Article

Digital Governance and Public Values in Fighting COVID-19

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Abstract: A previously unknown illness caused by the coronavirus spread all over the world was declared a pandemic by the World Health Organization on 11 March 2020, and announced no longer a public health emergency of international concern on 5 May, 2023. The success factors for fighting the COVID-19, in addition to the countries around the world have engaged in close and effective cooperation, the most important thing is the revolution of information and communication technologies, Big Data and artificial intelligence, which leading the third wave governance. This paper analysis the role of technologies in five phases of fighting COVID-19. The fighting process was very complex, and governments around the world had to make right decision for saving their people's lives. The policy-making based on the policy-makers' perception and judgment of public value.

1. Introduction

COVID-19, a previously unknown respiratory illness caused by the coronavirus SARS-CoV-2 1,2, was declared a pandemic by the World Health Organization (WHO) on 11 March 2020, and announced no longer a public health emergency of international concern (PHEIC) on 5 May, 2023. After the coronavirus infection cases were first detected, in a very short time, the virus spread to at least 220 countries in Asia, Europe, North and South America, Africa, Australia, and Oceania.

Throughout the COVID-19 pandemic, a variety of new and existing surveillance technologies were leveraged to aid the public health response. Deploying digital technologies (e.g. cell phone geolocation, mobile phone contact tracing applications, closed-circuit cameras, drones) for population surveillance and public data collection was often rationalized by states, public health agencies, and the private sector as an acceptable approach to help mitigate the spread of COVID-19 and to enhance compliance with public health measures.

2. Digital Technologies and the Third Wave Governance

2.1. The digital technologies and digital governance

Digital technologies innovation, especially innovations of Information and communication technologies (ICTs), Big Data and artificial intelligence (AI) have shaped and transformed society again and again in the past, and the radical transformation of public administration through the adoption of digital technologies is not necessarily a new phenomenon. The impact of these new types of digital technologies would be any different from the past experiences with technological innovation. In the mid-2000s, Dunleavy and his colleagues had already been declaring the replacement of the new public management (NPM) era – the dominant public administration ideology of the 1990s – with an emerging 'Digital-Era Governance', whereby the government changes at its core by focusing on the reintegration of services, and holistic, and joined-up approaches to policymaking through the extensive digitalization of administrative operations (Dunleavy et al., 2006: 7). Some other scholars gave other names the new paradigm, such as 'New Digital Era Governance', or 'New Digital Era Governance', no matter what is called in public administration, it

simply means a new governance paradigm differencing although they have some difference by their concept.

During the same period, many governments announced their national strategies for the digital transformation of public services using ICTs to improve public service performance. At the end of February 2023, the Communist Party of China Central Committee and the State Council jointly released a plan for the overall layout of the country's digital development. According to the plan, building a digital China is important for the advancement of Chinese modernization in the digital era, and provides solid support for the development of new advantages in the country's competitiveness. The digital development path that features joint building and sharing of digital resources, vibrant digital economy, efficient digital governance, flourishing digital culture, effectively guaranteed digital security, and mutually beneficial digital cooperation. The development of digital governance is a complex process, with "data" and "network" as the core components of the evolution and development of digital social forms, promoting the development of the digital economy. Data governance and Internet governance are the basic elements of digital governance, and they are important components of the evolution and development of digital social forms.

2.2. Toffler's the third wave

Digital governance is the third wave governance paradigm according to the waves of civilizations. A prominent futurist Alvin Toffler published his important work Third Wave in 1980, and he noticed that some scholars divided civilization into only three parts—a First Wave agricultural phase, a Second Wave industrial phase, and a Third Wave phase beginning with the development of new technologies. Toffler regarded the Third Wave Civilization started around 1955 in U.S. The First Wave of change unleashed ten thousand years ago by the invention of agriculture, the earthshaking Second Wave of change touched off by the industrial revolution, and the Third Wave of change started with technological innovations such as computer and Information Communication Technology (ICT). The First Wave of change— the agricultural revolution—took thousands of years to play itself out. The Second Wave—the rise of industrial civilization—took a mere three hundred years. Toffler believed that today history is even more accelerative, and it is likely that the Third Wave will sweep across history and complete itself in a few decades, as he predicted that half century later, new technologies becoming denominated the real world.

Toffler posed serious philosophical question: "Will intelligent machines, especially as they are linked together in intercommunicating networks, outrun our ability to understand and control them?" He did not answer the question but reminds us of our potential intelligence and imagination which has yet to be fully utilized for addressing the dilemma. Recent technological innovations such as computer and Information Communication Technology (ICT) have, as Toffler indicated, augmented human capacities and expanded human horizon beyond our innate faculties. Toffler anticipated that the emerging intelligent environment could create new theories, ideas, ideologies, artistic insights, technical advances, economic and political innovations which were unthinkable and unimaginable before.

The computer science and ICTs has exerted an epistemic influence since 1950's and is transforming our view of human and the world, which are not only enhancing human capacities but also remaking our environment and ourselves, replacing our daily life clearly divided between online and offline environments with onlife experience. It seems that our own planet seems much smaller and more controllable than before ever, however, Akihiko Morita (2022: 87) concluded that recent human failure to controlling COVID-19 is dethroning us as the sovereign of the universe, the earth, and living entities. Although there were so many problems and failure of ICTs, we should notice the positive side of the technologies, that means if there is no ICTs took a decisive role in fighting COVID-19, human would loss the batter at the first beginning years ago.

3. Digital Technologies in Pandemic Management and Response

Despite relying on established public health principles, countries across the world have had varying degrees of success in managing the burden of COVID-19. Digital health technology can facilitate pandemic strategy and response in ways that are difficult to achieve manually. This Viewpoint provides a framework for the application of digital technologies in pandemic management and response, highlighting ways in which successful countries have adopted and integrated digital technologies for pandemic planning, surveillance, testing, contact tracing, quarantine, and health care.

3.1. Planning and tracking

Big data and artificial intelligence (AI) have helped facilitate COVID-19 preparedness and the tracking of people, and so the spread of infection, in several countries. Tools such as migration maps, which use mobile phones, mobile payment applications, and social media to collect real-time data on the location of people, allowed government authorities to track the movement of people. Some countries' government integrated data from moving records with its centralized, real-time national health insurance database. This integration allowed health-care facilities to access patients' travel histories and identify individuals for SARS-CoV-2 testing and tracking. The information has been shared across its hospitals to track the status of facilities, allocate health-care resources, and increase hospital bed capacity. AI is not without limitations and requires training with COVID-19 datasets. The accuracy, validity, and reliability of each AI forecast should be assessed when interpreting projections.

3.2. Screening for infection

Some countries use free, web-based and cloud-based tools to screen and direct individuals to appropriate resources. High-performance infrared thermal cameras set up in public areas are used to capture thermal images of people in real time, rapidly detecting individuals with a fever. People have their temperature measured at the entries of workplaces, schools, and public transport. The data from the thermometers is tracked and used to identify emerging hot spots and clusters of infection where testing could be initiated. Systematic screening technologies are expensive and require trained personnel, restricting their uptake in many countries. The incubation period and the relatively high prevalence of asymptomatic infection compared with other infectious diseases limits the effectiveness of digital systems that screen vital signs or self-reporting of symptoms.

3.3. Contact tracing

Some country has implemented tools for aggressive contact tracing, using security camera footage, facial recognition technology, bank card records, and global positioning system (GPS) data from vehicles and mobile phones to provide real-time data and detailed timelines of people's travel. People will receive emergency text alerts about new COVID-19 cases in their region, and people who could have been in contact with infected individuals are instructed to report to testing centers and self-isolate. By identifying and isolating infections early, some country has maintained among the lowest per-capita mortality rates in the world. Contact tracing applications are not without pitfalls. Not all exposure requires quarantine, such as when the exposed individuals are wearing personal protective equipment or are separated by thin walls penetrable by mobile phone signals. On the other hand, relevant exposure could be missed when individuals do not carry their mobile phones or are without mobile service.

3.4. Quarantine and self-isolation

The indiscriminate lockdowns for infection control in several countries have had severe socioeconomic consequences. With digital technology, quarantine can be implemented in individuals who have been exposed to or infected with the virus, with less strict

restrictions imposed on other citizens. Some country's quick response (QR) code system, in which individuals are required to fill out a symptom survey and record their temperature, allows authorities to monitor health and control movement. The QR code serves as a COVID-19 health status certificate and travel pass, with color codes representing low, medium, and high risk; individuals with green codes are permitted to travel unrestricted, whereas individuals with red codes are required to self-isolate for 14 days. Some country also uses AI-powered surveillance cameras, drone-borne cameras, and portable digital recorders to monitor and restrict the gathering of people in public.

3.5. Clinical management

AI can facilitate rapid diagnosis and risk prediction of COVID-19. A cloud-based AI-assisted CT service is used to detect COVID-19 pneumonia cases in China. This technology processes CT images in seconds, differentiating COVID-19 from other lung diseases and speeding up the diagnostic process substantially. COVID-Net, an open-source deep convolutional neural network design available to clinicians across the globe, can quickly detect COVID-19 cases from other lung diseases on chest x-rays. Machine learning algorithms developed in some country can predict the likelihood of developing acute respiratory distress syndrome and critical illness among infected patients. These prediction models can guide clinical decision-making and resource allocation, identifying regions and hospitals in need of critical care resources and medical supplies. If implemented and delivered appropriately, virtual care can increase health-care access during the pandemic and after, but possible risks could include misdiagnoses, equipment malfunction, privacy breaches, and costs to the health-care system.

The integration of digital technology into pandemic policy and response could be one of several characteristic features of countries that have flattened their COVID-19 incidence curves and maintained low mortality rates. In the race to contain the spread of a highly transmissible virus, countries that have quickly deployed digital technologies to facilitate planning, surveillance, testing, contact tracing, quarantine, and clinical management have remained front-runners in managing disease burden. The comprehensive responses of countries that have been successful at containment and mitigation can provide insight to other countries that are still facing a surge of cases.

4. COVID-19 Response and Public Values

Over the past decades, e-government has evolved from providing static content and services to integrating user generated content and social media technologies. This allows citizens to participate and provide regular feedback on policies and programs, both of which promote public value through e-democracy. The diffusion of ICTs is central to the study of e-government (Calista & Melitski, 2007). The use of ICT tools can improve public trust when governments promote transparency, accountability, and government responsiveness (Milakovich, 2010).

From a public values framework, e-government creates value in several distinct areas. Public value theory examines how transparency, accountability, efficiency, and openness create public value (Nabatchi, 2018; Panagiotopoulos et al., 2019). Public value is created through each of these perspectives and is particularly relevant as ICTs mature. As technology and communication tools advanced, the public sector enhanced citizen engagement and transparency through the use of mobile technologies, smart technologies, and social media. Citizen use of mobile and smart technologies is increasing as are the various forms of governance such as m-governance, smart governance, and ubiquitous government.

There are eight values which relevant in the public sector, and focal point when reflecting on the successes of public organizations in the past. Hood (1991: 10-12) once outlines three different broad "families" of values of public administration, which are sigma-type values, theta-type values, and lambda-type values. But I would like to divide the

eight values into two groups, economy, efficiency, effectiveness (3Es) and leadership can be classified to hard value, and transparency, accountability, ethics, and professionalism can be classified to soft value. Hard values usually can be measured by some science technology, for example, mathematics, statistics, and soft values usually connected with philosophy and ideology. The soft values or public administration principles are largely the result of the jurisprudence of the western court of justice who has defined a large number of administrative law principles by making reference to the general legal principles of administrative law. They are closely related with citizen rights, but the hard values are mostly related government power.

Table 1. Main Hard Values and Soft Values in Public Administration

Values in Public Administration	
Hard Values	**Soft Values**
Economy	*Transparency*
Efficiency	*Accountability*
Effectiveness	*Ethics*
Leadership	*Professionalism*
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Emergency management presents the same challenges to administrators as other policy arenas (Cigler, 1988: 9), and it is of course truly a "national" problem, is clearly on the nation's systemic agenda. Emergency management is "commonly perceives as meriting public attention and as involving matters within the legitimate jurisdiction of existing governmental authority" (Cigler, 1988: 8). But there is an infrequent agreement on emergency management that is the local government has the first line of official public responsibility to handle an emergency or a disaster (McLoughlin, 1985: 165; Settle, 1985: 102; Cigler, 1988: 10; Hy & Waugh, 1990; Rubin, 1991; Schneider, 1992; Newkirk, 2001). But "emergency management exists within a complex political, economic, and social environment which explains the lack of a coherent, coordinated policy framework" (Hy & Waugh, 1990: 14), and they also states that "designing and implementing a comprehensive emergency management procedure is easier said than done" (Hy & Waugh, 1990: 11).

5. Discussion and Conclusion

It is vital for governments to provide accurate, useful and up-to-date information to people, particularly during times of crisis. During the COVID-19 pandemic, governments started providing information on their national portals, mobile apps or through social media platforms. ICTs play a vital role in promoting the health and safety of people and in keeping economies and societies working during the ongoing COVID-19 crisis. Digital government technologies either through information sharing or online services have kept governments and people connected during the outbreak. Digital technologies have also enabled governments to make rapid policy decisions based on real-time data and analytics, to enhance the capacities of local authorities for better coordination and to deploy evidence-based services to those who need them most.

The efforts in developing digital government strategies after the COVID-19 crisis should focus on improving data protection and digital inclusion policies as well as on strengthening the policy and technical capabilities of public institutions. Even though

public-private partnerships are essential for implementing innovative technologies, government leadership, strong institutions and effective public policies are crucial to tailor digital solutions to countries' needs as well as prioritize security, equity and the protection of people's rights. The COVID-19 pandemic has emphasized the importance of technology, but also the pivotal role of an effective, inclusive and accountable government. This policy brief addresses how digital government has played a central role as a key tool of communication and collaboration between policymakers and society during the COVID-19 pandemic. Policymakers need to further embrace the future of digital government, even when the crisis is over.