DIGITAL PLATFORMS FOR HEALTHCARE: A SUSTAINABLE APPROACH

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Abstract
Today, the advancement of technology has vast scope in several fields to manage the challenges in using resources and related issues. Sustainability is a widely used concept in different disciplines apart from environmental issues. A complex system like healthcare is also facing challenges in sustainability, while the research aims to identify the use of various digital platforms in advanced healthcare services. Digital technology has initiated a revolution in healthcare to attain sustainability goals and the study of the healthcare system is essential in today's digital world. The researchers have focused on different opportunities and advantages of digital platforms available today. The paper focuses on peoples' well-being and health by analyzing healthcare systems with a multi-disciplinary approach. These sustainability challenges are reinforced to boost sustainable approach for healthcare system development using digital technologies and platforms. The purpose of pursuing sustainability in the healthcare system requires the study of digital platforms to understand their efficacy in achieving desired goals. Healthcare systems are too complex to analyze data and interactions are based on foundational hypotheses of system thinking and a feasible system approach that makes the technology effective in health services. Thus, evaluation of digital platforms in terms of effectiveness, cost, and analysis with a capacity for high-quality service are the most important factors for sustainability performance. During the pandemic years, the need for healthcare system advancement is highlighted, across the world. The study illustrates how digital platforms are significant in boosting healthcare system quality through interactions between healthcare providers and people through sharing information. Moreover, the paper focuses on the use of digital technology for encouraging data access, analysis, and discussion.
Keywords: sustainability, digital technology, healthcare system, digital platforms

1. Background

Sustainability has gained traction throughout time, garnering the attention of academics from several fields [1]. As a result, sustainability research has expanded beyond the basic environmental focus to include social and economic concerns. Even though the concept of sustainability is widely discussed and recognised, the manner in which it has been investigated and understood are still hazy [2]. As a result, because they are diverse ideas, sustainability and sustainable development can't be treated in the same manner. As a result, they advocate for managing socio-ecological and socio-technical ecosystems, which are intrinsically complicated due to their multiple internal interconnections [3]. As a result, complex concerns emerging from intricate and often uneven human-based and interpersonal situations that influence decision-making at social, economic, and environmental levels must be addressed. A comprehensive strategy is necessary to address these difficulties [4].

In the framework of global epidemiologic shift toward chronic non - communicable disease (e.g. cardiovascular diseases, diabetes and cancer) [5, 6], roughly half of the global population is devoid of access to basic health care, and approximately 100 million people are impoverished as a consequence of health-care spending . Furthermore, the World Health Organization (WHO) predicts a global shortfall of about 12.9 million health-care employees by 2035. To address these issues, the WHO has emphasised the relevance of digital technology in different draughts and reports to assist enhance global access to affordable individual- and community-centered services and care. [7]

Healthcare is among the most important service areas, with a high level of complexity attributed to the reason that it deals with people's health and well-being. As a result, a number of linked concerns should be addressed, including the efficacy of health care, cost effectiveness and the capacity to provide high-quality, tailored services [8]. As a result, the main objective is to understand whether and how systemic relationships can improve interactions between the performers who constitute healthcare systems (– for example, patients, institutions, familiers, health providers and so on), boosting resource sharing—primarily information—and thus nourishing the system's long-term sustainability. Using the interaction type meta-model, the central role of information and communication technologies (ICTs), particularly the most recent digital platforms, in increasing or restraining interactions and consequent resource sharing among a variety of diverse actors will be studied. [9]. Healthcare systems should move away from a focus on efficiency and effectiveness and toward a more comprehensive and harmonised perspective [10, 11], with the goal of increasing system sustainability.

The fast advancement of new technology has generated a plethora of e-health options, in which healthcare may be given remotely via information and communications technology (ICTs). The word "e-health" refers to Internet-based health services and streamlined, up-to-date health-related information [12]. The goal of incorporating these services into healthcare is to improve patient-centered treatment. This comprises electronic health records, digital entry for physician's instructions, e-prescribing, public health information, and other services that promote cooperation and interaction among professionals and patients [13]. Sustainable development and healthcare monitoring are regarded as key components for ensuring well-being across all ages by the United Nations' Sustainable Development Goal (SDG) No. 3. The science community and the general public have recently been much more interested in using the Internet for wellbeing goals. Digital platforms have sprung up in response to these recommendations, linking practitioners, users and experts in the health field. Despite the growing relevance of online stakeholder participation in practice, scholarly discussion about the role of sustainability in social media and allied domains is still in its early stages [14].

2. Need of Digital Healthcare

Digital platforms are beneficial in increasing the participation of those who are present to operate as active entities. They are collaborating and activating network contacts, and it is thought that digitalization is a key instrument in the health system for system development. As per [15] contemporary technology has provided a variety of benefits for the healthcare industry, which are critical to improving healthcare services. With the use of digital platforms, the issue of information asymmetry that is impacting the relationship between physicians and patients may be gradually eliminated. Digital platforms are extremely useful for gathering and analysing large amounts of data in the healthcare information system [16]. It also gathers and processes information from "medical equipment, patients/family members, and application server (internet of things, social platforms, telemedicine)," among other sources. With the use of digital platforms, it is much easier to make accurate diagnoses and adapt effective treatments, and it also boosts the total capacity of the medical system and better advises customers. In a study, [17] discovered that digital platforms improve the "efficacy" and "efficiency" of medicinal therapy. It is critical to encourage decision-makers in the healthcare industry to handle information and communication technology (ICT) systems so that they may work to establish a competency centre in the digital health care system. Because information and communications technologies platforms are widely used, it has been demonstrated that they are essential in both the "therapy phase" and the "prevention phase." In the therapy phase, clinicians utilised the information and communications technologies (ICT) platform to communicate with their patients and their families, and in the preventive phase, it was employed as a tracking tool [18].

3. Importance of Digital Technology and ICT in Sustainable Healthcare

People and technology appear to be two fundamental parts of a healthcare system, according to a well-established service study route [19, 20]. People (healthcare providers, patients, family members, peers, and so on) are the primary source of variation, which is defined as a unique combination of different dimensions in which physical, emotional, cognitive, and cultural factors influence the processes that occur in a given system. Technologies, particularly digital platforms, have the potential to significantly improve people's relationships by allowing for even more efficient data management [21]. Thus, the ability to tailor medical conditions to patients depends not only on one's social and mental conditions, age, personal traits, preferences, family circumstances, and financial capacity, but also on other factors like their age, social and mental conditions, personal characteristics, preferences, family circumstances, and financial capacity. As a result, even while personalization normally increases costs [22], digital technologies appear to be even better at confronting and constraining it. This is largely due to their capacity to refresh and organise the processes at the heart of health-care delivery more efficiently [23]. Around the same time, ICTs and digital services have the potential to increase the efficiency and quality of services supplied. This renders them even more patient-centered, thanks to the active engagement of empowered individuals, who can now access a vast quantity of information, primarily through digital devices, that feeds their capacity to self-manage their ailment. It's worth noting that technologies, particularly digital platforms, can act as enablers of interactions, initiating particular and dynamic relations between various actors who can reciprocally share their resources in order to constantly create new ones, ensuring the long-term sustainable development of the entire healthcare system. Patients and others can improve their comprehension and understanding of medical concerns by using digital platforms that have increased access to information and more reputable sources. As a result, patients and others can become more active in the healthcare system. Finally, digital platforms can improve resource accessibility and the establishment of more long-term multi-actor interactions based on resource sharing, collaboration, and networking. Health digital platforms can help address the complexity of this service domain by balancing efficiency (doing things the right way), effectiveness (doing the right things), and sustainability (the effort to establish the right connections with other systems) [24], as well as incorporating prolonged sustainability to healthcare.

4. Applications of Digital Healthcare

4.1 Tele Health Systems

Developing telemedicine services for both screening and treatment of different conditions, HCWs can examine and connect alongside patients via virtual visits instead of risking exposure by providing digital chatbots and webbots to them. West telemedicine teams are assisting physicians in quickly screening COVID-19 cases (with questionnaires) and triaging them to specified regions if necessary to reduce in-hospital clustering and minimise exposure. By providing follow-up treatment via virtual visits, we can reduce, minimise, or postpone elective visits and operations. This allows many patients to be triaged at home and keeps numerous stable individuals out of hospitals, where they would otherwise be exposed to unnecessary danger. Robotic telemedicine carts with cameras, interactive displays, and basic hospital instruments that may be delivered inside isolated patient areas to examine patients, decreasing HCW exposure and danger. HCWs may monitor up to 60-100 patients in ICUs across various hospitals utilising two-way cameras, video displays, microphones, and smart alarms connected by high-speed data lines in tele or electronic intensive care units (e-ICU). Using vICU and tablets, web technology may also assist bring relatives into patient rooms, lowering the number of visitation to hospitals.[25]

4.2 Use of Artificial Intelligence (AI) in Healthcare

Several potential advantages and benefits are listed by promoters of the planning and application of AI-based healthcare application in LMICs, primarily to boost the effectiveness of health systems whilst lowering costs [26]. For illnesses needing expensive equipment and specialist skills, such

applications might substantially lower the costs of testing and treatment plan selection in Low and Middle Income Countries (LMIC), especially in rural and isolated locations [27]. Indeed, when new digital technologies, such as AI, are available in local contexts, they can help developers create more inexpensive, higher-quality, and accessible innovations while overcoming resource constraints [28, 29]. By using software applications (e.g., digital apps "monitor body temperature or visual impairments, instead of requiring thermometers or costly eye measuring gear"), these solutions might mitigate the need for hardware and accompanying large investments [30]. Furthermore, the use of AI - powered chatbots or virtual avatars could assist populations suffering from stigmatising pathologies (e.g., HIV/AIDS, mental health pathologies) in receiving timely care and follow-up services (e.g., advice, suggestions, referrals) through engaging and personal communication.

AI automated translation systems that adapt to regional languages and cultures might increase access to and usage of services, as well as treatment compliance, in locations where cultural language are hurdles to health care. From an epidemiological standpoint, AI may be able to forecast the development of diseases or vulnerabilities within specific groups or communities, allowing for more effective treatments [31]. Finally, AI has considerable promise for maternal and neonatal, which is one of the most pressing public health concerns in LMICs [27], such as pregnancy monitoring, birth asphyxia prediction, and mother and/or child malnutrition.

4.3 Digitizing Dissemination of Information in Public

Creating free interactive chat systems that can assist the general public in learning about major illness concerns. Users can ask queries and be connected to suitable healthcare providers that provide automated informative replies to common sickness questions. [25] This can help expand public knowledge about various illnesses and communicate information about hygiene habits on a larger scale in the current situation. Applications are also being made accessible for folks at home to interact with healthcare professionals who can assist monitor and report symptoms if necessary.

4.4 Incorporating treatment procedures that are constantly changing into clinical judgement tools

Developing rapid data incorporation and analytical sources for medical decision making can assist synthesis fragmented data into complete bias-free analysis, offering quick, on-demand insights that are impossible to do manually. The development of these clinical decision supports can aid in the transformation of offline, static, data-driven recommendations (which are virtually daily developing) into interactive, online, up-to-date algorithms for speedy implementation. Incorporating patient demographics and data into systems can aid in the creation of decision-making tools at the point of care. In response to global healthcare concerns, these software analytics may be utilized to improve epidemic monitoring, geographical analysis, cluster outbreak reporting, and the creation of appropriate treatment algorithms.

4.5 Using digital tools to provide administrative assistance to healthcare workers (HCWs).

Connecting administrative authorities with HCWs via digital technology: Such technologies can aid in the setup of interactive two-way communication between HCWs and its different administrative websites or ministries for real-time knowledge transfer, data management, and resource management solutions, even in remote places. The fact that governmental sponsorship, monitoring, and co ownership of electronic healthcare systems is crucial for controlling pandemics is highlighted through the use of a current digital healthcare technology system and its expansion and adaptation to developing healthcare demands. [25]

5.   Reasons for slow progress in Healthcare Digitization

First, strong actors in the healthcare delivery system frequently oppose health IT deployment [32]. Professional standards, detrimental impact, danger to professional autonomy (physicians focus on maintaining condition and reject latest tech [33]), and privacy issues [due to hacked medical devices [34] and also lacking and opaque software privacy policies are all contributing to the resistance. Additional barriers to health IT adoption for organisations include upfront and enduring costs [35],

tech assistance, technical concerns [36], productivity loss during the transformation, and concerns about potential obsolescence of purchased health IT [36].

Secondly, patients are a major reason why the digitalization in healthcare is taking place slowly. Healthcare information is very personal and the more people regard medical information as sensitive, the less eager they are to share it or embrace new health IT [37]. People do not trust for-profit and government enterprises with electronic health systems, according to a study [38], and their hesitation to give patient data is greater when requests are made from governments.

Finally, health IT is a crucial component in the sluggish digital revolution of healthcare. Few health IT vendors, according to [39], produce products that are straightforward to use. As a result, physicians are upset because health IT necessitates time-consuming data input and disturbs rather than aids their practice. Such systems might potentially hurt patients, and it was discovered when an EHR system was implemented and found an unanticipated rise in patient mortality. Furthermore, the ability of health sensors, ehealth devices, and smartphone apps to provide trustworthy and high-quality data is also a question [34].

6. Conclusion

Digital platforms are critical in the health-care system because they enable interaction and activate specialised and dynamic relationships between diverse agents, such as health-care practitioners, families and patients. These health-care digital platforms enable service providers to share resources, improve accessibility, and deliver services to patients. It allows consumers to contact their physicians and share their health concerns, while service providers may monitor, analyse, and treat their patients from afar. They have increased access to knowledge and information resources, allowing individuals to improve their understanding and awareness of medical concerns while also incorporating them in the overall service delivery. Digital health applications might give numerous opportunities for LMICs with limited resources and experience, and could be used to deliver universal, high-quality, and cheap health care to all. However, if digital health technology is not presented inside and as an important component of a global sustainable development plan, it has the potential to worsen public health difficulties in nations currently grappling with significant challenges and urgencies.

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