APPLICATION OF TECHNOLOGIES BASED ON ARTIFICIAL INTELLIGENCE IN THE HEALTHCARE SECTOR OF GEORGIA

Giuli Giguashvili  
Doctor of Economics, Professor  
Gori State University, Gori, Georgia

Tamar Makasarashvili  
Doctor of Economics, Professor  
Gori State University, Gori, Georgia

Davit Mamatsashvili  
A second-year student of the One Step Educational Program for MD, Faculty of Medicine  
Tbilisi State Medical University, Tbilisi, Georgia

Summary. Interest in artificial intelligence (AI) is rapidly growing in the modern world, and Georgia is no exception. Artificial intelligence has transformed many fields in recent years, including healthcare. Artificial intelligence has the ability to analyze large amounts of data, make predictions, and provide personalized experiences, making it a powerful tool for medical professionals. The paper examines the impact of artificial intelligence on the medical sector. The study results show that hospitals in many countries around the world are already using AI-supported systems to increase the capabilities of medical staff in the process of diagnosing and treating patients for a wide range of diseases. In addition, artificial intelligence systems have an impact on improving the efficiency of hospital management, reducing medical costs, and more. Considering the risks associated with the use of artificial intelligence in the healthcare sector, it is necessary to plan it effectively and develop an appropriate strategy to maximize the benefits.

Keywords: artificial intelligence, healthcare industry, healthcare economics.

Introduction. Artificial intelligence (AI), in order to increase productivity improve work processes and final results, is actively used in many fields: economy, finance, business, law, education sectors, e-government processes, and others [1]. During the Covid-19 pandemic, special attention was paid to its use in medicine. The AI implementation in this sector can bring various benefits to patients, doctors and workers in the field.

Aim of research. The paper aims to study the features of artificial intelligence use in medicine, determine the possibilities of its improvement, and evaluate the clinical, economic, social, organizational, and ethical impact of the artificial intelligence introduction in the healthcare sector.

Methodology. The scientific article research methodology consists of
familiarization with the scientific works, studies, and Georgian and foreign researchers strategies on the research topic, analyzing the data, and drawing conclusions based on it.

**Literature review.** Artificial intelligence has been involved in medicine since the 1950s when the first attempts by doctors to use computer programs to improve diagnosis were recorded. Interest in medical AI applications has particularly increased in recent years due to the increased computing power of modern computers and the ability to collect and use large amounts of digital data [2].

Notably, by 2020, ninety-five percent (95%) of hospitals and healthcare centers in the US are already using artificial intelligence (AI), and in China, there is a robot called Xiaoyi that consults in primary care with an 85% success rate. Studies show that there is still a prevailing opinion in society that the results of observations and diagnoses made by doctors and medical personnel in emergencies are more reliable for the patient than the conclusions made by the computer. However, it is recognized that AI can significantly ease the workload of healthcare workers, especially during pandemics [3].

Organizations operating in the medical sector store large amounts of human health records, clinical trial results, and other types of data. By means of technologies based on artificial intelligence, these data can be sorted, compared with each other, analyzed much faster and qualitatively and consequently, more accurate intelligent decisions can be made [4].

Various researchers confirm that artificial intelligence use (AI) can revolutionize the healthcare system, which will lead to increased efficiency by automating routine tasks and reducing health-related costs, expanding access to healthcare delivery, and more accurately calculating patient needs [5]. However, there are ethical, social and legal challenges that arise from implementing AI in the healthcare sector.

Another significant challenge is that the introduction of AI health technologies into the health system often occurs within a relatively short period of time after their development (for example, the treatment guidelines and vaccines of the COVID-19 pandemic). In order to avoid the risks caused by the unregulated development of artificial intelligence, it is necessary to develop guidelines. It is worth noting that the High-Level Expert Group on Artificial Intelligence created by the European Commission launched the report Ethical Guidelines for trustworthy Artificial Intelligence in 2019. The report aims to promote reflection and discussion on the ethics of artificial intelligence technologies beyond the countries of the European Union (EU) [6].

Unfortunately, little is known about the capabilities of artificial intelligence for a particular part of the medical community. Further work is needed to integrate artificial intelligence teaching into university curricula in the near future [7].

It is significant to evaluate the impact of artificial intelligence in the context of healthcare costs, in particular, in the process of diagnosis and treatment. A number of studies have shown that using AI tools in diagnosis and treatment can result in great cost savings. The positive economic effect is critical while determining whether to invest in an AI solution in healthcare business [8].

**Discussion and Results.** The main purpose of using artificial intelligence in medicine is primarily to support medical personnel. The developed algorithms
support doctors in their daily activities - from filling out the documentation to the initial diagnosis, then continuous monitoring and implementation of appropriate treatment as soon as possible. AI is not about replacing doctors but helping them have as much time as possible to care for the patient. The cooperation between digital technologies and people, such as doctors and patients, is a remarkably significant step in the development of medicine [9].

Today, 60% of the world’s leading medical centers are actively using chatbots and virtual health assistants. Through chatbots, users can get relevant answers on various health-related topics, including payment processes, illness and symptoms. Virtual health assistants successfully manage the process of managing the patient’s medical information, covering sensitive data, scheduling appointments with doctors, sending them reminders, etc. [10]. Individual AI applications are actively used by healthcare providers. However, as AI and related technologies continue to advance, providers are constantly challenged to offer new forms of service to patients. Effective applications of artificial intelligence require adequate planning and new strategies development to maximize the benefits new technologies have to offer.

In various countries, many people are already using wearable devices to collect daily data, including measuring heart rate, blood pressure, etc. With the help of this AI data, people at risk of certain diseases can avoid disease exacerbation, which can lead to additional costs. AI-powered smartphone apps capture significant details of a patient’s profile that can help them manage chronic diseases. That has a direct impact on the health economy.

The use of AI-based technologies in healthcare has a number of benefits. Among them, we can single out the three most significant ones:

- Providing a customer-oriented experience (providing the necessary information to staff and patients in a complete and optimal time);
- Improving the efficiency of operations (by learning patterns, AI-based technologies help healthcare organizations use their accumulated data, assets and resources in the most useful way. That, in itself, increases the efficiency of various types of operational processes);
- Connecting disparate data (data available in the healthcare sector is often fragmented and stored in different formats. With the help of artificial intelligence, organizations can connect disparate data and, therefore, see a broader, unified picture) [10].

Finding the best and latest treatment methods for each patient requires a lot of resources from doctors. Using artificial intelligence-based technologies, healthcare professionals can simplify the process of extracting relevant information from the latest biomedical data and electronic health records. In addition, by means of artificial intelligence, it is possible to select millions of chemical compounds, select the most useful components for a specific case, and select the correct dose of medicine. With the help of artificial intelligence, it is possible to make an accurate diagnosis and detect potentially fatal diseases at an early stage. In the direction of diagnosis, the use of artificial intelligence while analyzing medical images is also noted. For example, a typical clinical trial may accumulate thousands of data images that must be analyzed one by one. And AI makes it easier to decipher them and detect certain patterns. In addition, such technologies are also used in everyday
processes in the medical field - even when analyzing the results of computer or magnetic resonance imaging and making a diagnosis.

The issue of artificial intelligence introduction and the use of its capabilities in Georgia became especially active during the pandemic. COVID-19 has created many challenges for artificial intelligence (AI) specialists. Among these challenges are: Can AI help predict the spread of infection and diagnosis? How can it be used in treatment and vaccine research? How can it be used for social control?

A number of studies have been conducted around the world to answer those questions. Various initiatives have been implemented to collect, share data and create new AI models. Georgia is actively involved in the process of using artificial intelligence in the healthcare sector. It is planned to create a national strategy. We already have impressive startups and state-government initiatives that show quite good results for our country [11].

In 2018, the Georgian University of Business and Technology created DigitalMed - the first Georgian artificial intelligence-based system for the medical sector, which speaks the Georgian language and has the ability to process and analyze the received information and thus, make an initial diagnosis, advise the patient to visit the appropriate doctor. The product, created with specially developed unique algorithms, is entirely different and replaces diagnostic and doctor consultation procedures with new approaches [12].

Since 2020, artificial intelligence has been actively used in the Caucasian Medicine Center. According to Levan Danelia, Head of the IT Department at Evex Hospitals, artificial intelligence is a novelty in technological medicine and creates significant opportunities in the radiology field.

"Artificial intelligence has great potential and can be used in many ways. In our chain, during the first stage, two artificial intelligence algorithms were introduced in the fields of intracranial hemorrhage (hemorrhage in the brain) and pneumothorax (accumulation of air in the pleural cavity). In December, the COVID-19 algorithm was launched, which monitors the lungs of infected individuals and does not require patient involvement. An algorithm (Bone Health) was also introduced, which determines the calcium level in the bone and give the necessary recommendations. We plan to work towards this direction and make maximum use of the possibilities of artificial intelligence," said Levan Danelia.

The vast majority of algorithms planned in the chain are approved by the US Food and Drug Administration (FDA). Artificial Intelligence Service successfully functions in leading medical service providers such as Israel, the USA, India, the UK, European countries, Sweden, etc. [13]

A number of artificial intelligence technologies are used in the health sector of Georgia, for instance, skin examination applications, vocal biomarkers, smart stethoscopes, AI-based ultrasounds, sepsis detection programs, cough/breath pattern analysis, etc. [14]

**Conclusion.** Thus, the bibliographic analysis of the research topic revealed that AI is constantly evolving and will have an even more distinguished impact on the healthcare sector in the future. New technologies such as Generative Adversarial Networks (GANs) and deep learning are increasingly being developed, which will facilitate the emergence of even more advanced and sophisticated forms of AI. The
The future of AI in medicine looks promising, as it can bring about radical changes in the relationship between patients and medical institutions and help improve medical care.

References: