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Leveraging of Digital Transformation to the Improvement of the Quality of Healthcare Services

Abdull hameed nasser al-hameid

Ibrahim eiad almotiri

Adel Saleh Al-Sayegh

Abdulrahman Mohammad Almohaizaie

SULTAN OMAR ALSUBAEL

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Introduction

Over the course of the past few years, the healthcare sector has witnessed a considerable shift toward the adoption of digital transformation as a means to improve the quality of services that are delivered to patients. The integration of technology in the healthcare industry enables individuals to achieve improved health outcomes, an extended lifespan, and enhanced productivity. In 2015, telemedicine was utilized by over one million individuals as an illustration. The number of individuals utilizing telemedicine is projected to experience a substantial rise in 2021, with an estimated 12 million people accessing these services. Tortorella et al. (2023) assert that technology has enabled patients, especially those in rural places, to conveniently obtain high-quality healthcare treatments.

Adopting digital technology to better society and healthcare is what digital transformation is all about. Digital technology presents healthcare systems with an opportunity to improve healthcare delivery and handle medical issues more effectively (Gopal et al., 2019). The healthcare industry is undergoing a digital revolution as a whole, with the internet and digital technologies playing a significant role in the development of new treatments and the improvement of health management processes. It is possible to improve patient welfare and reduce service expenditures by implementing stringent quality control procedures for the massive amounts of data collected.

Essentially, digital transformation in healthcare refers to the incorporation of digital technology, including electronic health records (EHRs), telemedicine, wearable devices, and mobile health apps, into many areas of healthcare delivery and management (Senbekov et al., 2020). These technologies facilitate healthcare providers in simplifying procedures, enhancing communication, optimizing resource distribution, and eventually providing more individualized and efficient treatment to patients.

The advent of digital transformation has brought about a significant shift in the operational procedures of healthcare organisations, resulting in enhanced efficiency and cost-effectiveness. Automated appointment scheduling systems and electronic billing platforms, such as those mentioned, optimize administrative processes by streamlining activities and minimizing errors,

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hence eliminating the need for paperwork. Data analytics technologies assist healthcare management in optimizing resource allocation, identifying patterns, and predicting demand, resulting in the more effective utilization of healthcare resources and enhanced financial viability (Wang et al., 2018).

In contemporary healthcare management, digital transformation has emerged as a fundamental component that propels organisational innovation and influences strategic decision-making (Danneels & Viaene, 2022). Healthcare executives acknowledge the criticality of adopting digital technologies in order to maintain a competitive edge, enhance patient outcomes, and address the changing demands of their respective communities. As a result, healthcare organisations are progressively allocating resources towards digital infrastructure, talent development, and technology partnerships in order to capitalize on the complete capabilities of digital transformation in the provision of healthcare.

Improving the quality of healthcare services is a crucial goal for healthcare organisations globally. Through the utilization of digital transformation, healthcare administrators and leaders may effectively tackle long-standing difficulties and inefficiencies in the healthcare system. Digital technologies have the capacity to simplify clinical operations, minimize medical errors, optimize resource distribution, and enable patients to play a more proactive role in maintaining their health. Moreover, digital transformation has the potential to help healthcare organisations adjust to changing patient demands, and regulatory standards, guaranteeing their ability to thrive and remain competitive in an ever more digitalized environment.

1. The Healthcare System's Digitization

Organisations in the health care industry and all other service sectors have also been impacted by digitization. Before, health care information system development and deployment were thought of as cornerstones of digital transformation, but they turned out to be rather minor components of the larger process of system digitization. But with the information system in place, not only is communication considerably improved, but the flow of information resources within the system is also increased, which can lead to more economical utilization of the existing capacity. But with digital transformation, organisations can do more than just adjust to changing market conditions; they can also learn new things and become more competent. Developing new skills can lead to better products and services and, in the long term, a competitive edge.

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Recognising the current state of affairs and the organization's context is the first step in digital transformation. According to Lapão (2019), organisations are unable to determine the gap between the current state of health care and the degree of service that users desire unless they establish the context and expectations of stakeholders. Nonetheless, new technology must always be considered with an eye towards enhancing the process and expanding its possibilities.

Healthcare settings are progressively utilizing a wide range of digital tools and activities, such as electronic health records (EHRs), wearable devices, telehealth, and telemedicine platforms as shown in figure (1).

- Wearable Devices

Wearable gadgets, including smartwatches, fitness trackers, and medical-grade sensors, have become more important in healthcare due to their capacity to consistently monitor vital signs, activity levels, and other health measurements (George et al., 2023). These gadgets facilitate the monitoring of patients from a distance, enable the early identification of health problems, and provide assistance in managing chronic diseases. They enable individuals to actively participate in their health and offer crucial data for customized treatment programs.

- Electronic Health Records (EHRs) and Electronic Medical Records (EMRs)

Electronic Health Record (EHR) and Electronic Medical Records (EMRs) systems convert patient health information into digital format, encompassing medical history, diagnosis, prescriptions, and treatment plans. This enables safe storage and streamlined access to data. EHRs and EMRs optimize the efficiency of medical processes, alleviate administrative tasks, and improve collaboration amongst healthcare professionals (Anshari, 2019). In addition, they facilitate decision-making by including clinical decision support tools and ensuring compatibility with other healthcare systems.

- Telehealth and Telemedicine

Telehealth comprises a wide array of digital communication technologies that are utilized to provide healthcare services from a distance, whereas telemedicine primarily relates to remote clinical consultations and treatment. Telehealth platforms facilitate virtual consultations, remote

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surveillance, and teleconferencing for healthcare professionals and patients. These technologies enhance the availability of healthcare, particularly for those residing in rural or underserved regions, and diminish obstacles to healthcare provision.

- Mobile Health (mHealth) Apps

Mobile health applications, often known as mHealth apps, are software programs specifically created for smartphones and tablets. These apps are aimed to assist in several areas of healthcare delivery and help patients manage their own health (Iyengar, 2020). These applications provide features such as the ability to schedule appointments, receive reminders for taking medicine, track symptoms, and access resources for health education. They enable people to actively monitor their health, comply with treatment programs, and connect with healthcare practitioners at any time and from any location.

- Personalized Medicine

Personalized medicine utilizes advancements in genetics, biomarker research, and data analytics to customize medical treatments based on individual patients' features, preferences, and genetic composition. This approach facilitates more accurate diagnosis, anticipation of treatment response, and enhancement of therapy regimens. Personalized medicine seeks to enhance treatment outcomes and reduce unwanted effects by taking into account the individualized demands and genetic characteristics of each patient.

- Artificial Intelligence (AI) and Machine Learning

Artificial Intelligence (AI) and machine learning algorithms scrutinize extensive amounts of healthcare data to detect patterns, trends, and insights that guide clinical decision-making, forecast patient outcomes, and customize treatment approaches. AI is used in several applications such as diagnosing medical conditions using image identification, documenting clinical information using natural language processing, predicting risks through analytics, and engaging patients with virtual health assistants (Chen & Decary, 2020). Healthcare providers may increase diagnostic accuracy, optimize treatment regimens, and enhance patient care outcomes while reducing healthcare costs and administrative hassles by utilizing AI and machine learning.

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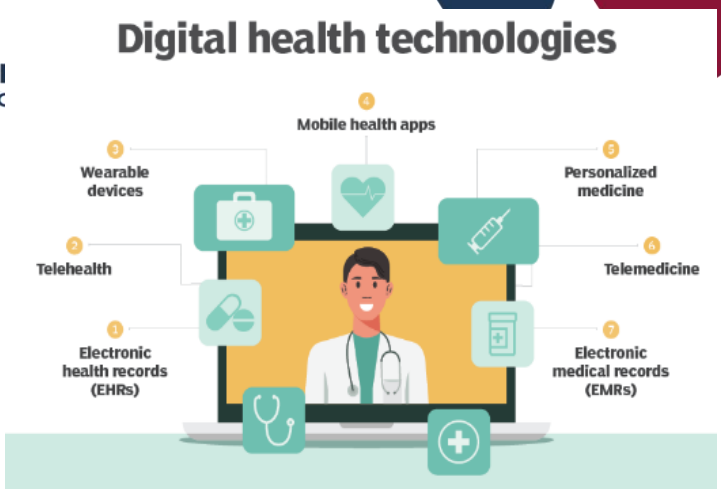

Figure (1): Different Digital Health Technologies

2. The Influence of Digital Transformation on Health Services' Quality

The implementation of digital transformation has a substantial influence on the efficiency and effectiveness of organisational activities. This is a chance for every organization to enhance the capabilities of their processes and optimize all operations that can lead to cost savings. By improving efficiency, effectiveness, and service quality, organisations can maximize their potential.

The assessment of the health service's quality can be determined by utilizing quality indicators, which may differ based on the specific health system under evaluation. Digitization can enhance some clinical indicators, such as early cancer identification, the rate of hypertension therapy, and the prompt arrival of healthcare consumers through organized transportation in emergency medical care inside a healthcare organization. Specifically, the Internet of Medical Things (IoMT) allows for the continuous monitoring of the health state of healthcare users, providing early alerts in the event of any fluctuations in vital signs, such as heart rate, unexpected spikes or drops in blood pressure, and so on (Polu & Polu, 2019).

Also, surgical treatments can be more easily executed with the help of expanded reality, which cuts down on the likelihood of medical mistakes. The rapid transfer of diagnostic procedure results to specialists in each health area is made possible by the development and implementation of technologies like e-health and m-health, as well as an information system that allows

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communication and sharing of information. This allows for much faster diagnosis. In addition, by facilitating remote communication with medical staff, fewer in-person doctor visits are required, which in turn reduces patient wait times and speeds up access to critical medical treatment. Additionally, this leads to a decrease in the time needed to treat health concerns (Rodríguez-Salvador & Garcia-Garcia, 2018).

The implementation of automated systems and robotization can lead to cost reduction in the deployment of skilled medical personnel and address the issue of staff shortage. The implementation of artificial intelligence can enhance the accuracy of medical processes that demand high precision from healthcare professionals. By utilizing expert systems, the process of diagnosing and treating patients can be conducted with greater effectiveness and efficiency.

With the digitization of healthcare processes, those in locations without access to high-quality medical help can nonetheless benefit from it. Thanks to advancements in areas like machine learning, it is now feasible to interpret diagnostic results and specify the medical interventions required to alleviate symptoms. Similarly, patients can self-diagnose and treat minor health issues; this reduces the need for medical professionals' visits, which in turn reduces patient wait times and perhaps worsens the health of other patients.

3. Importance of Leadership and Management in Digital Transformation

Leadership is the fundamental basis of a prosperous journey towards digital transformation. It offers the guidance, orientation, and drive required to traverse the intricacies and uncertainties that accompany the adoption of new technology and processes. Competent leaders empower their teams, foster an environment that encourages creativity, and embrace change in order to fully exploit the promise of digital transformation.

Effective leadership establishes the trajectory and vision for endeavors related to digital transformation. Healthcare leaders establish strategic objectives and priorities, which serve as a road map for the organization's digital transformation and guidance (Gobble, 2018). Through effectively communicating a distinct vision regarding the potential of digital technologies to optimize patient care, streamline operations, and foster innovation, leaders instill staff and stakeholders with a sense of assurance and dedication.

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In addition, effective leadership cultivates a culture of creativity and preparedness for change inside the organization. Leaders foster an environment that promotes innovation, experimentation, and risk-taking, encouraging staff to enthusiastically embrace new technology and readily adapt to ever-changing digital trends (Hossain, 2023). Leaders may create a favorable atmosphere for successful digital transformation by promoting a culture that prioritizes ongoing learning and growth.

According to (Khan, 2016) leadership is essential for coordinating organisational resources and priorities to effectively support digital efforts. Healthcare executives contribute financial resources, staff, and infrastructure to facilitate the implementation of digital technology. The organization places a high importance on investing in digital infrastructure, training programs, and cybersecurity measures to ensure that it has the required resources to support its efforts in digital transformation.

Furthermore, proficient management is crucial for supervising the implementation of digital transformation projects and guaranteeing their triumphant execution. Healthcare managers oversee the coordination of cross-functional teams, establish project timetables and milestones, and track progress towards achieving digital transformation objectives. They detect and resolve hurdles and issues that occur during implementation, making necessary adjustments to ensure the progress of digital initiatives.

4. The Challenges to the Effective Implementation of Digital Transformation

Although digital transformation in healthcare offers numerous advantages, there are significant obstacles and impediments that hinder its successful adoption in healthcare organisations. An important obstacle revolves around issues pertaining to data privacy and security. Healthcare organisations handle confidential patient data that requires safeguarding from unauthorized access, breaches, and cyberattacks (Al-Issa et al., 2019). Implementing digital solutions becomes more challenging when ensuring compliance with strict data protection standards. Furthermore, the rapid expansion of digital health technologies amplifies the potential for security vulnerabilities, necessitating strong cybersecurity measures to protect patient data.

In addition, the reluctance of healthcare professionals to embrace change is a significant obstacle to the implementation of digital transformation initiatives (Burton-Jones et al., 2020). Healthcare

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professionals may exhibit reluctance in adopting novel technology due to apprehensions regarding the potential disruption to their established work processes, diminished control over decision-making, or perceived risks to the doctor-patient dynamic. To overcome opposition, healthcare organisations must implement effective change management strategies, establish extensive training programs, and cultivate a culture of innovation and continuous learning.

Limited financial resources pose an additional obstacle to the successful execution of digital transformation in the healthcare sector. Although digital health technologies have the potential to save costs in the long run, the initial investment needed for upgrading infrastructure, implementing software, and training people can be significant (Gupta, 2018). Insufficient funds and conflicting objectives can hinder the distribution of resources to digital initiatives, especially for smaller healthcare institutions or those catering to marginalized populations.

Moreover, the differences in digital literacy and availability of technology among patients pose obstacles to achieving fair and widespread implementation and use of digital health solutions. Certain demographics, such as the elderly, persons with poor wealth, or those residing in rural areas, may have limited abilities or resources to actively participate in digital healthcare platforms. To tackle these inequalities, specific initiatives are needed to enhance digital literacy, offer inexpensive technology access, and guarantee that digital health solutions are accessible and inclusive for all population segments.

5. Strategies for Maximizing the Benefits of Digital Transformation

Within the constantly changing healthcare industry, the adoption of digital transformation has become a significant driver for boosting service administration and improving patient care. Nevertheless, the effective execution of digital initiatives in healthcare organisations necessitates skillful manoeuvring through several barriers and constraints. Healthcare leaders must implement efficient methods to overcome these obstacles and optimize the advantages of digital transformation.

- Improve the safety of the data

In an era of heightened digital connectivity, safeguarding patient data against breaches and unauthorized access is paramount. Robust cybersecurity measures, including encryption, access controls, and regular security audits, are indispensable in fortifying the integrity of healthcare

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systems. Moreover, comprehensive staff training on data protection protocols is essential to ensure compliance with regulatory standards. By prioritizing data security and privacy, healthcare organizations can uphold patient trust and regulatory compliance while safeguarding sensitive information (Ernest et al., 2023).

- Education to Overcome Resistance to Change

The successful adoption of digital tools and workflows hinges on proactive efforts to address resistance to change among healthcare professionals. Comprehensive training and education initiatives play a pivotal role in equipping clinicians with the requisite skills and knowledge to embrace digital transformation (Adeyemi, 2017). By involving clinicians in the design and implementation process, organizations can tailor solutions to address workflow concerns and underscore the tangible benefits of digitalization in enhancing patient care. Through collaborative efforts, healthcare organizations can surmount resistance to change and foster a culture of innovation and adaptability.

- Secure Sufficient Funding

Advocating for adequate funding and resource allocation is fundamental to the sustainable advancement of digital transformation initiatives in healthcare. Developing compelling business cases that delineate the potential return on investment (ROI) and long-term cost savings associated with digital solutions is imperative in garnering support from key stakeholders. Exploring alternative funding sources, such as grants and strategic partnerships, can further augment financial resources and bolster organizational capacity to drive digital innovation.

- Promote Digital Inclusion

Ensuring equitable access to digital health solutions is essential for mitigating disparities in healthcare delivery and promoting health equity. Tailoring solutions to accommodate the diverse needs of patient populations, including those with limited digital literacy or access to technology, is paramount (Hoffman, 2022). Collaborating with community organizations and government

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agencies to address barriers to digital inclusion and promote accessibility is imperative in fostering a healthcare ecosystem that is inclusive and equitable for all.

- Embrace Continuous Improvement

Cultivating a culture of innovation and continuous improvement is foundational to the sustained evolution of healthcare organizations in the digital age. Encouraging experimentation, embracing emerging technologies, and learning from failures are essential components of this ethos. Establishing mechanisms for soliciting feedback from stakeholders and iteratively refining digital solutions based on user experiences and evolving needs is crucial in driving meaningful advancements in healthcare service delivery. By fostering a culture of innovation, healthcare organizations can navigate the complexities of digital transformation with agility and resilience, ultimately enhancing the quality and efficacy of patient care.

Conclusion

The healthcare industry has the ability to undergo a significant change and enhance patient outcomes through digital transformation. Nevertheless, healthcare organisations must meticulously evaluate the possible advantages and difficulties associated with adopting digital technologies. Healthcare organisations may optimize the patient experience, increase efficiency, lower expenses, and promote the general health of the population by effectively utilizing digital technologies in a deliberate and well-planned manner.

Healthcare organisations must prioritise investments in cybersecurity, worker training, and regulatory compliance to protect patient data and ensure trust in digital health technologies during the process of digital transformation. Furthermore, cultivating a culture that promotes innovation, collaboration, and ongoing enhancement is crucial for facilitating long-lasting digital transformation efforts and guaranteeing that digital technologies give actual advantages to both patients and healthcare providers.

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