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Digital dilemmas in the (post-)pandemic state: Surveillance and information rights in South Korea

ABSTRACT

Drawing on South Korea's response to COVID-19, this article examines how the digital measures that were implemented by the nation state during the pandemic intensified the dilemma between public safety and information rights. South Korea's highly praised handling of COVID-19 raises the question of how far digital technology can infiltrate everyday life for the sake of public safety and how citizens can negotiate the rapid digital transformation of a nation state. The South Korean government's digital measures during the pandemic involved the extensive use of personal data; however, citizens were not allowed sufficient participation in the flow of information. By critically examining the South Korean case, this article reveals that the government coped with the pandemic through digital surveillance as a way to avoid physical lockdown, and in so doing, projected its desire for transition to a digitally advanced state while facilitating nationalism through a digital utopian discourse.

KEYWORDS

COVID-19
South Korea
digital technology
digital surveillance
digital utopianism
information rights
3Ts (test, trace and
treat)
K-bangyeok
(K-quarantine)

1. While there are ongoing discussions about how information rights should be defined, in this article, the concept refers to the rights of individuals and communities 'to know about the collection, use, or disclosure of personal information about them' (Caidi and Ross 2005: 669) and, furthermore, to participate in the flow of information (Nissenbaum 2009).

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INTRODUCTION

In response to the COVID-19 pandemic, governments implemented digital measures to control not only the virus but also the potential hosts of the virus – the population. Nation states' increasing reliance on digital technology is distinctively observed in how they coped with the pandemic. The digital measures taken during the pandemic, such as the tracing of personal data, exacerbated the dilemma between public safety and citizens' information rights.¹ This dilemma distinctively emerged in South Korea, where numerous digital tracing and surveillance technologies were quickly adopted during the pandemic (Kim et al. 2020; Ryan 2020; Sonn and Lee 2020). In response to the COVID-19 outbreak in early 2020, South Korea extensively implemented top-down digital measures to contain the virus through its centralized system of disease control (Sonn and Lee 2020; You 2020). In so doing, the government exhibited its desire for transition to a digitally advanced state and facilitated nationalism through a digital utopian discourse. However, the centralized control of COVID-19 through measures with which the South Korean public by and large complied raises the question of how far digital technology can infiltrate everyday life for the sake of public safety and how citizens can negotiate the rapid digital transformation of a nation state.

CENTRALIZED CONTROL THROUGH THE 3T STRATEGIES

South Korea was praised for its effective crisis management especially during the early months of the COVID-19 pandemic. For example, in an international report published in June 2020, among the Organisation for Economic Co-Operation and Development (OECD) member countries, South Korea was ranked the highest in terms of the ability to address the health impacts of COVID-19 and mitigate its impacts on the economy (Sustainable Development Solutions Network 2020). As of 10 November 2020, South Korea's COVID-19 mortality rate (deaths per 100,000 population) was 0.94 (485 deaths and 27,653 confirmed cases), which is significantly lower than those of most other countries, including OECD member countries – Australia (3.63: 907 deaths and 27,669 confirmed cases), Canada (28.66: 10,620 deaths and 272,034 confirmed cases), Chile (77.89: 14,588 deaths and 522,879 confirmed cases), Germany (13.76: 11,408 death and 689,146 confirmed cases), Japan (1.45: 1834 deaths and 109,191 confirmed cases), the United Kingdom (74.19: 49,329 deaths and 1,216,747 confirmed cases) and the United States (72.82: 238,256 deaths and 10,111,077 confirmed cases) (Johns Hopkins University Corona Virus Resource Center 2020). The South Korean government's disease control measures, referred to as 3Ts (test, trace and treat), were praised by global organizations (e.g. the World Health Organization), the overseas news media (e.g. Reuters, BBC and *The Washington Post*) and scholarly communities (e.g. Ryan 2020; Sonn and Lee 2020; You 2020).

Among the 3T processes, the speed and scope of South Korea's *testing* far exceeded those of any other countries. The government began widespread open public testing in February 2020, and as of 8 March 2020, 189,236

Koreans (3,692 per million people) had already been tested; this number can be compared with other countries in the same period, including the United States with 1,707 (five per million people) and the United Kingdom with 23,513 (347 per million people) (Woodward and Gould 2020). Prompt and extensive examination continued in South Korea through its more than 600 nationwide testing centres, which included conveniently designed drive-through and walk-through facilities (Thompson 2020). Moreover, the *treatment* of patients was prompted and supported by the effective allocation of medical resources. For example, COVID-19-positive individuals with mild symptoms were accommodated and monitored at government-managed temporary residential treatment centres – which were repurposed non-medical facilities, such as churches and corporations’ training centres – while hospitals treated patients with serious symptoms; in doing so, the depletion of medical resources was prevented (Noh et al. 2020). Overall, by allowing free testing and low-cost treatment,² the Korea National Health Insurance Service and its universal health coverage are considered an important foundation of the country’s effective handling of the pandemic (Kim and Castro 2020).

Regarding the 3T processes, although digital technology was used for *testing* and *treatment*, it was used more extensively for *tracing*. Various digital measures were implemented to trace and isolate those who contracted the virus, alert the general public and offer information regarding the recovery of those who were infected. The health authorities’ extensive access to and publication of personal data enabled tracing and alerting to be conducted. When necessary, South Korea’s Center for Disease Control and Prevention Agency, the central authority responsible for controlling the pandemic, disclosed people’s personal information, including their ages, genders, neighbourhoods, workplace locations and detailed logs of their routes per minute (Zastrow 2020). These centralized digital measures were made possible by the country’s legislation on infectious disease, which had been substantially updated to cope with the outbreak of the Middle East Respiratory Syndrome (MERS) in 2015 (Kim et al. 2020).

In the early months of the COVID-19 outbreak, the government reinforced the legislation and regulations that allowed extensive data tracing and surveillance. On 26 February 2020, prior to the World Health Organization’s declaration of COVID-19 as a pandemic on 11 March 2020, the South Korean parliament quickly passed legislation to allow the authorities to conduct extensive digital data tracing and to implement other online and offline measures; this legislation took effect on 1 March 2020. According to the amendment to the Infectious Disease Control and Prevention Act’s (2020) Articles 34-2 and 76, for the purpose of disease control, national and local governments and health authorities can access and disclose individuals’ personal information even without their consent. Furthermore, local authorities can force individuals who are suspected of having contracted an infectious disease to undergo testing; anyone who refuses to be tested is subject to penalties of up to 3 million KRW (equivalent to USD 2,800).

Based on the updated legislation and centralized disease control system, digital tracing was extensively incorporated into South Koreans’ everyday lives during the pandemic. Data about not only individuals who were infected but also those who were merely suspected of being infected were obtained through credit card transactions, mobile phone tracking, closed-circuit television footage, and travel and medical records, all of which were searched using a government-managed, big data-processing system called the Epidemic Investigation Support System (Shin et al. 2020). By applying algorithms to

2. Testing is open to anyone in South Korea and is free for those who have respiratory symptoms or a doctor’s referral; otherwise, the cost is 160,000 KRW (equivalent to USD 140) (Korea Disease Control and Prevention Agency 2020).

large-scale data in real time, this system accesses an individual's various data sets in about ten minutes (You 2020).

Moreover, various apps and alert systems were introduced during the early phase of the pandemic. Since 19 March 2020, all in-bound travellers and residents arriving from abroad were required to install the Self-Quarantine Safety Protection App or Self-Diagnosis App, which monitors their symptoms for fifteen days and automatically informs the authorities (Central Disaster Management Headquarters 2020). While COVID-19 alert systems have been introduced in many countries during the pandemic, the Korean alert system is distinctive because it enables extensive access to personal data while taking pre-emptive measures by identifying, alerting and tracing individuals who are potentially exposed to COVID-19 (Park 2020). In South Korea, when a person tests positive for COVID-19, a text alert is sent to everyone living nearby. This alert typically includes a link to a detailed log of the infected person's movements – in some cases, to the nearest minute – which are reconstructed from public data, such as closed-circuit television cameras (Kim et al. 2020). *Nature* magazine's editorial noted that the South Korean COVID-19 alert system 'is based on a degree of surveillance that people in many other countries will find hard to accept' (2020: par. 10). However, there are debates about the effectiveness of the alert apps, despite their nationwide use (Kasulis 2020).

Furthermore, on 10 June 2020, the government introduced the mandatory Electronic Visitor Registration System, based on Quick Response (QR) code verification technology, to a wide range of facilities, including museums, libraries, restaurants, movie theatres, clubs and gyms. All visitors to these facilities had to access a QR code check-in site via their smartphones and receive a code that is required for admission. This system stores the visitor's information (e.g. name, address and time of arrival) on the server of the government-sponsored Social Security Intelligence Service for four weeks (Yonhap News 2020a).

These extensive digital measures seem to have contributed to the country's ability to maintain relatively low COVID-19 infection and fatality rates without implementing complete lockdown measures (Sustainable Development

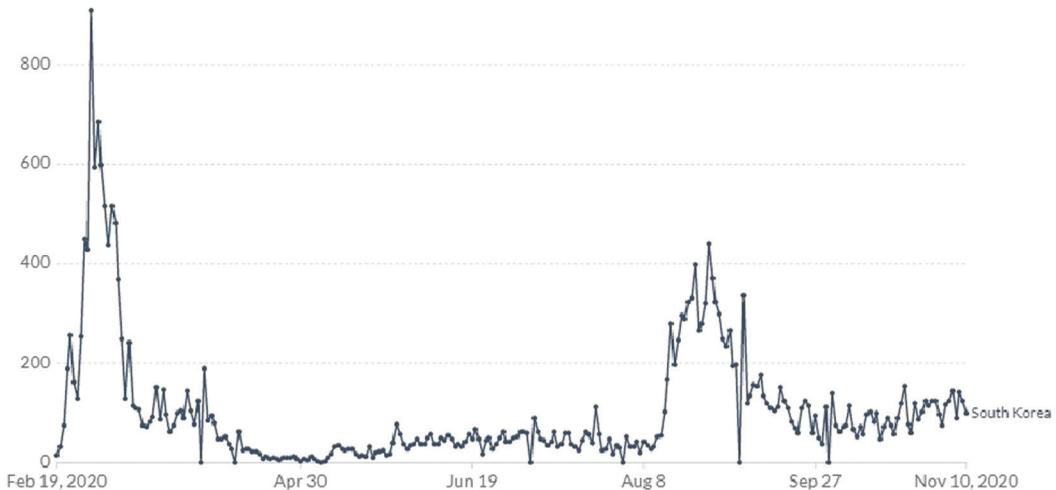


Figure 1: The number of daily COVID-19-positive cases between 19 February 2020, when the first positive case was reported, and 10 November 2020. Source: <https://ourworldindata.org/coronavirus/country/south-korea> (CC BY). Accessed 11 November 2020.

Solutions Network 2020). Praise for South Korea handling of COVID-19 was challenged when the number of new cases spiked in mid-August (see Figure 1). This was reportedly due to an evangelical church members' public gathering, which caused the daily number of positive cases to increase to 441 on 27 August 2020 – the highest since early March. By late September, the daily number of new cases decreased to fewer than 100. Even during and after the August surge, the government did not implement a complete lockdown (level 3), choosing instead to apply stricter social-distancing rules (level 2.5) in the Greater Seoul area for two weeks in August and September; the social distancing rule was again reduced to level 1 in October. As of 10 November 2020, South Korea's newly reported COVID-19 cases in the last 24 hours stood at 100 (cumulative total of 27,653), with five deaths (cumulative total deaths of 485). In other words, even after the August crisis, when compared with many other countries, South Korea still seemed to have relatively effective control of COVID-19 (World Health Organization 2020).

DISCOURSE OF THE POST-PANDEMIC DIGITAL TRANSFORMATION

The rapid deployment of digital surveillance was made possible by the country's information communication technology (ICT), which had already been extensively developed before the pandemic. According to the annually published ICT Development Index, widely used for international comparison, South Korea has been ranked first for the past decade, except in 2013 and 2017, when it was ranked second after Denmark (2013) or Iceland (2017) (The Telecommunication Development Sector 2020). South Korea continues to be known for having the world's highest penetration rate for smartphones; according to the Pew Research Center's 2018 survey, South Korea had the highest smartphone ownership rate of 95%, followed by Israel (88%), the Netherlands (87%), Sweden (85%), Australia (81%), the United States (81%) and Spain (80%) (Silver 2019). South Korea is also known for its high rate of active consumers who use credit cards, digital banking and other types of e-commerce, and for its credit card payment-oriented consumer economy, in which only 20% of payments are made by cash (Harris and Kang 2016). The country has the world's fifth largest e-commerce market and the highest digital banking penetration rate among Asian countries (Oberlo 2020; Herth 2018).

Undeniably, South Korea's already highly digitally oriented infrastructure and economy accelerated its use of the digital tracing system for COVID-19 control. Importantly, the disease control process also reinforced and was reinforced by a techno-utopian discourse in which digital technology is imagined as a solution to social problems and inherently accelerates social transformation (Kim 2018). In particular, the government, along with the news media and ICT industries, engaged with the discourse of digital transformation as post-pandemic South Korea's destination, defining technology as an instrument of economic growth, welfare and, in part, environmental sustainability (e.g. Ministry of Science and ICT 2020a, 2020b). In particular, encouraged by the foreign media's attention to South Korea's 'success story' regarding its disease control, the government proposed the promotion and development of the country as a digitally advanced nation. For example, in a report published in August 2020, the Ministry of Science and ICT (2020b) announced that the government would take advantage of the global attention being paid to South Korea owing to its response to the pandemic, using it as momentum for the country 'to become a global leader' in the science and technology fields. The government's initiative was not entirely new, as it resonated with preceding

3. South Korea's relatively effective COVID-19 control in the early months, especially compared with other economically advanced countries, earned the government a high approval rating, which also fuelled the ruling Democratic Party's massive win in the national parliamentary election in April 2020; this was the 'world's first nationwide vote of the Coronavirus era' and was conducted at physical polling stations (Delury 2020). Indeed, the South Korean public showed strong support for and compliance with the government's COVID-19 measures. According to an international survey of nineteen countries that were heavily affected by the COVID-19 pandemic in June 2020 (Lazarus et al. 2020), South Korea ranked high based on the public's favourable perception of the government's response to the pandemic; China was ranked first (mean score 80.48) and South Korea (74.54) second. These countries were followed by South Africa (64.62), India (63.88), Germany (61.32), Canada (61.00), Singapore (57.55), Italy (51.71), the United States (50.57), France (49.20), Russia (48.84), the United Kingdom (48.66), Mexico (46.48), Nigeria (46.32), Spain (44.68), Sweden (42.07), Poland (41.28), Brazil (36.35) and Ecuador (35.76).
4. Interestingly, despite South Korea's large size and high national economy indicators, South Koreans tend not to consider it an 'advanced country' (*seonjingu*). This perception is primarily derived from historical contexts, in that all areas of the country had to catch up with American systems

governments' heavy investment in technology and culture industries. Indeed, consecutive South Korean governments in the twenty-first century 'have continued to develop the ICT-led digital economy, considering ICT as one of the most important driving forces to foster growth in the national economy' (Jin 2017: 720).

Targeting overseas markets, the South Korean government endeavoured to brand the Korean infectious disease control measures as a Korean-developed set of know-how and technology, referred to as 'K-*bangyeok*' (K-quarantine) in Korean news media and government documents. The government continued to seek international recognition of its COVID-19 response measures, such as Korea-developed testing kits and methods, by proposing them to International Organization for Standardization (ISO)'s approval (Ministry of Food and Drug Safety 2020; Yonhap News 2020b). Benchmarking the rising global popularity of South Korean pop music (K-pop), the government aimed to export various bio- and digital-technological tools as a 'K' bundle, with the 'K' signifying Korea. The government established a task force to develop and export K-*bangyeok* packaged products, including tracing systems and mobile apps for implementing self-quarantine and identifying mask-sale locations, and thus, to enhance its national brand (Lee 2020). To facilitate the global dissemination of K-*bangyeok*, in May 2020, the government launched an international online seminar series (in English), titled 'Webinar on COVID-19 for policy and technology sharing', which primarily targets international audiences (<http://www.medicalkoreawebinar.or.kr/>), and published several English-language source books, such as the *Korean-English Glossary for Korea's Response to COVID-19* in July 2020.

While the government's endeavour to promote K-*bangyeok* targeted international markets, it also addressed South Korean citizens. By promoting its advanced digital technology and disease control system, the government, often along with the news media, circulated the discourse of national pride and thus mobilized citizens to further comply with the centralized pandemic control.³ The sense of nationalism and national pride was not only imposed through the state and media but also emerged among South Korean citizens, who felt an enhanced sense of national identity in response to the crisis. National surveys conducted in May and June 2020 revealed that the pandemic enhanced South Koreans' perception of their country as an 'advanced country' (*seonjingu*) – even more so than advanced western countries (Chun 2020; Federation of Korean Industries 2020). Based on the results of these surveys, critics argued that the country's effective response to the pandemic appeared to provide an opportunity for its people to overcome the inferiority complex vis-à-vis the West (Chun 2020).⁴

Based on the favourable evaluation of its pandemic control and public support, in July 2020, the government announced a long-term strategic plan for the country's transition to a post-pandemic world through the extensive use of digital technologies, which was referred to as a 'digital transformation' in government documents (e.g. Ministry of Science and ICT 2020a, 2020b). This 'Digital New Deal' plan, along with the 'Green New Deal' plan, constitutes the government's ambitious national policy titled the 'Korean New Deal', which aims to accelerate the country's proactive economic development in the post-pandemic world (Stangarone 2020).⁵ The aim of the Digital New Deal plan is to advance the digital technology infrastructure and data economy by generating a 'data dam' to collect an extensive range of data from public and private sources; this information can then be used to explore the big

data-based economy and generate a large number of new jobs (Ministry of Science and ICT 2020b). To achieve this objective, 560 billion KRW (equivalent to USD 459.2 million) was designated to build fifteen new big data platforms by 2025 (Stangarone 2020).

This five-year plan, announced during the country's battle with COVID-19, outlined the government's ambition to move towards a digital and data-based economy. However, the proposed big data economy, achieved through the early adoption and development of the centrally controllable infrastructure of an extensive range of data (i.e. a 'data dam'), does not seem to sufficiently address the issues that emerged during the pandemic period, such as citizens' rights to information. While the government's digital transformation plan seemed to propose a digital welfare state that offers digital technology-driven benefits, such as new jobs based on the data economy and enhanced public services (Alston 2019), the plan excluded discussions about how citizens would participate in the big data economy (e.g. how the data economy would be organized and how personal data would be protected). Thus, a few days after the government's announcement, an alliance of six major South Korean civic organizations criticized the Digital New Deal, describing it as 'a policy aiming to facilitate industries by selling citizens' personal information for the sake of fast digital transformation' (Koo 2020: par. 1).

As these examples suggest, a techno-utopian discourse, through which the country is defined and imagined as a forward-looking digital state, emerged in South Korea's response to COVID-19. The pandemic appears to be a crisis that provided momentum for South Korea's advanced digital technology to be tested and reimagined.

DILEMMAS IN THE POST-PANDEMIC DIGITAL TRANSFORMATION

South Korea's digital measures taken to cope with COVID-19, as well as the government's Digital New Deal plan, raise the question of how the probable side effects of the centrally controlled digital technology can be mitigated. While there were debates about the effectiveness, equity and transparency of the digital measures used in South Korea's disease control system, these issues have been insufficiently addressed in scholarly publications. Only a few recent studies have examined several factors that influenced the relatively effective control of COVID-19 in South Korea, such as the roles of the interventionist government, the national healthcare system and digital technology (Kim and Castro 2020; Kim et al. 2020; Sonn and Lee 2020; Ryan 2020; You 2020). These studies suggest that there is a trade-off between digital surveillance and physical lockdown. According to Sonn and Lee (2020), in response to the global pandemic, governments had to choose between 'two evils' – digital surveillance and lockdown – and South Korea chose the former. This perspective is echoed by Ryan (2020), who argues that the benefits of the digital contact-tracing technology outweigh its potential risks.

Responding to the increase in digital measures – especially the COVID-19 contact-tracing apps used in 71 countries as of October 2020 (Woodhams 2020) – digital media ethicists and activists have called for further discussions of the ethical use of digital technology during the pandemic. For example, in their study of COVID-19 contact-tracing apps, Klar and Lanzerath (2020) pointed out several challenges, such as the tracing apps' probable ineffectiveness (especially if used among a small population), technical problems (e.g. the false identification of positive cases), privacy infringement and inequity

during the post-colonial (since 1945) and post-Korean war period (since 1950). Postcolonial South Korea has been characterized by its extensive westernization and Americanization. South Koreans' desire to catch up with advanced western countries (especially the United States) has often resulted in frustration that their country is always mimicking the West (Choi 1993). In this regard, Koreans tend not to consider their country advanced, a fact that often surprises foreign journalists and critics (Marshall 2020). However, according to a survey conducted in June 2020, 83.9 per cent of Koreans perceived their country as advanced, largely due to its recent response to COVID-19, along with other reasons such as the country's entry into the '30/50 Club' (a group of countries with a gross national income of \$30,000 and a population of more than 50 million) in 2018 and its entry into the OECD in 1996 (Federation of Korean Industries 2020).

5. The Korean New Deal plan, announced on 14 July 2020, consists of two sub-plans – the Digital New Deal plan, which prepares the nation for its digital transformation, and the New Green Deal plan, which facilitates environmentally friendly industries and infrastructure. The government aims to invest 160 trillion won (USD 133.1 billion) until 2025 (Ministry of Culture, Sports and Tourism 2020). As implied in the term New Deal, the South Korean government promoted the plan as a twenty-first century

Korean equivalent to the post-Depression New Deal program implemented by the Franklin D. Roosevelt administration in the 1930s. The 'digital dam' as a core project of the Korean Digital New Deal intentionally makes use of the dam analogy to compare itself with Hoover Dam, which was constructed and contributed to generating new economies during the United States' Depression period.

6. The Itaewon outbreak occurred prior to the introduction of the aforementioned mandatory QR code check-in system; thus, visitors were advised to manually write down their contact information when entering the clubs and bars. Some visitors provided inaccurate information because of their fears that their LGBTQ identities would be revealed. The difficulties of tracing after the Itaewon outbreak led the government to introduce the mandatory QR code system later that same month (Kang and Hong 2020; Yoon and Martin 2020).

(e.g. the exclusion of those who are not digitally literate) (see also Taddeo 2020).

South Korea's digital-based central pandemic control system is not free of these challenges (Ryan 2020). First, the extensive digital measures – especially digital tracing – involved the 'social sorting' and profiling of the population (Ryan 2020). The South Korean Center for Disease Control and Prevention's extensive digital tracing revealed its risk to the public's information rights on several occasions. A prominent example is the stigmatization of sexual minority groups during the COVID-19 outbreak in the Itaewon cluster of Seoul, an area that is known for its LGBTQ (lesbian, gay, bisexual, transgender and queer)-friendly clubs. After a 29-year-old man who visited clubs and bars in the neighbourhood tested positive in May 2020, 5,500 people who were at the same locations on the same night were extensively traced (Yoon and Martin 2020).⁶ The infected man's personal information – including his age, gender, occupation, workplace address, neighbourhood and previous records of his whereabouts – was made public. Information about many others was also potentially exposed due to their visits to the Itaewon area. The information was widely disseminated and sensationalized, especially via the news media outlets that assumed the infected man's sexual orientation. They exposed his personal information, including records of his personal travels. During the first three days of the Itaewon outbreak, as many as 1,174 news articles included the keywords 'homosexuality', 'gay clubs' and 'gay', which had no relevance to tracing efforts (Yoon 2020). Driven by the commercial media's voracious appetite for sensationalism, many journalists chased down the personal data of individuals who tested positive (Yoon and Martin 2020).

Second, the highly digital technology-reliant measures implemented in South Korea may reinforce the existing digital and social divide. For example, South Korea's mandatory QR code system, which is required for customers and visitors to use certain facilities, has prevented some older people from accessing these facilities (Park and Lee 2020). As of 2019, 73.7 per cent of people 70 years or older owned a smartphone; however, 15.5 per cent of this age cohort owned 2G phones, which are unable to generate QR codes (National Information Society Agency 2020). Consequently, digitally marginalized groups, some of whom are also vulnerable to COVID-19 (e.g. older people), have limited access to public places and businesses. The extensive use of digital technology does not necessarily reduce the existing social inequalities, but potentially amplifies them. Natural disasters, like the COVID-19 pandemic, may entail human-made disasters that trap already marginalized people in a precarious situation (Madianou 2020).

Third, the technological glitches in tracing and alerting tools can infringe on citizens' rights to information and safety. The *New York Times* investigated the South Korean government's COVID-19 self-quarantine app and determined that it was vulnerable to attacks by hackers; personal information, such as people's names and real-time locations, could be retrieved by cyber attackers (Cho et al. 2020). Ironically, the system whose aim is to keep the public safe from bio-attacks seems to leave them vulnerable to extensive digital attacks. In addition to technical glitches and the vulnerability to cyberattacks, the users seem to be tired of receiving the authorities' continuous alerts and instructions on their personal smartphones. As the authorities' alert text messages were sent frequently (as many as ten times per day) during the pandemic, and South Koreans were not permitted to opt out of receiving them, some experienced fatigue and began to view the constant texts as a nuisance (Kasulis 2020).

Overall, the extensive data-tracing and alert systems implemented during the COVID-19 crisis showed how digital technology can be utilized to enhance public safety but potentially risks citizens' information rights, data security and social equity. These dilemmas over the extensive digital measures are concerned with the fundamental question of the governance of digital technologies (Taddeo 2020).

CONCLUSION

South Korea's response to the COVID-19 crisis relied extensively on digital technology. The government adopted digital surveillance and tracing measures instead of implementing a physical lockdown. South Korea's highly praised pandemic control provided momentum for the acceleration of the country's transition to the digital state on the one hand and for the reinforcement of nationalism on the other hand. This process suggests that the COVID-19 crisis has reshaped how the nation state deploys technology to manage its population. The South Korean government's Digital New Deal plan, which was developed as a digital technology policy in response to the pandemic, reveals how the nation state is shaped as an imagined community through the techno-utopian ideology of the digital as a solution and route to the future.

As the South Korean example reveals, the constant and extensive top-down digital measures implemented during the pandemic period can be deeply incorporated into everyday life, thus becoming the new normal; that is, 'what is justified during an emergency now may become normalized once the crisis has passed' (United Nations 2020: 16). The normalization of exceptional data surveillance measures suggests an ominous outlook for the digital state, in which social sorting and data-based profiling may continue. Critics have proposed that digital measures should be ethically designed and applied (Luciano 2020; Taddeo 2020), even in response to urgent circumstances such as the COVID-19 pandemic, and, furthermore, should be used only temporarily (Morley et al. 2020). In fact, in response to criticism about the disclosure of personal information, the Infectious Disease Control and Prevention Act was revised on 29 September 2020 to ensure that local authorities destroy the personal information of those who have contracted or are suspected of contracting the disease as soon as the purpose of the disclosure is achieved (Article 34-2-2). However, it remains uncertain how citizens will be informed of and allowed to participate in information flows. The government's digital measures and the Digital New Deal plan involve the extensive use of personal data; in the absence of platforms on which citizens can engage with information flows, citizens are not sufficiently informed of nor have control of when, where, why and how information about them is collected, managed, secured and publicized (Luciano 2020).

As the South Korean case illustrates, centralized digital measures contribute to the prompt control of the flow of infectious diseases through top-down information flows, while raising the question of citizens' information rights. The South Korean government's prompt intervention seemed to draw on the premise that digital surveillance can be an effective temporary measure for offline safety (e.g. everyday life without lockdown) (Ryan 2020; Sonn and Lee 2020). Nation states' increasing application of surveillance measures for the sake of national security and public safety, which potentially risks individuals' rights and freedom, has fuelled debates about the security-privacy trade-off (Friedewald 2017). Some critics argue that individuals' information rights and digital technology-driven

7. After the completion of this article, South Korea faced a new wave of COVID-19. The country witnessed an unexpected spike in positive cases in late November and December. As of 7 December 2020, daily cases exceeded 600 for the second day in a row, which is a quadruple increase in a month. The government enhanced social distancing measures to the second-highest level in the metropolitan Seoul area. On 7 December, the health minister said, '[t]he capital area is now a COVID-19 war zone'. He warned that the highest-level social distancing (lockdown) measure would be considered if the spread of COVID-19 was not controlled in time. Due to increasing community transmissions of unclear origin, the health authorities struggled to trace the virus. The digital tracing system no longer operated effectively compared with the earlier pandemic period. This new wave of COVID-19 transmissions further questions the effectiveness of digital technology-driven disease control, while challenging the myth of digital utopianism that was implied in the South Korean government's discourse about COVID-19.

public safety can coexist without sacrificing one for the other (e.g. Caidi and Ross 2005; Cavoukian 2017). As Cavoukian's (2017) discussion of the dilemma between privacy and security in the post-9–11 period suggested, the digital state does not have to sacrifice citizens' rights to information to ensure public security; rather, it can set human rights as the default design through technological innovation, such as particular forms of justice-driven artificial intelligence and legislation (see also Caidi and Ross 2005).

The COVID-19 crisis tests how information rights can be negotiated for public safety and centralized disease control and how technology should be incorporated into information flows. Digital measures were applied extensively in some countries, while being relatively slowly adopted or restricted in others. However, as the pandemic continued, an increasing number of countries incorporated digital measures, such as contact-tracing technologies. For example, Belgium, which initially decided not to use digital contact-tracing apps and witnessed a rapid increase of COVID-19 cases since September 2020, eventually launched one nationwide in September 2020 (Chini 2020).

At the time of writing this article, it is uncertain how far digital technology can be incorporated into governments' COVID-19 measures. A government's response to the pandemic affects how the nation state is shaped as a particular form of digital state in the post-pandemic world, as evidenced by the South Korean government's desire for big data-based governance and economic development, which is supported by the techno-utopian discourse of nationalism.⁷

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