

Path to Advanced Healthcare in the Wake of COVID-19

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"Our history began with quarantine, after all."

An interesting perspective on how South Korea has become the leading exemplar of the prevention of Coronavirus Disease 2019 (COVID-19) accounts its success to Korea's founding myth of Dangun. A bear, in hopes of becoming a human, puts itself into voluntary quarantine in a sunless cave with only a mugwort and 20 cloves of garlic. On 100th day, it transforms into a woman and later gives birth to Dangun, the founding father of the ancient Korean kingdom. Technically, the bear-woman's successful quarantine can be said to have influenced South Korea's timely response to COVID-19 outbreak.

COVID-19 is changing the world. It is evaluating how a country copes with unpredictable global disasters both domestically and internationally. During the outbreaks of SARS (severe acute respiratory syndrome) in 2003 and MERS (Middle East respiratory syndrome) in 2015, the global community merely responded at a level that identifies and complements loopholes in each country's healthcare system. This year, COVID-19 befell as a global blockbuster disaster film, disrupting robust economies of most developed nations at an unprecedented scale.

With the number of confirmed cases nearing three million, we can't help but ask: Is today's healthcare sufficient to



prepare for the worst? If another infectious disease emerges, can we be certain that we will not bear the same results? If not, what should we do to develop a sustainable healthcare system?

The virus itself is simple; we have already unveiled the science behind it, including its mechanism. However, disease control is a totally different issue that involves multiple perspectives including social and cultural aspects. In fact, we have witnessed how each country's distinct policies and regulations create differences in countermeasures to the outbreak, from the supply of masks to availability of emergent hospital beds. To minimize the stark contrast between countries with advanced healthcare and those without, we must develop National Health Information Infrastructure (NHII).

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National Health Information Infrastructure

NHII is an initiative to standardize services, platforms, and ultimately infrastructure, on which healthcare technology is built. The establishment of NHII involves three components: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).

The first step is to develop SaaS, which hosts a central server and provides different softwares. This process requires digitizing all preexisting disease control guidelines, thereby maximizing the synergy between cutting-edge information technology and conventional healthcare provision.

Once SaaS models are established, they evolve into PaaS. Each PaaS is composed of SaaS models that fall into a specific category. For instance, SaaS models for COVID-19, MERS, and SARS are categorized into PaaS for coronaviruses, whereas those for tuberculosis, AIDS and malaria are classified into PaaS for other chronic infectious diseases. In the same manner, SaaS of guidelines or data accumulated by medical academia need to be shared and classified on a comprehensive platform.

The final stage involves IaaS, in which services operate within a country's system as a whole. At this phase, intersectoral collaboration among government bodies, along with public involvement, takes place. In the case of COVID-19, such collaboration refers to sharing and collection of massive amounts of data that span different ministries and departments, from immigration clearance to contact tracing. Taiwan demonstrated the epitome of this very case at the early stage of COVID-19 outbreak, with prompt response and appropriate preventive measures.

Another major characteristic of IaaS is a total platform that offers comprehensive patient care. Using a simple app, patients will not only be able to review their health conditions, but also check availability of nearby emergency rooms and access data managed by intensive care units. Their data will be automatically transported from a device in an ambulance to a monitor in the hospital ward. As such, the platform en-

ables free data transfer and operates at all levels of IaaS.

Full utilization of information technology through NHII begets legal issues, specifically in terms of privacy. Indeed, despite the rapid development of technology, legal measures against potential invasion of individual privacy have yet to be established. Ironically, the outbreak of COVID-19 has allowed us to reach a consensus in deep-seated legal disputes. In fact, many countries including South Korea have temporarily approved the use of telemedicine and lifted the ban on tracking of individual contact. Regardless of relaxed regulations, we must still ensure that appropriate safeguards are in place.

South Korea's Path to Advanced Healthcare

South Korea possesses great potential to develop into a healthcare pioneer. As the world's first to install a 5G wireless network, it has already built an excellent foundation for information infrastructure. Its medical personnel is of high quality, and the public demonstrates great interest in medical service. However, these factors alone cannot revolutionize the medical system; it is their synergy that makes the difference, and that's where the government steps in.

The government needs to foster the medical service industry as the national foundation. It needs to invest in a holistic system that encompasses public health facilities, research centers and educational hospitals. It needs to standardize treatment guidelines and implement evidence-based healthcare assessments. Finally, it needs to support institutions that partake in the initiative. If the South Korean government is more proactive and goal-driven for advanced healthcare, it is only a matter of time before South Korea creates a breakthrough in healthcare.

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