DIGITAL MEDICAL ECOSYSTEM: TRANSFORMATION AND DEVELOPMENT PROSPECTS

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Abstract. Attention is focused on modern processes of transformation of the online medical services market and the formation of the concept of a digital medical ecosystem as a modern network approach to organizing medical services in a digital space. The need to implement this approach is substantiated, taking into account the active digitalization of medical services and trends in the development of online medicine.

Keywords: transformation of medicine, digital medical technologies, medical ecosystem, network medical infrastructure, trends in the development of online medical services.

I. INTRODUCTION

The concept of a digital medical ecosystem appeared relatively recently and is associated with the manifestation of a number of factors: firstly, the intensive development of the digital economy is actively changing the requirements for personnel training, in particular, it brings to the fore the problem of developing digital competencies and flexible skills, which led to the objective need for transformation traditional healthcare system

The relevance of the topic is due to a number of reasons that are associated with the general digitalization of the economy and the COVID-19 pandemic, which has accelerated the process of digital transformation of the medical field. Determination of the reasons for the transformation of the traditional hierarchical system of medicine, the rapid development of the online medical services market and, as a result, the formation of the concept of a digital medical ecosystem as a modern approach to organizing the medical environment in the context of society's transition to a new technological order, networking of the global medical space and active implementation in the treatment and prevention process of digital technologies is defined by the author as the main goal of this study.

A comparative analysis of trends in the global and Uzbek medical spaces made it possible to identify the main directions for the development of the online medical services market, distinctive features and factors in the formation of a digital medical ecosystem. Based on the analysis of empirical data, a conclusion is made about the accelerated pace of development of the online medical services market, and the predicted value of the growth rate of online medical services over the next few years is calculated. The author's vision of the digital medical ecosystem is formulated as a network infrastructure that forms a single technological medical platform using digital technologies, creates conditions for effective interaction of stakeholders through the provision of personalized medical services based on the interests of patients [1-4].

To train medical personnel for the digital medical ecosystem, it is necessary to integrate the content of education in a medical university, which is based on the requirements of the educational standard for the professional training of a medical worker. Therefore, the emphasis should be placed on integrative subjects that have a high integrity of the content of education and

ensure the transition from a disciplinary model of professional education to a competency-based one. This is due to the fact that the competency-based model of professional education is characterized by a high degree of integrity of integrative theoretical knowledge and practical experience.

II. SOLUTIONS TO THE PROBLEM OF ECOSYSTEMS WITH THE HELP OF ICT

Information and Communication Technologies (ICT) can play a crucial role in addressing the challenges associated with the development of digital medical ecosystems. Here are some potential solutions:

- Data security: One of the most important challenges associated with digital medical ecosystems is ensuring the security of patient data. ICT can be used to develop robust security protocols and data encryption techniques that can protect patient data from cyberattacks and data breaches.

- Interoperability and standardization: To facilitate the sharing of patient data across different platforms and systems, ICT can be used to develop interoperability standards and protocols. This can help to ensure that patient data is accessible to healthcare providers regardless of the platform or system they are using.

- Telemedicine: ICT can be used to develop and implement telemedicine solutions that allow patients to consult with healthcare providers remotely. This can be especially beneficial for patients who live in rural or remote areas, who may have difficulty accessing healthcare services.

- Data analytics: ICT can be used to develop AI and ML algorithms that can analyze large volumes of patient data to identify patterns and trends that can inform clinical decision-making. This can help to improve patient outcomes and reduce healthcare costs.

- Patient engagement: ICT can be used to develop patient engagement solutions, such as mobile apps and patient portals, that can empower patients to take a more active role in their healthcare. This can include features such as appointment scheduling, medication reminders, and access to medical records.

- Education and training: ICT can be used to provide education and training to healthcare providers on the use of digital medical technologies. This can include training in data analytics, telemedicine, and other digital healthcare tools, as well as training in data security and privacy.

- Infrastructure development: ICT can be used to develop the necessary infrastructure to support the digital medical ecosystem, including high-speed internet connectivity and cloud computing solutions.

In order to solve such problems in many countries there have been global changes in priorities in medical education: from structure to process, and in the last decade - to educational results. This was characterized by the active introduction of new learning technologies, such as problem-based, electronic, mixed, team, simulation and others. However, it is necessary not only to use innovative teaching technologies, but to achieve specific measurable results through them, which can be demonstrated by students [5-8].

The digital medical ecosystem has become increasingly important in recent years, especially with the ongoing COVID-19 pandemic. The ecosystem consists of various digital tools and technologies that allow for remote patient monitoring, telemedicine, and other forms of digital healthcare delivery. These technologies have the potential to transform healthcare delivery, improve patient outcomes, and increase efficiency in healthcare systems.

One of the main drivers of the development of the digital medical ecosystem is the increasing availability and accessibility of healthcare data. With the proliferation of electronic health records (EHRs), wearables, and other medical devices, vast amounts of patient data are being generated every day. The use of artificial intelligence (AI) and machine learning (ML) algorithms can help to analyze this data and provide insights that can be used to improve patient outcomes.

Another important aspect of the digital medical ecosystem is telemedicine, which has become increasingly popular during the COVID-19 pandemic. Telemedicine allows patients to consult with healthcare providers remotely, without the need for in-person visits. This can be especially beneficial for patients who live in rural or remote areas, who may have difficulty accessing healthcare services.

The development of digital medical ecosystems also has the potential to improve the efficiency of healthcare systems. By automating routine tasks and streamlining administrative processes, healthcare providers can free up time and resources to focus on patient care.

However, there are also challenges associated with the development of digital medical ecosystems. One of the main challenges is ensuring the security and privacy of patient data. As more patient data is collected and shared across different platforms, there is an increased risk of data breaches and other security threats [9-12].

Another challenge is ensuring that the benefits of digital healthcare technologies are accessible to everyone, including those who may not have access to the necessary technology or who may not be comfortable using digital tools.

In summary, the development of digital medical ecosystems has the potential to transform healthcare delivery, improve patient outcomes, and increase efficiency in healthcare systems. However, it is important to address the challenges associated with these technologies, including data security and accessibility, in order to ensure that everyone can benefit from the digital healthcare revolution.

The low level of training of medical personnel is a consequence of the imperfection of basic and postgraduate education: poor material and technical support of universities, traditional teaching methods with an emphasis on theoretical knowledge, lack of continuity, lack of a differentiated approach at the individual level, the problem of student motivation.

Unfortunately, graduates of medical universities have poor practical skills, theoretical knowledge is mainly of a fundamental nature.

A survey of 620 students on the assessment of their preparation in a higher educational institution showed that in terms of practical skills, only 13% of respondents rated their preparation as good, 42% - as satisfactory, and 45% - as unsatisfactory. Masters' assessment of the quality of practical skills and abilities formed at the university showed the following: 17% considered their quality to be good, 54% to be satisfactory, and 29% to be unsatisfactory.

When observing students in the process of practice, the following are revealed: they do not have the skills to use the algorithm of actions and basic resuscitation techniques, as well as the lack of teamwork skills [13-14].

The problems of preparing future family doctors are associated with many factors in the learning process: the negative reaction of patients to contact with students, the existing risk when performing certain manipulations, the student's lack of preparedness and the insufficient level of interpersonal skills.

Based on the foregoing, today there is a need to create a new modern model -digital medical ecosystem, which will meet the needs of specialists of different levels of training to reduce the number of medical errors, improve the quality of medical care to the population, and this is associated with the manifestation of a number of factors:

- firstly, the intensive development of the digital medical economy is actively changing the requirements for the training of medical personnel, in particular, it brings to the fore the problem of developing digital competencies and flexible skills, which has led to the objective need for transformation in the healthcare sector.

- secondly, the COVID-19 pandemic turned out to be the main reason for the transition to an accelerated form of service, which accelerated the processes of intensive development of digital medical technologies and the formation of a market for online medical services;

- thirdly, the pace of socio-economic changes, which is growing exponentially, justified the expediency of developing a network infrastructure of the medical environment based on an intelligent platform and digital tools for transferring knowledge, the speed of completing tasks, as well as monitoring their development of information and results;

- fourthly, the active development of online medical services has led to an increase in competition between IT companies, medical organizations and other stakeholders, which has led to the personalization of the treatment and prevention process and the creation of multivariate medical tracks.

To address the challenges associated with the development of digital medical ecosystems, it is important to establish a comprehensive regulatory framework that ensures the security and privacy of patient data. This framework should also address issues related to data interoperability and standardization, which can make it easier for healthcare providers to share patient data across different platforms.

Another important aspect of the development of digital medical ecosystems is the need to ensure that healthcare providers are adequately trained to use these technologies. This includes training in data analytics, AI and ML algorithms, as well as telemedicine and other digital healthcare tools. By investing in the training and education of healthcare providers, healthcare systems can ensure that they are equipped to provide the best possible care to patients [9-13].

Finally, it is important to ensure that the benefits of digital healthcare technologies are accessible to everyone, regardless of their socioeconomic status or geographic location. This includes ensuring that patients have access to the necessary technology and infrastructure, as well as providing support for patients who may not be comfortable using digital tools. By ensuring that everyone can benefit from the digital healthcare revolution, we can create a more equitable and inclusive healthcare system.

III.   CONCLUSION

The conducted research makes it possible to formulate a number of conclusions:

- Firstly, there is still no single standardized definition of the concept of "artificial intelligence" in the healthcare sector.

- Secondly, the use of artificial intelligence algorithms in medical practice raises the problem of introducing new rules to enable AI on a global scale.

- Thirdly, the use of AI systems makes it possible to increase the competitiveness of manufactured medical products and medical services.

- Fourth, the widespread involvement of AI solutions in medicine will require complex

and multilateral negotiations.

The obtained results of the work make it possible to confirm the formulated hypothesis about the predominance of positive consequences of the use of artificial intelligence in the framework of the provision of medical services. In particular, AI algorithms make it possible to build reliable scenarios for the further development of events in the provision of medical services.

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