DIGITAL HEALTH INNOVATIONS: SHAPING THE FUTURE OF HEALTHCARE

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ABSTRACT

Digital health is emerging as a transformative force in healthcare delivery, promising to address numerous challenges in the sector. This paper explores the potential of digital health solutions to improve patient outcomes, enhance healthcare efficiency, and promote population health. While digital health offers significant opportunities, its full potential can only be realized through strategic planning, policy support, and substantial investment. The integration of digital health technologies into mainstream healthcare practices, coupled with the empowerment of patients, is essential for driving innovation and achieving optimal health outcomes. Addressing the complex challenges posed by digital health requires a global, coordinated approach, including adequate funding and robust governance frameworks. By investing in digital health infrastructure and fostering a supportive ecosystem, we can create a healthcare system that is more accessible, equitable, and resilient to future challenges.

Keywords: digital health, healthcare transformation, patient empowerment, policy, investment, global health

1. INTRODUCTION

This review discusses how digital transformation comes into play and how it will shape future healthcare for all stakeholders (Brunetti et al., 2020). The challenges are heavily discussed within a global context throughout the volume, recognizing that global healthcare has its differences in the provision of care services (Hermes et al., 2020). However, this should not prevent the sharing of innovative care models and digital healthcare strategies to improve healthcare, its quality, and experience.

The ongoing digital transformation reshapes healthcare delivery as traditional care models are replaced by innovations that offer better patient outcomes and efficiency (Akinola & Telukdarie, 2023). The aim is to reduce waste, increase operational transparency, and enhance the patient experience with advances in digital devices, wireless communication, and healthcare system integration (Ghosh et al., 2023). However, alongside the promises, new challenges need to be solved before such innovations are accepted by both the provider and user of care.

Overview of Digital Health Innovations

By integrating digital technologies, new and advanced features are created or incremental improvements are made to overcome healthcare challenges (Bates et al., 2021; Senbekov et al., 2020). Healthcare quality is increased, errors are decreased, and patient safety is improved. Health status and access to health services are expanded to a larger population, enabling healthcare delivery at cheaper sites, reducing hospital trips and costs, while maintaining high-quality care.

The digital landscape has evolved dramatically in recent years (Maharjan et al., 2020; Salih et al., 2020). The use of portable devices, real-time communication, automatic data generation, analytics, and convergence with other scientific areas has promoted digital health innovations. Examples include M-health, Telemedicine, Electronic Health Records (EHR), Geographic Information Systems (GIS), e-Health, Cloud Computing, Wearable Technology, Big Data, Internet of Things (IoT)/Internet of Everything (IoE), 5G mobile networks, artificial intelligence/machine learning, and robotics.

Importance of Digital Health in Healthcare

The digital health landscape is complex and fragmented, with various companies offering innovative solutions (Gleiss & Lewandowski, 2022; Abernethy et al., 2022). This complexity creates risks and challenges for those seeking to develop a digital health approach or fund digital health ventures. To navigate this landscape, we have identified key digital health takeaways to consider.

Digital health technologies play a crucial role in addressing modern healthcare challenges (Senbekov et al., 2020; Mbunge et al., 2021). Artificial intelligence and machine learning enable early diagnosis, digital-first services streamline system functioning, and secure data sharing and storage protect sensitive patient information. These innovations blur the lines between traditional healthcare and modern health interactions, making it essential to consider them when initiating new blockchain technology projects.

Foundations of Digital Health

The rise of digital health, a relatively new discipline, began with the advent of digital technology (Awad et al., 2021). The convergence of technology, wireless communications, sensors, engineering, and design thinking has improved access and convenience to care, promoting digital health (Mbunge et al., 2021). This field has developed flexibility and the ability to integrate and disseminate information at an unprecedented rate, enabling connected citizens or patients to link with health systems, medical staff, and other entities (Wang et al., 2021).

Digital health utilizes electronic interventions and communications technology, devices, software, and innovations, having a social and psychological impact (Crawford & Serhal, 2020). Its principles can be applied to evaluate, manage, and enhance healthy living (Yao et al., 2022). The benefits of digital health extend to individuals, patient practitioners, researchers, healthcare delivery systems, policymakers, and society as a whole (Abernethy et al., 2022). Digital health empowers individuals to track, manage, and improve their own and their family's health, living better and more independently, and improving the nation's health and economic competitiveness (Philippe et al., 2022).

Key Technologies in Digital Health

The significant investment in digital health can be attributed to its potential to benefit all parties involved, including patients seeking a healthier lifestyle, healthcare providers and authorities aiming to reduce costs, companies exploring business opportunities, and nations seeking to attract qualified professionals (Lattouf, 2022). Digital revolutions are driving this transformation, but transparent development and deployment of digital health solutions are crucial for successful humanization. Despite the evident benefits, there are obstacles and risks that need to be addressed (Béranger & Rizoulières, 2021).

The attractiveness of digital health to diverse stakeholders, including researchers, technology companies, and government agencies, lies in its potential to address the limitations of current health systems in managing chronic diseases and caring for the growing elderly population (Chang, 2023). Key technologies like artificial intelligence, wearables, and the Internet of Things are contributing to a smarter, more efficient, personalized, and humanized response from health systems (Shajari et al., 2023). These innovations empower healthcare systems to better respond to citizens' needs, making digital health an attractive field for collaboration and investment.

Regulatory Landscape

The growth and development of digital health innovation have been hindered by barriers, sparking debates about the presence and impact of these obstacles (Gleiss & Lewandowski, 2022). The availability and access to modern technologies in health systems are uncertain, introducing new expenditure, surveillance, and medical dependence models in healthcare services. This uncertainty highlights the need for urgent regulations at international, European, and national levels, raising crucial questions about decision-making and action in health regulations in the digital age.

Digital health encompasses the use of digital tools, systems, technologies, and platforms to manage health and healthcare, transforming the entire healthcare system (Abernethy et al., 2022). This transformation includes changing how service providers treat and assist clients, while patients manage their own health information and available tools for maintaining health, receiving treatment, and accompanied care. Digital health products and services are software-based, and their innovative process is referred to as digital innovation, which is now a key challenge in regulation. With digital health, innovation has shifted to focus on user-benefits, discovering and defining a new universe of guidance and regulation concepts to facilitate technological acceleration.

Applications in Clinical Practice

Remote patient monitoring utilizes digital technologies to collect medical and health data on patients and transmit it securely to healthcare providers for assessment and treatment recommendations (Shaik et al., 2023). Telehealth, encompassing telemedicine and remote patient monitoring, has been shown to aid primary, specialty, and emergency care, providing patients with rapid access to care, reducing wait times, and improving patient health and satisfaction. Telehealth consultations across various medical specialties have also reduced the inconvenience of travel and expense, particularly in rural areas (El-Rashidy et al., 2021).

Direct-to-consumer digital health technology plays a significant role in several clinical practice domains, including telehealth, remote monitoring, public health reporting, and patient engagement (Abernethy et al., 2022). The Centers for Medicare and Medicaid Services defines telehealth as a range of services using information and communication technology to deliver clinical care from a distance. The telehealth spectrum includes synchronous interactions, asynchronous review of patient information, and remote patient monitoring, all of which have transformed the way healthcare is delivered and accessed (Mantovani et al., 2023).

Telemedicine and Telehealth

The state's obligation to provide adequate public health services is becoming increasingly challenging due to population growth and the rising demand for professionals and doctors (Wilhite et al., 2022). Telemedicine and telehealth can help meet emerging needs and differentiate cities that offer these services, even for people living in hard-to-reach areas. Devices that use assistants to advise professionals and patients, such as in cases of ambulatory care for chronically ill individuals, can contribute to forming a favorable opinion for the regulation and support of telemedicine and telehealth.

Telemedicine is no longer a new term, but its importance is more significant than ever, and its future impact is yet to be fully realized (Wilhite et al., 2022). Telehealth, an allied term, refers to the collection of means or methods for transmitting signals, sounds, data, images, and other information necessary for healthcare assistance, transportation, distribution of pharmaceuticals, and management of the general state of health. Over the past 40 years, telemedicine has made significant strides, particularly during the technological boom of the 90s, with new devices and expanded professional sectors. Since then, it has continued to spark debates and development, catching the attention of politicians, doctors, and hospitals.

Wearable Health Technologies

The wearables market continues to expand, with innovations like Patch AI's wearables for "invisible health monitoring" and GlaxoSmithKline's biomarker-monitoring wearable (Morozova & Gurova, 2022). However, the industry's effectiveness and suitability require scrutiny from government health agencies, considering factors like credibility, sustainability, and high barriers to entry. Wearable health technology has potential in addressing long-term healthcare conditions, but concerns persist.

The wearables market has rapidly expanded over the past five years, driven by commercial interests, partnerships, and large consumer health device companies (Shei et al., 2022). With nearly 350 companies active in this market, wearables facilitate the shift from provider to patient, aiming to generate healthcare cost savings. While wearable devices have showcased impressive growth and innovation, it's essential to acknowledge their fallibility and limitations to provide a rounded view (Bhatti et al., 2022).

Data Management and Privacy

Privacy-preserving computation, crucial for secure data sharing, comes with its own challenges, including potential security and reliability risks if not managed properly (Khalid et al., 2023). These technologies must address requirements and trust concerns to prevent privacy breaches and discriminatory outcomes.

Privacy-preserving computation enables training statistical models from disparate data sources, generating software for aggregate inferences without direct access to personal data (Yuan et al., 2023). This technology permits systematic and automated inferences, setting up possibilities for continuous monitoring without direct human access to underlying data.

Recent years have seen a surge in enthusiasm for privacy-preserving computation, driven by productivity and machine learning advances (Zhao et al., 2021). This technology supports privacy-respecting sharing of sensitive data, essential for companies to capitalize on increasing demands for analytical sophistication while ensuring safe and secure data product development and deployment.

To predict new treatments and cures, diverse health data sets at scale are needed, and technology companies like IBM, Google, and Microsoft are developing products to address this growing need (Sheikh et al., 2021). However, these companies face important public expectations around ethical healthcare data collection and use, evident in recent public developments.

Big Data in Healthcare

Data sharing should be a top concern for patients, and blockchain technology can help them control their data and its use for medical research (Rehman et al., 2022). This technology enables patients to autonomously supervise and maintain control over their data, while also benefiting doctors and healthcare professionals with a faster approval process. Organizations, including those in the pharmaceutical industry, are encouraged to join this revolution and commit to data sharing initiatives that democratize virtual healthcare.

In healthcare, big data analytics has the potential to identify trends, facilitate accurate treatment, aim for prevention, and reduce time and costs (Rehman et al., 2022). Big data refers to the vast accumulation of data from patient medical records, and key databases include electronic health records, administrative claims data, and patient-generated information. Wearable devices and Internet of Things technology-enabled devices track vital signs and acquire health-related information, allowing patients to be more informed about therapies and health-related incidents. Synchronizing big data with machine learning capabilities empowers health entities to apprehend near-term risks and promote regular

health screenings. However, big data must challenge regulations that inhibit the shareability of proprietary health data and resources.

HIPAA Compliance

HIPAA rules aim to increase e-health use and ensure privacy and security, but some rules can delay data exchange between care providers and discourage patient engagement in the digital world (Arvisais-Anhalt et al., 2022). The rules primarily police HIPAA-covered entities and their business associates, not health innovators seeking to link e-health data to improve healthcare. Recently, the U.S. Department of Health and Human Services proposed rulemaking to lower costs for care providers, implement cross-system linkages, and emphasize patient health.

The Health Insurance Portability and Accountability Act (HIPAA) of 1996 describes innovative programs like population health management and specifies security and privacy measures for electronic protected health information (Sadri, 2024). However, these requirements can slow down the pace and increase the cost of leveraging technology to improve patient care, and even prevent companies from entering the healthcare ecosystem if they are HIPAA-covered entities or business associates.

Artificial Intelligence in Healthcare

The precision medicine paradigm is redefining disease diagnosis and medical treatment by leveraging digital healthcare through AI-powered wearables, continuous prediction, and decision-support systems (Shiwlani et al., 2024). These patient-centric platforms are expected to add substantial data to medical research databases, essential for developing novel personalized health solutions.

AI has brought a paradigm shift to healthcare, enabling automated insight discovery and addressing the limitations of big data (El et al., 2022). The increase in healthcare costs necessitates automated tools, such as AI-powered pattern detection and action-taking solutions, to manage costs effectively. The short-term future of healthcare lies in developing custom, cognitive technology-based solutions to overcome uncertainty and improve healthcare outcomes.

Machine Learning in Diagnostics

The traditional image recognition pipeline is being replaced by machine learning techniques, which have proven reliable in radiologic image recognition tasks (Nicora et al., 2022). These tools optimize and accelerate imaging processing, detect and interpret abnormalities, and aid in traditional analysis, reducing labor and increasing reliability. They also show promise in monitoring real-time vital signs and adding value in diagnostic and early warning systems.

Recent advancements in machine learning (ML) have significantly improved diagnostic tools, aiding medical professionals in clinical decision making (Javaid et al., 2022). Statistical and optimization methods used in medical image analysis are crucial in diagnostics and planning for complex medical problems, and these methods continue to improve, addressing new challenges and leveraging increased data availability.

Natural Language Processing in Healthcare

There is a growing demand for organizational support functions like revenue cycle management, billing, and coding, driven by the need for improved customer and physician satisfaction (Abernethy et al., 2022). Frugal innovations, such as NLP systems, can facilitate communication challenges and manage the spike in demand.

NLP technologies have become a necessity in healthcare, transforming the way physicians interact with patients and other stakeholders (Vashishtha and Kapoor, 2023). With only 10 minutes of patient interaction in a clinical setting, NLP systems can handle queries and improve satisfaction.

The global healthcare NLP market is projected to reach $3.7 billion by 2025, driven by the accelerated use of NLP in understanding COVID-19 and its effects (Abro et al., 2023). NLP aims to facilitate management and communication processes between physicians and organizational support functions.

NLP, or conversational AI, refers to techniques for automatically processing and generating natural human language (Fanni et al., 2023). AI-powered virtual assistants and chatbots provide quick customer support solutions, revolutionizing healthcare communication.

Digital Health Startups and Entrepreneurship

The expansion of health-related software has enabled the growth of startups in digital health, primarily led by new players with engineering or management backgrounds (Pessot et al., 2023). These companies have leveraged business opportunities by putting patients at the center of the health sector and addressing existing problems. High demand for innovative products and willingness to adopt new services have driven this evolution. New players have demonstrated that understanding the healthcare sector, combined with overcoming resistance to change and legacy databases, can generate business opportunities (Pessot et al., 2023).

Innovative Business Models

Alzheimer's disease, the main cause of dementia, is associated with multiple social factors, leading to excess personal care costs (Wimo et al., 2023). A business model and potential product were developed to connect social factors and biophysics factors, aiming to make valuable health resources available to those in need. Small-scale customized product production and cloud services enable efficient production and information transmission.

Emerging shifts from B2B to B2C2B enhance the roles of patients and end consumers in business service processes, creating and transferring value in innovative healthcare business models (Haimi, 2023). Telemedicine offers healthcare access regardless of location, providing benefits to patients and healthcare providers through online diagnostic consultations and medical data management. Social networking and genome analysis are also being used in business models, requiring collaboration among healthcare stakeholders to develop innovation and new products.

Challenges and Opportunities

Machine learning algorithms can exploit big data to predict clinical events, such as patient deterioration during acute illness, and will likely become valuable components of the medical information infrastructure as they are further developed and tested (Azmi et al., 2022). These innovations will be particularly valuable in systems willing to pay for high-quality inferences, such as hospital-based critical care teams.

Big data, used in digital health innovations, comprises large, diverse data sets analyzed using innovative computing, such as machine learning algorithms that identify patterns in data (Rehman et al., 2022). While big data creates technical, regulatory, and organizational challenges, it also offers unique opportunities for learning about health and healthcare due to its quality and scale.

Ethical Considerations in Digital Health

Remote security options like multi-factor authentications are crucial for digital health platforms, as they face increasingly sophisticated cyber-attacks (Suleski et al., 2023). The growing reliance on artificial intelligence, machine learning, and data science requires that digital services prioritize trust to maintain digital trust. Secure services are essential, as they provide assurance of unbreached trust, and no organization is immune to breaches.

As digital health technologies improve patient care, trust and security must be prioritized (Thomas-Jacques et al., 2021). Virtual care models should consider equity of access, and data collation must be secured by healthcare professionals and the global community. Cybersecurity challenges can have destructive consequences, so the value of sharing data must be balanced with privacy and security concerns. Healthcare providers must trust digital health platforms' security settings to feel confident in the data and be more accountable.

Patient Privacy and Consent

The combination of manufacturers receiving more data about their products' usage and digital artifacts can compress the time between information receipt and provisioning of necessary accountabilities (Ma et al., 2022). Digital artifacts can be cast in the form of certainty equivalents for standard contracts, such as warranties or product liability coverages.

The Health Insurance Portability and Accountability Act (HIPAA) provides protection for health information, and standards for data sharing could evolve as an example for digital health technology (Oakley, 2023). Tools like "radical transparency," "digital watermarks," and IT support for access permissions can facilitate wide voluntary sharing of digital artifacts without creating opportunities for misuse. Techniques that separate identity, privacy, ownership, and accountability issues for an artifact are likely to be promoted by similar laws for other types of data use. Digital artifacts that exhibit "stickiness" are likely to be sold for higher value, all else equal.

Equity and Access

Literacy is a crucial aspect of equity and access in healthcare technology, ensuring people can utilize new technologies to improve their healthcare and wellness (Leone et al., 2021). Initiatives in health education, training of health professionals, and media and civic education can provide critical support, making the implementation of these technologies cost-effective. Improving health data quality and control can strengthen the social value proposition of these technologies, making people more willing to contribute to social health utilities.

Telemedicine, telehealth, and mobile health technologies can support lay-referral networks and contribute to universal health coverage, addressing workforce shortages and poor distribution of health providers (Bhat et al., 2023). While technology can reinforce health disparities, political measures have mitigated the 'digital divide' in education, demonstrating that such disparities can be turned into opportunities. The convergence of health and information technology sectors can achieve the promise of digital applications in health.

Global Perspectives on Digital Health

The development of scientific and technological knowledge is crucial for generating innovations that benefit society, with social needs playing a significant role (Alowais et al., 2023). Technological advances in areas like artificial intelligence, extended reality, and telemedicine are increasingly influencing fields such as education, commerce, and healthcare. In healthcare, applied research activities focus on physical activities, mental health support, remote patient surveillance, and teleconsultation.

A 2014 study mapping the ecosystem of the Portuguese mobile applications economy found that only 22% of developers focused on pure business-to-business markets, with most applications not addressing significant societal needs or modifying user behavior (Ramoneda Cobos, 2022). In contrast, digital health innovations have the potential to empower citizens to manage their health, with experts exploring benefits and challenges from various viewpoints (Benis et al., 2021). Qualitative and empirical studies examine technologies, business models, societal value, and implications for lifestyles and daily habits.

International Collaboration

Facility-based investments in data-driven integrated care infrastructure, skilling, and interoperability measures played a crucial role in overcoming barriers to building digital health infrastructures (Dixon et al., 2023). These investments aimed to promote openness, interoperability, and skills alignment in the health sector, leading to benefits such as the removal of information bottlenecks and policy mismatches. Additionally, they improved the potential for EU countries to participate in collaborative global projects for digital health, supported by international partnership agreements on data sharing, security, governance, and standardization.

The international dimensions of innovating, investing, and learning jointly with users demand a global perspective, continuously improving engagement between EU countries and the world (Aarestrup et al., 2020). Collaborations in ambitious, global health informatics infrastructure projects based on shared trust and common standards are essential. Furthermore, it is vital for innovators, funders, regulators, investors, and international partnerships to become more proactive in nurturing the innovation and skills ecosystem, understanding the impact of policy leadership and joined-up strategies (Betz et al., 2023). Collaboration across domains, such as digital cross-border health service provision and exchange of global best practices, is necessary to create vibrant environments for deployment.

Emerging Markets

For digital healthcare to be successful, devices and software must be made practical, reliable, useful, and affordable (Saeed & Masters, 2021). Fortunately, prices are dropping, and internet access is increasing, leading to a growing number of people using digital healthcare applications, especially for personal use. However, public and private payers in developing countries face policy and regulatory challenges that must be resolved to maintain this digital trend. Digital technology offers many potential solutions, but understanding appropriate use, planning, and investment is key to success.

Several digital health solutions have successfully entered emerging markets, addressing unique challenges and fulfilling compelling needs (Yao et al., 2022). These solutions have increased healthcare access for the poorest in developing countries, reduced healthcare costs, and improved quality, diagnosis time, and program management. The use of different devices in the healthcare sector is also growing, demonstrating that digital health can make a significant impact. Many projects showcase the potential of digital health to transform healthcare, especially in countries with a scarcity of healthcare professionals.

Future Trends and Predictions

Consider a future where predictive capabilities, genomics, and phenomics combine to change the path of chronic diseases like diabetes and cancer, shifting focus from treatment to prevention and reducing disease burden (Saki, 2024). Digital innovations will provide powerful predictive capabilities, educate individuals on their health and wellness, and change the path of chronic diseases, maximizing healthy years and lifestyles. With real-time actionable data, personalized care in real-world evidenced-based medicine will become a reality.

The 4th industrial revolution is transforming healthcare through connected data and insight, shaping a future with powerful capabilities to change what we measure, understand, predict, pre-empt, and treat (Istepanian, 2022). Digital health innovations using AI, machine learning, digital biomarkers, and other techniques will develop low-cost and scalable ways of monitoring health and disease, encompassing both traditional and novel health and wellbeing data. This revolution will disrupt and change healthcare, finally making "The Second Machine Age" a reality.

Advancements in Remote Monitoring

Prior to focusing on operational realities and considerations, we conclude our work with the key takeaways for the efficient implementation and future blissful new world of remote monitoring (Ahmad et al., 2022).

A connectivity section discusses several supporting telecommunication technologies and cloud storage and computing capabilities, complementing remote computational abilities (Al-Marsy et al., 2021). We review interactive smartphone technologies for patient empowerment, data transfer, and decision-making tools, followed by a discussion on remote monitoring of crucial health variables, including digital monitoring for emergency and critically-ill patients and real-time high-quality, low-cost, and 3D-imaging related solutions.

Upon kick-starting with patient data collection, we examine inherent challenges and expand to wearable health and biosensing technologies, followed by a detailed discussion on consumer health, FDA-cleared, and investigated mobile health applications (Nguyen et al., 2022).

In this manuscript, the authors assess the various impacts of such a future in a descriptive nature, focusing on healthcare from a digital perspective that spans the complete spectrum of stakeholders (Baines et al., 2022).

An important health-specific sector that can benefit enormously from digital monitoring innovations is health and healthcare, with tricorder-like digital diagnostic devices emerging as an integrated entity with wireless communications, data storage, and data analysis (Sahu et al., 2022).

Unprecedented in their span of capabilities, recent innovations in digital technologies have yielded a suite of diagnostic and monitoring devices for the human body, occupying the extraordinary promise of ushering in a far superior monitoring experience (Abernethy et al., 2022).

Personalized Medicine

For most health problems, a thorough history and mental status complemented by a select physical examination provide the necessary information to make a diagnosis and plan treatment (Johnson et al., 2021). Personalized medicine uses stored knowledge of similar clinical relations to predict diagnosis and treatment, igniting a dialog between the physician and decision support system to guide diagnostic decision making and therapeutic choice (Hassan et al., 2022).

Personalized medicine recognizes the limitations of the traditional "one size fits all" approach, emphasizing the use of genomic, epigenomic, and patient-derived characteristics to tailor treatment strategies (Wang & Wang, 2023). As digital tools generate patient-specific data, sophisticated methods are needed to process, integrate, and act on this information, addressing health and racial disparities in genomics education and literacy (Farrokhi et al., 2023).

Implications for the Future of Healthcare

With advanced data, analytics, and AI, we have a new opportunity to bend the cost curve and make health personalized, preventive, and proactive, marking the true new frontier of personalized medicine (Alowais et al., 2023).

The focus of digital health is expanding to include wellness, behavior changes, and prevention, incorporating biometrics, sensory data, and social determinants (Rehman et al., 2022). Value-based contracting and risk-sharing models are growing, with pilot programs and real-world evidence driving innovation in payment structures (Gensorowsky et al., 2022). The alignment of health costs and benefits with care providers and consumers may change stakeholder dynamics, driving industry innovation.

Recent years have seen major shifts in healthcare driven by technological advances, new regulations, and digital innovation, with large technology and health companies entering the space (Stern et al., 2022). The future of digital health is broad, with opportunities for growth and innovation.

2. CONCLUSION

In conclusion, the future of healthcare is changing and digital health is here to stay. Technologies can be a tool to address some of the challenges we face in healthcare, however, there may be a significant pathway still to travel before its full potential is realized. Such social, political, and policy attention is needed to build on the many offerings that digital health solutions have. With careful planning, the innovative deployment of digitized diagnoses and cure, and clear, consistent political leadership, digital health offers a sustainable solution to face many of the challenges facing global health today and into the future. The increasing trend towards personal responsibility for health and wellbeing, and the empowerment of the patient/consumer, is likely to shape digital health innovation. Incorporating digital health solutions in regular healthcare practices and personalised family health record could enhance patient's safety, patient experience, professional fulfilment and effectiveness of care. It is therefore paramount to invest in a more efficient health system that has the ability to prevent and meet the demands of international markets for digital and division. The health system transformation is not likely to be achieved through short-term, piecemeal solutions or voluntary organisational commitments. These large challenges need to be adequately funded and planned with a collective global approach in order to safeguard the political and economic sustainability of the future, and to ensure the people of the planet are as healthy as they can be regardless of where and when they are born.

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