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Seung-Youn Oh
Bryn Mawr College, soh03@brynmawr.edu

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RESEARCH ARTICLE

From a 'super spreader of MERS' to a 'super stopper' of COVID-19: Explaining the Evolution of South Korea's Effective Crisis Management System

Seung-Youn Oh

Department of Political Science, Bryn Mawr College, Bryn Mawr, PA, USA

ABSTRACT

COVID-19 has placed global and national leadership under a serious stress test by threatening lives and livelihoods on an unprecedented scale. South Korea emerged as one of the first countries to flatten the transmission curve despite its high population density and proximity to China, without imposing the aggressive lockdowns or complete travel bans that China and many other countries adopted. This paper explores two questions. First, what kind of institutional and legal foundations explain South Korea's strong public health response to the pandemic? Second, from a historical perspective, South Korea evaded the worst of the SARS outbreak in 2003 yet failed to replicate the success with MERS in 2015. What explains these fluctuating public health responses within a country and how did this effect South Korea's response to COVID-19? This paper argues that South Korea's crisis management system developed strategic agility and flexibility in its hierarchical model that allows crisis-friendly partnerships and swift collaboration among key actors to manage public policy challenges. Studying South Korea's responses to these three outbreaks will not only contribute to our understanding of *cross-national* crisis management but also further our comprehension of South Korea's evolution in public health response through analysing *intra-national* variations.

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COVID-19; South Korea; crisis management; agile government; collaborative network; public health

Introduction

The globalization of public health has emerged as a topic in policy discourse to reflect the challenges that transnational public health crises pose to both international and national governance systems. The outbreak of an infectious disease in one part of the world can quickly become a threat to all of humanity in the globalized and interconnected contemporary world. The COVID-19 pandemic not only exposes the varying degrees of effectiveness in countries' pandemic responses but also highlights the essentiality of *national* crisis management systems in disease containment within and across national boundaries.

South Korea emerged as one of the first countries to flatten the transmission curve, despite its high population density and proximity to China. South Korea was able to do so without imposing the aggressive lockdowns or complete travel bans that China and many

CONTACT Seung-Youn Oh soh03@brynmawr.edu Department of Political Science, Bryn Mawr College, Bryn Mawr, PA 19010, USA

other countries adopted. Instead, it managed the crisis based on the 'TRUST' strategy – an acronym for 'Transparency, Robust screening and quarantine, Unique but universally applicable testing, Strict control, and Treatment' (Ministry of Foreign Affairs, 2020). South Korea's strong public health approach to the unparalleled global pandemic is an outstanding achievement compared to its poor response to the Middle East Respiratory Syndrome (MERS) outbreak in 2015. South Korea failed to take prompt measures in the initial stage due to a lack of leadership and situational awareness, which led it to become the largest epicentre outside the Middle East. The current president Moon Jae-in (who was then the opposition party leader) criticized the government authorities as 'super spreaders of MERS' for their slow-footed response. This raises the question of what transformed the South Korean government from 'a super spreader of MERS' to a 'super stopper' of COVID-19 five years later.

Studying the South Korean experience will contribute to our understanding of *cross-national* crisis management and public governance by explaining the factors behind effective combat against COVID-19. It will also further our comprehension of the evolution of South Korea's crisis management system by examining the *intra-national* variations in the ways it handled three infectious diseases in the past two decades. In 2003, South Korea successfully contained the spread of Severe Acute Respiratory Syndrome (SARS) with only three confirmed cases, yet such success was not replicated with the MERS outbreak in 2015. What explains South Korea's varying response to a series of infectious diseases and what kind of lessons can we derive from that?

In answering these questions, this article argues that South Korea's crisis management system developed strategic agility and flexibility in its hierarchical model that allows crisis-friendly partnership and swift collaboration among key actors to manage uncertain public policy challenges. The initial hierarchical model filled the institutional gap in crisis management and allowed the top leader to orchestrate emergency operations with strategic direction and coordination among key stakeholders. Yet, the model's high reliance on the top leadership exposed its weakness with the MERS outbreak and opened the doors for organizational learning towards institutionalization and legalization for 'agile governance'.

The remainder of this article proceeds as follows. The first section discusses the literature highlighting the importance of an agile governance and organizational learning in crisis management. The following section illustrates South Korea's transition from the rigid top-down model to an adaptive and receptive institutionalized collaboration-friendly model. Five pillars of South Korea's crisis response system are introduced: 1) a crisis response agency with a clear chain of command and standard operating procedures at the national-level, 2) a situation-adaptive approach to central-local and local-local government collaboration, 3) swift public-private partnerships that enhance managerial capacity of key actors, 4) transparent crisis communication that promote a sense of urgency and the shared goals in the society, and 5) voluntary collaboration from the public. The final section discusses the public health policy lessons from South Korea's successful transformation from a super-spreader of MERS into an effective-fighter of COVID-19.

Literature review: collaborative capacity building through organizational learning

Contemporary society faces an increasing number of complex problems that go beyond the scope and capacity of any single organization. Thus, the government's ability to draw

timely coordination and collaboration among key governmental and non-governmental actors are key in solving public policy challenges. Managing emergencies further requires thorough preparedness and vigilant flexibility that adjust to different crises and evolving situations on the ground.

A crisis management system refers to the process of developing and implementing public policies for dealing with unexpected disasters and reducing the risk to human life: 1) pre-disaster prevention and preparedness, and 2) during- and post-disaster response and recovery (Petak, 1985). The former is a proactive phase that demands meticulous planning, whereas the latter is a reactive one that needs an immediate, flexible, vigilant and spontaneous approach. In the case of (re)emerging infectious diseases, the unanticipated aspects of the outbreak, the unknowns of the virus, the speed of transmission, and intense public fear make efforts in the pre-planning stage only partially useful and demand immediate measures in mobilizing and deploying necessary resources to the right places with a limited response time (Agranoff & McGuire, 2001; Mandell et al., 2017; O'Toole & Meier, 1999).

Both scholars and practitioners in public governance have widely recognized the importance of networks among stakeholders and the collaborative capacity to manage such partnership (Lai, 2012; Moynihan, 2005; Waugh & Streib, 2006). As the centre node of networks, clear leadership plays a pivotal role in coordinating multiorganizational, intergovernmental, and intersectoral operations to streamline command structures, mobilize resources without unnecessary inter-agency competition, and facilitate a circular flow of information. It contributes to sharing goals and responsibilities within networked actors in generating concerted and all-out efforts for crisis management (Jones et al., 1997; Kapucu, 2006). Leadership also holds the key to organizational learning, which refers to a process of information exchange, reflection, and feedback on successes and failures that results in a collective knowledge for organizational improvement and competitiveness (Argote, 2011; Moynihan, 2005). The capacity and willingness of policymakers significantly affects the extent, the scope, and the types of learning (Huber, 1991). The ultimate efficiency of the leadership comes down to its ability to mobilize resources and partnerships from local governments, private actors, and citizens. The article traces the following five factors to analyse the development of South Korea's crisis management system (see Table 1).

In South Korea, the landscape of public governance has shifted from a traditional top-down approach to a flexible and adaptive governance model through various opportunities for organizational learning. South Korea has been traditionally known as a strong 'developmental state' with a hierarchical top-down bureaucratic system and state-centred relationships with society (Amsden, 1989). Such characteristics may have stunted the development of horizontal collaboration within the government, yet the 'embedded autonomy' allowed the state to develop institutionalized channels with societal actors (Evans, 1995). Through economic and political liberalization, the South Korean government has gradually strengthened its collaborative capacity by drawing support from actors outside the bureaucracy to deliver public services and handle more complex social problems.

The South Korean crisis management system has been reconfigured through major failures of public policy implementations. The failures often create political momentum to revisit the existing structure and practices, generate an accumulation of new information, and subsequently lead to organizational changes. South Korea's first exposure to a major

Table 1. Five pillars of South Korea's crisis management system.

Pillars	Functions
Control Tower/ Leadership	– Streamlines command structures in intergovernmental and intersectoral operations – Mobilizes resources without unnecessary inter-agency competition – Contributes to sharing goals and responsibilities among stakeholders
Centre-Local/ Local-Local Partnership	– Enables division of labour where central government provides broader goals and a framework for collaboration and local governments takes specific actions catered to the needs of each region – Permits mobilization of locality-specific resources
Public-Private Partnership	– Allows more efficient use of resources and better capacity to plan for and address complex social problems – Ensures greater competitiveness and higher quality in public services
Crisis Communication	– Consolidates shared goals and collaboration among stakeholders, when transparent and timely – Cultivates a sense of urgency and community that increases people's trust in government authorities and willingness to abide by public health guidelines
Public Collaboration	– Serves as key in effective prevention and mitigation of public crisis

epidemic with SARS in 2003 demonstrates how the top-down leadership with strong state capacity became a source for speedy crisis management despite the lack of institutional settings for infectious disease control and prevention, and addressed the problems of dispersed responsibility and scattered resources. As such, the hierarchical system can play a central role as a coordinator of emergency operations to provide strategic direction and essential links among key stakeholders with a clear chain of communications. It can fill the institutional and legal gap to set up clear rules for collaboration among key actors, and create faster and more consistent responses. This should be distinguished from an authoritarian model where information flows only from the top to bottom, and lower-level government officials and social actors have little agency in planning and delivering operations.

However, its high reliance on the insight and vision of a particular leader lacks consistency and reliability. Lack of awareness by the leadership or different political priorities other than infectious disease control could easily lead to a poor response and significant damage to social stability. South Korea quickly learned such pitfalls of the rigid hierarchical command-and-control model through the traumatic failure of the MERS outbreak response but quickly adopted 'quadruple-loop learning' by continuously updating internal knowledge and operations with external information from political and social contexts to improve for the next crisis (Lee et al., 2020). Through iterative and interactive learning process, South Korea successfully combined centralization with adaptive agility in its crisis management system based on a flexible organizational structure, collaborative participation of stakeholders, strategic resource management, and an efficient decision-making process (Moon, 2020).

From rigidity to agility: evolution of South Korea's crisis management system

From a cross-national perspective, South Korea's strong public health approach to COVID-19 showcases the necessary institutional and legal foundations that other countries could emulate. From an intra-national perspective, examining South Korea's evolution in its public health approach demonstrates the importance of organizational learning and

taking specific actions to move from a hierarchical, ad-hoc management system to an institutionalized, agile system. This section will argue how such development took place within the hierarchical model by replacing a 'rigid' top-down system with 'agile' governance by increasing collaborative and managerial capacity, rather than demonstrating a shift from a hierarchical to a horizontal model. When collaborative network-based crisis management is clearly institutionalized, the hierarchical model can effectively activate crisis-friendly partnerships among stakeholders and increase managerial capacity. In doing so, the section will provide a comparative analysis of South Korea's evolving crisis response system in three main periods of international public health crisis: SARS in 2003, MERS in 2015, and COVID-19 in 2020. Given the differences in intensity and duration of the different epidemics, more focus will be placed on South Korea's institutionalization after the MERS outbreak. Yet, examining the evolution of crisis management system from the SARS case is critical because organizational learning takes place over time through experiencing successes and failures at critical junctures.

In 2003, South Korea successfully contained SARS early on with only three confirmed patients when there were more than 8,000 confirmed cases and 813 deaths in 26 countries, of which 7,000 cases were in mainland China and Hong Kong. Despite its geographical proximity to China and absence of a specialized government agency for epidemic control, South Korea evaded the worst of SARS because its strong central leadership had early awareness of the severity of the SARS outbreak in neighbouring countries and used its capacity for prompt mobilization of resources and experts.

Even prior to the first confirmed case in the country, the then South Korean President, Roh Moo-Hyun, immediately created the Pan-government Countermeasures Support Headquarters, led by the Prime Minister. Under the Headquarters, the Office for Government Policy Coordination, various ministries, the National Institute of Health, local quarantine stations, and health centres formed a multiorganizational network to unite efforts to build strong prevention and control measures (see Figure 1). Such critical prevention measures included investigation for tracing the routes of suspected patients, quarantines, emergency medical support and an information hotline. The WHO named South Korea a role model for infectious disease prevention due to its hierarchical model that filled the gap left by the lack of institutional development and standard operating procedures.

Yet, the 2015 MERS outbreak exposed the weakness of a system with the leadership as the sole deciding activator of the pan-governmental crisis management system. South Korea learned such lessons with the 2015 outbreak of MERS. South Korea suffered the largest MERS outbreak outside of the Middle East – 186 cases, 38 deaths, and 16,752 people placed under quarantine (WHO, 2014a). South Korea started to make major changes in the course of fighting MERS to enhance agility for a flexible disaster approach and facilitate collaboration through institutionalization and legalization.

National-level coordination

In crisis management, clear leadership plays a critical role in coordinating intergovernmental and intersectoral operations to streamline command structures, mobilize resources, and create a shared goal among stakeholders to generate all-out efforts for crisis management. During the MERS outbreak, South Korea initially started with

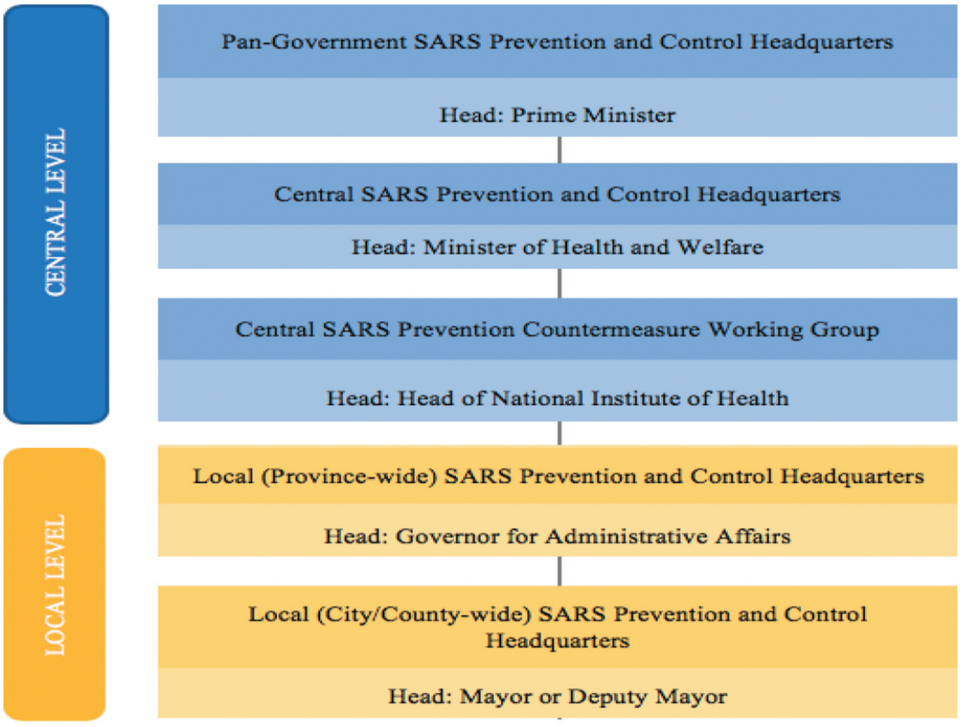

Figure 1. South Korea's 'centralized' crisis response system with SARS. **Source**: Kwon (2003).

inappropriate leadership strategies and a lack of situational awareness. MERS first appeared in Saudi Arabia in 2012 and continued to spread in the Middle East; by mid-2014 there were 852 confirmed cases globally and 301 related deaths reported to the WHO (WHO, 2016). The WHO issued MERS recommendations in May 2014, suggesting that countries increase MERS awareness and incorporate prevention and response measures into existing legal frameworks (WHO, 2014b). Yet, the South Korean authorities failed to adopt adequate measures and South Korea's legal framework for disease prevention, the Infectious Disease Control and Prevention Act, had not been updated to include MERS on the list of infectious diseases at the time of the outbreak in South Korea in May 2015. Thus, the government lacked a legal basis for an extensive response.

The absence of legal provision, however, was not in stark contrast with the SARS outbreak in South Korea. What differentiated the two circumstances was the lack of crisis-response leadership during the MERS outbreak (Bae, 2016; Go & Park, 2018; Jang & Park, 2017). The South Korea Centre for Disease Control and Prevention (KCDC) was created in 2004 as the main epidemic control centre under the Ministry of Health and Welfare. The KCDC led the response to MERS, but its director-level administrative status lacked independent decision-making power and a channel for horizontal collaboration with other ministries. For example, the director could not authorize a shutdown of facilities and other pre-emptive quarantine measures without higher-up approval. The South Korean authorities established several ad-hoc organizations instead of giving more power to the KCDC or streamlining the chain of command. The Ministry of Health formed the Central MERS

Management Headquarters, while the former Ministry of Public Safety and Security – which merged with the Ministry of the Interior in 2017 – created the MERS Response Support Headquarters. As Figure 2 shows, a total of five competing and overlapping chains of command sprang up within three weeks without clear guidelines for inter-agency collaboration. Consequently, the KCDC spent more time explaining situations to bureaucrats of these five organizations than productively using its expertise and resources to contain MERS.

The uncoordinated response was aggravated by the absence of an integrated control tower to oversee the ad-hoc headquarters and coordinate the responsibilities of different line ministries. The Central Disaster and Safety Countermeasure Headquarters (CDSCH) headed by the Prime Minister is the highest-level organization in charge of crisis management, which can facilitate inter-agency cooperation with power that exceeds that of the heads of the Ministry of Economy and Finance and the Department of Education at the deputy-prime minister-level. However, the CDSCH could not be formed during the MERS outbreak because the alert level was never raised beyond caution (yellow) despite its rapid spread, as its activation required the highest alert level. Setting the proper alert level is critical because each alert level establishes corresponding response measures, specifies the roles of relevant institutions, and activates the potential personnel for epidemic control. In addition, it also accurately signals the severity of the situations to relevant agencies and the public.

Following the MERS outbreak, the South Korean authorities realized the importance of an integrated control tower at the national level and the provision of clear manuals. First, the KCDC gained greater authority over epidemic control issues with an administrative upgrade from a director to a deputy-ministerial-level agency. Second, the KCDC established the Emergency Operations Centre, which performs both key preparation and response functions when infectious diseases emerge in South Korea. The Centre's Division of Risk Assessment and International Cooperation facilitates international monitoring, collaboration, and informational analysis with international organizations such as the WHO and Global Health Security Agenda. Third, the KCDC increased the number of full-time epidemiology investigators and epidemic control officers.

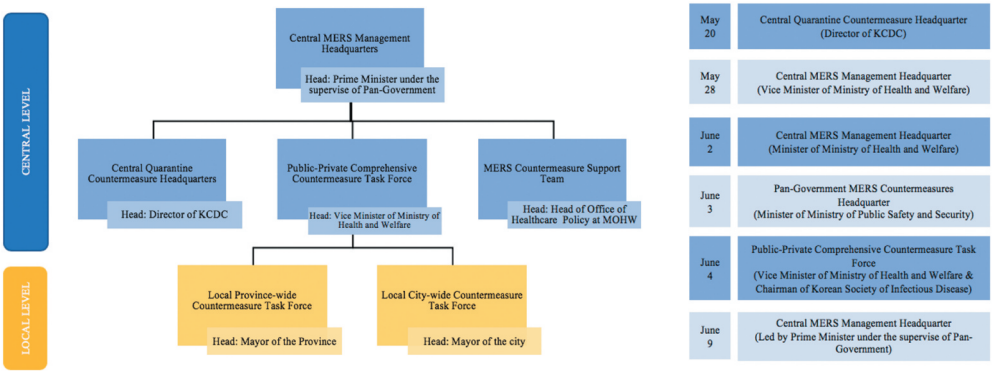

Figure 2. South Korea's 'fragmented' MERS response system (right) and changes of responsible agencies (left). **Source**: Ministry of Health and Welfare (2016).

The South Korean government raised its national alert level with COVID-19 more quickly than it did with MERS. The level was raised to attention (blue) on January 3rd, 2020, three days after COVID-19 was reported to the WHO, to caution (yellow) with the first confirmed case on January 20, and to warning (orange) on January 27 with four confirmed cases, and finally to the highest alert level of red on February 23 with the massive outbreak in Daegu city. With the country on red alert, the CDSCH, under the Prime Minister's leadership, was assembled to discuss drastic measures such as closing schools, limiting public transportation, and border closures and lockdowns.

Centre-local and local-local government partnership

A rapid response in combating the spread of the virus requires mobilization of locality-specific resources. While the central government provides a broader framework for epidemic control, the local governments are at the frontlines, taking specific actions for each region. During the MERS outbreak, a lack of general awareness and the absence of clear manuals on cooperation undermined effective response and led to the nation-wide crisis (Ministry of Health and Welfare, 2016). The Prevention of Contagious Disease Act limited the role of local governments to preventive vaccination. As a result, the central government took control over the regional responses throughout the country, creating a rigid and slow-footed response. On several occasions, the KCDC transferred MERS patients to local medical facilities without notifying the local authorities, causing tensions with the local leaders and insufficient preparation to cope with the situation.

In 2015, an amendment to the Infectious Disease Control and Prevention Act (IDCPA) created a legal basis for clear central-local cooperation and explicitly referenced local governments as a body responsible for disease control measures, while mandating that the local municipalities have at least two epidemiology investigators (Article 4 & 5). With an outbreak, provincial and municipal governments can establish Local Disaster and Safety Management Headquarters to conduct investigations, secure supplies, take necessary measures, and repost cases publicly. The IDCPA also allows for the formation of organizations connecting major local hospitals, medical doctors, and individual experts for comprehensive and effective disease control (Article 8).

On February 23, at a pan-government meeting, President Moon ordered both the central and local governments to take unprecedented measures to stop the virus (Dae, 2020). The central-local partnership proved its worth when the city of Daegu confronted massive community transmission in late February among the members of the Shincheonji Church of Jesus. The group's secretive nature and unique service style of sitting on the floor next to each other heightened government and public concerns. The CDSCH collected the list of church members and shared with the local governments for mandatory testing. The KCDC immediately granted local authorities more power to take necessary actions without first reporting to KCDC, while transferring the testing kits to local medical institutes to expedite testing.

Based on this flexible coordination, provincial leaders issued an emergency executive order for a two-week shutdown of Shincheonji-related facilities and revealed a list of unofficial Shincheonji churches to break the chain of transmission. Regions with few church members offered free testing, while larger centres like Daegu announced potential prosecution of non-cooperative individuals. Such localized strategies enabled the rapid

testing of all 200,000 Shincheonji members. In early March, church members accounted for over 60% of all confirmed cases, making Korea one of the more significant flashpoints of the global virus (Korean Central Disease Control [KCDC], 2020). By March 15, only 41 new cases were reported. In addition to the central-local government cooperation, local governments supported each other by sharing medical personnel and supplies across regions. The epidemic response network involving the national KCDC, local governments, and local medical associations effectively managed the massive outbreak through networked collaboration (see Figure 3).

Public-private partnership

Due to the increasingly complex nature of social problems, public services are delivered through networks of multiple governmental organizations and are often outsourced to nongovernmental actors including private sectors and communities. The public-private partnership invites more efficient use of resources, better capacity to plan for and address complex problems, greater competitiveness, and higher-quality services for customers (Brass et al., 2004; Huxham & Vangen, 2005). Accordingly, a crisis-friendly public-private partnership is vital for meeting public demands. To create a comprehensive crisis management system, private medical communities and biotech companies can assist in developing the best offensive in epidemic control–early and extensive testing, accurate diagnoses, and scaling and speeding up testing kits. In 2015, South Korea's public health system missed an opportunity to detect the outbreak when a newly developed MERS in-vitro diagnostic kit had not passed clinical trials and could not be used outside of the KCDC (Kim, 2020). Sticking to the rigid customary regulations led to a lack of testing, which prompted people infected with MERS to visit multiple hospitals and turned those hospitals into the country's main sites of disease transmission (Oh et al., 2018).

After the MERS outbreak, the government learned the importance of public-private linkages in developing testing resources and enacted an amendment to the Medical

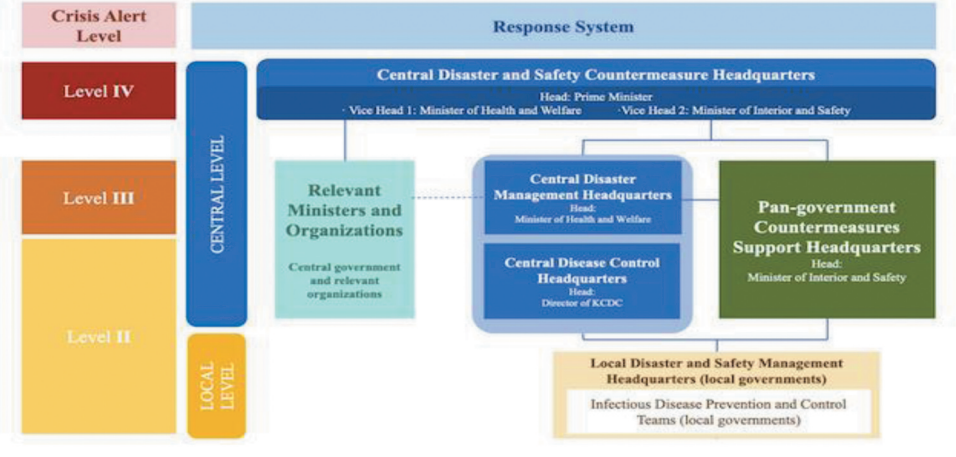

Figure 3. South Korea's 'two-top' crisis response system with COVID-19. **Source**: Ministry of Health and Welfare (2020).

Devices Act (Article 46–2) in June 2016 to promote public-private medical partnerships. The Act permits the government to authorize the use of unapproved in-vitro diagnostic test kits in an emergency when no approved diagnostic tests are available. Within one week of the first confirmed COVID-19 case in South Korea on January 27th, 2020, the KCDC's COVID-19 Task Force Team convened a meeting with biotech companies to develop a test kit and promised the activation of the emergency approval system. The first authorization of an unlicensed COVID-19 test came on February 4, with three more test methods approved by the end of February. As a result of public–private partnership, national and private healthcare providers set up a mostly free testing effort across South Korea with more than 600 locations that screen up to 20,000 people a day. National authorities also welcomed innovation by local governments and hospitals such as drive-through and walk-through test stations. The government provided ex-post approval and created guidelines to be circulated nationwide (Lee & Lee, 2020).

Two globally lauded recipes for South Korea's successful battle against the virus, the testing kit and the drive-through system, are the product of public–private partnership. The effective 3 T model (Test, Trace, Treat) has allowed South Korea to control the spread of the virus without drastic measures like complete lockdowns or travel bans. The situation is often compared with that of the United States, whose first case was detected the same day as South Korea's on January 20th. While South Korea streamlined bureaucracy and public-private partnership based on a sense of urgency, the US struggled to meet demand for testing as a result of a fragmented bureaucracy and a rigid reliance on protocol. Instead of drafting the private sector early on to develop tests, U.S. health officials stuck to time-consuming vetting procedures and relied on test-kits prepared by the U.S. Centres for Disease Control and Prevention until Feb. 29, but some test-kits were faulty and not approved by the U.S. Food and Drug Administration.

Crisis communication

Sharing credible information to different agencies and the public in a timely and transparent manner is key in consolidating shared goals and cultivating a sense of urgency and community (Jang & Baek, 2019; Reynolds & Seeger, 2005). First, the circular flow of information becomes the building block of collaboration. The centre must circulate up-to-date information to the local agencies and to the public on the disease, transmission, and overall strategic planning. The information should flow from the bottom to the top so that strategic planning can be updated and adjusted.

Second, clear crisis communication contributes to developing and preserving trust while increasing the government's authoritativeness within the society (Siegrist & Zingg, 2014). If the government does not provide adequate information, people seek alternative communication channels to resolve ambiguity and anxiety. This will open doors for misinformation that further aggravates public panic, causing serious conflicts with public health guidelines. Third, as shown in various studies on the 'protection motivation theory', people's risk perception of the severity of a health threat contributes to public participation in adopting public health guidelines and preventive measures (Ibuka et al., 2010; Rogers, 1975). Circulating consistent information throughout various communication channels, including traditional media outlets and social media platforms, can increase people's risk awareness and encourage their adoption of preventive measures.

Furthermore, people's willingness to abide by public health guidelines largely depends on their trust in the government's ability to respond to crises. Therefore, disclosing trustworthy and consistent information promptly and pre-emptively to the public not only enables the citizens to appropriately assess transmission risks but also to cooperate with the government measures (Kim et al., 2019).

During the MERS outbreak, the Korean authorities maintained a secretive approach and withheld key information on patients' locations, fearing that the public would panic and demand that hospitals treating MERS patients shut down completely (Noh et al., 2020). The public began seeking and sharing unofficial information about MERS through online media and offline social networks, including a citizen-made online MERS map identifying hospitals and other locations where MERS had been reported. This led to the spread of fake news, which stoked greater fears among the public and compromised public health directives. The government relied solely on the traditional media outlet as a communication channel with the public instead of the social media outlets where most Korean people consume news and share information. Additionally, several mayors decided to contradict KCDC guidelines and release information about local MERS patients based on the public's 'right to know'.

Following MERS, the 2015 IDCPA amendment mandated risk communications to the public. The KCDC established the Office of Risk Communication in 2016 to provide guidance on how to disclose trustworthy information promptly to local governments, medical facilities and the public. Since the first confirmed case of COVID-19 in Korea on 20 Januaryth, the KCDC Director, Jung Eun-kyeong, has been leading the country's daily briefing with an approval rating of 90% (Jung, 2020). Foreign media lauds her for her leadership and clear communication that earned public trust (Walker, 2020). The government's public information campaigns about the development of COVID-19 and public health guidelines are circulated through various platforms, including an official website, TV, social media, text messages, posts and placards to provide consistent guidelines across various channels. This transparent, versatile, and integrated communication system functions as a heavy counterweight to rumours, myths, and misinformation.

The revision of the IDCPA also granted public health officials greater access to personal information on suspected patients, mandating that telecommunication businesses should agree to health authorities' and local polices' requests for locational information on patients and suspected patients (Article 76–2). This allows public health authorities and local governments to collaborate to obtain information about patients' movements during a public health emergency using closed circuit television footage, cell phone records, credit card receipts, and other private data. All local governments send out brief summaries of emergency information to citizens through websites, text messages, and social media.

Citizens' participation

The effective prevention and mitigation of infectious diseases cannot take place without citizens' participation in complying with public health guidelines, especially when actions such as wearing masks and self-isolation are difficult to enforce or reward. Knowing the significance of nonpharmaceutical interventions such as personal sanitization and social distancing, the South Korean government launched extensive public information

campaigns to educate the public and promote citizens' engagement (Moon, 2020). The public was also actively engaged by learning from the traumatic experience with the MERS outbreak on the importance of precautionary measures.

In addition to voluntary participation, some citizens took more proactive actions and developed user-friendly apps to improve the visualization and accessibility of the official information released by the government authorities. For example, 'Corona Map' shows the confirmed cases by region and 'Corona 100 m' alerts users when they breach the 100-metre radius of a confirmed patient. How to strike a balance between civil liberties and public health demands is subject to further discussion – but according to a poll conducted in February, nearly half of South Korean citizens called for more information disclosure while only six percent wanted less (Realmeter, 2020). Many South Koreans prioritize public health over privacy during an outbreak, valuing their freedom of movement (which would be unavailable during a complete lockdown) more than the privacy protections. As such, South Korea's relative success in combating the virus without a complete lockdown is the result of the government-citizen collaboration that fostered a virtuous cycle. The government's effective and agile approach increased citizens' trust and created a form of solidarity among citizens that encouraged social collaboration with government directives.

Summary of integrated framework

South Korea's crisis management system evolved from a rigid to an agile hierarchical model through organizational learning to institutionalize collaborative network-based crisis management and build crisis-friendly partnerships among stakeholders (see Table 2). It is important to note that political leadership and institutionalization of crisis management systems are not necessarily conflicting strategies. First, moving towards institutionalization does not mean less power for the top political leadership. Ultimately, political will and power to improve organizational efficiency are key to organizational learning based on past experiences and accumulated institutional memory. The different security mindsets and strategic visions of the South Korean President can affect situational awareness of the developing crisis and subsequent activation of the crisis management system. Jeong and Choi (2017) argue that President Roh Moo-Hyun's focus on comprehensive security allowed him to take vigilant action to prevent SARS, while President Park Geun-Hye's emphasis on traditional security threats led to a poor response to disasters and infectious diseases. Following this logic, the current President Moon Jae-in's attention to human security, prioritizing people's lives and safety, contributed to swift control and response to the COVID-19 outbreak.

Second, stronger institutional and legal foundations of crisis management provide sustainability of the governance system to weather political leadership changes at the top. The initial model's high reliance on top leadership exposed its weakness with the MERS outbreak and opened the doors for organizational learning towards an institutionalized collaborative network. The system in place allowed South Korea's political leaders to take a back seat and permit scientific experts to lead the management of the crisis since January 2020. With the KCDC as the national command centre, both governmental and non-governmental actors within the network committed to the shared goal of outbreak control and earned the public trust. Science and politics have been called 'uneasy

Table 2. Comparison of South Korea's public health crisis management (as of November 2020).

	SARS (2003)	MERS (2015)	COVID-19 (2020)
Governance Model	A Rigid Hierarchical Command		An Agile Hierarchical Collaboration
Top Leader	Roh Moo-Hyun	Park Geun-Hye	Moon Jae-In
Security Focus	Comprehensive security	Traditional security	Human security
Control Tower/ Network leader	Unified: Prime Minister	Fragmented: KCDC→ Ministry of Health and Welfare → Prime Minister	Centralized two-top: - Prime Minister (administration) - KCDC (disease control)
Centre-Local/ Local-Local Partnership	Harmonious	Conflictual	Harmonious
Public-Private Partnership	- No significant need due to early prevention - Excluded private hospitals	- Weak due to rigid reliance on protocol	- Swift through Emergency Use Authorization policy - Networks with major local hospitals, medical doctors, and individual experts
Crisis Communication	- Transparent - Top-down	- Secretive - Reliance on traditional media	- Transparent - Circular - Traditional & social media
Trust within the Network	Strong	Weak	Strong
Shared Goal among Actors	Clear manual with specific goals	Weak manual with no specific goals	Clear manual & consistent reinforcement
Domestic confirmed cases (death cases)	3 (0)	186 (38)	34,201 (526)
Global total confirmed cases (death cases)	8,098 (774)	2,519 (866)	65,760,928 (1,515,990)
Duration	March -July 2003	May – December 2015	January 2020- (through November 2020)

bedfellows' (Nature News, 2012). South Korea was able to balance that tricky relationship without politicizing the pandemic, avoiding a risk that several countries are running which undermines crisis control efforts.

Concluding remarks

Global and national leaders have been placed under a serious stress test in the face of an international public health crisis that is unprecedented in living memory. The COVID-19 pandemic highlights the dangers of non-traditional security threats that are transnational in scope and non-military in nature. The paradox of coping with such a threat is that as much as it demands global collaboration, the first frontline starts with each nation's crisis management. Effective crisis management systems depend on the ability of political leaders and public officials to fully comprehend the complexities of policy networks and tap into partnership across the whole nation in making all-out efforts to ameliorate the public health crisis.

It is often said that the common traits of countries that have effectively managed the COVID-19 outbreak have shared the experience of SARS. Yet the details of what countries actually learned and changed have not been fully unpacked. Through the case study of

South Korea's development of infectious disease management, this article showed what public policy lessons South Korea derived from its own success and mistakes through the SARS and MERS outbreaks, and took significant steps to add agility and increase collaborative capacity through stronger legal and institutional foundation-building in preparation for tomorrow's crisis. As a country that made the transition from a rigid to a flexible hierarchical governance model, and a country with fluctuating experiences with epidemics, South Korea demonstrates that striking the right balance between politics and science, and strengthening the appropriate partnerships within society, are integral for countries to overcome the pandemic. South Korea also presents liberal democratic countries with an alternative to the top-heavy approach that some countries employed in response to COVID-19. Transparency, communication, and networked collaboration are the key weapons in the battle against this invisible, mysterious, and debilitating infectious disease.

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