INTERPLAY OF GLOBAL TECHNOLOGICAL DYNAMICS AND LOCAL REALITIES: DIGITAL HEALTHCARE TRANSFORMATION IN TURKEY

KÜRESEL TEKNOLOJİK DİNAMİKLERLE YEREL GERÇEKLİKLERİN ETKİLEŞİMİ: TÜRKİYE'NİN SAĞLIK HİZMETLERİNDE DİJİTAL DÖNÜŞÜM

DAS ZUSAMMENSPIEL GLOBALER TECHNOLOGISCHER DYNAMIKEN UND LOKALER REALITÄTEN: DIE DIGITALE TRANSFORMATION DES GESUNDHEITSWESENS IN DER TÜRKEI

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ABSTRACT: Various trends have driven the digital transformation of health: Developments in digital technologies, pressures for cause reduction in healthcare and increasing demand and expenditures from aging populations. In parallel, Turkey is actively engaged in a great transformative journey with its Health Transformation Program (HTP) since 2003, embracing the age of digitalization in healthcare. This study explores the interplay among historical discourse, political influences, technological advancements which shaped the centralization of Turkey's health system. Specifically, it delves into how Turkey's healthcare system has undergone centralization under the aegis of digital transformation. Amidst this transition, a compelling question arises: How has the positive perception of digital health innovations by both the public and authoritative health institutions converged with the challenges posed by low health and digital literacy levels? This article uses the concept of biomedicalization to encompass the multisited and multidirectional health transformation processes in Turkey. By cultivating a technology-friendly environment, the nation is nurturing (bio)digital citizens through the process of biomedicalization. Drawing on a historical narrative of Turkey's digital health transformation, the article posits that the phenomenon of biomedicalization in the country, molded by intricate multidimensional factors at both micro and macro levels, compels policymakers, privacy advocates, and lawmakers to devise effective and sustainable regulations concerning data utilization, protection, and privacy. By investigating these dynamics, the research provides insights into how a country like Turkey navigates the multifaceted aspects of digital health implementation, shedding light on the potential strategies and mechanisms that enable the successful adoption of digital technologies in healthcare despite existing limitations. This

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contribution to the broader discourse on digital transformation enriches our understanding of the intricacies involved in leveraging technology to enhance healthcare systems, especially in contexts where there are literacy levels might pose.

Key Words: Digital health, biomedicalization, digital technology, (bio)digital citizenship, transformation of health, Türkiye

ÖZ: Sağlıkta dijital dönüşüm çeşitli eğilimlerden beslenmektedir: Dijital teknolojilerdeki ilerlemeler, sağlıkta maliyetleri azaltma yönündeki baskılar ve nüfusun yaşlanmasıyla artan sağlık talebi ve harcaması. Buna paralel bir şekilde, Türkiye 2003 yılında başlayan Sağlıkta Dönüşüm Programı (SDP) ile sağlıkta dijitalleşme çağını benimsemiş ve bu süreçte aktif olarak yer almıştır. Bu çalışma, tarihsel söylem, siyasi etkiler ve teknolojik ilerlemelerin arasındaki etkileşimin Türkiye'nin sağlık sisteminin merkezileşmesine nasıl etki ettiğini araştırmaktadır. Özellikle, Türkiye'nin sağlık sisteminin dijital dönüşüm başlığı altında nasıl merkezileştiğine dair ayrıntılara inmektedir. Bu geçiş süreci sırasında merak uyandıran bir soru ortaya çıkmaktadır: Hem kamu hem de otoriter sağlık kurumlarının dijital sağlık yeniliklerine yönelik olumlu algıları, düşük sağlık ve dijital okuryazarlık düzeylerinin yarattığı zorluklarla nasıl bir araya geldi? Bu makale, Türkiye'deki çok-alanlı ve çok-yönlü sağlık dönüşüm süreçlerini kapsamak üzere biyomedikalizasyon kavramını kullanmaktadır. Ülke, biyomedikalizasyon sürecinin eşlik ettiği teknoloji dostu bir ortam oluşturarak, (biyo)dijital vatandaşlar ortaya çıkarmaktadır. Bu çalışma, Türkiye'nin dijital sağlık dönüşümüne ilişkin tarihsel bir anlatıdan yararlanarak, ülkedeki biyomedikalleşme olgusunun hem mikro hem de makro düzeydeki karmaşık ve çok boyutlu faktörler tarafından şekillendirildiğinin, politika yapıcıları, mahremiyet savunucularını ve yasa koyucularını, veri kullanımı, koruma ve gizliliği ile ilgili etkili ve sürdürülebilir düzenlemeler tasarlamaya yönlendirdiğini öne sürüyor. Bu araştırma sıralanan dinamikleri inceleyerek, Türkiye gibi bir ülkenin dijital sağlık uygulamalarının çok yönlü boyutlarını nasıl yönlendirdiğine dair içgörüler sunarak, mevcut sınırlamalara rağmen sağlıkta dijital teknolojilerin başarılı bir şekilde benimsenmesini sağlayan potansiyel stratejilere ve mekanizmalara ışık tutmaktadır. Dijital dönüşüme ilişkin daha kapsamlı söylemlere yapılan bu katkı, özellikle okuryazarlık düzeylerinin sorun teşkil edebileceği bağlamlarda, sağlık sistemlerini geliştirmek için teknolojiden yararlanmanın içerdiği karmaşıklıklara dair anlayışımızı zenginleştirmektedir.

Anahtar Kelimeler: Dijital sağlık, biyomedikalizasyon, dijital teknoloji, (biyo) dijital vatandaşlık, sağlıkta dönüşüm, Türkiye

ZUSAMMENFASSUNG: Die digitale Transformation im Gesundheitswesen wurde durch verschiedene Trends vorangetrieben: Entwicklungen in digitalen Technologien, Druck zur Kostenreduktion im Gesundheitswesen und steigende Nachfrage sowie Ausgaben durch alternde Bevölkerungen. Parallel dazu ist die Türkei seit 2003 in einem bedeutenden Transformationsprozess mit ihrem Gesundheitstransformationsprogramm engagiert, das die Digitalisierung im Gesundheitswesen vorantreibt. Der vorliegende Artikel untersucht das Zusammenspiel zwischen historischem Diskurs, politischen Einflüssen und technologischem Fortschritt, die zur Zentralisierung des türkischen Gesundheitssystems geführt haben. Im Fokus der Analyse steht die Frage danach, wie das Gesundheitssystem der Türkei im Zuge der digitalen Transformation zentralisiert wurde. Inmitten dieser Transformation stellt sich eine weitere, wichtige Frage: Wie lässt sich die positive Wahrnehmung digitaler Innovationen im Gesundheitswesen in der Türkei sowohl durch die Öffentlichkeit als auch

durch autoritative Gesundheitsinstitutionen mit den Herausforderungen, die durch niedrige Gesundheits- und Digitalkompetenz bedingt sind, vereinbaren? Die vielfältigen und multidirektionalen Gesundheitstransformationsprozesse in der Türkei werden vor dem Hintergrund des Konzepts der Biomedikalisierung analysiert. Durch die Kultivierung eines technologiefreundlichen Umfelds bringt die Türkei im Zuge des Biomedizinisierungsprozesses (bio)digitale Bürger hervor. Auf der Grundlage eines historischen Abrisses der Transformation des digitalen Gesundheitswesens in der Türkei geht der Artikel davon aus, dass das Phänomen der Biomedikalisierung in diesem Land, das von komplexen multidimensionalen Faktoren auf Mikro- und Makroebene geprägt ist, politische Entscheidungsträger, Datenschutzbeauftragte und Gesetzgeber dazu zwingt, wirksame und nachhaltige Regelungen für die Datennutzung, den Datenschutz und die Privatsphäre zu entwickeln. Durch die Analyse dieser Dynamik bietet die Studie Einblicke in die Art und Weise, wie ein Land wie die Türkei die vielschichtigen Aspekte der Implementierung digitaler Gesundheitsdienste bewältigt. Gleichzeitig werden die potenziellen Strategien und Mechanismen beleuchtet, die die erfolgreiche Einführung digitaler Technologien im Gesundheitswesen trotz bestehender Einschränkungen ermöglichen. Damit trägt die Studie zum breiteren Diskurs über die digitale Transformation bei und bereichert das Verständnis für die Komplexität der Nutzung von Technologien zur Verbesserung von Gesundheitssystemen, insbesondere in Kontexten, in denen die (digitale) Kompetenz des Einzelnen eine Rolle spielen könnte.

Schlüsselwörter: Biomedikalizierung, ditgitale Technologie, (Bio)digitale Bürger, Transformation von Gesundheit, Türkei

1. INTRODUCTION

Advances in medicine and healthcare helped increase life expectancy worldwide while economic and political challenges and inequalities in access to healthcare services still exist.[1] Increasing life expectancy urges health professionals to take actions in preventing or, at least, decreasing the health expenses due to the number of individuals suffering from chronic illnesses, infectious diseases and other health conditions. The World Health Organization (WHO) reports that there is a shortage of around 17.4 million health workers in the globe (2016b) and forecasts the shortfall of 10 million health workers by 2030 for low and lower-middle income countries (2022). Thus, WHO and most countries including Turkey have seen it urgent to produce a system that could monitor and enable individuals to take actions for their own good health. WHO promotes digital health as a solution to increase the standards of health for people and provide them with easy access to the services that could protect and maintain their health and well-being. Showing their dedication to digital health as a promise of improving health worldwide, in May 2020, WHO even launched a mobile app produced to authorize health workers to expand their life-saving skills in fighting with the COVID-19 pandemic (WHO, 2020a). Encouraging

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[1] The life expectancy figures of 2021 for all countries and economies see The World Bank, 2021.

the world towards a digitalized health system, WHO regards three-tier approach to digital health delivery: Policymakers, practitioners and population (WHO, 2020b).

Turkey stands out as a nation at the forefront of embracing a digitalized healthcare system. Spearheaded by a reformative initiative officially known as the Health Transformation Program (HTP) announced in 2003, spearheaded by the Ministry of Health, Turkey has embarked on an ambitious journey of health digitalization over the past decade (Sağlık Bakanlığı, 2017, 2019, 2020a). This transformational endeavor signifies a profound shift in Turkey's healthcare landscape, reflecting its commitment to leveraging cutting-edge technology to reshape the delivery, accessibility, and efficiency of healthcare services. Through the strategic implementation of the HTP, Turkey is systematically integrating digital solutions into its healthcare infrastructure, creating a dynamic framework that bridges the gap between traditional healthcare practices and the boundless possibilities offered by innovative digital health technology. This concerted effort has positioned Turkey on a trajectory that not only addresses existing healthcare challenges but also shapes a more resilient and agile healthcare ecosystem capable of addressing the evolving health needs of its populace. The process involves policymakers, practitioners, and the population at various levels. Different health institutions in Turkey promote and encourage both the practitioners and population to use digital health applications. Hence, digitalization has become one of the main elements and "success showcase" of the HTP as to develop and centralize the healthcare system. Digitalization of the health system in Turkey is enabled by global technological developments; discussions about improving health of the citizens and decreasing the health expenses due to disease, illnesses and rapidly growing aging population. The reformist HTP, thus, indeed is part of such global and national developments.

Using the concept of biomedicalization, we demonstrate that digital health in Turkey is the result of long lasting debates in health, politics, and global developments in medicine, science and technologies. Adele E. Clarke et al. (2014) use the term of biomedicalization to unveil the complexities around medicalization[2]. For them, "biomedicalization" refers to the more and more intricate, multifaceted, and multidirectional processes of medicalization that are being extended and reconfigured by a highly and steadily becoming more technoscientific biomedicine. With the "bio" in "biomedicalization" they call attention to the changes that have been made to both humans and nonhumans as a result of technological advancements

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[2] Medicalization is defined as "a problem in medical terms, usually as an illness or disorder, or using a medical intervention to treat it" (Conrad, 2005: 3). For the concept of medicalization, see Conrad (1992, 2005, 2007), Freidson (1970), Illich (1975), Pitts (1968), Zola (1972).

in the fields, such as molecular biology, biotechnologies, genomization, transplant medicine, and new medical technologies. In other words, using the term, they show how medicalization is escalating, but in brand-new, intricate, and frequently technologically scientific ways. In the context of Turkey, such biomedicalization promote a form of digital citizens shaped by the interplay between living in "technology friendly country" and having low digital and health literacy (Şahinol and Kirschsieper 2016). Citizens' experiences with the healthcare system define the kind of citizenship idealized in the nation (Üstündağ and Yoltar, 2007). Developments leading to digital health shape the biopolitics at work, and produce new kind of citizenship category called digital citizens as "those who use technology frequently, who use technology for political information to fulfill their civic duty, and who use technology at work for economic gain" (Mossberger, Tolbert and McNeal, 2008: 2) of both information technologies and medical knowledge. Requiring digital and medical knowledge, HTP in Turkey creates a citizenship model that is between biological and digital citizenship (Rose and Novas 2004; Mossberger et al., 2008: 2). In other words, the kind of citizenship model that the biomedicalization in Turkey promotes is bio-digital citizens as the system requires citizens to engage in information technologies and health literacy. In this sense, bringing politically shaped historical debates on health and technology, the case of Turkey contributes to the discussions regarding bio-digital citizens (Petersen, Schermuly, and Anderson, 2019; Petrakaki, Hilberg and Waring, 2021).

This article offers analyses about several aspects of digital health in the context of Turkey by focusing on the given literature, especially the historical background about the evolution of health system in Turkey following the main aspects of digital health in and outside of Turkey. Although both health and digital literacy are low in Turkey, the country offers a contradicting picture regarding the wide use of digital health applications, such as e-health and self-tracking. This might be, we argue, because Turkey is a "technology friendly country" (Şahinol and Kirschsieper, 2016). In this article, we illustrate that digital health in Turkey is the result of global developments, discussions and the national context. Yet, although citizens seem enthusiastic about the use of digital health, both the laws and knowledge regarding privacy and protection of citizens' digital health data are not enough. In this sense, the question of how to protect individuals' privacy is still disputable and needs quick as well as effective solutions.

2. HEALTH TRANSFORMATION PROGRAM AND DIGITALIZATION OF TURKISH HEALTH SYSTEM

Although e-health projects and digitalization in Turkey have started with the HTP in 2003, health policy changing plans go beyond the Justice and Development Party (JDP, Turkish: *Ak Parti, AKP*) government came to power in 2002. The health policy changes suggested by different governments had not been successfully

implemented due to political reasons. Compared to previous health care systems, HTP managed to administer a system that is centralized and standardized for collecting, storing and analyzing health data to produce health policies in the field of healthcare.

To put all these in a context, since its foundation Republic of Turkey in 1923 until the 1940s, the health system was dispersed and administered by local authorities. In this period, one of the crucial problems was disease outbreaks caused by infectious diseases.[3] In 1946, authorities suggested a program called the *National Health Program* announced by the Minister of Health Dr. Behçet Uz to increase the effectiveness, accessibility and capacity of the health system. To do that, the health plan was incorporated with centralization of the health system. Although the program had not been enacted fully due to the change in the government, it was this period when centralization of the hospitals had taken place. Following this term, in 1961, a new law was promulgated for socialization of the health services. Focusing on the establishment of a health system characterized by its widespread reach, gradual implementation, consistency, and integration, the inception of the corresponding law took place in 1963. During this period, Turkey's healthcare system closely aligned with the welfare state model, drawing inspiration from established European frameworks. Attempts to draft legislation for a Universal Health Insurance law were actively pursued between 1967 and 1974; however, these drafts did not attain approval (Başkavak and Başkavak, 2013). Despite persistent endeavors to socialize the healthcare system, it remained distant from encompassing the entire citizenry. Notably, nearly half of Turkey's population (approximately 35 % to 38 % according to varying sources) remained outside the scope of the social insurance system (Ağartan, 2011; Üstündağ and Yoltar, 2007).

Thus, in 1998, attempting to develop a more accessible and inclusive coverage, General Health Insurance (*Genel Sağlık Sigortası-GSS*) system was brought to the Grand National Assembly of Turkey[4], but it could not become a law for a lack of consensus in the parliament. Until 2002 elections, ruling governments were mostly coalition parties, which created political instability and, thus, constrained reconstruction of the healthcare systems. Finally, when the JDP gained 34 % of the overall votes in 2002, they become a single-party government running a majority of the seats in the parliament. Being a single-party ruling government provided with "a window of opportunity" in making large scale policy changes

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[3] For a comprehensive study regarding the period between 1946-1950, see Atli and Kahraman, 2020.

[4] Grand National Assembly of Turkey (TBMM or Parliament) is the legislative and parliamentary chamber.

(Ağartan, 2015). The reformist HTP was part of such a change. Mehtap Tatar et al. (2011: xx) suggest that HTP accomplished concrete developments including:

> *"(...) improvements in citizens' health status; introducing the General Health Insurance System (GHIS), thus enhancing the financial protection of the population; instigating a purchaser–provider split in the health care system; introducing a family practitioner scheme nationwide; transferring ownership of the majority of public hospitals to the Ministry of Health; introducing a performance-based payment system in Ministry of Health hospitals; and enhancing the accessibility of health care services of acceptable quality for the whole population."*

The changes that the HTP has brought are also part of the developments and increased use of technologies in almost every aspect of life in Turkey. To be more specific, global technological innovations are also integrated into the last-period-health system change to achieve and maintain the developments. HTP is claimed to be innovative, and, in some places, reformative (Kahveci, Koç and Küçük, 2017), also due to its "successful" adaptation to technological developments. Intensification of technology in health provision in Turkey coincides with the transformation of the healthcare system. Stated differently, the medical domains in Turkey are presently undergoing a profound technological metamorphosis in the arrangement of healthcare services, mirroring the international trajectories (Başkavak, 2017). Biomedicalization in Turkey represents such globally experienced neoliberal conversions in the world. In this sense, rapid integration of technologies in the health system reshapes how (citizens') bodies and data about the bodies are regulated with the promise of being more effective, systematic, accessible and instant. Transforming the healthcare system in order to create healthier (read as desired) citizens indicates the biopolitics, in a Foucauldian sense, at work, which is not separate from the global technological developments (Clarke, 2014; Clarke et al., 2003; Good, 2001). Technological innovations integrated to health system require citizens to be active and literate in digital technologies as well as in health, promoting bio-digital citizens. Yet, citizens' responses and ways of adaptations to the transformation vary.

To wit, technological intervention and/or digitalization of health is interpreted as exhaustive control or surveillance of the citizens, they are also considered as empowering by increasing the authority of citizens on their health and data regarding their health (Lupton, 2012, 2013; Funnell and Anderson, 2004). According to an ethnographic study conducted by Üstündağ and Yoltar (2007), citizens of Turkey desired a reform in the health system that would technologically enable them to have more autonomy on the "choices" regarding their health. The health system reform in the citizens' minds were described as centralized (controlled and monitored from one center instead of a messy and dispersed system), modernized and providing citizens with rights to choose their doctors and hospitals as in some European

countries -such as in Germany. With these desires, citizens, too, supported the HTP that promised them a standardized, centralized and with the least possible face-to-face interaction between citizens and bureaucratic providers on a virtual platform.

As a place where bureaucratic relations take place, the health system is a good setting to study the State and the institutionalized relationship between the State and citizens (Üstündağ and Yoltar, 2007; Babül, 2018). The kind of ideal citizens profiled by the previous health system were those whom the government could tract them, who worked in formal jobs and worked for the government until they retired (Üstündağ and Yoltar, 2007). Yet, the system created *de facto* hierarchical citizenship statuses in which the health system was more accessible to *only* some citizens. Both the messiness of the healthcare system before HTP, and the institutionalized hierarchical citizenship motivated both the citizens and the power holders to work towards a health reform. Yet, this kind of reform brought by HTP has created new hierarchical relationships among the citizens. Namely, those who are not bio-digital citizens cannot engage with the digital health in Turkey compared to their peers of bio-digital citizens.

This is to say, the centralized new health system in Turkey is digitalized, which requires citizens to take part in the economy actively and constantly, having a level of digital health literacy[5] and being docile (willing to share personal data with the State and not rebel to that). Lupton (2018) states that "people's encounters and interactions with digital technologies generate reams of digitized information about their bodies, habits, preferences and social relationships" (p. 1) - which is crucial for data security issues. Pervasiveness of technologies in people's everyday lives transforms the information into datasets, by producing new kinds of citizenship experiences and models, such as bio-digital citizens. We use the bio-digital citizen concept in this article by combining digital and biological citizenship notions. According to Mossberger et al. (2008) "digital citizenship as representing capacity, belonging, and the potential for political and economic engagement in society in the information age" (p. 2). Explored further in this article, Turkey's embrace of technological progress across various domains, including healthcare, has gained noteworthy acknowledgment (Şahinol and Kirschsieper, 2016). Research accentuates the intricate link between understanding digital health concepts and the willingness to adopt technological advancements. This connection gains prominence as Turkey envisions a healthier society within a technologically refined environment (Şahinol, 2020). This dynamic interplay between technology and health pursuits shapes Turkey's distinct stance within the broader discussions on digital health. "On

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[5] The concept of health literacy refers to the relationship between the literacy skills and health status (Nutbeam, 2008). In this context, the main finding is that poor literacy leads to poor health (Parker, 2000).

the individual level, technophilia as a socio-cultural determinant leads to neglect data security issues, thus health data security awareness is not built up" (Şahinol and Başkavak, 2020: 41). Encouraging digitalization, HTP in Turkey forges a citizenship model straddling both biological and digital dimensions (Mossberger et al., 2008; Rose and Novas, 2004), termed as bio-digital citizenship. The concept of biological citizenship characterizes the relationship between emerging biological knowledge and citizenship frameworks in the era of biotechnologies, biomedicine, and genomics. This intricate interplay offers a nuanced perspective on citizenship dynamics in the evolving landscape of health and technology. Nikolas Rose and Carlos Novas (2004: 440) use biological citizenship in a general term to describe:

> *"all those citizenship projects that have linked their conceptions of citizens to beliefs about the biological existence of human beings, as individuals, as families and lineages, as communities, as population and races, and as a species. And like other dimensions of citizenship, biological citizenship is undergoing transformation and re-territorializing itself along national, local, and transnational dimensions."*

Thus, bio-digital citizenship is the model of the emerging digitalized health and IT era. Considering how both the bio and digital technological developments cannot be apart from human experiences in general, it would not be wrong to say that their integration to the health system, and health system regulations in Turkey reshape individuals' experiences with their health. The following sections explain aspects of digital health.

2.1. Digital Health and E-Health

In her article "Digital Bodies", Lupton (2015: 8) invites the reader to think about digital data assemblages as "lively capital". In the field of digital health, thinking about data as "lively" is a helpful metaphor since it brings attention to the body (politics), to the process that is historically shaped, and interconnected developments, i.e. biomedicalization. In this sense, telecommunication and virtual technology was the main driver of digital health (i.e., the body). The increased expansion of information and communication technologies (ICTs), the further dissemination of computers and internet have incrementally shaped the health sector especially since the 1990s (Şahinol, 2020). Such technologies created new spaces where the data related to health could be restored and accessed by different actors – which is one of the essential parts of digitalization – such as the state, health care related institutions, hospitals, health care providers, and citizens. The digitalization of what used to be paper-based health records lead to remote accessibility (such as telehealth and eHealth).[6] This has also expanded to mobile units.

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[6] "Telehealth involves the use of telecommunications and virtual technology to deliver health care outside of traditional health-care facilities. Telehealth, which requires access only to telecommunications, is the most basic element of 'eHealth,' which uses a wider range of information and communication technologies." (World Health Organization, 2018)

Digital health is often associated with positive benefits, such as making online appointments and direct and accurate access to health-related information, for patients and for caregivers. Healthcare services have become dependent on technologies for many years. As by the 2010s, the phenomenon of digitalization of healthcare was unavoidable since medical knowledge, practice and research increased dramatically (Druss and Marcus, 2005); crucial changes in the roles of patients emerged, as patients have become empowered due to techno-medical developments (Greenhalgh and Wessely, 2004; Lupton, 1997) and patient organizations proliferated (Hugman, 1994: 193).

There are various terms like 'digital health', 'eHealth', Medicine 2.0' or 'Health 2.0' (Lupton, 2013: 256) that are characteristic for the digitalization process of health. *E-health*, as one of the most commonly used term, includes a broad range of conceptions and instruments. WHO, for instance, defines e-health as "the cost-effective and secure use of information and communication technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research" (WHO, n.d.). Yet, the term e-health indeed was barely used before 1999. When used, it was primarily by the technology market leaders rather than the academic world. Former created "e-words" such as e-commerce, e-solution, e-business, and so on. For instance, Intel – multinational and technology firm – was referring to e-health as "a concerted effort undertaken by leaders in health care and hi-tech industries to fully harness the benefits available through convergence of the Internet and health care" (Eysenbach, 2001: 5). In the academic milieu, one of the earliest descriptions regarding e-health presented by Gunther Eysenbach (2001: 4):

> *"E-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology."*

Later, in 2005, Oh et al. obtained and analyzed 51 definitions of e-health, which have mostly included positive terms with no evidence on negative effects or disadvantages or even barriers of e-health (Şahinol, 2020). According to the results of Oh et al. (2005: 8-9) the term:

> *"eHealth encompasses a set of disparate concepts, including health, technology, and commerce. (...) Health, as used in these definitions, usually referred explicitly to health care as a process, rather than to health as an outcome. (...) In the definitions of eHealth ... technology was viewed both as a tool to enable a process/function/service and as the embodiment of eHealth itself."*

Digital health serves as a tangible manifestation of the transition from traditional paper-based healthcare practices. The form of biomedicalization elucidated earlier embodies a transformative essence, wherein various components of e-health seamlessly harmonize and interlock. Nonetheless, as this phenomenon purports to enhance empowerment and democratize healthcare, certain ethical considerations emerge, encompassing issues like patient data access and safeguarding (Şahinol, 2020). This endeavor also introduces noteworthy implications, notably in the realm of healthcare policy and practice, as underscored by the substantial impact of health-related big data on public health strategies and interventions (Lupton, 2017: 60). Further exploration of these aspects will be undertaken in subsequent sections of this article.

The digital health concept covers various disciplines including computer science, engineering, information science, journalism, economy, clinical medicine, public health, epidemiology, and others. The multidisciplinary character of digital health might lead to difficulties in coordination. For example, technical developments within the health sector are always faster than their legal regulations. Nevertheless, without laying out its drawbacks, the digitalization of health is associated with mostly positive aspects as it is linked "to deliver better value healthcare against a backdrop of increasing levels of chronic disease, ageing populations, global financial crises and reduced public spending, and digital health tools and services are widely touted as being part of the answer, offering low-cost and patient-centered solutions" (Powell et al., 2016: 1). On a more individual level, digital health technologies provide information to people regarding their own healthcare, help them "share their experiences of health and illness, training and educating healthcare professionals, helping people with chronic illnesses to engage in self- care and encouraging others to engage in activities to promote their health and wellbeing and avoid illness" (Lupton, 2017: 1).

These technologies bear the possibility of "dehumanizing healthcare" (Meskó et al., 2017: 1). Dehumanization in medicine can be defined as "the fact of no longer treating a person without respect for the dignity of human beings" and the main reasons of such dehumanization are hospital staff, advanced technology or sophisticated treatments (Leyens, 2014: 168). In addition, the situation where dehumanization will emerge even more is the close relationship between medicine and artificial intelligence (AI). As recently argued in academic milieu, AI will not completely replace doctors in the near future. Instead, AI will support doctors. Thus, it is emphasized that a major revision is needed in medical education to alleviate the impact of dehumanization (Al-Amoudi, 2022; Briganti and Le Moine, 2020: 4; Lopez-Jimenez, 2023). The table indicates a user profile that consists of technologically informed and health-wise responsible individuals who consume the health products extended to them by various companies. Yet, users might not be

aware of their digital "rights" (if defined any) and might not be prepared for taking on new responsibilities that the digital aspect of health brings. One of the methods to solve the problem in the long term is a reform that is generated "by people, policymakers, health professionals, patients and, importantly, from citizens". Most recent example of such change has been brought up by the National Health Service (NHS) in England around the concept of "digital health citizen" (Powell et al., 2016: 1- 2).

> *"Establishing a patient-centered culture of digital innovation and improvement could lead to an NHS that better serves its users. Engagement could include using a personal health record which shares data with the NHS and health service researchers, contributing data from wearable technologies that monitor parameters of health or illness, using mobile apps that support decision making or deliver interventions, participating in remote care and consultations, and providing online ratings and reviews of experiences of care. Digital health citizenship could play a crucial role in ensuring that patients and the public are firmly placed at the heart of the health service, a popular message that is not yet the reality of healthcare practice."*

According to the NHS, it is necessary to establish digital rights and responsibilities of digital health citizens in order to co-create a digital future in the 21st century. For this goal, the NHS outlines a proposal for digital health citizens, which defines both the rights and responsibilities of citizens. Patient rights mostly concern with basic parameters for supportive and preventive digital health technologies and parameters for (a self-management of) a healthy life connected to responsibilities of data sharing. Thus the conceptualization of digital health citizen is related to informed and responsible patients and the "making of health conscious citizens" (Ayo, 2012: 99). Along the same lines, the study published by Foundation for Technology Assessment TA-SWISS[7] (2018) encourages both manufacturers and people (in the same way NHS describes people) to take on responsibilities and produce data protection legislation about self-tracking and data produced by self-tracking. They urge researchers to conduct scientific investigations about if indeed self-tracking can foster better health and lessen health care expenditures (TA-SWISS, 2018). Developments in information and communication technologies in the world motivated countries both to be a part of these developments and take measures in order to be "digital health citizens" NHS used. Turkey is also one of these countries where the expansions of technological, communication and informatics in the use and access of the healthcare system have been encouraged by different state institutions. Following section describe aspects of the landscape of digital health in Turkey.

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[7] TA-SWISS is Centre of Competence of the Swiss Academies of Arts and Science.

2.2. Digitization of Turkish Health System

As mentioned before, steps have been taken and adopted through the HTP with the aim of developing and improving the health services in Turkey. Before the HTP, any national standardization for collecting, storing and analyzing health data to produce health policies in the field of healthcare was not available. Thus, health data storage and collection were not as organized and regular as now before the HTP. One of the significant steps taken in data protection in the HTP in 2003 was the e-health project entitled "Access to Effective Information in Decision Process: Health Information System" (Ulusal Sağlık, 2014: 14). Within the scope of this target, Health-Net (*Sağlık-Net*) system, which aims to bring a new digital infrastructure to the health system, includes studies aiming to develop health services and standardization in Turkey. Then, the Ministry of Health has established a national healthcare network called the "National Health Information System" (*Ulusal Sağlık Bilgi Sistemi-USBS*), which performs e-health and electronic transformation in health.

Established in 2015, the National Health Information System in Turkey is an information databank that aims to gather under a single database. This database is expected to send data not only from public hospitals but also from private hospitals and clinics. A total of three data sets are expected to be sent to the Turkish National Health System: patient information, diagnosis information and treatment information. The price and the amount of information are not expected to be included in this information. Only the diagnosis, treatment, examination data, prescriptions and laboratory results are electronically converted through *SBYS* (*Sağlık Bilgi Yönetim Sistemi* - Health Information Management System). These electronic records are sent to the Turkish National Health System via the Turkish Health Information Management System (Dentalbulut, 2018). In this aspect, digitalization of health is supported and encouraged by the national health institutions, which includes and centralizes broad range of health systems. However, making institutionalized digitalization successful on the ground also needs individuals who can be crafted into bio-digitalized citizens. Having technology friendly culture, in this sense, as well as low digital and health literacy levels are the essentialities in which citizens become bio-digital in Turkey (Şahinol and Kirschsieper, 2016).

2.2.1. Digital Landscape of Turkey: An Overview

As one of the key figures concerning technology in Turkey, the ratio of smartphone users in Turkey is over 75 % of the total population, with 68.7 million internet users (Shrestha, 2023). According to GSMS Intelligence[8], there are 81.68 million cellular mobile connection and % 95.4 of the total population in Turkey in

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[8] GSMA Intelligence enables global mobile market information and estimates regarding mobile industry using data around the world (www.gsmaintelligence.com).

January 2023 (www.gsmaintelligence.com). Additionally, mobile connection increased by 2.6 million between 2022 and 2023 (Kemp, 2022). Furthermore, the number of smartphone users are estimated in Turkey between 2024 and 2028 by in total 7.5 million users (Dierks, 2023). Therefore, considering the statistics around the world, Turkey has a rapid progress in technology usage, and internet and social media utilization. The *Household Information Technology Use Survey, 2023*[9] conducted by the Turkish Statistical Institute (*Türkiye İstatistik Kurumu-TÜİK*) shows that proportion of households with internet access is 94.1 %, while this rate was 95.5 % in 2023. The rate of internet usage increased from 85 % in 2022 to 87.1 % in 2023 for the age group of 16-74. The rates of internet usage for the age group of 16-74 are 90.9 % for males and 83.3 % for females in 2023. According to the report, the percentage of household members who have access to the Internet is 95.5 % in 2023. In addition, 73.9 % of individuals used e-government services. Moreover, as of July 2023 (in the last 3 months), the most used way by individuals using the Internet to manage access to personal data was checking the features of websites to ensure the security of personal data, with 41.8%. This was followed by 36.2 % not allowing sharing of personal data for advertising purposes and 31.1 % reading the privacy rules of the website or application before giving permission personal data (TÜİK, 2023).

These figures above are quite important as it shows the widespread accessibility of the means that enable users to digitize their health data and to participate in digital health. The increasing distribution rate and usage of smartphones are important factors for the pervasiveness of medical applications, which could connect various actors and systems such as manufacturers and the State, and the e-health in general.

2.2.2 E-health Projects in Turkey

E-health projects aim to standardize data flow in health services, increase efficiency, accelerate data flow among stakeholders, and keep electronic personal health records (Sağlık Bakanlığı, 2014). The basis of the e-Health project is the Health Information System (*Ulusal Sağlık Bilgi Sistemi-USBS*) and it is one of the most important stages of the reforms within the scope of the transformation project. Health.net (*Sağlık.net*) is an information and communication platform of e-health practices in Turkey and compromises quite a few systems and applications. As defined by the Ministry of Health, Sağlık.NET has main components of health practices such as Centralized Hospital Appointment System (*Merkezi Hastane Randevu Sistemi-MHRS*), Tele-Medicine, National Health Data Standards (*Ulusal Sağlık Veri Standartları-USVS*), Health Coding Reference Dictionary (*Sağlık Kodlama Referans Sözlüğü-SKRS*) and many services offered over the internet, e-

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[9] Hanehalkı Bilişim Teknolojileri (BT) Kullanım Araştırması, 2023.

mail services (Sağlık Bakanlığı, 2023), additionally Family Medicine Information System, E-Prescription (*e-reçete*), and E-Pulse (*e-Nabız*) (2016 ITA Health IT-Top Markets Report, 2016; 60-61; Sağlık Bakanlığı, 2023).

Electronic Health Record/Personal Health Record in Turkey

Via Electronic Health Record (EHR)/Personal Health Record (PHR)[10] systems, patients get a possibility to manage and maintain their health information. In the WHO survey (2016: 94), EHR is defined as:

> *"real-time, patient-centred records that provide immediate and secure information to authorized users. EHRs typically contain a patient's medical history, diagnoses and treatment, medications, allergies, immunizations, as well as radiology images and laboratory results."*

EHR systems are associated with many promises. E-Pulse is one of the applications that could be categorized both as an EHR and PHR. The Turkish Ministry of Health describes e-Pulse in their own official website as:

> *"an application that citizens and health professionals access to health data collected from health institutions via internet and mobile devices. Regardless of where your examinations and treatments are held, it is a personal health record system where you can manage all your health information and access your medical background from a single location. It is the world's largest and most comprehensive healthcare information infrastructure that you can access safely on the internet, enabling physicians within the time frame and bounded authority of your choice to assess your health records, thereby increasing the quality and speed of the diagnosis and treatment process and establishing a strong communication between you and your physician." (https://enabiz.gov.tr)*

E-pulse allows users to access their own lab results, medical images, prescription, diagnosis history, reports, medication details emergency information via mobile phones or desktop.[11] Today, the number of e-pulse application reached 9 million users. The e-Pulse app was awarded "Best Health Practice" at the 2016 World Summit Awards given by the United Nations World Information Society Initiative (Sağlık Bakanlığı, 2020a). But e-pulse was discussed very controversially, as it raised questions regarding data protection (Şahinol, 2020; Özkan, 2011). In their case study on e-Pulse, Şahinol (2020) shows, "ethical dilemmas regarding the rights

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[10] What the specific area that PHR refers to could be used interchangeably with EMR/EHR. In other words, the term PHR started to be accepted as a separate concept from EMR with the use of phrases like personal medical record (1995) and computer-generated patient-held medical record (1996). This separation from digitized and paper records occurred when computerized records became the standard, and the word 'electronic' was added to PHR in order to distinguish it from past paper records. (Kim, Jung and Bates, 2011). For a historical overview and trends of PHR see Kim et al., 2011.

[11] See for a significant critic by Turkish Medical Association (*Türk Tabipleri Birliği-TTB*) on e-pulse project and its legal implementation: Turkish Medical Association, 2015.

to data protection and privacy" and refers to "the interdependencies of the socio-technical, socio-cultural and socio-political shaping of knowledge landscapes and its relations to personal properties. These case specific findings are associated with concerns, ethical and governance issues raised by eHealth in general" (p. xx). In this regard, there is a discrepancy in the way digital health is promoted and lack of digital health data protection laws.

Turkey: A Technology-friendly Country

Health literacy can be seen as one socio-cultural factor of individuals' and society's health level. Turkish society is a technology-friendly culture (Şahinol and Kirschsieper, 2016) and large proportion of its population uses the latest technological tools and devices. However, according to "Health Literacy Survey" conducted by SAĞLIK-SEN (Health and Social Service Workers' Union, Turkey) in 2015, the health literacy rates in Turkey is low. 64.6 % of the total respondents constitutes inadequate and problematic levels of health literacy. The health literacy level of Turkish females seems to be higher than males. The data on the health literacy level in Turkey are as follows:

Table 3: Turkish Electronic Health Records (EHRs)

Health Literacy Level	Adult rate (%)	By Sex Distribution (%)	
		Female	Male
Inadequate	24,5	10,5	9
Problematical	40,1	23,1	18,5
Adequate	27,8	15,9	13,9
Excellent	7,6	4,3	4,8
TOTAL	100	100	100

Source: The table is adapted from Örnek, 2016: 34-35.

Örnek, M. (2016). *Sağlık-Sen Sağlık Okuryazarlığı Araştırması*. Sağlık Okuryazarlığı, Ankara.

Another significant study is the "Turkey Health Literacy Level and Related Factors Research" conducted by the Ministry of Health, General Directorate of Health Promotion (SGGM) in 2020. This study determined the level of health literacy level at national level and investigated how the level of health literacy varies according to demographic characteristics, socioeconomic conditions, and the communication tools used as a sources of information on health-related issues. According to the findings of this research: (a) 7 out of 10 people have low health literacy levels, (b) as health literacy level decreases, chronic diseases increase, (c) health literacy level varies by gender. While the frequency of those with inadequate health literacy is 35.3 % in women, this rate is 26.4 % in men. Hence, men have higher health literacy level in Turkey (d) 9 out of 10 elderlies (65 and over age group) have low health literacy level (Sağlık Bakanlığı, 2020a). Turkey's low health literacy has gained attention from different institutions. For example, with the attempt of improving the low health literacy rate in Turkey, the Ministry of Health's Directorate General for Health Information Systems has started publishing a journal called

"Digital Health: Journal of Health Informatics" since August 2018.[12] The aim of the journal is, specifically, to present current debates about, and share institutional information and developments in the field of digital health. By including information about future technologies, the journal also makes predictions for the ways in which these technologies could be implemented in and cooperated with the health system. The journal, in general, uses a positive language in describing the effects of using the current and future technologies on citizens, doctors, and developing public policies. Centralization and digitalization of the health system is seen as a "success" (Kahveci, Koç and Küçük, 2017). In this sense, the aspect of Turkey having a technology friendly culture is also encouraged and promoted by the institutions, which would further contribute to digitalization of the health system, and increase the health literacy in Turkey.

The enthusiasm about digital health displayed in the language of the journal draws a citizen profile that is adequate in both understanding and using digital health. Citizens fitting into such a profile are good/desired citizens, whom namely are bio-digital citizens. "Right" way of managing health requires understanding and using digital health effectively. The HTP adapted technology friendly health policies both to increase the effectiveness of healthcare and monitor health related matters from a single center. Developing digital tools, such as *e-nabız* (e-pulse) and digitalization of the hospitals described below, that serve to the government, doctors and the citizens, digitalization of health became integral to health and health service in Turkey. Therefore, ideal citizens have become bio-digital citizens as well.

The Digitalization of Hospitals in Turkey

The digitalization of hospitals is another e-health project in Turkey. The spreading of healthcare information by means of smart devices has been extending in recent years. In the age of advanced digital technologies, integration into the health organizations and patient care has gained acceleration. Digital transformation of healthcare is driven by numerous impetuses to minimize costs, improve healthcare delivery, enhance patient experience and increase patient participation. The concept of digital hospital is "a medical ideal where everyday operations and record-keeping are carried out and maintained almost exclusively with computers" (Weiss, 2002: 44). In this structure, electronic medical records (EMR) and the electronic patient record (EPR) carries vital importance. Digitalization of hospitals enables patient's all medical records, lab results, and images electronically and transfers immediately to the clinicians' screens. This software tools provides accuracy of treatment, acceleration of results, minimization medical errors, and reducing medical costs due to paperless flow in the processes (Weiss, 2002: 44).

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[12] For details, see: https://dijital.saglik.gov.tr/

Turkey has also been experiencing digital hospital process. Yet, public healthcare services have a lot of challenges in adopting new technologies. The aim of establishing and disseminating the concept of digital hospitals in the facilities belonging to the Ministry and its affiliates is involved in the 2013-2017 Strategic Plan of the Ministry of Health. Therefore, Turkey applied to the Healthcare Information and Management Systems Society (HIMSS)[13] in 2013 to assess the level of Turkish digitization levels in hospitals and provide its convenience to international standards. Digitalization processes and levels of all services offered by hospitals are evaluated by the HIMSS – an international independent accreditation body. It is expected that human error rates will decrease significantly in all hospitals. The shortening of waiting periods for work and operations and increasing productivity in healthcare delivery are other goals of the Turkish Strategic Plan. With the establishment of the General Directorate of Health Information Systems (*Sağlık Bilgi Sistemleri Genel Müdürlüğü- SBSGM*) has brought a new dimension to the process of "paperless/digital hospital" in Turkey.

The "Digital Transformation Project", *paperless/digital hospital*, was launched in 2012 and implemented firstly at Ankara Gazi Mustafa Kemal Public Hospital chosen as a pilot hospital. According to the Electronic Medical Record Compliance Model (*Elektronik Tıbbi Kayıt Uyum Modeli-EMRAM*)[14], hospitals are rated internationally based on to their level of digitality and accredited by auditing the level of use of information technologies. For instance, in May 2013, Ankara Gazi Mustafa Kemal Public Hospital has received a Stage 6 by EMRAM. By 2017, digital hospital work has gained speed all in Turkey. Briefly, 155 Turkish hospitals were evaluated EMRAM and these hospitals were evaluated at Stage 6 (Dijital Hastane, 2017; Ministry of Health, 2017).

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[13] HIMMS (The Healthcare Information and Management Systems Society) was established in 1961. It is an American not-for-profit organization and a global advisor to improve health care in quality, safety, cost-effectiveness, and access through the best use of information technology and management systems. The HIMMS is based on an idea as "better health through information and technology". It has 72.000 members and 630 corporate organizations. Another important function of HIMMS is evaluates and rates hospitals which applies by itself. The HIMSS evaluation model is grounded on eight stages (0-7) that measure a hospital's implementation and utilization of information technology applications. The best stage, Level 7, means an advanced patient record environment. Put it differently, Level 7 is the successful process of integrating an electronic medical record system and empowering other advances in information technology (for more details about the organization, see: https://www.himss.org/)

[14] EMRAM (Electronic Medical Record Adoption Model) was developed by HIMMS Analytics. This is a methodology for appraising the progress and effect of electronic medical record systems for hospital.

2.2.3. Self-tracking in Turkey

Self-tracking is another form of digital health. Life expectancy is becoming higher and the WHO forecasts that there is a shortage of around 17.4 million health workers in the world (WHO, 2016: 6). As average human life has extended, the number of individuals suffering chronic illnesses increased as well as health expenditure for their treatments, not only worldwide but also in Turkey. Therefore, long-life individuals might need to track their own health conditions and chronic illnesses. As found recently in Turkey in the research of Şahinol and Başkavak, the use of self-tracking devices in chronic diseases (i.e., Type 1 diabetes) is effective in minimizing potential health risks and protecting against diseases (Şahinol and Başkavak, 2020; Şahinol and Başkavak, 2021). People have tracked their digital health data with the increasing popularity of smartphones and other mobile devices containing applications such as step counter. The concept of self-tracking, also used in the context of life-logging, the quantified self, personal analytics and personal informatics, has recently appeared as a very new trend in optimizing one's life in both health and lifestyle issues. Each of these concepts similarly describe the collection of data using digital technologies and devices about the person on voluntary, continuous and self-controlled bases; the monitoring and recording of particular characteristics of their behaviors, lives and feelings, and finally analysis of these data to create statistics and visualization of the data such as diagrams and images (Lupton, 2014: 77). As defined by Selke (2016) "lifelogging, comprehensive digital self-tracking and logging of everyday life, can be understood as a technical form of self-observation and a passive form of digital self-archiving, with which a lot of potential, but also pathologies are associated" (Selke, 2016: 3).

As the high amount of smartphone users in Turkey suggests, digital self-tracking and logging of everyday life in Turkey might be also forced by their usage as well as kinds of health related applications provided by telecommunication companies. For example, telecommunication companies in Turkey, such as Vodafone, Turkcell, Türk Telekom and Avea, have recently developed chronic patient monitoring technologies. That way, individuals can follow-up on their own chronic illnesses via these monitoring systems provided by these companies. Turkcell has introduced the chronic patient monitoring system as "Health Meter" (*Sağlık Metre*). For its customers, Vodafone has also launched a follow-up system for chronic diabetes patients called "Vodafone Diabetes Tracking System" (*Vodafone Diyabet Takip Sistemi*). Similarly, Türk Telekom presented a follow-up system for chronic diabetes patients called "Türk Telekom Comfort Life" (*Türk Telekom Konforlu Hayat*). Finally, Avea introduced its own tracking system for chronic diabetes patients (Diyabetimben, 2016).

Health associations also play a significant role in distribution of self-tracking and digitalization of health. For instance, The Turkish Heart Association established

the "Digital Health Project Group" on 27.11.2018. The association promotes digital health for the reasons of wide accessibility, and its role to control and improve health. According to the association, promotion and wide use of digital health is especially important for Turkey since it has a growing, and aging population in which chronic diseases are the highest. They state, "chronic diseases with the greatest impact of digital transformation are coronary artery disease, chronic heart failure, hypertension, hyperlipidaemia". Thus, digital health is seen as a solution for both reducing the country's financial burden due to health related expenses, and improving health in general. Digital Health Project Group explains their goals regarding digital health as the following (Türk Kardiyoloji Derneği, 2018):

- To contribute to the awareness and education of our colleagues on digital health,
- To contribute to the Turkish health system in the transformation of digital health with the projects that we implement,
- To contribute to the digital health literacy of society,
- To share with our colleagues, the most current studies and experiences in digital health with the meetings to be held,
- To organize and organize scientific research in the field of digital health, participate in ongoing studies and support our colleagues,
- Conducting and finalizing joint projects with technology companies interested in digital health.

Along the similar lines with WHO, the goals outlined by the Digital Health Project Group suggests that digital health could be a tool for transforming health, helping with the health expenditures and shortage of health workers. Thus, being a part of digital health, self-tracking applications are encouraged and promoted both by international organizations, national associations and businesses. Use of self-tracking is also significant in becoming a digital health country in Turkey.

3. DISCUSSION

This study discusses how Turkey's healthcare system evolution is intricately intertwined with both global developments and the country's socio-political landscape. The profound transformation of Turkey's healthcare system through the lens of digitalization serves as evidence to its connection with historical, political, and technological forces. This intricate tapestry highlights Turkey's significance as a context for comprehending the multifaceted and multisided dimensions of digital health. Sitting at the crossroads of global technological advancements and national healthcare transformations, Turkey serves as a significant context and case for comprehending diverse facets of digital health. From its establishment in 1923, Turkey has undergone four major modifications in its national healthcare system. These alterations, as well as the potential modifications within the healthcare framework, were intricately linked to the prevailing political landscapes. The most recent transformation, known as the HTP, introduced a pioneering healthcare system marked by centralization and digitization. Our discourse in this paper postulates that

the digitization of healthcare in Turkey is interwoven with worldwide technological advancements and the ongoing discourse regarding health enhancement through cutting-edge technologies.

In the midst of this global momentum, the domestic environment has played a pivotal role in shaping the trajectory of Turkey's digitalized healthcare system. Prior to the inception of the HTP, a fragmented system prevailed, characterized by convoluted health-related information. The disorderliness of the system posed challenges for both citizens and the government in terms of accessing and regulating pertinent health information, thereby contributing to pronounced inequalities within the healthcare system. Consequently, citizens expressed a genuine aspiration for a healthcare system that could be effectively administered from a singular center. With the advent of the HTP, data originating from private and public hospitals/clinics were centralized within a singular repository. The centralization and digitization initiatives have gained widespread support from citizens and institutions alike. The shift from a fragmented healthcare system to the central repository under the HTP reflects the collective aspiration for more efficient healthcare administration.

The emergence of bio-digital citizenship introduces a fresh perspective on citizenship ideals within the digital health era. This concept encapsulates the fusion of technology, healthcare, and citizenship, exemplifying the transformative power of digitalization on healthcare and citizenship experiences. Applied to Turkey's context, the concept of biomedicalization illuminates the emergence of the bio-digital citizen. This novel type of citizenship reflects the interplay between Turkey's "technology-friendly culture" and its low digital and health literacy levels.

Furthermore, the interplay between technology and healthcare has necessitated a certain level of health and digital literacy among citizens. Despite modest health literacy levels, the enthusiasm for digital health technologies, such as e-health and self-tracking applications, remains palpable among Turkish citizens. This seeming paradox can be attributed to Turkey's predisposition as a technology-friendly nation. However, this integration of digitalization into healthcare also brings forth concerns regarding individual privacy and data protection. Legislative safeguards are evolving, but the ongoing discourse centers around identifying sensitive data warranting legal protection.

By investigating these dynamics, the research question provides insights into how a country like Turkey navigates the multifaceted aspects of digital health implementation, shedding light on the potential strategies and mechanisms that enable the successful adoption of digital technologies in healthcare despite existing limitations. This contribution to the broader discourse on digital transformation enriches our understanding of the intricacies involved in leveraging technology to enhance healthcare systems, especially in contexts where literacy levels might pose obstacles.

In the contemporary landscape, personal data protection is gaining prominence globally, including in Turkey, which introduced its Personal Data Protection (PDP) Law in 2016. Within the domain of eHealth, the principles of transparency, data protection, and freedom of information shape communication structures. Cultural contexts play a substantial role in defining the interplay between transparency and data protection, emphasizing the importance of context-specific approaches. Since Turkey, analyzed as a case study in this paper, constitutes an original, multifaceted and complex example, thus potentially offering new topics and venues for further research.

In conclusion, this study traverses a comprehensive narrative that underscores the intricate interplay between global dynamics, socio-political factors, and digital transformation in Turkey's healthcare system. The emergence of bio-digital citizenship symbolizes the convergence of healthcare, technology, and citizenship ideals. The concept of biomedicalization sheds light on the emergence of the bio-digital citizen, weaving together Turkey's technological disposition and its evolving healthcare landscape. This study ultimately contributes to the discourse on digital health, highlighting both the global impetus and the local intricacies that shape the transformative journey of Turkey's healthcare system. The technological landscape of Turkey is characterized by an inherent alignment with digital progress, making it amenable to the integration of innovations in healthcare practices. This orientation can be attributed to a prevalent culture of technological affinity, driving the country's aspirations towards a future where health and technology coalesce to facilitate a heightened quality of life. As digital health literacy gains prominence and people become more conversant with the implications of technology in healthcare, Turkey's vision of achieving a healthier society becomes intricately intertwined with the nation's journey towards technological optimization. This symbiotic relationship between digital health literacy and technological orientation highlights Turkey's distinctive position within the larger discourse on digital health. The nation's inclination to harmonize health aspirations with technological progress opens doors to novel approaches that can potentially reshape healthcare delivery and access, making it a fascinating case study within the broader global context and this in-depth and original case study of the issue is expected to provide inspiration for future researches.

Ethical Declaration

In this study, all the rules stated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed.

Ethics Committee Approval

The study VALID-TR was approved by the local ethics committee (Özyeğin University Human Research Ethics Committee) for field research and was conducted according to the principles of the Helsinki Declaration II. All procedures involving

human participants were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of Interest and Funding

The authors declare that they have no conflict of interest. This study is based on the international project titled "Digitale Gesundheitsdaten zwischen sozialer Inklusion und sozialer Robustheit. Risikoethische Abschätzung digitaler Selbstvermessung im Gesundheitswesen unter besonderer Berücksichtigung vulnerabler Personengruppen (VALID)" supported by the German Federal Ministry of Health (#ZMV | 1 - 2517 FSB 016) within the framework of a collaboration between Furtwangen University and the Orient-Institut Istanbul.

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Gülşah Başkavak played a key role in drafting and critically revising the manuscript (contribution: 40%). Melike Şahinol was the primary contributor in conceptualizing the article and led its overall drafting and revision (contribution: 40%). Şafak Kılıçtepe provided support in revising, editing, and formatting the manuscript (contribution: 20%).

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