

# Chapter 3

## Digital Transformation and Health Systems Performance in Global Settings During COVID-19

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### **ABSTRACT**

*This chapter aims at providing a view of the recent digital transformations features and applications that have taken place amid the COVID-19 pandemic. The government-coordinated efforts worldwide have focused mainly on the pandemic containment and mitigation. The scale of coordination and data management required for effective implementation of the various containment and mitigation strategies across many countries has relied on adopting digital health applications, integrating them into health policy and healthcare services. This was observed in pandemic planning, surveillance, testing, contact tracing, quarantine, and healthcare services. Evaluating the implementation of these technologies, practices, and health delivery services worldwide, as well as factors supporting or hampering their use are highlighted in this chapter.*

### **INTRODUCTION**

COVID-19 is an infectious disease caused by the novel Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). It originated from Wuhan, Hubei Province, China in December 2019, then was declared as global pandemic (Zhu N, 2020). Until today, the source of the coronavirus disease (COVID-19). The human-to-human and health care worker transmission is high, and the fatality rate is greater than 1%

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with no effective antiviral therapy and some emergency-use-approved vaccines have been produced and used worldwide.

Since the emerging of the COVID-19 and despite the relative availability of the vaccines, the core of the pandemic management across the world has been containment and mitigation<sup>1</sup> with various degrees of success in managing the burden of COVID-19 (Zhu N, 2020). Because of COVID-19 incubation period and strong transmissibility the containment and mitigation efforts of COVID-19 pandemic face many challenges. For example, if we compare COVID-19 with severe acute respiratory syndrome (SARS) and Middle East Respiratory Syndrome (MERS), COVID-19 has many new features and hidden symptoms. In addition, it spread more rapidly due to increased globalization (Peeri, N C, et. al. 2020). The virus mutation, and further spread is now a fact.

As part of the mitigation and containment efforts, the world gradually locked down life in different ways and different degrees. Not only were lives lost, but also people lost their jobs and most countries' economies were and still suffer. Moreover, the pandemic reshaped many sectors and business models. The most affected and argued to be changed forever is the healthcare sector (Sohrabi C, 2020). Fundamental changes took place in the core of the health industry and system across most of the countries and in a very high speed.

In their attempts to develop new ways for containment and mitigation of the virus, many countries have adopted digital health technologies (Zhou F, 2020). The world has soon realized that digital health technologies can offer an innovative pandemic response strategy by using more effectively methods that are challenging if followed manually. The containment and mitigation efforts were translated into surveillance, testing, contact tracing, and strict quarantine related activities and processes to flatten the incident curve. Many countries, therefore, have integrated digital technologies into their governmental coordinated policies and processes (Sera Whitelaw, 2020). The integrated digital health technologies and processes are employing artificial intelligence (AI), big data, 5G mobile networks, Internet of Things (IoT), mobile health applications, telehealth services, cloud computing, blockchain, and health information exchange (HIE) services (Kuperman G J, 2011). Integrated with national health systems, these digital health technologies can aid in reporting and monitoring human-to-human transmission, data collection and analysis, tracking and alarming, building solution scenarios, providing remote services for isolated cases among other services. These technologies proved to be helpful in providing effective support in pandemic containment and mitigation (Ammenwerth E, 2006). This was mainly observed in the functions of planning, surveillance, testing, contact tracing, quarantine, and healthcare delivery. Australia; Canada; China; Iceland; Germany; Singapore; South Korea; Sweden; and Taiwan; are among the main countries which employed and integrated these technologies in their health policies to face the pandemic.

These countries have succeeded in flattening their national COVID-19 incidence curves and kept low mortality rates. The creation of integrated smart healthcare systems using digital health technologies played a vital role in these success stories. These comprehensive coordinated responses can offer a guide to other countries which are still struggling with the pandemic (Sera Whitelaw, 2020). In addition, it can offer insights into the other applications of digital health technology beyond confronting the current pandemic.

Recognizing the digital health technologies value added, the *Empowerment through Digital Health flagship initiative of the European Program of Work, 2020–2025* – “*United Action for Better Health in Europe*” (EPW) has been launched to harmonize and assist the high-level adoption of digital health initiatives in the WHO European Region (WHO, 2020). This has been done in line with the WHO Global Strategy on Digital Health 2020–2025 directions.

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