THE IMPACT OF DIGITAL TRANSFORMATION ON HEALTH SERVICE MANAGEMENT

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ABSTRACT: *In the context of the Covid-19 pandemic, when health systems in general are under unprecedented pressure, and health services in particular are experiencing increasingly significant changes in the way medical intervention is conducted, we believe that an analysis of new health technologies, their speed of integration and the impact they will have on the management of health services. The present paper is structured in three chapters, as follows: first chapter presents the way in which health services are organized; the second chapter describes digital technologies in the field of health and how they contribute to the digital transformation in the field of health; the third chapter looks at the effects that the digital transformation has on the management of health services. The authors conclude that the sustainability of health services will depend on how open their management will be to the integration of new technologies in the field of healthcare.*

KEY WORDS: *health services, modern technologies, digitalization of healthcare, healthcare management.*

JEL CLASSIFICATIONS: *M120, O320.*

1. ORGANIZATION OF HEALTH SERVICES

The health organization is an entity that delivers health services, diagnostics, surgeries and treatment or recovery of the patient, and can be at the same time a unit of scientific research and university teaching (Roig, et al., 2018).

Health systems have as major goal the regulation of the provision of medical services, disease prevention and control, health workforce management, and increasing the living standards of the population from social, economic and environmental perspectives. Moreover, health systems must ensure equitable distribution and access for all citizens (World Health Organization, 2021).

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There are, however, differences between providing health care for all citizens, such as between the United States and Europe, with European citizens receiving universal health coverage (UHC), unlike US citizens who have a private system. European health services could have the disadvantage of long waiting times for non-emerging services precisely because of this type of universal coverage, on the other hand, US health services provide quick but substantial access. The year 2030 tends to be a milestone in the globalization of the concept of universal health coverage (Rook, 2018, Montagu, 2021).

The Public Health National Center for Innovations (PHNCI) and the De Beaumont Foundation, with the support of the Centers for Disease Control and Prevention, have developed a new form of Essential Public Health Services (EPHS), which offers 10 health services needed for the health of all people in the community (Figure 1).

Source: https://www.cdc.gov/publichealthgateway/publichealthservices/essentialhealth services.html

Figure 1. 10 Essential Public Health Services

Within the European health systems, classified according to the three types, Bismarck, Semashko and Beveridge (Miron, 2020) can be identified 4 types of hospitals, considered to be the largest health services, as follows: mostly private (over 60 % of hospitals are private), in countries such as Belgium, Switzerland, Germany, the Netherlands or Norway; balanced public / private (between 40% and 60% are private) - France, Portugal, Austria, Luxembourg, Italy, Spain; mixed, mostly public (20% -40% private) - Finland, Czech Republic, Hungary, Latvia, Estonia, Poland;

mostly public (less than 20% private) - UK, Lithuania, Denmark, Sweden, Iceland, Slovenia and Ireland. Dental services are mostly private, Finland being an exception with just over 50% of private services. In terms of specialized services, in more than half of the countries they are performed privately. Primary health care is provided in the private sector, Sweden offering, for example, this type of care in public centers (56.2% of the 496 centers). Pharmaceutical services are 85% private (out of a total of 145,143), only hospital pharmacies being public. About three quarters of European citizens are satisfied with national health services (Montagu, 2021).

2. DIGITAL HEALTH TECHNOLOGIES

The healthcare sector has shown extremely reluctance to the global digital revolution compared to the financial or media sectors. The healthcare sector has shown extremely reluctance to the global digital revolution compared to the financial or media sectors. The Covid-19 pandemic has created a special context of digital transformation in the field of health, with new technologies aimed at irreversibly changing the provision of medical services in the coming years (Edelmann, 2019, Rotageek, 2021).

The digital transformation consists in a process of permanent recalibration of the competencies of the organizations, in general, but especially of the business models, operational models and relationship with the clients (www.deloitte.com/ro).

We further list the technologies that have the capacity to make unprecedented changes in the field of healthcare: Artificial Intelligence, Telemedicine / Telehealth, mHealth, Electronic Medical Record, Virtual Reality, Augmented Reality, Trackers, Portable Devices and Sensors for Health, Robots, Nanotechnologies, Genome Sequencing, Medical Tricorder, Revolutionary Drug Development Technologies, 3D Printing, Blockchain, Voice search, Personalized mobile applications, Advanced social networking, Video marketing, Big Data, Internet of Things (Meskó, 2020, Reddy, 2021, Bokolo, 2021, Takyar, 2021).

Artificial Intelligence (AI) is the technology with immeasurable capacity that has the potential to completely reconfirm healthcare. AI algorithms have the ability to extract electronic medical records, to design treatment plans and drugs, with examples in this regard such as Atomwise with Ebola drugs or DeepMind, a Google tool for analyzing breast cancer.

Virtual reality (VR) is an essential technology for future surgeons in performing operations, very effective in managing pain and reducing anxiety (during births, chemotherapy sessions, infusions, etc.), recovery in physical therapy (exercises developed by Neuro Rehab VR), to understand other people's problems (an elderly person with hearing loss).

The Internet of Things (IoT) facilitates effective interactions between physicians and patients, increasing the satisfaction and involvement of the latter. The beneficiaries of IoT are patients, specialists, health care organizations or health insurers.

Augmented reality (AR) puts information in real time, while keeping in touch with reality, making this technology a driving force for the future of medicine.

Healthcare trackers, wearables and sensors offer the user / patient the possibility of continuous monitoring of health status (weight, stress or energy levels, cognitive abilities), with the possibility of sharing the results to their own doctor remotely.

The analysis, capitalization and management of data from different industries have been changed through the use of Big Data. In the medical industry, Big Data can help prevent disease, anticipate outbreaks, improve treatment, reduce healthcare costs, and facilitate the efficient management of health services.
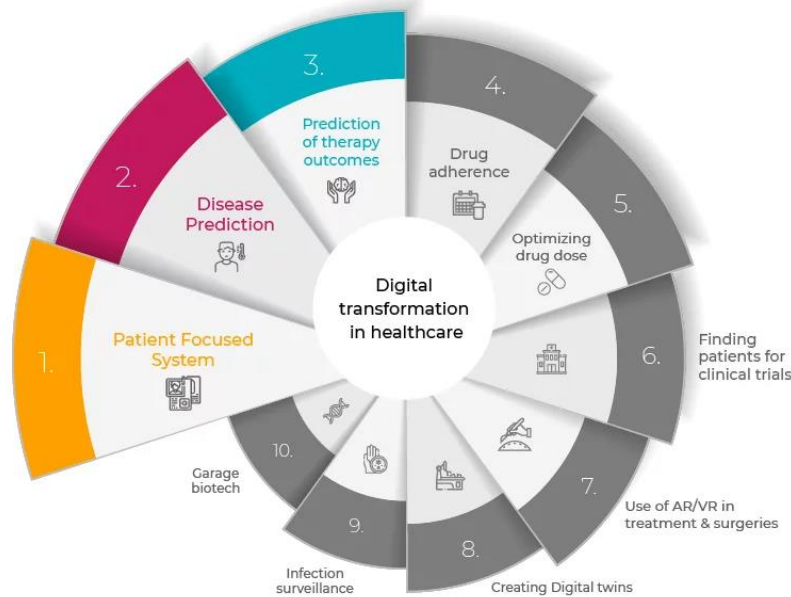
Source: https://www.acuitykp.com/blog/digital-transformation-in-healthcare/

Figure 2. Digital transformation in healthcare

The use of digital technologies listed above for the provision of health services is called the digital transformation into healthcare (Figure 2). It is a long process caused both by the complexity of the health system and by the lack of time of the medical staff (Patale, 2020).

3. HEALTHCARE MANAGEMENT IN THE CONTEXT OF DIGITALIZATION

The digitization of healthcare consists of a process of using digital technologies in order to produce and deliver medical products or services in a whole new way. The digital transformation in health should not be seen only as a technical progress, but one with strong organizational and cultural accents. Managers at various levels of organizations, structures or health systems must be aware and responsible in the implementation of digital technologies, as they produce irreversible effects in terms

of the culture of health care delivery, structures and professions, treatments and results. Procuring these technologies for implementation, from the system level to the small health service, requires technical knowledge from managers with responsibilities in this regard. Exchange of best practices with counterparts who have already taken steps in the insertion of digital technologies is recommended, so being part of an extended network is one of the advantages of digitization. (Ricciardi, et al., 2019).

The implementation of innovative technologies in healthcare involves an allocation of policies, practices, human resources and a functional relationship between top managers and intermediaries (Birken, et al., 2015).

Digital health innovations are addressed to three categories: individual, community and population. To improve their ability to provide medical services, managers must have the following business model (BM) that combines the three categories listed with the BM elements (Figure 3).

BM elements *Health levels*	Offer/value proposition	Resources	Finance/profit formula	Client/process	Examples
Individual	Customized services for individuals with medical expertise, digital devices, mobile technologies and several services/advices	Medical and IT expertise and innovation IT equipment Web platform Communication devices Confidentiality Security of data	Prices adapted to the package of services Volume of sales enabling to cover costs	Patient/person	BewellConnect for patient Ignilife for individual
Community	Customized services for a group with homogenous medical needs with medical, epidemiologic and other health expertise, digital devices, mobile technologies and data management/data mining	Innovation Medical and IT expertise IT equipment Web platform Communication devices Mass storage Confidentiality Security of data Process expertise	Hand-to-hand prices based on the level and intensity of services provided Identification of a purchaser	Companies Prevention bodies Top-level sports organization... Hospitals Health Institution Regional health authority	IMSPro DVSanté
Population	Collective experiences designed to improve health at politic, strategic and operational levels coherently	All society skills and assets relevant to the objective with digital expertise	Long-term investment Co-payment Co-implication Co-responsibility	Collective process of improvement of health outcomes for the population of a territory	HealthPartners IMS Health

Source: Menvielle, et al., 2017

Figure 3. Convergence between connected health, business models and the impact on the population
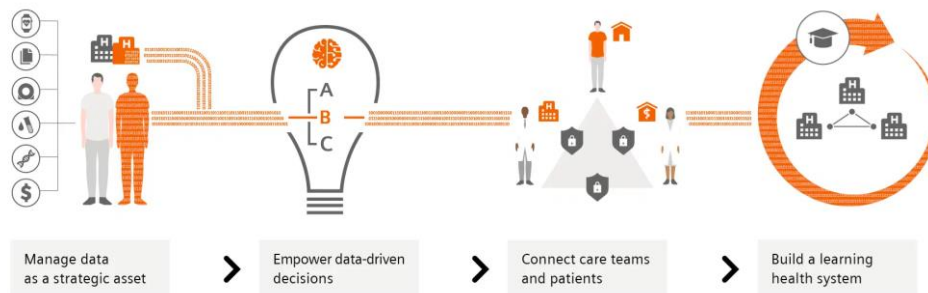
The digital transformation in health implies a special attention for the specialized workforce in the field, the managers considering this aspect essential for the good functioning of the organization. The European Commission supports the construction of its own capacities for each component country in establishing a more coherent forecast and prognosis in terms of the health workforce (Figure 4).
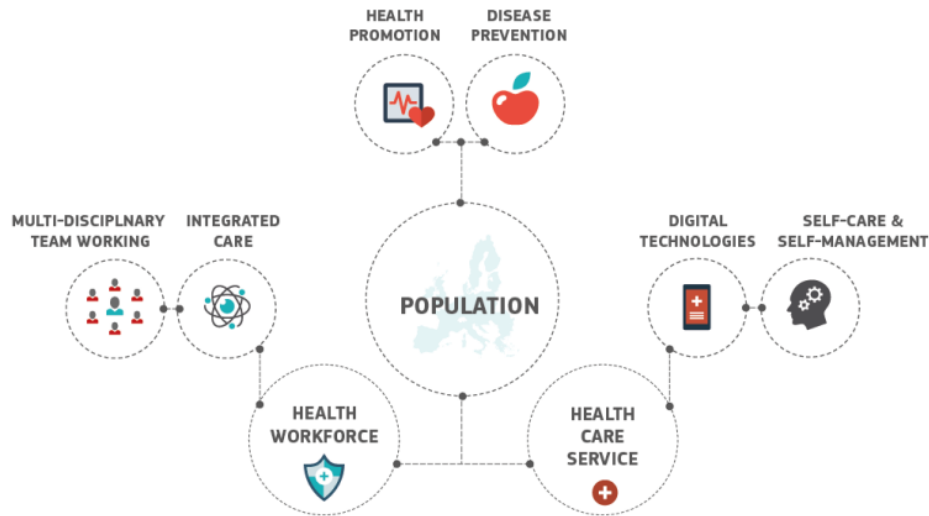
Figure 4. The driving forces influencing future skills and competencies

Structuring the data and increasing the analytical capacity will give the management of health organizations an extremely different perspective on clinical and non-clinical processes, having the opportunity to use innovative technologies, such as Artificial Intelligence, in decision making. A cultural transformation towards a digital mindset, based on technological innovation, will facilitate the development and continuous improvement of the health system (Figure 5).

| Manage data as a strategic asset | Empower data-driven decisions | Connect care teams and patients | Build a learning health system |

Figure 5. The driving forces influencing future skills and competencies

Accenture Digital Health Technology Vision (2021) conducted a study on 399 healthcare professionals from 6 countries, recording the following results:
- 92% of health managers are aware that the level of technology of the organization they lead will determine its ability to generate value;
- 93% of them say they are already innovating in their organization;

- 66% of managers confirm that they will be in the cloud next year, 96% in the next three years;
- 81% say that the digital transformation is happening at an accelerated pace in their organization;
- 73% say that the overall success of their organization will be conditioned by the technological architecture;
- 25% are currently experimenting with digital twins in their organizations;
- 66% of managers say they are optimistic about the increase in investment in digital twins in the next three years;
- 84% are aware that they will have to train people to personalize technological innovations at the individual level;
- 92% are aware of the need for data security and governance;
- 55% of healthcare organizations have acquired digital collaboration and remote monitoring tools during the current pandemic.

4. CONCLUSIONS

The provision of efficient health services with the greatest possible coverage of patients will be conditioned by the adoption of emerging medical technologies in the coming years. Unsustainable healthcare systems have the potential to become sustainable through open management to take advantage of the opportunities offered by digital technology. For the success of digitalization of healthcare, managerial responsibility and technological leadership are essential. The management of the competitive health organization must strategically build its technological infrastructure, to be able to choose efficient technologies.

The digital transformation in healthcare requires managers to be more than leaders of rigid entities, which are waiting for patients and applying interventions in the traditional style. They innovate their own organization to "meet" the patient anywhere, to collaborate in international networks in the interest of the patient and the quality medical act.

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