

Digital Health as a Strategic Paradigm for Enhancing Healthcare
Delivery: Opportunities and Challenges

Ibtissam Bedri ¹

¹ University Of Batna 1, ibtissam.badri@univ-batna.dz

Received: 27/08/2024

Accepted: 02/10/2024

Published:15/10/2024

Abstract:

This study elucidates the status quo of digital health in Algeria, focusing on how the expansion of technological and informational frameworks can substantially enhance healthcare efficiency. This study aims to align with global advancements and international competitive standards while evaluating the impact of digital transformation on the enhancement of healthcare service quality and the promotion of health awareness. Despite global adoption, digital health in Algeria faces multifarious challenges that inhibit its full-scale development and integration into healthcare services.

Keywords: Digital Health; Healthcare; Status Quo; Challenges.

Corresponding author: Ibtissam Bedri, ibtissam.badri@univ-batna.dz

1. INTRODUCTION

Recent years have witnessed a burgeoning interest in digital health, establishing it as a cornerstone of contemporary healthcare systems. Digital health leverages information and communication technologies (ICT) to foster a more efficient and accessible healthcare environment. Its significance is amplified by its capacity to streamline virtual healthcare operations, optimizing the use of available technologies and a workforce adept in a transparent, flexible, and competitive digital culture.

Extensive literature underscores the pivotal role of digital health globally as a catalyst for healthcare enhancement. However, this role is often compromised by inherent challenges, particularly pronounced in developing nations. Recognizing the transformative potential of digital media in healthcare, many countries have embarked on initiatives to harness this potential for systemic improvement.

Research Problem

This paper addresses the critical question: How does digital health contribute to the improvement of healthcare in Algeria, and what are the emergent opportunities and inherent challenges?

Derived from this central question are several ancillary questions:

- What is digital health?
- What is the current state of digital health?
- What are the predominant challenges that impede the activation of digital health to enhance healthcare?

Research Hypotheses

- The adoption of digital health systems correlates positively with improvements in healthcare services.
- The efficacy of digital health is contingent upon surmounting prevalent challenges.

2. Digital Health and Healthcare: Conceptual Framework and Implications

Digital health has gained traction as an innovative approach to harness the capabilities of ICT in elevating healthcare quality, reducing costs, and

minimizing resource wastage, while delivering superior patient services. This paradigm is particularly pertinent to the Algerian healthcare landscape, necessitating a robust digital health framework.

2.1. Digital Health Definition

Digital health has emerged as an indispensable and multifaceted concept within the lexicon of contemporary healthcare, although its precise definition varies depending on the context in which it is used. This term is prevalently adopted across a spectrum of entities, including academic institutions, professional organizations, and funding agencies. Despite its widespread use, a universally accepted and globally applicable definition remains elusive. Nevertheless, a more nuanced understanding can be derived from an examination of several authoritative definitions:

The World Health Organization (WHO) characterizes digital health as "the effective and cost-efficient utilization of information and communication technologies to support health and health-related fields, encompassing healthcare services, health surveillance, health literature, health education, as well as knowledge and research dissemination."¹

Jeff Dachis, founder and CEO of Data Systems, articulates that "digital health has ascended to a critical pillar within modern healthcare frameworks. He asserts that integrating traditional care methodologies with digital technologies can substantially enhance patient care by providing solutions that are both more efficient and customized to individual circumstances, particularly during global health crises such as pandemics."²

Digital health is also defined as the "application of information and communication technology systems effectively in both medical and educational domains within the same healthcare system or remotely."

³Another delineation describes it as the "synergistic use of information and communication technology (including digital transmission, storage, retrieval, and sharing) within various healthcare contexts, which encompasses medical, health, educational, research, and administrative applications, whether located on-site or remotely."⁴

Therefore, digital health represents a broad, interdisciplinary concept that intersects technology and healthcare, driving the digital transformation

within this sector through the integration of hardware, software, and services. The scope of digital health includes diverse applications such as mobile health, telemedicine, wearable technology, personalized medicine, electronic medical records (EMRs), and electronic health records (EHRs). Moreover, it extends to encompass health information technology, health analytics, and health informatics, alongside hospital and medical technology.⁵

Digital health is recognized as "a domain of knowledge and practice associated with the development and utilization of digital technology to improve health outcomes." It expands the e-health framework to include a broader array of digital technology consumers and a wider range of smart devices and connected equipment. This broader conceptualization also embraces additional digital technology applications in healthcare, such as the Internet of Things (IoT) and artificial intelligence (AI).⁶

Countries worldwide are actively developing digital health strategies that align with their national policies, aiming to implement digital health solutions that contribute to the achievement of sustainable health-related development goals. These strategies are designed to respect national sovereignty and are tailored to fit the cultural, value-based, and policy-oriented contexts of each country, addressing specific health needs and utilizing available resources optimally.

2.2. Telehealth:

Telehealth, an integral component of digital healthcare, involves the application of digital information and communication technologies—such as computers, mobile devices, and smartphones—to facilitate remote access to healthcare services and the management of patient care. These technologies can be deployed in various settings, including patients' homes, or used by healthcare professionals to enhance and support healthcare delivery.⁷

Telehealth is broadly defined as the utilization of digital information and communication systems to remotely access healthcare services and manage healthcare provision. This includes a range of digital tools such as computers, tablets, and smartphones, which can be employed by patients at

home or by healthcare practitioners—including nurses and specialists—from medical facilities or mobile units. This is particularly relevant in rural areas where access to healthcare is limited. Moreover, physicians use these technologies to optimize healthcare services by improving accessibility and efficiency.

Formerly referred to as telemedicine, telehealth is now recognized as the use of digital communication technologies to deliver healthcare services across distances. It encompasses all forms of electronic communication between patients and healthcare providers, from traditional phone calls to interactive video conferencing and web-based interactions. As technology continues to evolve, so do the capabilities and applications of telehealth.

The scope of telehealth extends to various domains, including remote clinical care, tele-diagnosis, digital patient monitoring, and mobile health applications⁸.

The primary objectives of telehealth initiatives are:

- Enhancing access to healthcare for individuals residing in rural or underserved regions.
- Ensuring patient and public safety during outbreaks of contagious diseases, such as COVID-19.
- Delivering primary care services for a broad spectrum of health conditions.
- Improving the availability of healthcare services for individuals with mobility challenges, time constraints, or limited access to transportation.
- Expanding access to specialized healthcare professionals.
- Facilitating improved communication and coordination between healthcare teams and patients.
- Providing guidance for the self-management of chronic health conditions.

Telehealth's utility extends beyond basic communications, such as Short Message Service (SMS) and Multimedia Messaging Service (MMS). Technological advancements have yielded more sophisticated solutions,

such as mobile diagnostic laboratories. For example, in South Africa, a mobile lab has been developed for diagnosing complex and difficult-to-treat diseases. The lab generates digital results and images that can be securely stored and transmitted to specialists located remotely. Encryption and scanning technologies ensure the security and confidentiality of patient data and biological samples.

In Algeria, both public and private diagnostic laboratories have adopted digital technologies for managing patient records, creating digital files that can be accessed in future medical consultations. The practice of teleconsultation has also gained traction globally, with an increasing number of remote consultations being conducted across various medical specializations. Telehealth technologies have proven effective, even in complex and high-risk surgeries, where live video feeds enable real-time oversight by qualified surgeons and medical experts.⁹

2.3. The Current State of Digital Health in Algeria: Prospects for Healthcare Sector Digitalization

Algeria is progressively advancing toward the digitalization of its healthcare sector, integrating digital health strategies within its national healthcare framework. This shift has been catalyzed by the profound ramifications of the COVID-19 pandemic on both national and global scales. The digitalization of healthcare systems aims to reduce patient mobility, facilitating remote access to healthcare services and ensuring continuity of care. This strategic transition underscores the urgent need to reevaluate and restructure the healthcare system to meet the evolving demands of the contemporary healthcare landscape.

However, the successful realization of digital health initiatives requires robust inter-ministerial collaboration and cross-sectoral synergies, particularly involving the Ministry of Post and Telecommunications, which plays a critical role in establishing the digital infrastructure necessary for healthcare digitalization. Despite these ongoing efforts, critics within the fields of information technology and media have highlighted significant deficiencies in current policy frameworks. These policies are perceived as falling short of the rigorous standards observed in more advanced

healthcare systems globally, as well as in neighboring regions. Experts emphasize the necessity of engaging digital transformation specialists to manage this complex process with enhanced transparency, technical proficiency, and strategic oversight. Such measures are essential for fostering the digital maturity required to optimize healthcare service delivery and drive sectoral innovation.¹⁰

Notable digital health advancements in Algeria's healthcare sector include:

2.3.1. Docta Digital Platform

Launched in 2021, *Docta* is a cutting-edge digital health platform designed to connect patients with healthcare providers, offering a more intelligent and efficient approach to healthcare delivery. The platform streamlines the scheduling of medical appointments and facilitates the management of patient data and medical records, all within a unified digital interface. Additionally, *Docta* enhances the communication dynamics between physicians and patients, enabling patients to quickly find specialized doctors, access their availability, and track their appointments via notifications. The platform also provides patients with real-time information regarding their health conditions, making healthcare management more accessible and informed.¹¹

2.3.2. e.tabib.dz Telehealth Platform

e.tabib.dz stands as one of Algeria's pioneering digital health initiatives, focused on remote medical consultations. Developed by a local company specializing in smart healthcare solutions, the platform was launched in 2020 in response to the COVID-19 pandemic. It offers complimentary remote medical consultations during lockdown periods, allowing patients to resume their medical care using smartphones or computers. The primary objective of *e.tabib.dz* is to alleviate the burden on hospitals by reducing patient mobility and overcrowding. By the end of March 2020, the platform had successfully facilitated over 2,600 remote consultations, predominantly for COVID-19-related cases.¹²

2.3.3. Sahatek Digital Healthcare Network

Sahatek is a digital network designed to streamline medical

appointment scheduling and coordination among patients, hospitals, and pharmacies. Developed by the Algerian Innovation and Development Company (AFIND), which specializes in technological innovation and healthcare solutions, the platform simplifies the process of securing medical appointments and locating nearby pharmacies. By integrating physicians' schedules into a centralized database, *Sahatek* enables patients to search for specialists based on geographic location and book specific appointment slots with ease.¹³

2.3.4. COVID-19 Digital Tracking Platform

Developed by Algeria's Ministry of Health, this digital platform is dedicated to tracking the progression of COVID-19 across the country. It monitors the spread of the virus, documenting daily statistics on infections, recoveries, and fatalities in all provinces through an interactive epidemiological map. The platform also serves as a resource for the public, providing timely updates, health advice, and preventative measures related to the pandemic, thus enhancing public health awareness and response.¹⁴

Despite the availability of these digital health platforms, widespread adoption remains limited in Algeria. The challenges stem from a lack of awareness and trust among both patients and healthcare professionals. This reluctance to engage with digital health technologies underscores a broader issue of underappreciation for the potential of these innovations to simplify daily healthcare practices, reduce geographical barriers, and enhance service delivery.

While the Algerian government has made strides in advancing healthcare digitalization through policy reforms and the integration of information and communication technologies, the sector continues to experience significant delays in fully realizing the transformative potential of digital health.¹⁵

3. Challenges Impeding the Effectiveness of Digital Health in Enhancing Healthcare

The deployment of digital health technologies encounters a spectrum of challenges, which vary by national context but are particularly pronounced in developing countries. Here, we detail the primary

impediments to the effectiveness of digital health in enhancing healthcare delivery:¹⁶

1. Operational and Technical Challenges:

- Effective implementation of digital health necessitates a robust integration between information and communication technologies (ICT) and healthcare information systems across healthcare institutions.
- The absence of a standardized framework for data quality assurance is a critical barrier.
- There is a tangible risk associated with the loss of digital health records, compounded by inconsistent maintenance and updates of these systems.

2. Internet Connectivity Challenges:

- Significant fluctuations in internet stability have obstructed numerous digitalization initiatives in healthcare, especially those involving the integration of digital platforms within healthcare infrastructures. Such initiatives require robust and high-capacity internet connectivity to manage extensive digital content effectively.
- The transition from outdated copper cable networks to modern fiber-optic infrastructure is essential yet challenging, affecting the quality of the network.
- Issues with internet management—characterized by slow data speeds and inadequate coverage, often due to delays in upgrading undersea cable systems—severely restrict digital health operations.
- A deficiency in adequately trained and qualified ICT personnel exacerbates these issues, limiting the potential for technological advancement in healthcare.

3. Technological Barriers:

- Maintenance and upgrading of both computer systems and medical devices pose significant challenges, particularly when dealing with outdated equipment.
- The development of medical software is hindered by ambiguities

concerning specific requirements, specifications, and operational protocols.

- Limited support for the Arabic language in various software applications restricts accessibility and usability.
- Difficulties in managing imported medical technology, coupled with a scarcity of training facilities for these technologies, represent substantial technological obstacles.

4. Administrative Challenges:

- Inadequate planning and coordination at higher administrative levels undermine the success of digital initiatives.
- The lack of organizational changes necessary to support digital transformation stifles progress within healthcare institutions.
- An absence of a clear strategic vision for digital technology application within healthcare settings often leads to misaligned efforts.
- Resistance to change among healthcare staff, who may continue to adhere to traditional administrative practices, hampers the adoption of digital solutions.

5. Legislative and Regulatory Challenges:

- Non-compliance with ratified laws intended to support digital health initiatives limits legal support for these efforts.
- The lack of alignment with national and international standards creates a disjointed regulatory environment.
- Current legislation does not sufficiently protect personal rights or ensure the privacy of patient data.
- The absence of comprehensive legal frameworks governing digital health necessitates the development of robust regulations to manage these systems effectively.
- There is no designated governmental oversight to evaluate digital health financing programs or make necessary adjustments to enhance digital readiness, which is crucial for advancement.

6. Financial Constraints:

- The financial demands of digitalizing healthcare are considerable, reflecting the sector's critical nature.
- Limited financial resources allocated for training and capacity building in digital health hinder the development of necessary competencies.
- The high costs associated with medical and digital health technologies pose additional financial burdens.
- Opportunities for investment and funding to improve infrastructural capacities, such as networks and communications, are insufficient.¹⁷

7. Human Resource Limitations:

- There is a pervasive lack of cultural awareness about the benefits of ICT, both at societal and organizational levels, which can impede the acceptance and integration of digital health technologies.
- The shortage of advanced training programs in digital health technologies limits the availability of skilled healthcare professionals.
- The dearth of experienced personnel, coupled with inadequate financial incentives, diminishes the motivation to engage with digital health initiatives.
- Employee apprehensions about their capability to manage new technologies, particularly those requiring proficiency in English, create barriers to effective implementation.
- Resistance to digital transformation, coupled with a reluctance to embrace new operational models, further challenges the sector's ability to capitalize on digital health opportunities.

4. Conclusion

Digital health represents a relatively novel paradigm in healthcare delivery, one that streamlines information management, communication, and transactional processes within and across healthcare institutions. It enhances service delivery, fosters improved communication among healthcare stakeholders, and mitigates geographical and professional isolation. Despite its potential, several barriers continue to obstruct its

widespread adoption.

In Algeria, the strategic importance of digitalizing the healthcare sector is well recognized, particularly in its capacity to enhance the quality of healthcare services. Consequently, the country has embarked on a series of reforms aimed at integrating technological advancements into the healthcare system. However, despite the implementation of some digital health initiatives, the sector remains hampered by significant challenges. Progress has been incremental, and much of the healthcare system still operates on traditional frameworks. These limitations are attributed to a range of obstacles that hinder the full-scale digital transformation of the healthcare sector.

To overcome these challenges, a fundamental shift in entrenched attitudes is essential, coupled with a robust commitment to the transformative potential of digital health. The following recommendations are proposed to establish a comprehensive digital health framework in Algeria:

- Formulate clear and comprehensive digital health strategies, ensuring their successful implementation across all dimensions of healthcare delivery.
- Enhance human resource capabilities in digital health by integrating medical informatics into the mandatory curricula for all healthcare professionals.
- Promote public engagement with digital health applications to broaden access to healthcare services and improve public health outcomes.
- Modernize healthcare infrastructure and equipment to align with the technological requirements of digitalization, ensuring compliance with contemporary standards.
- Develop robust legal frameworks and regulatory policies that support the digitalization of the healthcare sector, with a particular focus on safeguarding the privacy and confidentiality of patient health data.
- Improve internet service quality and bandwidth, recognizing this as a

foundational component for the effective deployment of digital health technologies.

- Foster public-private partnerships to stimulate research and development in digital health systems and applications, thereby driving innovation in the sector.
- Adapt successful global digital health models to the Algerian context, ensuring that these frameworks are tailored to the specific needs and capacities of Algerian society and other developing nations.
- Strengthen national healthcare resilience by developing skilled healthcare professionals and equipping healthcare facilities to better respond to public health crises.

3. References:

¹ ITU, I.T, standars and e Health, Recupéré sur ITU-T Technology watch Report: <http://www.itu.int/ITU-T/tech> watch, January 2011, visit le: 26/11/2021.

² Hanan Salah Kamel, "Electronic Health Records and the Challenges of Digital Transformation in Healthcare: An Exploratory Study," *The Scientific Journal of Libraries, Documents, and Information*, vol. 5, no. 15, July 2023, p. 135.

³ Durra Omar Mohammad et al., "Diagnosing the State of E-Health at King Abdullah University Hospital: A Case Study," *Arab Journal of Management*, vol. 37, no. 2, 2017, p. 7.

⁴ Shafiqa Mehri, *Current Research Issues and Challenges in Egypt*, Egypt: Duroob for Publishing and Distribution, 2019, p. 50.

⁵ Borstien C (2021), Digital health (digital health care, Retrived 22 jun 2020, from <http://searchthit.Techtarget.com/definition-health-digital> healch care 2021

⁶ Rayani. P, E-Health: Away of Digitalization, international journal of trand in scientific research development (IJTSRD), Vol 1, NO 01, p156.

- ⁷ Telehealth: Technology Meets Healthcare Demands, accessed on 25-02-2024, <https://www.mayoclinic.org/ar/healthy-lifestyle/consumer-health/in-depth/telehealth/art-20044878>.
- ⁸ Hayat El Harshi Srir, "E-Health: A New Perspective for Improving Healthcare in Algeria: A Proposed Concept," *Journal of Economic Studies*, vol. 16, no. 2, 2022, p. 349.
- ⁹ Malina Jordanova, *Mobile Health Service: Final Report for the International Telecommunication Union*, Telecommunications for e-Health, https://www.itu.int/dms_pub/itu-d/opb/stg/D-STG-SG02.14.2-1-2010-PDF-A.pdf.
- ¹⁰ Nawal Wessar, "Digital Health Amid the COVID-19 Pandemic: A Model of Digital Health Applications via Smartphones," *International Journal of Social Communication*, vol. 9, no. 1, 2022, pp. 399-413.
- ¹¹ Islam Kaabash, "Algeria Launches a Digital Health Platform Connecting Patients with Doctors," retrieved on July 15, 2022, from Sky News, <http://www.skynewsarabia.com/muddle-east>.
- ¹² Islam Kaabash, *ibid*.
- ¹³ Islam Hossam El-Din, "Your Hospital on Your Phone: Remote Medical Consultation in Algeria," from Anadolu News Agency, 24-02-2022, accessed on July 13, 2022, <https://www.aa.com.tr/ar>.
- ¹⁴ Jalloud Allache and Samia Bouhafs, "The Emergence of E-Health as a Mechanism to Combat COVID-19 in Algeria," *Journal of the Research Unit for Human Resources Development*, vol. 17, no. 1, pp. 336-360.
- ¹⁵ Mohamed Ben Djamaa and Zuleikha Snoussi, "Digitalization for the Reform of Algerian Hospitals: Opportunities and Challenges," *Journal of New Economics*, vol. 14, no. 1, 2023, p. 609.
- ¹⁶ Abolade. T,& Burosinmi. A, The benefits and challenges of E-health Applications in Developing Nations: A Review Proceedings of the 14 th is

TEAMS Multidisciplinary Conference Alhikmah university, December 2018, pp37-41.

¹⁷ Kamal Sar, "Obstacles to the Implementation of E-Government in Public Administration," *Al-Hikma Journal of Media and Communication Studies*, vol. 9, no. 2, 2021, pp. 78-99.