DIGITALIZATION – ESSENTIAL FACTOR FOR INCREASING THE PERFORMANCE IN THE HEALTH FIELD

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Abstract: The health system is made up of a set of independent components (but specialized and profiled) that are interdependent and allow ensuring the health of the individual, in families, groups and the community. In this regard, entities with attributions in the field of health are those that fulfill a mission that means more than diagnosing and curing diseases, they are those entities that must orientate their objectives to ensure everyone and everywhere a perfect state of health, a state of physical, mental and social well-being. Since the benefits of digitization are unanimously recognized in the sense of improving processes, increasing efficiency and effectiveness, reducing costs and digital transformation has progressed rapidly in the recent period, increasing the overall efficiency of the health sector can be achieved through the use of digital solutions. Without pretending to be an exhaustive approach, through this article we will highlight some coordinates of the digitization of the health system, taking into account the studies and research from the specialized literature, which presents the success factors, opportunities, challenges and risks.

Keywords: digitalization; health system; performance; digital transformation; increasing health status

1. Introduction

On the scale of social values, which define the standard of living and the quality of life, for any human community, health has become a first-rate issue. For this reason, in the definition of human health, the equality that is sometimes placed between health and the absence of disease must be abandoned and considerations must be made regarding functional well-being, the body's ability to adapt to the varied conditions of life and work, the human condition that makes a creative individual. Thus, health cannot be oriented only towards the individual, as a strict attribute of him, but must be seen as a fundamental value, both for the individual and for society, constituting the main premise for fulfilling social roles and becoming an indispensable resource for the development of society as a whole (Druguș, 2003).

Considering the criteria used to define health, the following are identified:

- The existence of interdependence between individual health, the health of human groups and public health (Enăchescu and Marcu, 1994), giving health the status of goal and means of individual and social human existence.
- The parameters of the health status (Nica, 2006) must be analyzed from: a biological perspective (relieving the biophysical condition of the organism for normal functioning); psychological perspective (with reference to mental well-being, respectively the optimal capacity of mental functions and the adaptation of the individual to the environment); social perspective (as an effect of the economic, social and cultural development of the country of which the individual belongs).
- The health status factors are numerous, with different influences and variations, which depend on the level of economic, social and cultural development; the level of development of science and technology; advances in medicine; geographical area; gender and

age; residential environment. Although these factors can be grouped according to different criteria (biological, demographic, sanitary, ecological, social, economic, cultural), their influence must be approached globally and inter-relationally, because their action is not isolated but in a permanent interdependence.

- Choosing the right type of strategy (Petrescu and Muscalu, 2003) in the field of health requires taking into account endogenous determinants (public and managerial experience, institutional size and complexity) and exogenous determinants (labor demand and supply, informational-scientific flows, technological flows), from the perspective of the relationship that the institution with attributions in the field of health has with the external environment.

The effort made by each nation to improve health performance must take into account the main strategic areas of intervention (public health, health services, components of the health system), with the clear identification of general objectives, specific objectives, directions of action and measures to be taken. In this context, for the improvement of performance in the health field, a particularly important role belongs to digitization, its advantages being unanimously recognized in various fields of activity, such as:

- If initially, the introduction of digital technologies was considered a way to increase the efficiency of models/processes (by reducing costs, increasing the quality of products/services, increasing comfort, reducing the time to solve problems), at the current stage, digital technologies have a particular impact on competitive results (Lee and Falahat, 2019).
- Reduced access to digital infrastructure causes a widening gap between developed countries and developing countries, with impact on income, productivity, infrastructure, competition and global competitiveness (Fann, Hsu and Lo, 2023).
- Digital transformation causes changes at the level of process, organization, field of activity and structure, contributing to the adoption of new tools, streamlining processes, offering new services, eliminating unsustainable practices, changing value roles, organizational efficiency, effectiveness in developing strategies and decision-making (Parviainen, Tihinen, Kääriäinen and Teppola, 2017).
- Each organization must take into account the fact that digitization facilitates the acquisition of knowledge and improves business relations, and the increase of digital capacity, through the application of digital technologies, will contribute to the creation of added value, with an impact on internationalization (Lee, Falahat and Sia , 2019).

Those specified above are arguments for the digitization process in the health field, being an essential factor in the current stage for improvement and performance, recognized by international bodies, such as the World Health Organization (WHO) and the European Commission.

Digital health is part of the strategic vision of the World Health Organization (WHO). As early as 2005, WHO recommended to member states consider digital health as an integral part of health priorities, considering its benefits for patients, professionals, health care providers and the medical industry, the objective being "Health for everyone and everywhere!". In this framework, the multiple changes in the world's medical systems, as well as the effects of the SARS-CoV-2 pandemic on these systems led WHO to develop a Global Strategy for Digital Health for the period 2020-2025, having as keywords: consolidation, accessibility, sustainability, development, improvement, transparency, interoperability, security, privacy, equity, trust and well-being (WHO, 2021). With a view to an appropriate and sustainable adoption of digital technologies in health, the guiding principles of this strategy aim to: (i) analysis at the level of each state of the national context, national health policies, objectives, needs and resources in order to recognize and institutionalize digital health; (ii) the development and integration of digital technologies in the context of the national health sector

and health strategies; (iii) proper promotion of digital technologies, how to use/properly manage them, so as to ensure efficiency, effectiveness, equity, trust and sustainability; (iv) the analysis at the level of each state of all the resources necessary for the implementation of digital technologies in health (financial resources, human resources, material resources – infrastructure, informational resources – education, human capacity). The short, medium and long-term directions of action through the four strategic objectives of the Global Strategy for Digital Health aim to, on the one hand, the creation of increasingly adequate, sustainable, cost-effective and efficient health systems and services, and on the other hand increasing health and well-being.

Among the political priorities of the European Commission for the period 2019-2024, the digitization of the health and healthcare sectors occupies a very important place. Thus, the measures that the Commission intends to adopt regarding the digital transformation of health and assistance services through the 2018 Communication (European Commission, 2018) cover three areas, respectively: access and sharing of medical data; facilitating medical research by connecting medical data; strengthening medical services for citizens in managing their own health.

2. Study of the specialized literature

The interest in digitization and its impact on the health field is visible through the large number of studies and research found in the specialized literature. Thus, based on searches in the Web of Science database (as of 16.11.2023), the following resulted:

- a number of 57,617 scientific publications were identified, of which 80% address „digital health" aspects, 17% follow aspects regarding „e-health" and 3% refer to „health digitalization";
- by using 2 filters (scientific field and type of document), from the total of 57,617 publications, the following were identified: 1,242 articles with „digital health" topic; 194 articles with „e-health" topic; 79 articles with „health digitalization" topic;
- in 832,565 scientific publications aspects of performance and health improvement are addressed, of which in 17,091 articles (64%) aspects of health improvement are found;

As can be seen from Fig. no. 1, most of the studies and research for digitization in health are published in the last 10 years, with a substantial increase after 2019. Most articles are published in the year 2022 (respectively 297 articles), the Covid-19 pandemic having a significant impact on digitization in health.

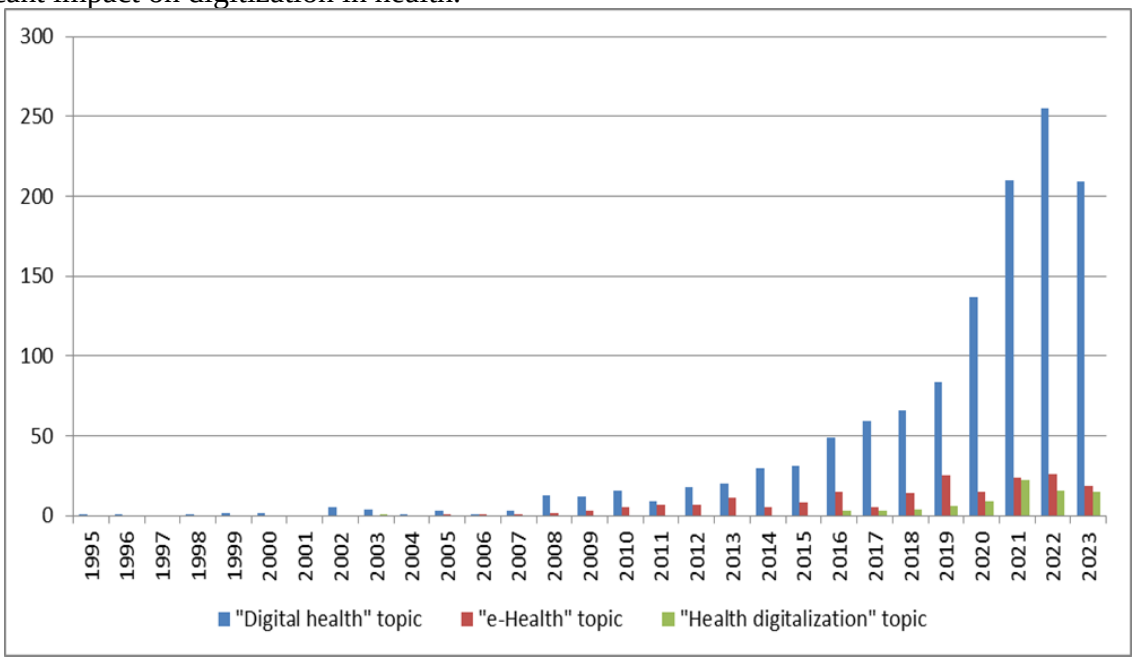

Fig. no. 1 Evolution of the number of scientific articles in the field of digitization and health, published in the period 1995-2023 in Web of Science

Source: Web of Science (WoS, 2023)

Taking into account the areas of interest, the issue of digitization in the health field is found both in publications specific to this field and in related fields, as shown in the table no. 1.

Tab. no. 1 Number of scientific articles in the field of digitization and health, published in the period 1995-2023 in Web of Science, by area of interest

Web of Science Categories	***Number of articles with topic:***		
	„Digital health"	***„e-Health"***	***„Health digitalization"***
Health Care Sciences Services	188	35	13
Public Environmental Occupational Health	159	18	14
Medical Informatics	154	27	11
Environmental Sciences	100		10
Engineering Electrical Electronic	66	26	-
Computer Science Information Systems	63	29	-
Multidisciplinary Sciences	53	-	-
Other categories	459	59	31
Total articles	***1,242***	***194***	***79***

Source: Web of Science (WoS, 2023)

The relevance of publications in the field of digitization in health results both from the number of citations (the 1,242 articles with the topic "Digital health" recorded a total of 18,251 citations; the 194 articles with the topic "e-Health" were cited 3,537 times; a number of 683 citations are for the 79 articles with "Health digitalization" topic), as well as the surprising benefits for patients, doctors and the entire health system, offering solutions for improving access to medical services, improving the quality of medical services and increasing efficiency in the health system. A top of the articles published in Web of Science, by relevance, is shown in table no. 2., where citations are recorded, even to the most recent articles published.

Tab. no. 2 Scientific articles in the field of digitization and health, published in the period 1995-2023 in Web of Science, by relevance

Authors	***Article title***	***Source and publication year***	***Number of citations in international databases***
Wienert J. , Jahnel T., Maass L.	*What are Digital Public Health Interventions? First Steps Toward a Definition and an Intervention Classification Framework*	Journal of Medical Internet Research, 2023	20

Yang K., Hu Y.K., Qi H.Y.	*Digital Health Literacy: Bibliometric Analysis*	Journal of Medical Internet Research, 2022	23
Beasley B., Reeves N., Riley E.	*Introduction to digital health course*	Journal of Professional Nursing, 2023	
Hafner J., Schönfeld S., Tokgöz P., Choroschun K., Schlubach A., Dockweiler C.	*Digital Health Interventions in Depression Care-A Survey on Acceptance from the Perspective of Patients, Their Relatives and Health Professionals*	Healthcare, 2022	2
Palumbo R., Nicola C., Adinolfi P.	*Addressing health literacy in the digital domain: insights from a literature review*	Kybernetes, 2022	15
Bucci S., Schwannauer M., Berry N.	*The digital revolution and its impact on mental health care*	Psychology and Psychotherapy-Theory Research and Practice, 2019	263
Beuscart R., Chazard E., Duchêne J., Ficheur G., Renard J.M., Rialle V., Souf N.	*E-health*	Medical Informatics, E-Health: Fundamentals and Applications, 2014	11
Duplaga M., Andrychiewicz A., Danda J.	*The Opinions About e-Health Among Nurses Employed in Hospitals Located in an Urban Area in Poland*	CIN-Computers Informatics Nursing, 2013	11
Mandal Y., Jha K., Kumar G., Singh A., Barman D., Menon I.	*Assessing knowledge, attitude, and readiness to use e.health among doctors in a tertiary health care unit in Bhubaneswar city, Odisha - A cross-sectional survey*	Journal of Education and Health Promotion, 2023	
Jiang L.C., Wang Z.Z., Peng T.Q., Zhu J.J.H.	*The divided communities of shared concerns: Mapping the intellectual structure of e-Health research in social science journals*	International Journal of Medical Informatics, 2015	41
Gulliksen J.	*Institutionalizing human-computer interaction for global health*	Global Health Action, 2017	35
Kaihlanen A.M., Laukka E., Nadav J., Narvanen J., Saukkonen P., Koivisto J., Heponiemi T.	*The effects of digitalisation on health and social care work: a qualitative descriptive study of the perceptions of professionals and managers*	BMC Health Services Research, 2023	3
Zeike S., Choi K.E., Lindert L., Pfaff H.	*Managers' Well-Being in the Digital Era: Is it Associated with Perceived Choice Overload*	International Journal of Environmental	71

	and Pressure from Digitalization? An Exploratory Study	Research nd Public Health, 2019	
Rahmanov F., Salahov R., Hashimova A.	*Management of digitisation processes in the field of social services*	Marketing and Management of Innovations, 2023	1

Sursa: Web of Science (WoS, 2023)

Without pretending to be an exhaustive approach, we consider relevant the following aspects found in the specialized literature for the digitization of health:

- By considering public health functions and digital technologies for health, the first definition of digital public health interventions appears in 2022 (Wienert, Jahnel and Maaß, 2022), namely the application of participatory, technology-based methods to properly manage and improve population health.
- Bibliometric analyzes demonstrate the progress of digital health research and the significant potential for improvement of this sector (Yang, Hu and Qi, 2022). Whereas it is generally accepted that digitization fundamentally changes society through the development and use of digital technologies, especially digitization in support of global health must consider both a deep understanding of the entire health system and a user-centered approach to digital technologies. Thus, a series of results with a strong influence on the digitization of healthcare for developing countries are noted (Gulliksen, 2017), such as: digital technologies for preventive healthcare; digital technologies for a more efficient management of resources; digitalization of the medical record; digital technologies for asynchronous remote medical approaches; digital technologies for medicines; digital technologies for remote monitoring; digital resources used in case of trauma and disasters; digital skills for communication and information.
- Medical education in the field of medical assistance must take into account the impact of digital health on the activity carried out, thus it is recommended to organize specialized courses that address: general coordinates of digital health; legal regulations, policy and procedures in digital health; the advantages and disadvantages of using digital health; pragmatic aspects of digital technologies in health (Beasley, Reeves and Riley, 2023).
- The combined use of electronic communications and information technology in the health sector (e-health) has expanded considerably through a diverse range of applications and innovations (telemedicine, telehealth at home), allowing the exploitation of an impressive volume of data in the field of medical assistance (Beuscart at all, 2014), so that the concept of digital health expands from "e-health" to "m-health" (mobile health). In this framework, access, availability, appropriateness, acceptability and applicability become keywords for understanding social scientific research in e-health (Jiang, Wang, Peng and Zhu, 2015).

3. Digitization of the health system in Romania

In support of the implementation of the National Health Strategy 2022-2030, at the level of the Ministry of Investments and European Projects in Romania, for the period 2021-2027, the "Health Program" (a multi-fund program) is running, with a total allocation of 5.88 billion euros, intended to contribute to reducing the structural deficiencies also highlighted by the specific country recommendations from 2019 and 2020 (Ministry of European Investments and Projects in Romania, 2023). As can be seen from Figure no. 2, the digitization of the medical system is a priority within this program, the advantages being beneficial to all participants in the health field.

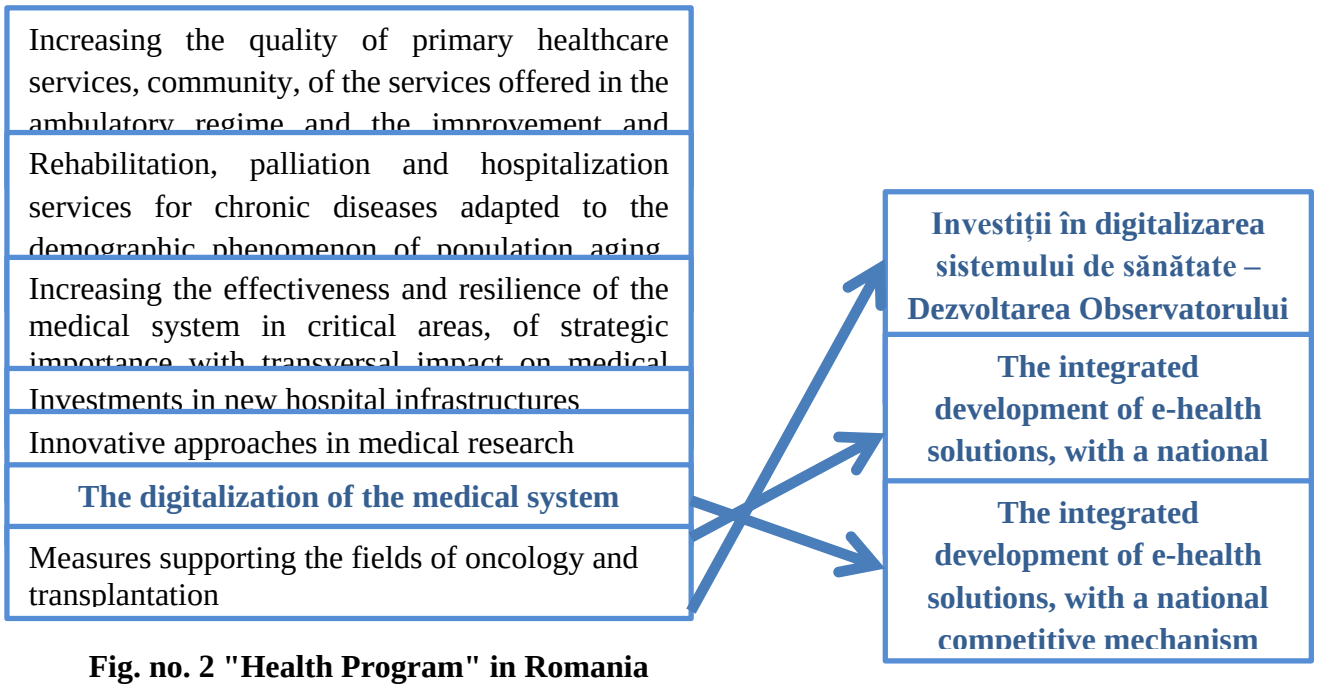

Fig. no. 2 "Health Program" in Romania
(Source: Ministry of European Investments and Projects in Romania)

Through the "National Observatory for Health Data" real data and information will be collected regarding health status, access to health services, quality of health care, efficiency and performance of health services. The integrated development of e-health solutions will allow not only a technical development, but also an attitude and commitment to networked, global thinking to improve health care locally, nationally and internationally through the use of information and communication technology (Eysenbach, 2001). Without listing all the possibilities, e-health software solutions can refer to: the appointment and referral system; automating information flows related to medical letters and home care recommendations; clinical management solutions for the critical patient; electronic storage of patient data and medical results; connection systems to European networks; remote medical services - telemedicine.

The benefits of digitization in health (increasing access to health services, improving medical services, reducing errors, optimizing the management and planning of health resources) are key elements that determined the representatives of the Romanian Ministry of Health to identify the general and specific objectives for the development of the first national strategy for digitization in health. Thus, in collaboration with the World Health Organization Office for Romania, in 2023, August occurred the first meeting of the Technical Working Group, for the elaboration the National Strategy for Digitization in Health and the Action Plan for Romania (Ministry of Health of Romania, 2023).

Based on the above, we can affirm that all the actions undertaken for the digital transformation can strengthen the health system in Romania, helping to ensure that the right information is available to the right person at the right time.

4. Conclusions

A connected system of health and care means that data and information can flow securely and seamlessly between IT systems, care providers and beneficiaries, and the real value of digital technology must come not only from the digitization of existing practices, but also from its use in the complete redesign of some practices.

At the current stage, the digital revolution in healthcare faces many challenges, which is why the difference between digital health and healthcare software must be understood, and

the information provided through The Global Digital Health Monitor (Global Digital Health Monitor, 2023) may constitute directions for action, through identifying success factors, opportunities and risks.

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