

## Industry and Technology Trends in Digital Healthcare

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### Abstract

Large-scale legacy systems could lead to inefficiencies in the healthcare industry. Major internet businesses like Google and Microsoft have started spending more in digital health, despite the fact that governments and healthcare institutions have traditionally been the main supporters. Additionally, the global COVID-19 epidemic is reviving amid discussions about digital healthcare. This essay will look at the technologies, industry, and laws surrounding digital healthcare.

**Keywords:** Big data, AI, healthcare, and digital healthcare.

## 1. INTRODUCTION

ICT and medicine have once again attracted attention as a result of the revelation that Canada's BlueDot artificial intelligence platform was the first to suspect the possibility of a novel Coronavirus disease. The COVID-19 global pandemic also briefly allowed several forms of telehealth, demonstrating the local demand for telemedicine. Research [1] demonstrates that "tele healthcare" is the non-face-to-face technology that is most crucial for enhancing the access of poor communities to medical care, in addition to COVID-19. Prior to COVID-19, As the trend toward monitoring one's own health in daily life took hold as a result of aging, it was predicted that demand for the digital healthcare industry would increase, as well as the advancement of smart gadgets and sensor technologies. It will become more crucial than ever to revitalise related industries as a result of the COVID-19, which is expected to drive up demand for non-face-to-face medical care [2].

As a result, this paper will investigate the sector, laws, and technologies connected to digital healthcare.

## II. INDUSTRY OF DIGITAL HEALTHCARE

A new era of medical knowledge is beginning to emerge as a result of the information age, and telemedicine and digital health are only two of the fast evolving delivery systems for healthcare services. Additionally, the concept of "the age of healthcare" as a whole is evolving,

and several technologies are being developed concurrently [3].

As shown, there are four sub-sectors within the field of digital health in "Fig.1" [4] in a report on the industry that multinational consulting firm Deloitte produced for the UK's Office of Life Sciences.

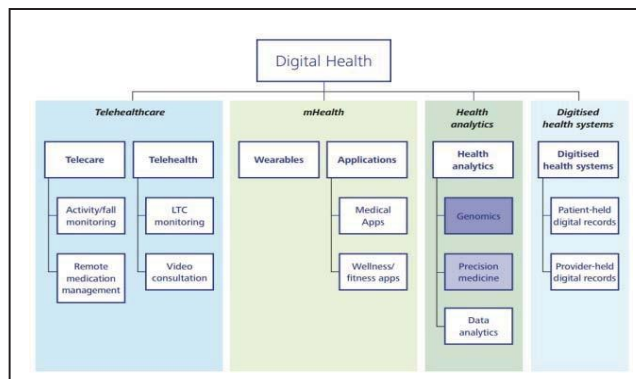


Figure 1. Digital health industry

Telemedicine, a branch of the non-face-to-face medical services sector, is sometimes referred to as tele health. Until recently, receiving health care involved visiting a hospital when a disease's symptoms started to appear, having the disease identified through a variety of tests based on the symptoms, having the disease treated based on the diagnosis's findings, and having the symptoms eliminated or relieved. ICT is used in telehealth to enable remote clinical data sharing and long-distance treatment delivery between patients and providers. Healthcare that is provided remotely is becoming more practical and efficient thanks to the active integration of technologies like IoT, cloud, artificial intelligence, big data, and mobile [2]. Apps that are related to wearable technology are included in the second "mHealth" category. For general well-being and health, it also provides software-based health solutions and mobile applications (apps).

These apps cover a wide variety, from fitness and well-being apps targeted for experts to medical apps with a consumer focus. In other words, it uses wearable technology to keep an eye on activity levels, sleep patterns, and heart rate. In many areas of digital healthcare, wearables are crucial. Data mining, sophisticated analysis, and data visualisation are just a few of the topics that are covered in the third chapter of the "Health Analytics" book. [4] The significance of healthcare analytics is growing as a result of the need to manage enormous, diverse data sets, growing competition, more complicated rules, and innovations like population health management, value-based care, and precision medicine. Today's health care industry has the capacity to change, develop new revenue streams, and differentiate itself from competitors thanks to robust and practical analytics [5].

For instance, using healthcare analytics, you can identify potential drug candidates for specific diseases and genes by learning enormous volumes of data, or you can gather, integrate, and analyze clinical information about cancer.

The final phase, "Digitized health systems," includes components for patient medical record storage and digital health information exchange [4]. In an effort to quickly diagnose various diseases, develop novel treatments, or increase the effectiveness of medical institutions. Electronic medical records, personal genetic information, health information, and data on

national health are all producing different kinds of values. Individuals will benefit from the National Assembly's recent ratification of the Data and organizations should have additional opportunities to use data in the medical industry. As a result, the market for personal health management has grown very modestly. However, when new services containing private biometric data are released, it is projected that the medical industry will grow [6]. The digital health market is anticipated to be worth over USD 106 billion in 2019 and grow at a 28.5% CAGR through 2026, based on a report released in June 2020 by Multinational Market Insights, a multinational management consulting and market research firm [7]. According to a Korea International Trade Association report [1], the "mHealth" sector is expected to grow significantly over the course of the analysis period, as shown in Table 1. The rise in COVID-19 cases around the world has accelerated the adoption of digital health technology, which will accelerate the industry's growth.

**TABLE I. FORECAST OF THE SIZE OF THE GLOBAL DIGITAL HEALTHCARE INDUSTRY (2019–2026)**

Digital health industry sub-sectors	Market size (billion of dollars, %)				Annual Average Growth Rate (%)
	Year 2019		Year 2026		
	Money	Prop.	Money	Prop.	
Telehealth	45.5	35.1	175.5	27.1	21.3
mHealth	35.3	27.2	341.3	52.8	38.3
Health analytics	20.9	16.1	83.9	13	22
Digitised health systems	28	21.6	45.7	7.1	6.9

### A POLICY FOR DIGITAL HEALTHCARE

According to the American Food and Drug Administration, the Digital Health Center of Excellence will debut in September 2020 [8]. This appears to be a significant advance in the agency's overall commitment to improving digital health technology, which includes wearable's when employed as medical devices, Mobile health devices, technology for medical research.

The fact that doctor-patient telehealth is prohibited demonstrates how severely constrained growth in related industries is in Korea. [1] The government has recently made a number of efforts to promote innovation.

One of the five new industries in 2017 will be the bio-health sector, and the R&D budget will rise, according to a statement from the Ministry of Trade, Industry, and Energy. The only

industry that makes up a bigger percentage of the budget for the five new sectors in terms of absolute size is the new energy sector (21.7%). This suggests that the government will continue to support initiatives for health-related policy [9].

In order to provide customers more control over how their data is shared, the Ministry of Science and ICT has been financing the My Data firm since 2019 and used. To create a platform that may offer different medical and health services through the privately maintained and dissemination of health data, two medical goals were chosen for this year [10].

The Data 3 Act, which was most recently amended, is an example of how the government actively encourages deregulation of emerging technology. The 10 main projects of the Korean New Deal were also unveiled in July 2020. The "Smart Medical Infrastructure" endeavor, for example, aims to institutionalize and activate non-face-to-face medical treatment by creating a smart hospital with a digital foundation that can collaborate with other medical facilities and track patients in real time [11].

## **DIGITALHEALTHCARETECHNOLOGY**

ICT convergence technology, which is based on the development of novel technical forms like industry-to-industry fusion, space object-centered fusion, and human-centered fusion and human-centered fusion is what's driving the digital transformation. In addition to the digital revolution, healthcare is changing as well. non-personal care is responsible for the shift in healthcare from being hospital-centered to community- and consumer-centered, and the Internet of Things (IoT) and wearable technology-driven convergence of space and objects provides people with access to daily healthcare that is not constrained by time or place [2]. A few of the ICT convergence technologies that constitute the basis of digital healthcare are big data, the Internet of Things, You may argue that big data technologies are the main force behind medical innovation. One person will produce 1,100 TB of ambient and daily living data in addition to 0.4 TB of medical data and 6 TB of genomic information.

Big data technologies, you could argue, are the driving force behind medical innovation. In addition to 0.4 TB of medical data and 6 TB of genomic data, an individual will produce 1,100 TB of ambient and daily life data. Over the course of their existence, it represents an incomparable amount of data. It can be used to a large extent thanks to big data technology [12]. As a result, "data-based medicine" is being sought after by the medical community in place of "evidence-based medicine," which now serves as the foundation for medical care. Since "Evidence" can be defined as a sort of knowledge derived from data [6], One could argue that the endeavor to intentionally use source data to lessen potential faults and limits in data processing is a natural evolution.

The Internet of Things (IOT) technology, which connects any devices with an Internet connection, makes information sharing and communication feasible and can be used to collect this data. It functions with monitoring hardware and wearable technologies [3]. The collection of data on changes in a patient's health status that occur in real-time and are not present in conventional medical data is made possible by the use of IOT-enabled technology. The ability to identify, predict, and infer the patient's status as well as improve the efficiency of healthcare services is made possible by the lifelong data it provides on the patient's behavior change and response [9].

Machine intelligence (AI) is becoming increasingly significant as a core technology that is revolutionizing healthcare [13]. AI is transforming the healthcare industry in all facets, from

patient care and diagnostic accuracy to medical research and drug discovery. Healthcare professionals are praising developments in machine learning and voice recognition as the future of effective therapy and precise diagnosis. Similar to this, as they become more aware of its advantages, pharmaceutical and healthcare businesses are committing more to using AI to enhance their goods. Big data and AI technologies have the potential to significantly reduce maintenance and drug costs, enhance healthcare, control epidemics, and save countless lives [14].

Demand for medical assistants and automated robotics is rising as a result of efforts to boost medical productivity and reduce common errors. In addition to other uses, robotics is employed in medical treatment, research, and surgical robots [3].

Utilizing consistently organized data, block chain applications in the medical field, such as smart healthcare services, have the advantage of eradicating identity fraud, reducing the chance of information leakage, and enhancing the convenience and compatibility of medical information sharing. As a result, activating patient-centered medical information is particularly effective [15]. The management of chronic conditions and domestic telemedicine continue to be the cornerstones of the smart healthcare sector.

## CONCLUSION

Despite accounting for a large portion of the economy, the healthcare sector's outmoded systems can reduce efficiency. Despite the fact that historically the primary investors in digital health have been governments and healthcare firms, such as Google and Microsoft, they have started to increase their investment [14].

It is also anticipated that the COVID-19 epidemic will raise interest in and spending in the area of digital healthcare. The need for medical services is anticipated to increase continuously as the population ages.

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