

FIGHTING COVID-19 THROUGH TECHNOLOGY

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Executive Summary

1. Countries the world over have deployed their best possible capabilities such as advanced robotics, telemedicine, tracking systems and big data analytics in their combat against the COVID-19 epidemic.
2. Smartphone apps have thus far provided users with real-time information and kept people updated (including generating fake news, rumours and panic).
3. Creative predictive models to project the spread and proliferation of the virus have been made possible by the use of algorithms, Artificial Intelligence (AI) and data analytics in analysing big data.
4. These sophisticated systems also represent tech capabilities and strengths of countries and carry implications for the tech sector post-COVID-19.
5. Online connectivity provides people with more effective means of understanding the proliferation, dangers and properties of COVID-19 while conveying safety messages, health slogans and public campaigns.
6. Robots now work hand in hand with human operators who program them to clean up areas and deliver meals, beverages and pharmaceuticals to people who need them while other categories of robots collect and supply data.
7. To prevent infected or potentially infected patients from turning up at clinics, community hospitals and polyclinics, doctors, health planners and other stakeholders are using technologies to remotely connect these groups with doctors and medical practitioners to treat the patients from afar. These can be derived from existing telemedicine technologies.
8. However, there are also groups and individuals who are pushing back on such technological breakthroughs. The constant tensions between tech advocates and push-back resistance are likely to continue.

9. Meanwhile, states are not waiting for tech sceptics to voice their complete support before they forge ahead with plans to create consortiums and partnerships of multiple tech systems to have a consolidated tech approach in battling the COVID-19 disease.
10. The pandemic may stimulate many in medical establishments to change the way they practise medicine and reduce face-to-face consultations in the future, except for the most critical cases.

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Technology Comes to the Forefront

- 1.1 Prior to the outbreak of the COVID-19 pandemic, the world was engaged in intense Industry 4.0 and 5G technological competition with a determined US keen to maintain its technological lead in the world and China weaning off foreign imported technologies through the Made in China 2025 initiative. There was extensive rhetoric and narratives from all tech powers about the future of technological development and the nature of technological competition.
- 1.2 However, when COVID-19 erupted, the rhetoric and narratives soon became reality when the pandemic pushed all leading technological powers and their firms to put on display the most cutting-edge technologies in the world to fight the COVID-19 outbreak. Advanced robotics, telemedicine, tracking systems and big data analytics were soon deployed to the frontlines to battle against COVID-19. These sophisticated systems also became real-life displays of tech capabilities and strengths of the country, with implications for the tech sector even when the COVID-19 pandemic dies down eventually.
- 1.3 COVID-19 has revealed a number of vulnerabilities in humankind's defensive systems and the experience of the pandemic thus far has taught many the importance of technology in countering such disasters in the future. Smartphones and their killer apps have thus far provided real-time information and keep everyone in the know (though they are also responsible for spreading fake news, rumours and panic).
- 1.4 Algorithms, Artificial Intelligence (AI) and data analytics have contributed to the capability of analysing big data and creating predictive models to project the spread

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and proliferation of the virus. Start-up Yitu Technology, Huawei and Alibaba are providing their AI-backed services to analyse computerised axial tomography (CAT) scans generated by hospitals to analyse COVID-19 suspect cases using the Tianhe-1 supercomputer to go through a few hundred CAT scan images and provide diagnosis (with claims of 80% accuracy) in approximately 10 seconds in the National Supercomputer Centre in Tianjin where the supercomputer is located.¹

- 1.5 All these tools can make virus-coping mechanisms that have enhanced the effectiveness and efficiency of diagnoses. Online connectivity provides people with more effective means of understanding the proliferation, dangers and properties of COVID-19 while conveying safety messages, health slogans and public campaigns. When the Spanish Flu hit the world in 1918, global communities did not have these sophisticated technologies to fight the humble virus.

Advanced Robotics and COVID-19

- 2.1 One category of advanced systems used to combat COVID-19 is the advanced robotics systems; many tech powers have rolled out their latest hardware to perform various functions in the global fight against the pandemic. Many robots work hand in hand with humans as human operators remotely manoeuvre them to clean up areas and deliver meals, beverages and pharmaceuticals to people who need them while other types of robots collect and supply data. There are also robots that contribute to psychological well-being as dancing companions. Some of the most sophisticated robots with autonomous systems are even able to disinfect areas without the need for human operators.
- 2.2 The mass media is filled with images of tech used for combating COVID-19 like Chinese police helmets fixed with AI capabilities to identify individuals with fever 16 feet away while, half a world away, another Los Angeles eatery monitors incoming customers' temperatures at the entrance with an infrared noncontact

¹ Dai, Sarah, "Covid-19: Chinese government launches new tech database to help communities fight the virus" dated 17 March 2020 in The Star [downloaded on 17 March 2020], available at <https://www.thestar.com.my/tech/tech-news/2020/03/17/covid-19-chinese-government-launches-new-tech-database-to-help-communities-fight-the-virus>.

thermometer; and yet another accommodation facility near Houston's Texas Medical Centre uses robots to clean up and de-germ rooms and corridors.²

- 2.3 China was also busy deploying robotics systems to combat the viral outbreak. In early March 2020, Smart Field Hospital manned by robots which can attend to 20,000 patients was established in the Hongshan Sports Centre in Wuhan China, the epicentre of the pandemic, by Wuhan Wuchang Hospital, China Mobile and CloudMinds (a China-US cloud robotics systems manufacturer) to replace burnout medical workers.³
- 2.4 In such medical facilities, the robots managing COVID-19 outbreak include the humanoid Cloud Ginger (aka XR-1) and Smart Transportation Robot which can move food and pharmaceutical supplies prescribed by physicians to those who need them as well as track the patient's critical readings, bypassing direct physical contact; Cloud Ginger can also provide individuals in confinement with news and entertainment contents.⁴
- 2.5 Aside from domestic deployment, the Americans are busy exporting their sophisticated robotics system overseas in the COVID-19 context. Texan Xenex Disinfection Services is accelerating production and dispatching virus-killing robots to Singapore, Thailand, South Korea, Italy and Houston, including the Xenex's LightStrike robots with germicidal UV light powered by concentrated pulsed xenon to disinfect dozens of rooms and common corridors as well as emergency rooms, ambulances and other areas with COVID-19 individuals daily.⁵

² Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like devices" dated 18 March 2020 in USA TODAY [downloaded on 18 March 2020], available at <https://www.usatoday.com/story/tech/columnist/2020/03/18/coronavirus-tech-telemedicine-and-gadgets-war-against-covid-19/5058150002/>.

³ Hornyak, Tim, "What America can learn from China's use of robots and telemedicine to combat the coronavirus" dated 18 March 2020 in CNBC [downloaded on 18 March 2020], available at <https://www.cnbc.com/2020/03/18/how-china-is-using-robots-and-telemedicine-to-combat-the-coronavirus.html>.

⁴ Hornyak, Tim, "What America can learn from China's use of robots and telemedicine to combat the coronavirus".

⁵ Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like devices".

- 2.6 The Europeans are equally savvy with exporting their advanced robotics systems overseas. Odense Denmark-based UVD Robots dispatched hundreds of robots to the front lines in the battle against coronavirus. It has dispatched to Wuhan, Rome and Veneto (Northern Italy) disinfection robots which shine a mounted all-round UV-C light ultraviolet light to decontaminate surfaces (about nine to 10 rooms on average, eliminating 99.9% bacteria and some viruses like MERS CoV and MHV-A59 in 10 minutes); the robots are also able to map out the physical surroundings in hospitals, operating autonomously with lidar navigation for approximately 2½ hours per charge.⁶
- 2.7 Besides terrestrially bound robots, flying drones are also utilised in the fight against COVID-19. South Korea utilised robots to deep disinfect Daegu (an epicentre in South Korea) while Japanese drone manufacturer Antwork (a conglomerate of different companies) saw its Terra Drone flying and collecting medical samples and quarantine materials in Xinchang China in February 2020 at the peak of the viral outbreak.⁷
- 2.8 China and Spain also deployed drones to track individuals during city shutdowns. China uses drones in the sky to monitor individuals who congregate outside to gossip or chat and then use a loud hailer mounted on the drones to ask perpetrators to go home, avoid congregation and idle talk. The drones are also used to warn individuals to put on their masks through public identification (public shaming).

Social Distancing and Telemedicine Technology

- 3.1 The United States has been using long-distance telemedicine technologies for years. Berkeley-based Eko built the FDA-approved digital stethoscope armed with an AI-powered cardiac screening platform to monitor heartbeats; 40,000 of such units have been sold from 2016 and used in 4,000 hospitals.⁸ Besides measuring instruments,

⁶ Jolly, Jennifer, “Coronavirus: The role of tech from telemedicine to Star Trek-like devices”.

⁷ Hornyak, Tim, “What America can learn from China’s use of robots and telemedicine to combat the coronavirus” dated 18 March 2020 in CNBC [downloaded on 18 March 2020], available at <https://www.cnbc.com/2020/03/18/how-china-is-using-robots-and-telemedicine-to-combat-the-coronavirus.html>.

⁸ Jolly, Jennifer, “Coronavirus: The role of tech from telemedicine to Star Trek-like devices”.

specialised video-conferencing to provide medical solutions have also been deployed for distant communications to prevent the spread of the COVID-19 disease.

- 3.2 Heal, a Los Angeles health-care company, has begun supplying video calling devices combined with doctors' personal visits (deployable within a few hours from eight in the morning till eight in the evening) to its patients' accommodation; the devices have been operating extensively in COVID-19-hit Silicon Valley in Northern California, New York city and Seattle Washington.⁹ Heal can monitor readings for respiration, heartbeat, pulse rate and 'live' vital signs that can act as a warning system for patients with tell-tale signs of health issues.¹⁰
- 3.3 Minneapolis firm Zipnosis uses web-based questionnaires for patients to facilitate doctors' quick differentiation of COVID-19 from other respiratory illnesses through asynchronous means. Physicians review the electronically submitted data using only an average of 1 minute 29 seconds to evaluate the patient, dispensing with the need for a large workforce and only a few medical providers are needed to manage over 400 clinical visits per day.¹¹
- 3.4 To prevent infected or potentially infected patients from turning up at clinics, community hospitals and polyclinics, doctors, health planners and other stakeholders are trying to use technologies to remotely connect these groups to treat patients from afar. These can be derived from existing telemedicine technologies.
- 3.5 The US government is facilitating the use of these technologies by fast-tracking bureaucratic approval procedures. To facilitate the proliferation and implementation of tele-medicinal apps, the Trump administration has modified federal rules to allow more physicians to treat their patients from a distance and encouraged virtual consultations amidst the COVID-19 pandemic.¹²

⁹ Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like devices".

¹⁰ Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like devices".

¹¹ Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like devices".

¹² Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like devices".

- 3.6 In Singapore, more than 500,000 users tap into the telehealth app MaNaDr with virtual patient consultation functions established by Dr Siaw Tung Yeng, a general practitioner; now 20% of Singaporean doctors dispense advisories through the app.¹³ Some potential COVID-19 patients diagnosed in this way and quarantined at home can also update their app doctors if they experience breathing difficulties, sustain high fever or generally deteriorating health conditions. They can also book an emergency vehicle to fetch them to a medical facility.¹⁴
- 3.7 Diagnosing patients online makes patients feel more at ease since they are within the comfort of their own homes and prevents public medical facilities from being overwhelmed by patients, disrupting the public health-care system and infecting hospitals through a large concentration cluster of patients.¹⁵ This is also in line with other anti-COVID-19 measures such as social distancing and stay-home calls to prevent more infections.

The Importance of Tracking Devices

- 4.1 Another category of devices used to combat, mitigate and slow down virus spread are the medical tracking devices. Individuals going into the Smart Field Hospital in Hongshan Sports Centre Wuhan China were monitored by 5G thermometers as an early warning system for patients with fever while patients/physicians/nurses wore smart bracelets and rings accessories connected to CloudMinds' AI platform for crucial readings like body temperature, heart beat and blood oxygen levels to be tracked at the initial stage of infection.
- 4.2 Meanwhile, Chinese digital barcodes on smartphone apps can track and reveal the health status of individuals while older technologies like CCTV continue to monitor people leaving their apartments. All Hong Kong residents under quarantine have to

¹³ Park, Alice, "The Tech That Could be Our Best Hope for Fighting COVID-19-and Future Outbreaks" dated 19 March 2020 in TIME [downloaded on 19 March 2020], available at <https://time.com/5805622/coronavirus-pandemic-technology/>.

¹⁴ Park, Alice, "The Tech That Could be Our Best Hope for Fighting COVID-19-and Future Outbreaks".

¹⁵ Park, Alice, "The Tech That Could be Our Best Hope for Fighting COVID-19-and Future Outbreaks".

put on a wristband connected with a smartphone app to sound off authorities if an individual left his/her quarantine location.¹⁶

- 4.3 In India, another rising tech powerhouse and a large emerging economy like China, airplane and rail reservation information was tracked to prevent people from long-distance movement and in Kerala (southern India), the state government utilised a combination of phone call logs, CCTV and mobile app movement data to locate individuals in proximity to COVID-19-stricken individuals.¹⁷
- 4.4 The US Federal government is speaking to tech giants like Facebook and Google about the tapping into their data to track the mobility data of ordinary Americans from their mobile phones to deal with COVID-19.¹⁸
- 4.5 Meanwhile, medical practitioners in Israel are utilising the US\$300 Tyto system to track individuals from a distance. Chief medical officer and chief innovation officer of Sheba Medical Centre in Israel, Dr Eyal Zimlichman, and his teammates deployed the device to analyse almost a dozen people on the doomed COVID-19 infected British-registered Diamond Princess cruise ship docked in Yokohama Japan.¹⁹
- 4.6 Even smaller nation-states are tapping into these movement tracking technologies. The Singapore authorities, for example, use the TraceTogether app based on Bluetooth communications between mobile phones to check if suspected COVID-19 vectors were near to other individuals. The Republic of Korea (ROK) feeds credit card transactions, mobile movement data, CCTV and old-fashioned interviews into a system where confirmed COVID-19 cases are constantly monitored and tracked, generating a map that reveals if certain individuals have been near a COVID-19

¹⁶ Kharpal, Arjun, "Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends" dated 26 March 2020 in CNBC.com [downloaded on 26 March 2020], available at <https://www.cnbc.com/2020/03/27/coronavirus-surveillance-used-by-governments-to-fight-pandemic-privacy-concerns.html>.

¹⁷ Kharpal, Arjun, "Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends".

¹⁸ Kharpal, Arjun, "Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends".

¹⁹ Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like device".

vector.²⁰ The TraceTogether app was selected possibly because it does not take down position/location data or access the mobile owner's contact list while data logs are stored in encrypted format.²¹

4.7 All these technologies have proven to be extremely useful in combating the COVID-19 virus while tracing the infected victims. However, the use of such breakthroughs met with public backlash in some countries from privacy advocates like non-profit organisation Electronic Frontier Foundation which argued that state agencies should be prevented from such sweeping rights unless they can demonstrate to the public that the technologies help to combat COVID-19.

4.8 This group opined that while the Global Positioning System (GPS)-based mobile systems are only accurate up to a 16-foot radius (according to US government sources), the Centres for Disease Control and Prevention (CDC) data indicated that COVID-19 can infect individuals within six feet; hence there are limitations and no guarantee that smartphone app-tracking technologies truly work.²² The constant tensions between the tech advocates and push-back resistance are likely to continue.

Unifying or Consolidating Applications

5.1 Meanwhile, states are not waiting for tech sceptics to voice their complete support before they forge ahead with plans to create consortiums and partnerships of multiple tech systems to have a consolidated tech approach in battling the COVID-19 disease. China is a good example of such a consolidation of multiple systems. On 16 March 2020, the Ministry of Science and Technology announced that Chinese bureaucracies had created a catalogue of more than 2,000 pioneering technologies (alongside their suppliers' names) ranging from auto temperature detection to diagnostics, affected communities, private companies, foremost stakeholders and

²⁰ Kharpal, Arjun, "Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends".

²¹ Kharpal, Arjun, "Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends".

²² Kharpal, Arjun, "Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends".

hospital info systems, after its elite leaders emphasised the importance of a high-tech approach to tackling COVID-19.²³

- 5.2 The first list of 283 technology products included systems for diagnosis and treatment of the virus, hospital information systems, logistic systems for ferrying crucial supplies and disinfection equipment; the objective of the list is to motivate more Chinese entities to take up and implement new tech systems effectively.²⁴ The eventual aim is to unify all functions of different tech equipment and accelerate progress in the research on life sciences/biotech/medical/health-care machines within the same system, a process that is enhanced through Chinese President Xi's directive.²⁵
- 5.3 Beijing is collectively managing 12 state departments to come up with treatment/cure, vaccines development and formulation of epidemiology and viral pathology models while President Xi met the Politburo Standing Committee to announce the building of fresh infrastructures like 5G networks and data centres to speed up recovery from the pandemic.²⁶

Big Data Collection to Fight COVID-19

- 6.1 Long distance diagnoses are not new in more advanced countries like the United States which has already put in place machines that facilitate users to evaluate indicators like temperature (especially rise in body temperatures within a certain area for cluster detection), blood pressure and blood sugar levels throughout the day and upload the medical data to the cloud for physicians to retrieve easily for medical evaluations.²⁷ When gathered in large quantities and protected appropriately by

²³ Dai, Sarah, "Covid-19: Chinese government launches new tech database to help communities fight the virus".

²⁴ Dai, Sarah, "Covid-19: Chinese government launches new tech database to help communities fight the virus".

²⁵ Dai, Sarah, "Covid-19: Chinese government launches new tech database to help communities fight the virus".

²⁶ Dai, Sarah, "Covid-19: Chinese government launches new tech database to help communities fight the virus".

²⁷ Park, Alice, "The Tech That Could be Our Best Hope for Fighting COVID-19-and Future Outbreaks".

confidentiality clauses, such data can become big data for predictive and macro diagnoses of entire groups or societies.

- 6.2 In the United States, Kaiser Permanente tele-medicine call centres leader Dr Stephen Parodi began tracking coronavirus-related phone calls from the 4.5 million-strong health-care system in Northern California in February 2020 and his entries went from 200 to 3,500 phone calls daily on COVID-19, a tell-tale sign of community spread which was also indicative of an acceleration in the number of cases.²⁸ Based on the data collected, hospitals are able to ascertain if they have enough ventilators and other important COVID-19 treatment machines for meeting the projected large number of incoming severe COVID-19 patients. The system also allows Kaiser's own medical practitioners to turn away non-severe cases and routine check-ups (or make them virtual) in favour of serious COVID-19 cases.²⁹
- 6.3 Jvion, a health analytics firm, utilises AI to analyse 30 million patients in its database to highlight individuals and location that are most vulnerable to COVID-19 by using more than 5,000 fields (such as medical track record, lifestyle choices, socioeconomic bases, housing issues and transportation means) and referring them to health-care providers.³⁰
- 6.4 South Korea and Taiwan's successful use of technologies for identification, testing and tracing has been credited with quickly detecting isolated cases (Taiwan) and flattening out increases in infections (in the case of South Korea). Geo-tracking through phones and other devices for instance helped South Korean trackers trace many individuals that the religious group Shinjicheon came into contact with. The ROK authorities promise to terminate data collection efforts and erase all personal data collected when the pandemic dies down.³¹

²⁸ Park, Alice, "The Tech That Could be Our Best Hope for Fighting COVID-19-and Future Outbreaks".

²⁹ Park, Alice, "The Tech That Could be Our Best Hope for Fighting COVID-19-and Future Outbreaks".

³⁰ Park, Alice, "The Tech That Could be Our Best Hope for Fighting COVID-19-and Future Outbreaks".

³¹ Kharpal, Arjun, "Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends".

- 6.5 In Bangladesh, coding, computer programs and algorithms originally created to track and monitor non-infectious illnesses such as hypertension and diabetes have been converted to include fields related to COVID-19 signs to accumulate big data on the virus and allocate resources to fight it.³² The strategic value of rapid detection is to delay or/and mitigate the pandemic peaking in order to avoid overwhelming medical facilities.
- 6.6 An important lesson is to learn from this pandemic and utilise technologies to their fullest potential. The pandemic may stimulate many in the medical establishment to change the way they practise medicine and reduce face-to-face consultations in the future, except for the most critical cases. The electronic inventory of pharmacies and sales of medicines like fever drugs may point to trends in disease spread within the community.
- 6.7 In this context, cybersecurity, confidentiality and privacy are equally important. While technologies provide convenience, speed and efficiency for diagnosis, tracing and treatment, the protection of data accumulated from such procedures is needed as the more secure data management becomes, the more resources can be channelled to the right places with support from the people (social legitimacy for such measures).
- 6.8 Simple electronic measures can help to delay or replace radical measures such as quarantine or sealing off of cities which can hurt the local communities' livelihoods and/or the national economy. Geotracking for example allows location coordinates in smartphones to be used by countries with less funding and tracking infrastructures for monitoring and accumulating data on epidemic clusters. The humble smartphone has hence become a source of affordable surveillance system to monitor the epidemic.
- 6.9 While privacy is an important concern for future development of digital technology, a number of firms/hospitals have been accused of not sharing data with a public platform for business reasons. Some opined that competing medical

³² Park, Alice, "The Tech That Could be Our Best Hope for Fighting COVID-19-and Future Outbreaks".

providers/commercial medical facilities may infer the kind of technology their rival firms/hospitals are using or the level of production cost in the case of equipment makers. This constitutes another confidentiality concern.

- 6.10 Some hospitals refuse to share data out of privacy concerns for their patients even though well-documented hospitalisation rates would allow epidemiologists to project the number of individuals who may become casualties from COVID-19 infections and approximate the number of beds a hospital system will need as the virus spreads.³³ Other hospitals (e.g. Kaiser Permanente in Northern California which has more than 20 hospitals) and medical conglomerates (e.g. Sutter Health, one of the biggest medical groups in Northern California) are documenting such data (including patient numbers) but not sharing them publicly based on reasons of patient and employee privacy.³⁴
- 6.11 The reluctance to share data has been highlighted in an Iowa Department of Homeland Security and Emergency Management internal report which reveals that it prevents health authorities from having an overall picture of the infection, accurate data and quantitative grasp of medical supplies.³⁵ Medical establishments mentioned in the report reasoned that they have their hands full coping with the situation and consistently reporting on fluctuating figures is an additional burden on the overextended workload.³⁶
- 6.12 Even US Vice President Mike Pence has requested almost 4,700 hospitals in the United States to provide patient testing information, bed spaces and supplies information via email (and/or fax) on a daily basis to a federal government inbox.

³³ Somer, Lauren, “Are Hospitals Seeing A Surge Of Coronavirus Patients? Some Officials Aren’t Saying” dated 31 March 2020 in NPR website [downloaded on 31 March 2020], available at <https://www.npr.org/sections/health-shots/2020/03/31/824665834/are-hospitals-seeing-a-surge-of-coronavirus-patients-some-officials-arent-saying>.

³⁴ Somer, Lauren, “Are Hospitals Seeing A Surge Of Coronavirus Patients? Some Officials Aren’t Saying”.

³⁵ Rodriguez, Barbara, “Internal coronavirus report says some Iowa hospitals are not sharing enough information” dated 31 March 2020 in Des Moines Register [downloaded on 31 March 2020], available at <https://www.desmoinesregister.com/story/news/health/2020/03/31/coronavirus-report-says-some-iowa-hospitals-arent-sharing-enough-information/5094055002/>.

³⁶ Rodriguez, Barbara, “Internal coronavirus report says some Iowa hospitals are not sharing enough information”.

Civilian initiatives have also emerged, such as John Brownstein, chief innovation officer (CIO) at Boston Children's Hospital and professor at Harvard Medical School, who contributed to the website *Covidnearyou.org* that persuades individuals to send daily medical data to crowdsource data that the federal/state governments lack.³⁷

- 6.13 Some argue that the US federal government's powers are limited by the inability to liaise directly with state authorities and medical services providers; the prevalence of a fragmented/decentralised system that is controlled by private physicians and medical establishments (instead of state management); the non-standardised format of reporting data where each state pursues different ways to create data sets; and the presence of internal laboratories within local community hospitals that carry out their own parochial tests.³⁸

Lessons for the Future

- 7.1 Many are busy analysing the current methods of handling COVID-19 with an eye for the future. COVID-19 may have fast-tracked tech use as well as legal and bureaucratic procedures in the medical field. One highly anticipated tech equipment currently undergoing approval by the US Food and Drug Administration (FDA) is MedWan but the COVID-19 may just accelerate that process of approval.³⁹
- 7.2 MedWan is armed with military-standard encryption to protect the data collected.⁴⁰ With a machine the size of a small computer mouse, an inclusion of 10 medical diagnostic tools and a high-tech high-definition camera, the device MedWan facilitates medical examination in an online platform by monitoring' one's heart and lungs, evaluating respiration/oxygen contents in blood, measuring body temperature,

³⁷ Flaherty, Anne, "White House asking hospitals to email them data on coronavirus patients" dated 31 March 2020 in ABCNews [downloaded on 31 March 2020], available at <https://abcnews.go.com/Politics/white-house-hospitals-email-data-coronavirus-patients/story?id=69876684>.

³⁸ Flaherty, Anne, "White House asking hospitals to email them data on coronavirus patients".

³⁹ Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like devices".

⁴⁰ Jolly, Jennifer, "Coronavirus: The role of tech from telemedicine to Star Trek-like devices".

examining the skin and looking at tonsils with the data sent ‘live’ to a protected video portal on the medical practitioner’s computer.⁴¹

7.3 Striking a balance between expediency in the use of data and protecting their privacy is necessary for the success of all digital system in the medical field. Worries about privacy and confidentiality are real as some express anxieties over the use of such technologies to monitor the population even after COVID-19 is long gone, particularly since some COVID-19-related collected data are also simultaneously fed into legal, judicial and law enforcement systems. Israeli security firm Shin Bet is utilising smartphone tracking data to track the places individuals have visited to implement quarantine measures and COVID-19 vectors, adding on to a non-disclosed backlog of data collected over the last few years for anti-terrorism objectives.⁴² This has resulted in some public controversy.

7.4 The Massachusetts Institute of Technology created the encrypted (off limits to unauthorised third parties) phone app “Private Kit: Safe Paths” to constantly refresh personal data and indicate if a person is stricken with COVID-19. The app allows individuals to immediately receive signals if they are near to an infected person while the virus-hit individual’s identity has been kept anonymous.⁴³

⁴¹ Jolly, Jennifer, “Coronavirus: The role of tech from telemedicine to Star Trek-like devices”.

⁴² Kharpal, Arjun, “Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends”.

⁴³ Kharpal, Arjun, “Use of surveillance to fight coronavirus raises concerns about government power after pandemic ends”.