID-19 Pandemic, *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 14(4), 337-339.

Vargo, D., Zhu, L., Benwell, B. et al. (2021). Digital Technology Use During COVID-19 Pandemic: A Rapid Review, *Human Behavior and Emerging Technologies*, 3, 13-24.

Whitelaw, S., Mamas, M. A., TopolL, E. et al. (2020). Applications Of Digital Technology In COVID-19-Pandemic Planning and Response, *Lancet Digital Health 2020*, (2), 435-440.

Willcocks, L. (2020). Robo-Apocalypse? Response and Outlook on the Post-COVID-19 Future of Work, *Journal of Information Technology*, 36(2), 188-194.

Word Health Organization. (2020). Digital Technology for COVID-19 Response. Department News, Geneva. Digital Technology for COVID-19 Response.