

Reacting to a Large-Scale UNK-UNK during Its Initial Onset: Fast Response and Retrospective Sensemaking in South Korea

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Abstract: - This study addresses how a nation may cope with a large unknow-unknown event with looming uncertainty. We focus on Korea's response to the onslaught of COVID-19. Although Korea's response was fast and immediate, it was also incremental and disjointed. This study aims to provide a structured understanding of the confusing state of early responses. We adopt the theory-building approach based on case studies and use newspaper articles and government press releases as the primary sources of data. We develop a grounded theoretical model as evidence and use the enactment theory to explain the underlying empirical and theoretical dynamics.

Key-Words: - fast response, incremental changes, sensemaking, grounded theoretical model, enactment theory, COVID-19.

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1 Introduction

As nations slowly emerge from the effects of COVID-19, scholars are asking what we may have learned from this large unknow-unknown (unk-unk) event, [1], [2]. They pose how we would respond if another one descended on us again. To address these important questions, we go back to the early months of COVID-19 and study how one government with its citizens coped with the onslaught of the virus. As, [3], point out, this unk-unk event affected entire societies. If so, governments should seriously devise ways to actively solve such problems that affect the entire society, [4]. Our goal is to offer one model for how a nation might respond in the future if another large unk-unk happens again.

The fundamental lesson is that we will not be able to act coherently and that is to be

expected. Planning cannot lead to responding because much is unknown and unproven, [5]. The responses at best can happen incrementally albeit haphazardly. The critical element here is that the responses need to make sense to rally the public, and that involves what, [6], [7] has called "retrospective sensemaking," where action leads to thinking. And that is how South Korea responded. We study the process of early responses in a grounded theory approach using major incidents during the early months as cases.

Among the countries affected early by COVID-19, Korea is considered one of the countries that responded comparatively well. In fact, by February 22, 2021, the confirmed cases

in Korea were only 0.17% of the total population, compared to 1.43% worldwide and 8.66% in the U.S., [8]. The real gross domestic product (GDP) growth of Korea in 2020 was -1.1%, compared to -3.7% in the U.S., -7.5% in the European areas, and -4.2% worldwide, [9]. Many media outlets at the time recognized Korea's response to COVID-19 as exemplary, [10], [11], [12]. Theoretically, the early months after the onset of such a major unk-unk event would imply the highest level of uncertainty. According to, [13], the COVID-19 pandemic was, by far, different from other crises that occurred in terms of cause, scope, and severity.

Similar to other countries, the Korean government faced a series of COVID-19-related crises, and preparation for a disruption of this magnitude was simply not possible. What appeared to have happened was reacting as best as they could to changing conditions that they had little control over. The responses were incremental and reactive with various degrees of successes and failures, [14]. In general, the government (i.e., KCDC) responded fast to the emerging crises. The literature discusses *pali pali*, roughly translated as quickly-quickly, as a cultural trait wherein Koreans would react fast to impending problems no matter the cost, including personal sacrifices, [15]. In addition, the effective response to the nationwide crisis involved cooperation between the government and the industries and public. Therefore, we aim to answer the following questions:

RQ1. What are the underlying mechanisms for Korea's fast response to the onslaught of COVID-19?

RQ2: How has the government worked with the industries and general public in its response to emerging incidental crises?

To answer these questions, we focus on three streams of research. First, we search for research related to managing change, [16], [17], to investigate how the government works with the public to help make sense during crises, [14]. Second, research on disaster responses and humanitarian operations management in the operations management field has focused on natural and human-made disasters, such as hurricanes, earthquakes, and large-scale fires, [18], [19]. Their main focus during disasters has

been on efficient responses by coordinating with various stakeholders, [18], mobilization of resources, [20], and timely sharing of information, [21]. Third, the literature on strategic change has investigated how decisions and changes are made, [6], [22], [23]. This body of literature evaluates decisions and changes made in small steps under bounded rationality, [24], [25], and in search of adaptation, [26].

2 Literature Review

Disasters caused by an epidemic are different from other types of disasters. In the case of COVID-19, the virus propagated with human movements causing disruptions. The impact tended to be more prolonged with ripple effects across supply chains, [27], where many entities are interconnected, [28], [29], [30]. Unlike other disasters, epidemic outbreaks develop and spread over vast geographic areas quickly, [31], requiring timely and continual adaptation against uncertainty and ambiguity.

2.1 Reactive and Adaptive Changes

During an epidemic crisis, changes are generally made in a forced manner with limited scope to provide immediate response, [17]. Time pressures are enormous, [32], and decision behaviors must cope with added stress under time pressure. Protocols for policy-making and problem-solving generally allow muddling through, [22], [23] and incrementalism, [26], [33], [34], which promote selective responses to be able to adapt to disruptions with minimal predictability, [35], [36].

Thus, changes during pandemic situations should be made immediately. Events change quickly, and new information emerges. In particular, responses can be formulated complementing the routines and structures of emergency management, [37], and selective adaptations are then made to specialized circumstances surrounding crises. As argued by, [18], the shifting situations in humanitarian disasters require humanitarian organizations to continuously adapt their operations.

Natural and human-made disasters usually occur in certain geographic areas and time scopes. However, pandemic outbreaks start at a certain time point and continue for a much longer period with changing situations. Despite this gap, the distinguishing aspect of how responses are constructed in the dynamic interplay between the environment and actions has been rarely explored.

In this regard, to suppress public anxiety and help them make sense of how they are adapting to emerging situations, managing general opinions through uncertain times becomes important.

How certain groups influence the understanding of emerging issues has been investigated in research on the social processes of organizational sensemaking, [38]. [16], examine the process of strategic change and assert that the leader's primary role during change is sensemaking. The news media often play a critical role in interpreting a disaster and shaping post-crisis sensemaking, thereby maintaining institutions, [39], [40]. Greater visibility of situational information in the environment impacts outcomes mainly by affecting the actions of decision-makers and perceptions regarding behaviors and task priority of others, [41]. Further, transparency and communication reduce uncertainty in the sensemaking of supply risk signals, [5], [42], [43], and help the firms and public regain trust and reduce unnecessary fear during pandemic crises, [14].

2.2 Disaster Response Management

Extant literature on disaster management, particularly humanitarian operations management, has focused on natural and man-made disasters, [44], [45]. Such disasters result in changing situations, volatile information, and interplay among diverse stakeholders. Consequently, humanitarian organizations are under pressure to continuously adapt their operations, [18].

2.2.1 Responding to Oncoming Disaster

An understanding of existing conditions is crucial for an effective response during a disaster by collecting timely information, [21]. Therefore, information management in terms of infrastructure, supply of resources, and needs is also crucial, [46]. In particular, information plays a central role as a driver of adaptive decisions, [18].

Well-coordinated interactions and collaboration support among various entities (e.g., governments, industrial companies, and individuals) can lead to synergies and can improve humanitarian outcomes, [47]. These are possible through mobile networks and wireless communications, [48]. To enhance operational performance, collaboration is instrumental among various stakeholders, from federal and local governments to private companies, to professionals and the public, [19], [20]. Hence, intergroup leadership becomes important, [49]. In addition, humanitarian operations should adapt to the changing demands and needs of the people

through capacity and resource allocations, [50], [51].

The literature on pandemic disaster response (e.g., MERS and COVID-19) has focused on coordination and collaboration, [52], risk communication, [53], and quick and agile responses, [14], [31], from the public administration perspective. [54], introduce two mechanisms, namely, contagion frame and civic capacity, to explain why some communities are more resilient than others when coping with epidemic crises. They assert that the reason why some communities can adapt better is due to a diverse non-profit sector leading the community with significant civic capacity.

2.2.2 Fast Operations Response

Flexibility, agility, and responsiveness have been advocated widely in humanitarian operations, [18]. Fast disaster response operations require rapid collection of well-aligned data and sharing of timely information, swift mobilization and supply of resources, and agile deployment and implementation of processes.

First, the timely collection of information is crucial for understanding emerging situations, [55], and this information can be collected using big data analytics, [56], [57]. Timely sharing of relevant information is critical for those directly affected to coordinate actions, [3], [58]. Risk communication can be conducted through network news coverage, [59], social media networks, [58], and blockchain technology, [57].

Second, fast operations response requires rapid mobilization and transfer of resources to the location of a disaster through responder networks; these responder networks typically comprise members of affected communities, professional first responders, local organizations, and informal community organizations, [20]. Specifically, response time is critical when matching institutional resources and resilience capabilities to disasters, and the ability to surge in response is a primary feature of organizations that have frontline responsibilities, [60]. Resources include disaster relief forces, [55], healthcare service professionals, [19], and life goods and materials, [61], [62].

2.3 Incremental Decision-Making and Change

Crisis management is a special type of change management, [17], that focuses on incremental responses. The incremental approach becomes the primary support during a crisis of unpredictable changes; however, during a time of stability, the

synoptic approach may be the main foundation, [63], anchored in the comprehensive analytical framework, [64].

The muddling-through concept states that decision-making is more productive when taken in small increments, [22], [23], [65]. This decision-making approach considers the limitations of humans' cognitive abilities when facing complex and imminent problems, [22], [23], [66]. Incrementalism emanates from a search for options in successive and limited comparisons, resulting in mutual adjustments based on what is practical and what is possible, [22], [67]. In muddling-through incrementalism, [22], [23], the disjointed incrementalism restricts analysis to a few familiar policy alternatives and, thus, explores the potential consequences through a series of trials and revisions, [67], leading to "incrementalism adaptation", [26]. Bounded rationality, [66], [68] advocates problem simplification, time constraints, physical constraints, and information overload, [25].

The logic in incremental approaches involves learning by doing, [22], [68]. In particular, the muddling-through incrementalism requires a cognitive process, [31], [66], a collective managerial cognition results in enactment, selection, and retention processes, [6]. Here, strategy is considered a pattern in a stream of organizational activities as an adaptation process, [69]. It relies on empirical assumptions regarding how decision-makers act within cognitive constraints in their work environment and, hence, provides recommendations when problems encountered are complex, [63].

3 Methodology

We adopted a case study approach. Following, [70], we compiled cases that provide information on how Korea responded to major incidental crises in the early months of 2020 (i.e., from January to July). Then, we inductively analyzed the cases for common patterns across the compiled cases. We then apply the Gioia method, [71], to conduct the cross-case analysis. The primary outcome of the cross-case analysis is the grounded theoretical model that comprises all key dimensions from the cases, [72]. This grounded theoretical model was developed in three steps: surveying to identify cases, data collection and compilation, and data analysis through within-case and cross-case analyses.

3.1 Exploratory Survey to Select Cases

The initial survey aims to identify the incidental crises that threaten the well-being of the general

public in Korea. We selected students and professors as our respondents from two major universities in Korea. The student respondents were from undergraduate and full-time MBA programs and part-time EMBA programs who have day jobs. A web-based survey was conducted, and 71 responses were collected from May 26 to 30, 2020.

In the survey, we requested them to write about three incidental crises that occurred in Korea due to COVID-19 that they consider most critical. To minimize possible ambiguity, we explicitly provided them the definition of incidental crisis as "a serious threat to the well-being (health, education, work, leisure, etc.) of the general public living in Korea, and individual, organizational, or government responses are required to address it."

3.2 Identification of Cases

Three incidental crises are offered in each of the 71 respondents, with a total of 213 results. Five crises are distinguished immediately in terms of frequency. We decided to add two more crises, one involving the situation in Korea immediately preceding the onset of COVID-19 and another involving the first, known infected patient. We intended to investigate more comprehensively the responses toward incidental crises from the beginning.

We compiled seven cases that reflect the most important crises, which are prologue, patient 1, Daegu mass infection, the great mask ordeal, adapting K-12 education, managing the new arrivals, and a perfect storm in Itaewon. Table 1 shows the duration of each case, data amount, and short descriptions, which is similar to the table presented by, [73].

Table 1. Selected cases

Case	Date	N articles*	Incident description
(1) Prologue	12/31/2019-01/30/2020	16	Outbreak of COVID-19 in China and the first suspected case in Korea
(2) Patient #1	01/19/2020-02/06/2020	19	Occurrence of the first confirmed patient in Korea
(3) Dnegu mass infection	02/18/2020-04/27/2020	61	First mass infection in Korea, occurred in Daegu involving a religious sect
(4) The great mask ordeal	01/28/2020-07/14/2020	56	Mask supply and demand mismatch
(5) Adapting K-12 education	01/28/2020-07/29/2020	64	K-12 education and online teaching
(6) Managing the new arrivals	01/21/2020-08/06/2020	67	Control of foreign arrivals in airports and seaports
(7) A perfect storm in Itaewon	05/06/2020-08/04/2020	68	Super spreader case originating from the Itaewon district

* N articles refer to the number of news articles or government press releases selected for case analysis. (See online appendix for the complete list—we will make this available upon request).

3.3 Data Collection

Our research aims to investigate the responses to these incidental crises. We collected data from newspaper articles, [73], to gather information with details of what happened. The newspaper articles offer the sequence of events and responses in chronological order. To triangulate the data, we compiled multiple newspaper articles associated with each case. To further increase rigor in our research as highlighted in, [71], we collected data from government press releases, [74]. The press releases were also used to gauge how the government exercised its leadership by keeping the industries and public informed and helping them cope with the emerging crisis.

We used NAVER, the largest Internet portal site in Korea, to retrieve newspaper articles for each case (see <https://news.naver.com/>). We searched news articles by combining appropriate keywords for each case. For example, for the third case that involves the city of Daegu, we used “Daegu” and “COVID-19” (or “corona”). Thereafter, we compiled the news articles in chronological order, from the start of an incidental crisis to the date when the three authors agreed the crisis was deemed resolved. The duration of each case, as presented in Table 1, generally overlaps with the dates of news articles for each case. The government press releases for each case were collected from the websites of various Korean government agencies. We compiled the government press releases along with newspaper articles in chronological order, and this approach was repeated for each case.

3.4 Data Analysis

3.4.1 Within-case Descriptions and Analysis

We first organized the content in bullet points in Korean, and then the case was written in English. Each case description consists of two parts: the response action (i.e., what actions and behaviors took place) and the government’s strategies to manage the general opinion (i.e., how the government used press releases and press conferences to ensure that the general public is informed). Table 1 lists the number of articles used for each case.

After writing the descriptions of the seven cases, in accordance with the procedure in, [70], and, [75], we conducted the within-case analysis to identify key event observations that capture the response actions to address the crisis and government strategies to manage the public opinion. Subsequently, we highlighted key observations from the seven cases and annotated them. We identified

72 key observations for the response action and 29 for the government strategy.

3.4.2 Cross-case Analysis

To build the overarching theoretical framework, we adopted the approach recommended by, [71]. We identified key observations that appear in multiple cases (i.e., two or more cases). These become the first-order categories as per the Gioia method. Then, we grouped these first-order categories into second-order practices (themes) following the practice of, [71], and, [72]. We compiled a total of 13 second-order practices for the response action and 4 for the government strategy. Finally, six overarching dimensions for the common response action and two for the common government strategy were distilled from the second-order practices.

The grounded theoretical model was built on the overarching dimensions as stipulated in the Gioia method, [71]. The three authors met virtually via teleconferencing at least once a week for 1–2 hours from April 1, 2020, to March 9, 2021. In total, we met 49 times for 60.5 hours by mid-March of 2021. We reached a consensus iteratively through a series of discussions to ensure the credibility of our findings, [70]. Overall, the systematic approach based on, [70], and, [71], allowed us to generate a theory of managing a nationwide crisis in Korea at the very onset of the COVID-19 pandemic when uncertainty would be the highest.

4 Within-Case Descriptions

The seven cases reflect the incidental crises that Korea encountered during the first 6 months of the COVID-19 pandemic. In each case, a figure (Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, Figure 7) is presented to capture the basic progression of activities in the case. After the figure, the case description focuses on how the government helped the general public make sense of what was going on. (Cases have been reduced to shorten the paper length. The full annotated cases are available upon request.)

4.1 CASE 1 Prologue: Devising New Processes for Imminent Invasion of the Virus

On December 31, 2019, China reported a novel pneumonia-like viral disease in Wuhan to the World Health Organization (WHO). The next day, the Korea Centers for Disease Control and Prevention (KCDC) instituted the process of testing a patient with similar symptoms and subsequent information

dissemination. The KCDC formed a task force, two days later, on the “Pneumonia of Unknown Cause” to provide 24/7 response.

On January 7, 2020, the first suspected case was identified. This person was examined using new processes that had, by then, been established by the KCDC. At that time, testing took about 1 week, and the results for that person returned negative. Thus, this first suspected case was considered a rehearsal for the new testing processes. On January 8, the KCDC issued a press release about this suspected patient and its testing process. On January 13, the KCDC received viral genetic sequencing information released by the Chinese government through a publication. Using this information, Korean medical researchers developed a testing approach that would yield results much faster, in only 6 hours, using real-time gene amplification testing (RT-PCR). This new testing approach was subsequently released throughout the country starting on January 31.

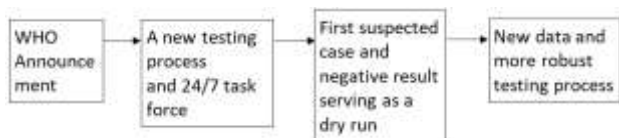


Fig. 1: Devising New Processes

The KCDC became the focal point in disseminating information to the general public. Without disclosing the identity of the first suspected patient, the agency informed the public regarding the details of the patient’s travel routes, what test was performed, how long the test would take, and the results. Further, the KCDC informed the general public how they were requesting information from the Chinese government for the genetic codes of the virus. Certainly, they made sure to let the public know when the results of the testing came out a few days earlier than the communicated expectation of 1 week. The KCDC also informed the general public that they expected to further reduce the testing time to a few hours.

4.2 CASE 2 Patient 1: The Inevitable

On January 3, an enhanced screening process was implemented for all airplane passengers arriving in Korea. All these passengers were subject to thermal scanning, but additional medical screening was required for those from Wuhan, China. On January 19, a woman arriving at Incheon International Airport from Wuhan was identified, by thermal scanning, too. Thus, in-depth testing and contact tracing were then conducted. A medical team worked overnight to test this patient fever’s samples

using the new RT-PCR viral testing system, and the result was positive.

The next morning, the patient was announced as Patient 1. The Korean government raised its alert level from Blue to Yellow—from the first to the second level out of a four-level national crisis-management system. On that same day, viral testing was conducted on all passengers who were on the same flight with Patient 1 and the flight crew. They were then placed under surveillance for 14 days.

In the afternoon of that day, the KCDC held an urgent press conference and confirmed the presence of Patient 1. By the evening, the city of Incheon, where the airport is located, had kickstarted its own 24/7 task force to respond to the possible existence of any potential cases. One staff would be assigned to each new suspected patient.

On January 21, a separate entry point was created by the management of Incheon International Airport for all passengers from Wuhan. Further, the management doubled the frequency of disinfection at ports of entry and expanded the target areas of disinfection on moving walkways, escalators, drinking fountains, etc. After 18 days of medical treatment, Patient 1 was discharged and sent home to Wuhan.

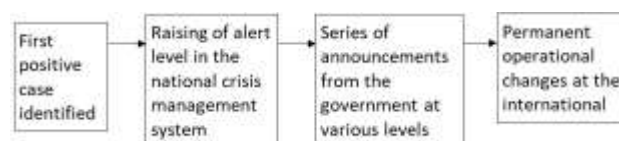


Fig. 2: Responses to Patient 1

After Patient 1 was identified, the KCDC held a press conference within hours and provided a detailed explanation of the process and how other passengers were being tested and quarantined. The Prime Minister was involved in communicating that same day to the general public, and various regional governments responded. Through their announcements, the KCDC was also attempting to educate the public about the virus. They also disclosed how they were doing the epidemiological tracking and tracing of the potentially asymptomatic travelers.

4.3 CASE 3 Daegu Mass Infection: Speed and Reach

Over the following month since the existence of Patient 1, cases of COVID-19 were isolated. However, with the emergence of Patient 31, the situation became intense as this patient was a member of a religious sect called Shincheonji, based in the southern city of Daegu. Up until then, new

cases were identified one or two at a time. With the 31st case, conditions tumbled into a mass infection.

When Patient 31 was first diagnosed as a COVID-19 case, this initially seemed like an ordinary, isolated case. However, during a routine epidemiological tracing process, the medical investigators found that she was a member of Shincheonji and had been in close proximity to other members. Sensing a potential mass infection, the KCDC acted on this case quickly.

Patient 31 checked herself into a public health clinic at about 4 pm on February 17. Then, at 11 pm, she was diagnosed with potential COVID-19 and was admitted to Daegu Medical Center. In the following morning at 5 am, she was confirmed to have COVID-19. The epidemiological tracing revealed she had participated in 2-hour Shincheonji worship services multiple times during the past week. Officials noted that the manner of their worship involved sitting shoulder-to-shoulder with other members. At 10 am that morning, the KCDC issued a press release, disclosing the potential implications for mass infection. Reactions by Shincheonji and the Daegu government were swift. On that same day around 2 pm, the Shincheonji leadership issued an official communication that all meetings would halt immediately. At 3 pm, the Daegu government announced that all major event locations that this patient had visited recently would be shut down, and everyone who had attended the same events should be placed in quarantine.

However, tensions intensified between the government and the Shincheonji leadership, as the government demanded that Shincheonji submit its complete member list but the leadership refused. Eventually, they gave in and released the member list, and the KCDC used that list to reach out to all members and conduct massive tracing investigations. To handle a large number of tests, the government called for volunteers. Many citizens not only from the Daegu area but also from other distant parts of the country have volunteered.

Negotiations between the Korean government and Shincheonji leadership occurred at many levels. On the side of the government, wide-ranging officials were involved: from the local public health clinic and Daegu City government to the Ministry of the Interior and Safety, Central Disaster and Safety Countermeasures Headquarters, the Prime Minister, and eventually the President. On the side of Shincheonji, the senior clergy subsequently issued a personal apology to the public and performed a traditional symbolic bow of submission on television.

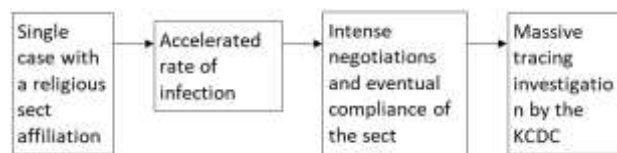


Fig. 3: Massive Infection and Massive Tracing

As the country moved to an uncharted territory of mass infection, the KCDC kept the citizens informed of the progress. The government seemed to take advantage of the negative public sentiment of Shincheonji. In particular, it released information on how they were forcing this religious sect to disclose its membership list. Prime Minister Chung issued a call for volunteers to help with the severe shortages of workers at testing sites. The government continued informing the general public on how they were tracing individual sect members when new information was found. The government highlighted that the city of Daegu would not be locked down as it was confident of its tracing capability. Further, the central government emphasized that it was increasing its financial subsidy to Daegu and sending additional medical staff to the city.

4.4 CASE 4 The Great Mask Ordeal: Reacting but not Giving Up to React

In general, Koreans have long used masks as a first line of defense against infection and pollution. Manufacturers in the country had already been developing high-quality masks to guard against the microscopic dust blowing into Korea from China every spring. With COVID-19, the demand for such high-quality masks became particularly critical. Toward the end of January 2020, the mask demand increased by almost 1,000%, and pricing jumped eight times on some online markets. Another major concern was the hoarding of masks by some merchants who intended to export them to China at premium prices. Many Koreans refer to the mask supply shortage at this time as the Great Mask Ordeal.

Despite the severity of this problem, it seems that no coherent strategy was developed to address it. The government, instead, provided a series of knee-jerk responses, and none of these seemed to mitigate the problem. There were announcements of imprisonment and fines for unfair mask trade practices, extensions of labor hours at mask manufacturers, first limitations and then prohibitions of mask exports, imposition of a new reporting system on mask manufacturers, and a mask-rationing system.

Although the responses were reactive and incremental, they did not stop coming. In a sense, the government was quite tenacious, continually trying one thing after another. From the upstream side of the supply chain, the government procurement office expanded the quantity of its mask procurement from 50% to 80% of the total national production. On the downstream side, the government imposed a more sophisticated rationing system. It first limited purchases per citizen to two masks per week. Then, it allocated different days in the week for each citizen. However, weekend purchases were allowed for those who could not purchase masks during the week.

Two other types of organizations showed their efforts to alleviate the mask shortage in addition to the government. The first type involved large Korean conglomerates. For example, Samsung engaged several mask manufacturers in supplier development to help them gain over 50% efficiency in their production. The second type was the professional associations of pharmacists. In Korea, most of the masks in the rationing system were sold through local pharmacies, and the pharmacists collaborated closely with the government to provide information for mobile applications that would track mask inventory levels and communicate their availability to citizens.

Mask distribution became more stable by April 2020. Hence, the government started to dispose of or adjust its initiatives. Unlike how haphazardly it reacted previously to the mask shortage, the phasing out seemed to take place in a much more orderly way. By May 2020, the government had released the ban on exporting masks. Further, it disbanded the rationing system in the first week of June 2020. The public procurement office reduced the mandatory supply level imposed on mask manufacturers from 80% to 60%. The number of allowed weekly mask purchases per citizen was increased from 2 to 10. By mid-July, the government had completely discontinued the government-controlled mask distribution, yielding control to market-driven distribution.

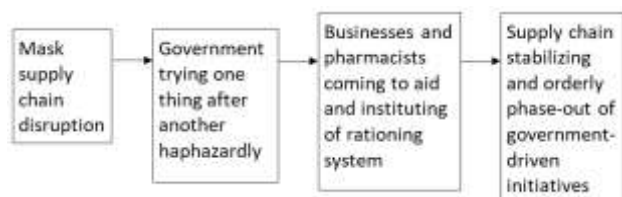


Fig. 4: Responding Haphazardly but Phasing Out Orderly

The government never really had a coherent strategy for the mask distribution, which eventually led to President Moon’s public apology to the nation. In early January, the KCDC recommended the use of masks, and they even distributed free masks in Seoul, which has a large population concentration. However, toward the end of January, the government started to control the distribution of masks. It urged manufacturers to produce more masks and issued policies against raising prices and hoarding. In particular, it punished online market sites for related violations. Toward the end of February, the government stopped all exports of masks, and it began operating under the rationing policies and even issued apologies when their responses were not effective. Then, the government adjusted its policies for more consistent operations of the rationing system. In March, more detailed plans for rationing were published to the general public, and the mismatch between demand and supply of masks began to decline in April.

4.5 CASE 5 Adapting the K-12 Education: Toward a New Normal

The academic year in Korea begins with the spring semester. After the outbreak of COVID-19, all K-12 schools needed to prepare for a switch to online education. In March 2020, the Ministry of Education (MOE) postponed the opening of the spring semester by 1 week. As COVID-19 cases continued to spread, the MOE kept rescheduling the opening day, eventually into April. The MOE launched an online information platform called “School On” to help teachers get ready for online teaching. The MOE also instituted online teaching policies and opened a forum for teachers, students, and parents. Regional governments also provided hardware and software support to schools that required additional help. Further, several corporations participated in supporting less privileged schools and students, by donating tablets and providing free Internet access.

Finally, the first-ever fully online school opening for all students, except kindergarteners, was set for a phased launching from April 9 to April 20—with the initial opening for the senior high classes, followed by lower classes. The intent was to give younger students more time to familiarize the new learning environment. Although it was supposed to be a historic opening, things did not work out quite as planned. On the opening day, online school servers became unstable, and students experienced difficulty logging in. The Education Broadcasting System (EBS) and Korea Education Research Information Service had been working

hard to provide enough bandwidth, but this problem became apparent. The EBS then worked with IT corporations to test the system and expand its communications infrastructure. Additional IT companies, such as SK Telecom, KT, and LG U+, along with the Ministry of Science and Technology (MST), joined the effort to improve the stability and security of the online education system. By the time the last group of students joined on April 20, the system had become stable.

In May 2020, the MOE announced that it promoted both in-person and online education, setting limits on the student count per classroom. However, social distancing, sanitization of common areas and surfaces, face coverings, classroom air circulation, staggered break times, and temperature monitoring were still closely implemented. The MOE also provided parents the right to switch to homeschooling. After waiting for another week, students began coming back to school on May 20.

Despite these precautions, there was a surge of new COVID-19 cases in different areas throughout the country by the end of May. The opening of school campuses, which were still in progress when this surge occurred, was halted in many schools. However, the MOE’s position remained in favor of opening the schools to provide both on-campus and online education. In June and July, many schools seemed to be fumbling along whether they continue or halt campus reopening. In late July, as schools moved toward summer recess, the rate of new COVID-19 cases decreased. Thus, the schools had settled down and adjusted to the new normal: using both in-classes and online classes.

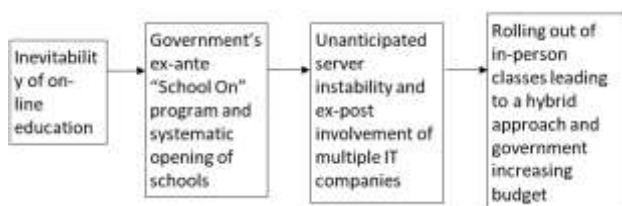


Fig. 5: Ex-ante Programs and Ex-post Responses

As K-12 students were getting ready for the school opening, the government issued a series of press releases on how to deal with COVID-19. It eventually postponed the opening dates and used the remaining days to prepare the teachers for the online programs and ensure that the necessary tools and supplies were ready. Much planning went into preparing, and the general public was kept informed as school opening dates were repeatedly pushed out. Moreover, new policies about online teaching were instituted as the preparations were ongoing. These preparations ranged from cyber security issues to

lessons for disabled students. After the opening-day system fiasco, the schools were beginning to operate with their online classes. Soon, many schools began bringing students on campus, but then they closed down again as the infection rate increased. Opening up and closing down of schools were repeated, and the hybrid approach that involves both online and in-person teachings was emerging as the new normal.

4.6 CASE 6 Managing the New Arrivals: Isolate and Conquer

The battle in Korea against COVID-19 was being waged on two fronts—containing the pandemic internally and managing new arrivals to the country. People were arriving constantly through airports and seaports of the country. Korea never locked down its international borders through the early months of the pandemic. In the government’s “isolate-and-conquer” strategy, targets are stratified, isolated, and controlled. Some aspects of this approach worked, but others did not.

Arrivals were stratified by their points of origin. Initially, arrivals from Wuhan were isolated and examined separately upon arrival, and this was then expanded to all flights from China. Eventually, isolation included several other countries, such as Japan, Iran, and Italy. For these arrivals, a mandatory self-diagnosis smartphone app was supplied, and they were required to report their health condition, twice a day, for 14 days. To accommodate different types of passengers, entry points were also stratified into two groups—airports and seaports. For example, the Incheon International Airport handles passengers from many different international points of departure, while the Incheon Seaport and Busan Seaport mostly handle cargo ships and crews arriving on those ships.

Being able to trace potentially infected individuals was an integral part of this isolate-and-conquer strategy. Therefore, the Korean government decided not to apply a quid-pro-quo policy to countries that had blocked arrivals from Korea. They reasoned that, even if they blocked passengers from those countries, the passengers could use improper channels to enter the country. Then, the government would lose the ability to track and control those individuals. Upon entry, passengers with symptoms and those without were stratified. Those passengers with symptoms were considered more controllable because they were definite entities. However, those without symptoms were trickier to handle because some of them could still be potential carriers. Therefore, all passengers

without symptoms were subjected to testing that required a waiting period of 10 hours to 1 day. If testing returned positive, then separate transportation to a quarantine location was offered for further isolation. Looking ahead, the Incheon Airport launched a post-COVID-19 task force that began using big data and artificial intelligence (AI) to position itself as an airport with a reputation for “smart prevention.”

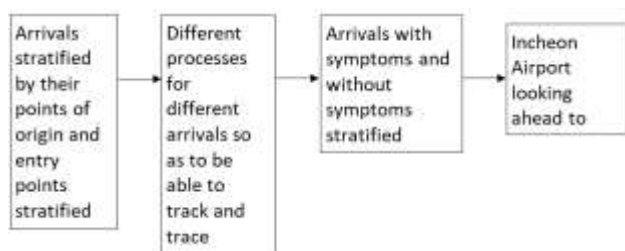


Fig. 6: Stratifying Arrivals and Processing Strategies

The government issued press releases on how they were dealing with arrivals from different countries. In particular, all passengers arriving from China were required to provide a mobile phone number to track them. The government also developed a mobile phone application for self-monitoring and reporting for all suspected arrivals. As the cases in Japan increased, the government issued a similar policy for the arrivals from there and then expanded this policy to European countries. The government was steadfast in its stand that it would not refuse arrivals even with the increasing number of infected individuals. All arrivals from overseas were then required to quarantine for 14 days. The government also reported how they were operating the dedicated transportation services for arrivals from foreign countries. It informed the general public that any foreign visitors who violated the arrival policies would be sent back home.

4.7 CASE 7 A Perfect Storm in Itaewon: Gay Clubs, Privacy and Epidemiological Tracing

The Itaewon district in Seoul enjoyed a lazy long weekend celebrating Children’s Day on May 5. However, a sinister infection case brewed that became known only afterward. When people were getting back to work on May 6, Patient 66 was discovered. He was a Korean national who worked at a software firm and was confirmed as a COVID-19 virus carrier. Over the weekend, when he was likely most infectious, he had been club-hopping in Itaewon. These clubs happened to be gay clubs, and

many of their patrons resisted disclosing their identities. Three days later on May 9, multiple cases popped up all over the country in various places, from military services to healthcare workers. Within three days, the government ordered the shutdown of all entertainment service shops (e.g., PC cafes, karaoke bars, and dance clubs) throughout the country.

The Seoul government and its adjacent provinces offered free medical examinations for the people who visited bars, restaurants, and other service shops in Itaewon. The KCDC attempted to conduct contact tracing using the visitor logs, but they discovered that over 3,000 people had used false identification. They collaborated with local law-enforcement agencies to trace people using phone records, credit card transactions, and closed-circuit television monitoring. Further, they activated the newly developed “COVID-19 Epidemiological Support System”: a big data system that used 3 telecommunications centers and 22 credit card companies to locate an individual’s movement within 10 minutes.

Meanwhile, the general sentiment of Korean public opinion, especially among the “netizens,” began to turn against the Korean gay community. Naturally, the gay community resisted disclosing individual identities and being forced to “come out.” In response, the government offered “anonymous testing,” requiring only a phone number to those people who had visited Itaewon and were reluctant to be tested. Even when testing returned positive, any personal information that could be tracked to a specific individual would be deleted, and only information necessary to trace secondary potential infections would be kept. A total of about 56,000 people exposed to the Itaewon case were tested. On May 16, the news became more encouraging as the rate of infection decreased significantly down to about 10 new cases per day.

However, the optimism was proven premature. By May 19, the infection had accelerated in Incheon, a city about 30 miles west of Seoul. These cases were eventually traced to a teacher in a for-profit teaching academy, who had been in Itaewon during the long weekend and who had lied about his identity to a government staff. By then, he had become Patient 102. Given that his occupation is a teacher, he eventually infected students, parents, and even the customers of karaoke bars that the students frequented. One of those infected by Patient 102 was an employee working for the distribution center of Coupang, the largest online retailer in Korea. She would become another super-spreader.

On May 24, the Central Disaster Safety Response Headquarters implemented a QR-code-based system to increase contact tracing accuracy. All entertainment service shops were required to use this system starting in mid-June. Eventually, in early August, the rate of infection decreased to about 10 new cases per day. Hence, the government relaxed the lockdown on entertainment service shops on August 4.

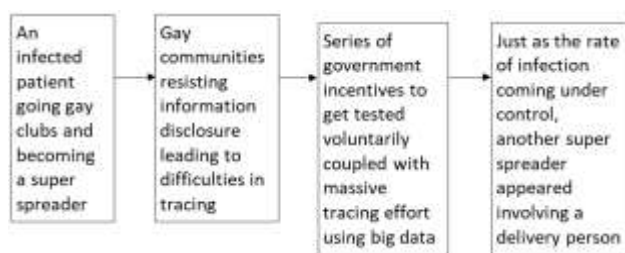


Fig. 7: Super-Spreader Leading to Another Super-Spreader

The government issued one press briefing after another as the super-spreader became known, and the general public was becoming more concerned. Press briefings included how the tracing was being conducted and clubs, bars, and other entertainment businesses were locked down. The government issued open notices for all visitors to the affected entertainment area in Itaewon to get tested, and they also noted potential punishment if otherwise. Those who get tested voluntarily were assured anonymity. The government also reminded the general public not to direct their criticisms against the gay community. It continued to inform the public about the ongoing tracking-and-tracing effort. For instance, the government staff had been calling those people suspected of being in the affected area, and they reported how many of them had been contacted and were yet to be contacted. Ultimately, they used the police force for the last few people that they were not able to contact via phone. Given the inaccurate records of the visitors to the entertainment businesses, the government has issued a new policy regarding the visitor log using the QR code.

5 Cross-Case Analyses

The key actions are extracted from the within cases by annotating each case and flagging them. These actions then lead to the first-order categories in the Gioia data structures (Figure 8 and Figure 9 in Appendix). These categories are organized into two groups—what actions and behaviors occurred in seven cases from the case description above the

summarizing figures (Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, Figure 7) and how government managed the general public through press releases from the paragraph following the summarizing figure in each within case.

5.1 Emerging Key Constructs

In each group, we compile common observations that occurred across multiple cases (i.e., two or more cases). Then, these common observations were used to build the overall grounded theoretic model as stipulated in the Gioia method, [71].

5.1.1 Observations Related to Action Responses

Responses in general occurred incrementally. Often, they seemed more like muddling and fumbling along. However, responses were made diligently and tenaciously, and improvements were achieved incrementally. For instance, during the early days, the KCDC was in a reactive mode in responding incrementally to new information from WTO and China. Their first responders immediately offered 24/7 services. Enhancements were made incrementally to regulate new arrivals from China, especially those arriving from Wuhan.

Technology had an enormous role in helping manage the pandemic. Smartphone applications were developed to help measure increased demand patterns for masks. Samsung's smart factory technology was disseminated to mask manufacturers to help them increase productivity. Additional smartphone applications and QR code-based systems were developed for tracking purposes and to gather the health information of the citizens. Big data and AI were applied to phone records, credit card transactions, and closed-circuit monitoring to control the mass infection.

The highest priority was being able to trace epidemiologically the movement of people and the potential spread of infection. For instance, when other countries were locking down their borders, the Korean government was firm not to close the borders because they were concerned about people arriving through illegitimate means, and this would cause a break in their tracing system. Further, after detecting the infection, the tracing system would kick in to identify the source and estimate the state of the spreading of the virus.

Various levels of government and professional organizations learned to launch new processes as they learned from incremental responses. The schools were ready to open their online teaching system. However, they ran into an unanticipated snag—the servers became unstable. They immediately involved various IT companies (i.e.,

SK Telecom, LG U+) and MST to ensure server stability and security of the online teaching system. Ultimately, the outcome was not perfect, but the school system had settled into a hybrid model of online and in-person teaching.

5.1.2 Government Strategies for Managing General Public

In general, the government opted to err on the side of full disclosure and giving away the details. When the tension was high about the first suspected case of infection, the KCDC informed the public of the details of this patient's travel routes, what testing was being performed, how long it would take, and the results.

The government offered information in real-time and repeated this process continuously. Specifically, following the outbreak of the mass infection in Daegu, one press release was given after another, and the news unfolded as if watching a live documentary. For instance, the KCDC issued a press release within 5 hours after the case involving a member of the religious section was confirmed, explaining the details of the case. Then, a few hours later, the local government of Daegu issued another press release about how they were locking down all major event locations that this patient had visited.

When the outcome was better than what had been announced, the government broadcasted the news in a celebratory tone. For example, this happened when the results of the first suspected case came out earlier than what had been announced. Further, it promised better performance in the future by referring to this success they just celebrated.

5.2 Cross-case Analysis using the Gioia Method

The Gioia method, [71], was adopted as a means to conduct the cross-case analysis. The first-order categories were compiled by looking across all seven within-case descriptions. Then, the second-order practices were extracted as emerging themes. Finally, second-order practices were grouped to articulate the overarching dimensions, as shown in Figure 8, Figure 9, Figure 10 and Figure 11 in Appendix.

Owing to the nature of the COVID-19 pandemic and the uncertainty it posed on the entire country and various government organizations, professional associations, and citizens, much of the responses occurred incrementally and by muddling through. As shown in the top row of Figure 8 (Appendix), both these two second-order practices capture adapting incrementally. Responding *pali pali*, which appears on the fourth row, is also conceptually close

to this dimension. It reflects a culturally unique characteristic of Koreans wherein they respond quickly under a sense of urgency. That is, they spring into action immediately and would keep at it tenaciously.

The dimension of investigating scientifically encompasses tracing epidemiologically and systematically probing for the triggering points of mass infections. This dimension is perhaps conceptually linked to another dimension referred to as implementing technologies. Problems were solved through different technologies, and the government cooperated with leading technology companies in the country to address the problems. Ultimately, new processes and plans were made, leading to the dimension of instituting new processes. Simultaneously, health information was collected, and communications were made with the public, which we refer to as the dimension of sharing information.

By evaluating the government's press releases, we observe how they attempted to help the public make sense of what was happening. As shown in Figure 9 (Appendix), their actions were captured in the first-order categories. A variety of strategies were utilized for constant communication with the public. Further, the government attempted to educate the public on various issues, such as preventive measures and protecting minority interests. These two second-order practices lead to the dimension of forming public opinion by explaining actions. The government also used previous successes and self-congratulatory broadcasts. By continuously informing the public about what happened, they attempted to build the public's confidence in them.

6 Results

Our grounded theoretic model explains how Korea has responded quickly to the outbreak of the COVID-19 pandemic and how the government attempted to help the general public make sense of what was going on. Incrementalism is at the center of all these efforts. After collecting and analyzing the data, it is clear that, unless responses were made incrementally, even as unprepared as they were, fast responses would not have been possible.

The model has two parts (Figure 10, Appendix). Divided by a broken line, the model above the broken line reflects the action responses captured by the overarching dimensions from Figure 8 (Appendix) and their relationships. Meanwhile, the model below the broken line reflects how the government has driven the sensemaking for the

general public through their press releases. The dimensions there were obtained from Figure 9 (Appendix).

6.1 Action Responses

The model begins with the deeply ingrained sense of *pali pali* among Koreans. This sense is embedded in their culture and drives how they can respond quickly to emerging circumstances. This explains why a health worker would not hesitate to stay up all night to complete the testing of a potential case. Such a sense is reflected in investigating scientifically. For instance, when the day of the online school opening drew near, everyone worked hard to respond. However, when they ran into a snag, they began investigating scientifically by coordinating with the leading technology companies in the country to address the problem. When the potential case of mass infection was suspected in Itaewon, the KCDC reached out to all citizens for their cooperation. Immediately, they activated their epistemological tracking technologies.

Interestingly, the scientific investigations almost always did not offer a definitive solution as they led to tinkering and adapting incrementally. For all new arrivals, the government used a stratified approach in terms of the types of arrivals and used tracking technologies. However, as the spreading behavior of the virus was elusive, the best they could do was to adapt incrementally. This did not imply that the government did not attempt to systemize processes. For the new arrivals, depending on whether they had symptoms, their process was different on how they were transported and how they were tracked. Therefore, there is a feedback relationship between adapting incrementally and instituting new processes with arrows pointing in both directions. This feedback relationship was apparent throughout the cases we have compiled. In particular, during the great mask ordeal, the government tried one thing after another instituting new processes, from blocking profit-motivated exporters to increasing manufacturing capacity and rationing system. Each time, adaptation was incremental and led to new processes.

6.2 Government Strategies for Sensemaking

The government used many different strategies to manage public sentiment. These approaches ranged from disseminating detailed information (i.e., testing procedures and handling of new arrivals) to educating and instructing them (i.e., how the problem associated with school opening is addressed and why the public anger should not be directed at the gay community).

The government also explained their corresponding actions openly with details and highlighted actual occurrences to gain the public's confidence. The two dimensions, as shown in Figure 10 (Appendix), are supporting each other. Helping the public make sense of what was happening (e.g., first suspected patient, potential mass infection, and mask shortage) was an incremental effort. The government attempted to form public opinion by explaining actions and gaining its confidence by highlighting specifics.

The grounded theoretical model for action responses is built around the two, reciprocally affecting dimensions of adapting incrementally and instituting new processes. As shown in Figure 10 (Appendix), these two action responses are focused on how Korea responded quickly to the COVID-19 outbreak. However, these responses were facilitated by the use of technologies, and all the dimensions ultimately feed into the dimension of sharing information. This is a critical observation because, ultimately, all the responses must be translated into a communicable form and sensibly provided to the public. Therefore, the dimension of sharing information crosses over to how the government manages public opinion and builds public confidence to keep them informed and make sense of unpredictable and ever-changing circumstances.

7 Discussion

As operations and supply chain management professionals, we tend to espouse that thinking leads to action. For example, the Shewhart cycle of plan, do, check, and act promotes that we think and contemplate first and then engage in doing and acting, [76]. The enactment theory, [6], [7], [77], [78], argues otherwise. It argues that we tend to engage in action first and then we think and make sense of what happened retrospectively by observing the actions committed, [41], [43]. This concept is particularly applicable in the context of the initial stage of disaster response where we need to respond and act before we can think and contemplate.

7.1 Enactment Theory and Sensemaking

Enactment theory was proposed by, [79], [80], [81]. It explains that individuals and organizations engage in sensemaking subsequent to their actions. Enactment is a social process by which a "material and symbolic record of action", [82], is established, and it involves both a process of actions and an enacted environment, [7]. It has also been identified

as one of the underutilized theories in supply chain management.

The virus struck Korea and gave the country its first case (i.e., Case 2). The KCDC took action in response and acted on the reality that impacted them. To ensure that the public remain informed, it then issued press releases and held press conferences to explain what happened in a sensemaking effort. Specifically, sensemaking is retrospective and circular, and subsequent sensemaking further shapes beliefs, [83]. Meanwhile, enactment produces the uncertain occurrence that is then made sensible. As the general public braced for another critical incident, the government gained trust, perhaps in a guarded way, to press forward.

The crises as captured in our seven cases require strong sensemaking demands. When actions are taken, people strive to sort out a crisis for both sensemaking and subsequent actions that would affect the unfolding of the crisis itself, [38]. A collective mind emerges as an ongoing activity stream when activities are considered as contributions to overcoming the crisis, [84]. In our study, the Korean government strove to provide a collective understanding for the general public by helping them make sense of the emerging situations through press releases.

7.2 Theoretical Implications: The “reactment” Theory

When facing an enormous unknown event that threatens the safety and well-being of everyone, reacting well may become the best option. Based on our study, reacting does not occur in a large, concerted effort, but it occurs in many incremental responses. Reactment theory, as proposed in Figure 11 (Appendix), may apply to the unk–unk disruptions wherein ex-ante strategies lose their effectiveness, but ex-post responses become the mainstay, [85]. Reactment combines two terms, reaction and enactment. What happened during the crisis was not a typical enactment but something that combines reacting and enacting.

7.3 Incremental Reactions

Our study focuses on early responses to the pandemic. The literature promotes resilience buildup and a shared culture of preparedness at the societal level before the disruptive event, [20], [86]. After a commotion occurs, responses should be quick, and responses require rapid mobilization and transfer of resources to where the disaster has occurred. Overall, the literature seems to promote preparedness and coordination when facing a

disaster. However, major disasters cannot be prepared for, and no overarching coordination is possible, which was the case with the COVID-19 pandemic.

Responses happen in a reactive mode, and there is little wide-ranging coordination. Instead, incremental responses and muddling occur. Organizations and the affected people do the best they can to stay afloat to minimize the spread of the virus. In these situations, decision-making is more effective when taken in small increments, as opposed to an overarching way, [22], [23]. In our study, although they happened reactively and incrementally, the sensemaking efforts by the government through their press releases were attempts to offer rationality and logic, [87], [88], for the responses. We observed how various organizations such as KCDC responded incrementally in a *pali pali* manner and the patterns of response actions converging on sharing information used by the government to lead public opinion.

7.4 Incremental Adaptation

We consider that, for a major crisis like the COVID-19 pandemic, recovering back to the previous state of normalcy cannot be the primary goal. Instead, adapting incrementally to seek new normalcy may become the primary end state of existence. As researchers, we need to find a way to be able to adapt and be viable with minimal damage to society, [18].

Adaption, rather than recovery, becomes the primary desired outcome. When a large gap exists between the potential preparedness measures and the steps that must be taken for them to stay afloat, people may realize that adjusting and adapting toward the possible new normal becomes more important than recovering from the disruption and returning to the way it used to be. As presented in our grounded theoretical model, incremental reactions through *pali pali* led to scientific investigation and technology implementation as adaptation strategies. Certainly, new processes were instituted as a sign of incremental adaptation.

7.5 Sensemaking and Sense-giving

In general, a lead group facilitates sensemaking for other groups, [38]. In our case, the government assumed this role. [16], explain how changes, in our case those caused by the spread of the virus, involve the “current modes of ... action to enable the organization ... to cope with consequential environmental threats” (p. 433). The leader’s primary role during significant change is not only

sensemaking but also sense-giving. Sensegiving is a companion concept to sensemaking and is defined as “the process of attempting to influence the sensemaking and meaning construction of others toward a preferred redefinition of organizational reality” (p. 442).

In our study, the government helped the public make sense of what was going on in their sensemaking efforts. The government was engaged in sense-giving, and through sensegiving the public attained sensemaking to elaborate on the concept of sensegiving. They highlighted what happened and explained the actions taken. Once the public attains sensemaking, that understanding and grasp of reality feedback to adaptation through the public’s confidence in the state’s leadership, as retention feedback to selection in the enactment model, [6].

7.6 Summary

Do actions lead thinking or does thinking lead actions? We think both. Planning and strategizing in a stable environment can lead to actions and behaviors. However, under a severe and widespread threat of an unk-unk event, the crises would appear in unexpected places. In this situation, reacting well becomes the best course of action for the government, industries, and the public. Korea reacted immediately and incrementally. Even when the reactions were made poorly, the negative impact was minimal as they were incremental, and Korea was able to rebound quickly. The government then helped the general public with sensemaking to understand the current situation. Therefore, the enactment theory has proven useful in understanding the reality that Korea lived through, we lived through, where quickly reacting in small increments emerges as a legitimate and viable approach to adaptation.

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APPENDIX



Fig. 8: Common response action data structure

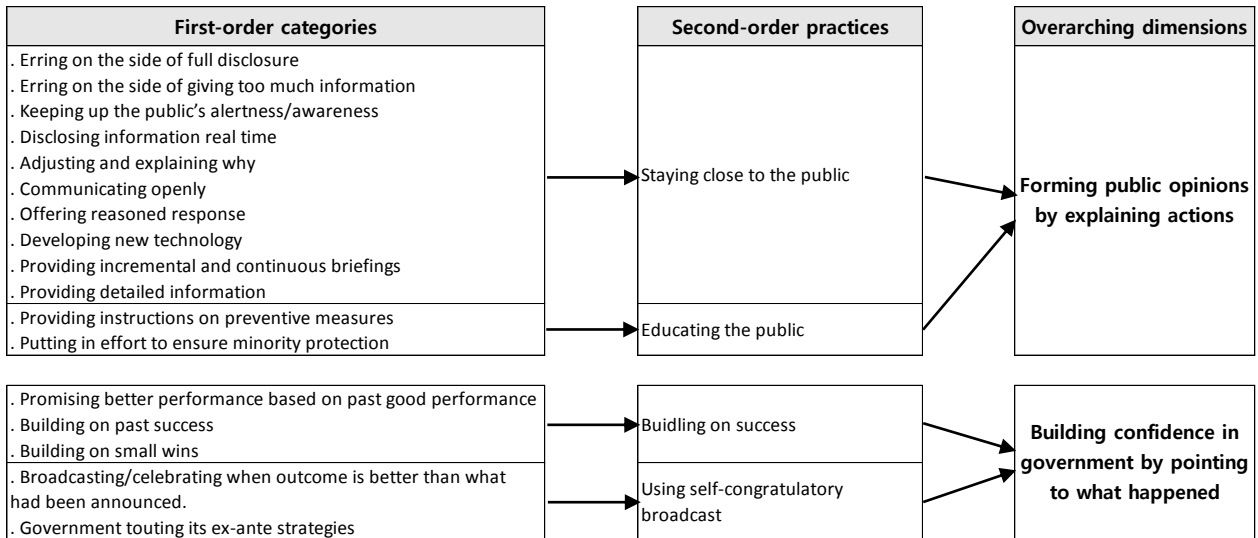


Fig. 9: Common government strategy structure

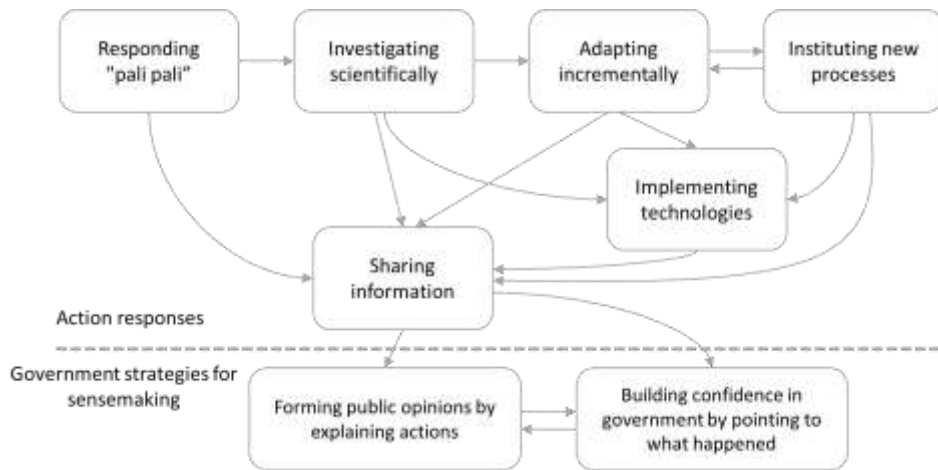


Fig. 10: Grounded theoretical model of fast responses and sensemaking

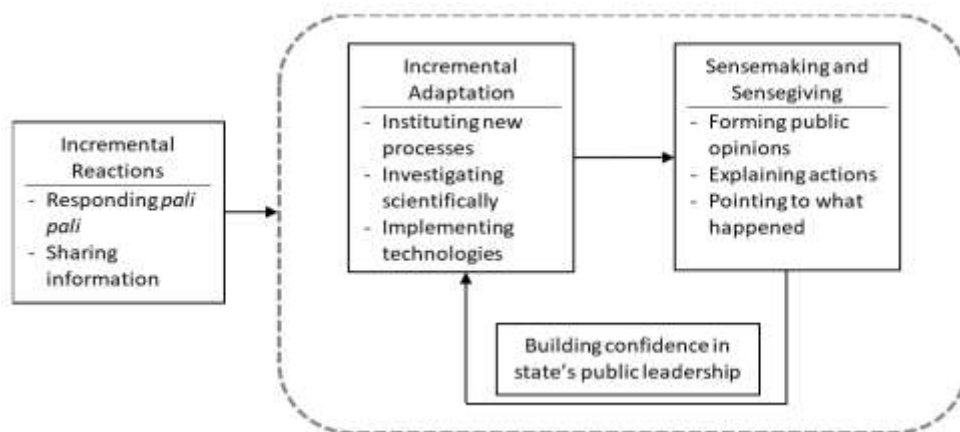


Fig. 11: Proposed reactment theory framework

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