Digitalization Strategy in the Healthcare Sector of Qatar: A Field Descriptive Study on its Impact on the Delivery of Health Services in Selected Public and Private Institutions

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Abstract:

This study aims to illuminate the core principles that underlie the digitization of the healthcare sector, a critical arena for countries seeking to advance their healthcare institutions and elevate service quality. Digitization, with its precision in health data, emerges as a vital tool for regulatory bodies to exert a degree of control over normal health scenarios and particularly during health crises. The study uncovers the strides taken by certain Arab nations, notably Qatar, in realizing digitization objectives. The findings underscore the presence of well-defined standards for implementing the digitization strategy in Qatar's healthcare sector. These standards encompass the adoption of a digital national health card for patients, the alignment of sector-specific methods with prevailing global digitization trends and a dedicated emphasis on

monitoring and research to foster development and competition within both private and public healthcare sectors.

- ✓ Keywords. Digitization. Healthcare. Digitization Strategies. Healthcare Digitization Strategy. Health in Qatar.

1.INTRODUCTION : In today's world, there is a growing global interest in digitization as a strategy with several advantages. Countries are keen to introduce digital methods across all sectors to keep pace with modern technological advancements, leveraging digitization for economic development.

Some Arab countries, particularly in the healthcare sector, stand out as pioneers in formulating clear visions for digitization. This is particularly crucial amidst health crises such as the COVID-19 pandemic. However, when it comes to rankings of Arab countries, they exhibit considerable variation. While one country may excel in one digitization indicator, it may lag in another. Moreover, classification criteria vary across organizations and centers. For instance, in 2016, the McKinsey Institute categorized Arab countries based on smartphone penetration, with Gulf countries surpassing 100%, while social media usage stood at 7%. Nevertheless, the region is striving to transition from being a mere consumer to an active player in digitization, as evidenced by ongoing efforts to activate and develop digitization (Mustapha, 2019)

Digitization is not a temporary trend imposed by circumstances; rather, it is a strategy adopted by nations and governments in an attempt to adapt to its ever-evolving landscape. Consequently, exploring the dimensions of digitization in hospitals and healthcare institutions necessitates a scrutiny of various international experiences.

Qatar, like other Arab countries, has embraced a new approach to managing healthcare institutions, aligning with global progress. Significant financial allocations have been earmarked to enhance the healthcare sector, implementing diverse applications to facilitate remote patient treatment and monitoring.

The essence of this strategy lies in continuous and evolving investment, subject to digital transformations in the health information system. It relies on gathering health indicators comprehensively, transforming them into mechanisms that ensure transparency and accountability.

Discussing digitization and its importance for humanity requires examining the services it provides to facilitate our daily lives. A crucial area for study and analysis is the healthcare sector, which concerns every individual in society. It is imperative in the digital age for individuals to have access to high-quality healthcare services, reflecting authorities' concern for both society and the individual. Through this nexus, a strengthened sense of belonging is cultivated, fostering reassurance and confidence among citizens in their nation. Additionally, advancing the healthcare sector in countries helps combat various challenges, including the fight against epidemics, diseases, and different viruses, controlling disease development, and enabling countries to manage expenditure budgets.

This study aims to unveil an international approach to the digitization of the healthcare sector, a necessary undertaking to understand the peculiarities of digitization in various countries, including Arab nations that have made significant progress in the digitization of the healthcare sector.

The significance of the study lies in its attempt to investigate the practical implementation of global digitization strategies, especially given its focus on a sensitive and strategic sector in countries—the healthcare sector. It is noteworthy that this domain necessitates further research due to its connection to the evolving developments in information and communication technology.

To delve deeper into this crucial topic, it was imperative to explore experiences from both Arab and foreign countries in the digitization of the healthcare sector. Therefore, we employed a descriptive-analytical methodology, relying on field

observations and gathering practical information to elucidate the fundamental principles underlying Qatar's strategy in the digitization of the healthcare sector.

Qatar was selected as a model due to its distinct and noteworthy strategies in the realm of healthcare sector digitization. Given our field observations of this experience, we will endeavor to explain the theoretical and practical dimensions of this strategy, framing our inquiry with the following question:

"What constitute the fundamental pillars of the digitization strategy within the healthcare sector, and how does Qatar implement the standards and foundations of this strategy across its public and private healthcare institutions in the year 2023?"

Study Inquiries:

➢ What is digitization? and what is its significance in healthcare sector institutions?

➢ What are the key pillars of the global digitization strategy in the healthcare sector?

➢ What are the foundations of the digitization strategy in the healthcare sector in Qatar?

➢ What are the obstacles and challenges to the implementation of digitization in Algeria in light of the Qatari experience?

2. Digitization Strategy in the Healthcare Sector : Conceptualization and Significance : The term "digitization" represents a contemporary concept that proves challenging to define definitively due to its prevalent use and dynamic association with rapid advancements in information and communication technology. The intricacy arises from the difficulty in determining how, when, and where it operates, given its link to variable factors. However, clarity can be achieved by elucidating the

implications of digitization from distinct perspectives:

1.1. Digitization as a Term:

Digitization, in essence, denotes a modern system adept at processing information through progressive methods, continuously leveraging developments in information and communication technology. Defining digitization is contextual, subject to the operational context. Digitization encompasses the conversion of continuous analog signals into binary digital signals. It involves encoding procedures that transform printed or stored materials, including microfilm, microfiche, audio tapes, and visual video tapes, into a digital format suitable for computer processing. This conversion is achieved through methods such as scanning or re-entry, wherein the materials are organized into discrete data units known as "bytes." Subsequently, these bytes are stored on internal storage media like laser disks and digital video disks, or they are made accessible on the internet (Yas, 2023).

In discussions about digitization, an essential aspect involves contemplating digital societies. Here, perspectives shift smoothly from predominantly analog to digital behaviors accepted and embraced by societies. Digitization does not uniformly impact file formats negatively; as the transition to digital forms is a standard state with positive characteristics. The pillars of digital societies include web-based information sources, the transition from static to dynamic information, and the adoption of dynamic and semi-intelligent documents (Owen, 2011).

1.2. Procedural Definition of Digitization:

In the context of this study, digitization encompasses all methods and frameworks adopted by healthcare entities to streamline medical procedures for patients. This entails facilitating the retrieval, archiving, categorization, and provision of patient data related to analyses and medical history on the digital national health card. Additionally, it facilitates medical examinations, surgeries, and the remote operations of both private

and public healthcare institutions through communication channels such as WhatsApp and email.

1.3. Literature review:

A recent study in the field of digitizing health information systems in Bangladesh, Indonesia, and Pakistan has garnered significant attention. The efforts in the digital transformation process focused on creating a global software product, deploying digital systems, and enhancing human resources. The study presented a pivotal table in each of the three countries, relying on indicators related to the registration of pregnant women and their remote monitoring. Through the study, it becomes evident that the deliberate process of digital transformation in well-thought-out settings has brought numerous benefits to the population, especially pregnant women (Tamrat, 2022). The study concludes that the ongoing global transition towards digital transformation, considered indispensable for aligning with the global system and progressing, requires specific factors. Among these, a critical emphasis is placed on optimizing the utilization of experiences derived from diverse countries, along with the collaborative endeavors of researchers and scientists. This collaborative effort is essential to instill a digital culture in the healthcare sector through authentic and collective studies and research.

Another recent study in Egypt delved into the topic of digitization and its impact on improving the quality of healthcare services, researchers focused on the effect of a national initiative, namely the Presidential Initiative to Eliminate Waiting Lists in Hospitals. The study aimed to monitor the impact of this initiative, considered one of the pillars of digitization, by attempting to eliminate some negative practices in hospitals. These included ending waiting lists for medical interventions, addressing the needs of non-Egyptian patients, enhancing data quality, activating the supervisory role, and improving communication channels (Suleiman, 2023). This study holds significant importance, especially regarding its digital aspects, with a primary focus on addressing immediate effectiveness and identifying negative practices prevalent in Egyptian

hospitals, particularly emphasizing issues such as waiting lists for patients.

2.Digitization in the Healthcare Sector : Strategies and Requirements

Digitization does not manifest in the manner commonly perceived by the public; rather, it entails long-term planning. Therefore, organizations' efforts to achieve this approach in development and progress are based on several foundations, including:

- **Human and Social Foundations:** Digitization requires a societal acceptance of technology or coexistence with it. It necessitates readiness to work with a different type of planning, programming, and execution. Additionally, digitization requires substantial material resources, especially regarding high-speed internet access, made equally available to everyone.

The UN program for digitization development in developing countries, exemplified by Mauritania, aims to improve and advance digitization through several pillars : (Steiner, 2023).

- **E-commerce:** Digitization is an investment with profits derived from various applications and other elements. It heavily relies on data, making it crucial to process big data efficiently and possess modern applications that classify and process data. Ensuring data includes a protective system enabling systems to maintain privacy.

2.1.Foundations of Digitization :

- **Ethical Foundations:** Digitization relies on ethical standards, with a particular focus on cyber-security. Cyber-security is indispensable for digitizing any specific sector, ensuring comprehensive protection of data from electronic attacks. It involves applying techniques, processes, and controls to protect computer systems, networks, programs, devices, and data from unauthorized access or attacks (Elmaarifia, 2022).

- **Human Capital:** Digitization requires physical resources and is inseparable from human expertise. The principle of transparency and objectivity in digitization requires individuals to work towards its realization and increased effectiveness. Individuals can be an integral part of the digital system, especially in the healthcare sector. People are essential stakeholders, and laws regulate and protect digital systems. Digitization cannot be applied without ensuring certain requirements such as a security system and non-intrusion (Elmaarifia, 2022).

To achieve digitization, a multitude of factors must be fulfilled, including the availability of infrastructure, which usually refers to the availability of computers, engineers, strategy formulation and adoption by different countries. It also involves having secure, modern applications, making the digital transformation process require significant physical and human infrastructure and pivotal strategies.

Digitization also requires a digital transformation, which encompasses smooth access to digitization. Digital transformation refers to all the processes that organizations undertake in preparation to receive a new form of administrative management.

Algeria's experience in digitizing the healthcare sector is characterized by its emergent and evolving stage of development, including several options. There are several projects adopted by the Algerian government, including the Digital Hospital project, digitizing contractual relations with social security organizations, and integrating information into the electronic medical record through the biometric identification card. Additionally, there are information systems for human resources, the mandatory disease declaration system, and information systems for maintenance and staff support in the healthcare system (Hussein, 2023).

The following are the prominent methods and components of the healthcare sector digitization strategy: genomics, remote healthcare, smartphone applications, social media, wearable devices and sensors, virtual and augmented reality, unmanned aerial

vehicles (drones), Internet of Things (IoT), artificial intelligence (AI), speech recognition, natural language processing, robotics, and distributed ledger technologies (DLT) (Odone, 2019).

The Global Strategy on Digital Health project prepared by the World Health Organization (WHO) from 2020 to 2025 encompasses the following plans (de, 2018):

❖ **Short-Term Plans (1-2 years):**

- Establishment of suitable structures and facilities.

- Creation of effective coordination mechanisms for managing digital health.

- Priority investment in the digital field.

- Enhancement of collaboration across sectors and focus on national digital health.

❖ **Medium-Term Plans (2-4 years):**

- Utilization of digital technologies in healthcare.

- Promotion of better practice exchange.

- Engineering of digital infrastructure: digital hospitals and adoption of digital health data.

❖ **Long-Term Plans (4-6 years):**

- Evaluation of achievements.

- Advancement of research in the field.

- Information Processing.

- Framework development for leveraging artificial intelligence.

These plans aim to enhance healthcare innovation, align with national health priorities, and achieve Sustainable Development Goals.

2.2 Foundations of Healthcare Digitization Strategy:

The table below outlines the principles of the digitization strategy in the healthcare sector:

Table 1 : A table showing the foundations of the digitization strategy in the health field

Foundations and Advantages	Challenges and Countermeasures
Enables healthcare systems to quickly and efficiently perceive and transfer information (DeepSc). Data security concerns arising from flexible sensor networks that access user data, posing potential risks of data breaches.	Deep learning-supported communication or perception provides secure data access. The need for new algorithms, such as reinforcement learning, to address digitization challenges (Xiao, 2023).
Ensures access to digital capabilities as a source of public health and healthcare equality.	Establishment of networks like TUPHA (47 members) to facilitate and activate digitization processes, particularly in European countries. Med Tech support for collaboration between medical and computer science professionals and data scientists.

3. Qatar's Healthcare Digitization Strategy:

The digitization strategy in Qatar's healthcare sector is built on both theoretical and practical foundations. The theoretical basis adopted by the strategy revolves around its flexibility to adapt to global advancements in digitization. This adaptability is

crucial, with experts continually monitoring global developments and introducing new digital mechanisms as needed. Another foundational aspect of Qatar's strategy to support the digitization of the healthcare sector focuses on improving services and strengthening digital infrastructure. This is achieved through (Saaidia, 2018)

- **Medical Information Systems:** A digital information system that allows patients to monitor their medical records even when abroad. Patients interact with healthcare facilities and remote doctors through various social media platforms.

- Electronic Portals: Effective mechanisms for patients to access medical files through various applications that schedule appointments, send test results, etc. Notably, platforms like "SIHATI" prioritize such services.

- National Digital Health Card: Providing several health services to Qatari citizens and residents, the card serves as a national health identification number. It contains accurate information about the patient, including medical details, treatment journeys, and prescribed medications. Input by healthcare professionals into the digital system allows the card to reveal the patient's health history effortlessly.

It's important to note that Qatar's National Health Strategy encompasses clear goals and methods, with a focus on seven objectives and 35 projects extending to the year 2030. The Supreme Health Council, as the highest national body for health affairs, aims to develop healthcare, coordinate with various private and public health entities, and engage citizens in the strategy. The strategy is outlined in various traditional and modern formats, demonstrating a commitment to citizen participation through conventional methods such as posters and contemporary approaches like online platforms. Our observations on Qatar's healthcare digitization field have allowed us to document the following information.

Date	Locations	Timings	Notes
July 4, 2023	Omar ibn Al-Khattab Hospital	9:00 AM	➢ Attend the examination with the national health card for residents and Qataris. ➢ Omar ibn Al-Khattab Hospital is a public institution affiliated with Hamad National Hospital, providing high-quality healthcare services. ➢ Obtain an entry ticket through electronic devices and proceed to a designated waiting area, considering gender and patient status. ➢ A medical examination department equipped with high-speed 5G internet. ➢ The doctor records the diagnosis in the national health card. Through it, another doctor can also monitor your condition without the need for you to explain anew or recall all the details of your illness
July 30, 2023	Hamad Medical Hospital	10:00 AM	➢ Hamad Medical Hospital's total reliance on a digitized system enables patients to schedule timely appointments despite current hospital congestion, ensuring comprehensive treatment with medications. ➢ It is noteworthy to mention here that the services provided by the hospital are primarily for Qatari citizens and, secondarily, for residents, as they often possess comprehensive social insurance coverage. However, for visitors, the matter is complex and subject to additional procedures that may be challenging and costly. Nevertheless, during events such as sports tournaments, including the World Cup, Qatar has implemented healthcare measures to ensure the provision of services to event guests
August 13, 2023	Omar ibn Al-Khattab Hospital	8:00 AM For medical tests	➢ The laboratory department undergoes digitization, allowing staff to identify the type of analysis through the health card. ➢ Test results are recorded on the health card for integration into the healthcare system's digital network. ➢ Utilization of paper posters on walls for reminders and displays of the digital health strategy, promoting citizen engagement
August 20, 2023	Turkish "Private" Hospital	7:00PM Emergency treatment	➢ Entry to the hospital and service access requires the use of the national health card. ➢ Comprehensive coverage of 70% or sometimes less for working residents and Qataris.

			➢ Availability of medical analysis services and pharmacies. ➢ Proficiency in digital skills, heavily relying on them for screening purposes. ➢ Additional skills: Computer literacy, internet usage, English language proficiency, and a diverse workforce

The above table provides insights into healthcare in Qatar, showcasing significant strides in digitizing the health sector and responding to national and international aspirations. Despite notable achievements, some shortcomings exist, particularly regarding the high treatment costs for residents and visiting expatriates. In Qatar, healthcare is not entirely free; instead, insurance companies cover a considerable portion of treatment expenses. Challenges in communication arise due to the diverse nationalities, languages, and thinking patterns, impacting interactions between patients and medical staff. However, Qatar has a national policy aimed at addressing this issue by employing individuals from various nationalities who speak different languages within hospitals and public and private health centers.

4. Application of the Qatari Experience in Algeria

Algeria demonstrates a keen interest in the digitization of the healthcare sector through various mechanisms, including the following approaches:

✓ The 8th workshop of the National Sessions for Modernizing the Health System, held on January 8th and 9th, emphasized the experts' focus on addressing the delay in integrating information and communication technologies into the health sector. Participants highlighted the need to create a conducive environment for development, launch electronic patient files, encourage telemedicine, establish a secure internet network, and adopt modern medical technologies (al-Djazairia, 2022).

✓ Since 2022, Algeria has initiated the implementation of a healthcare project in partnership with Qatar and Germany. The project, set to open at the end of 2025,

includes a 400-bed hospital with 30 intensive care units, 15 operating rooms, and 40 outpatient clinics. It is expected to accommodate over 250,000 visitors to outpatient clinics annually (Lhiani, 2022).

The anticipated benefits of this experience include maximizing the potential of digitization in the healthcare sector, facilitating communication with patients, and

streamlining the treatment process. Those involved in the project are urged to commit to digital principles, introducing various applications, encouraging digital communication among citizens, and focusing on digital infrastructure.Scientific

However, the current limitations in the application of healthcare digitization are evident, with reliance on paper files, lack of coordination between private and public sectors, absence of digital health cards, and insufficient progress in mapping diseases and their treatment in Algeria. While digitization brings positive aspects to support medical procedures and treatment processes, efforts are needed to enhance the overall healthcare sector, eliminate diseases and their complications, combat viruses, and promote health awareness.

Study Findings:

A. **At the Study Level:**

❖ The concept of digitalization strategy is widely accepted and aligns with international standards. The indicators are derived from basic standards set by organizations and countries to achieve digitization in the healthcare sector. The digitalization path for the healthcare sector is considered a fundamental principle rather than an optional choice to achieve digitalization goals.

❖ The foundations of the global strategy for digitizing the healthcare sector rely on several key principles, as advocated by the TUPHA network. The study emphasizes the importance of reviewing the steps to achieve healthcare digitization according to the strategy outlined by the World Health Organization.

❖ Qatar's strategy for healthcare digitization combines theoretical and practical frameworks. The theoretical one relies on studies and monitoring developments in digitalization. The practical one involves leveraging digital capabilities for healthcare, including benefits for patients, remote monitoring, and telecommunication.

❖ Algeria is moving towards digitization through various mechanisms, aiming to benefit from both Arab and Western experiences. A notable example is the Algerian-Qatari-German hospital project.

B. **At the Research Process Level (Digitization):**

❖ The study notes a lack of references specifically dedicated to digitization and a significant absence of digitization indicators in Arab countries. Conversely, Western research on digitization in the healthcare field is thriving.

❖ Researchers in the West collaborate across disciplines and countries to conduct research on digitization and its role in developing the healthcare sector. In contrast, there are individual efforts in Arab countries to monitor digitization indicators.

❖ There is a severe deficiency in the translation process related to digitization considering its role in the healthcare field, especially the translation into Arabic.

CONCLUSION :

Digitization within the healthcare sector transcends mere incremental steps or isolated digital achievements; instead, it constitutes an imperative and foundational tenet of the digitization paradigm. Consequently, the discourse on this subject extends beyond the purview of governmental and organizational responsibilities, evolving into an inherent principle intrinsic to the broader framework of digitization.

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