Legal Cooperation of Kazakhstan with the BRICS Countries on the Production and Operation of Medical Electric Vehicles with Artificial Intelligence Technologies

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Abstract. This scientific article is devoted to the study and analysis of legal relations between the Republic of Kazakhstan and the BRICS countries in the field of the production and operation of medical electric vehicles with artificial intelligence technologies. Particular attention is paid to legislative measures that promote the formation and development of a new industrial sector, such as the production of medical electric vehicles with artificial intelligence technologies. The research uses a number of methods, including studying empirical data, comparative legal analysis, synthesis, generalization, and scientific forecasting. The article proposes legislative measures to solve the problems facing the medical electrical machine-building industry and the unmanned medical electric vehicle industry, as well as the difficulties of integrating automation and digitalization into the production process of transportation plants in Kazakhstan and the BRICS countries. In the order of forecasting, the authors propose the adoption of several laws that are relevant to the issue under consideration. These proposals include the signing of new international cooperation agreements between Kazakhstan and the BRICS countries aimed at the introduction of digitalization at machine-building plants in Kazakhstan for the production of medical electric vehicles equipped with artificial intelligence technologies.

Keywords: international legal cooperation; digitalization; medical electric vehicles; artificial intelligence; electric buses-polyclinics; BRICS.

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Introduction

On the agenda of the BRICS international association and of each of its individual member states (Brazil, Russia, India, China, and South Africa), there are questions about the need to create a digital economy, digitalize medicine, and introduce artificial intelligence technologies into the field of medicine. In these areas, the BRICS member countries and the association as a whole have achieved considerable world-class results. A number of countries would like to enter into a cooperative relationship with this international organization and with each of its members to achieve similar levels of success in the new digitalized economy, particularly in the creation of "smart products" for medical purposes and medical vehicles produced at the factories of these nations' transport, medical, and technological industries. And the Republic of Kazakhstan is no exception to this ambition. The origins of the BRICS countries' successes are rooted not only in the development and improvement of their machine-building and industrial plants but also in other industries. Scientific, digital, and intellectual technologies have become key incentives for the development of these industries. According to Russian scientists, "intelligent technologies create the conditions for the transition to the digital production of the future,"[1] including the

[1] *Доржиева В.В.* Национальные приоритеты развития промышленного искусственного интеллекта в условиях новых технологических вызовов // Вопросы инновационной экономики. 2022. Т. 12. № 1.

production of medical vehicles and a variety of medical equipment installed in them. Suffice it to say, every fifth scientific article published in the world is of Chinese origin. Therefore, it is no coincidence that China (a BRICS member) is today the world leader in the field of digital technologies and artificial intelligence technologies in various fields of human activities[2] including the medical field. Furthermore, the legislative field of another BRICS member country, Russia, is currently working on formulating the norms of digital medical law, which "is assigned the role of a regulator of relations using artificial intelligence systems."[3]

Artificial intelligence is quite compatible with both transportation and medical machine-building if it is systematically implemented to solve the problems associated with both of these two types of machine-building, taking into account the specifics of the production of both specialized medical electric machines and medical equipment installed in them. Artificial intelligence has the capability to cope not only with the implementation of local but also complex tasks for the management of nearly all technological processes in factories, including those of the transport and medical industries.

The issues of digital technologies, specifically artificial intelligence technologies in the field of medicine on vehicles and stationary institutions are currently being studied by scientists and experts from various countries. These researchers include F. de Carvalho[4] (Brazil); O.E. Karpov, A.E. Khramov[5] (Russia); W. Warakamol, C. Vijay;[6] K.S. Kumar, N. Suganti, S. Mupidi, V.S. Kumar[7] (India); Y. Aixi, B. Xianghong, Y. Jiaxiang[8]

C. 111–121 [Valentina V. Dorzhieva, *National Priorities for the Development of Industrial Artificial Intelligence in the Face of New Technological Challenges*, 12(1) Issues of Innovative Econ. 111 (2022)].

[2] In 2020, China spent $14.3 billion on the introduction of artificial intelligence, and Russia spent $40 million. *See* Искусственный интеллект в России. Состояние отрасли и прогнозы // Skillbox. 2021. 14 июл. [*Artificial Intelligence in Russia: Industry Status Forecasts*, Skillbox, 14 July 2021] (Jan. 15, 2024), available at https://skillbox.ru/media/business/iskusstvennyy-intellekt-v-rossii.

[3] *Записная Т.В.* О формировании цифрового медицинского права // Медицинское право. 2022. № 1. С. 34–38 [T.V. Zapisnaya, *On the Formation of Digital Medical Law*, 1 Med. L. 34 (2022)].

[4] Fernanda de Carvalho, *Manual de Inteligência Artificial no Direito Brasileiro* [*Manual of Artificial Intelligence in Brazilian Law*] (2022).

[5] *Карпов О.Э., Храмов А.Е.* Информационные технологии, вычислительные системы и искусственный интеллект в медицине [Oleg E. Karpov & Alexander E. Khramov, *Information Technologies, Computing Systems and Artificial Intelligence in Medicine*] 480 (2022).

[6] Worakamol Wisetsri & C. Vijai, *Rise of Artificial Intelligence in Healthcare Startups in India*, 14(1) Advances in Mgmt. 48 (2021).

[7] K. Suresh Kumar et al., *FSPBO-DQN: SeGAN Based Segmentation and Fractional Student Psychology Optimization Enabled Deep Q Network for Skin Cancer Detection in IoT Applications*, 129 Artificial Intelligence in Med. (Article 102299) (2022).

[8] 杨爱喜，卜向红，严家祥. 人工智能时代：未来已来 // 人民交通出版社. 2018. 285 页 [Aixi Yang et al., *The Era of Artificial Intelligence: The Future Is Already Here*] 285 (2018).

(China); N. Mandela, D. Kaplan[9] (South Africa); J.U. Tlembaeva;[10] M. Kebisbayeva;[11] and G. Vologda[12] (Republic of Kazakhstan).

1. The Digital Policies of the BRICS Countries and the Cooperation Between Kazakhstan and BRICS on the Digitalized Functioning of Medical Electric Vehicles with Artificial Intelligence (AI)

Before talking about digitalization, it is important to note that Brazil, India, China, Russia, and the Republic of South Africa have the potential to achieve economic dominance on a global scale by the year 2050. Currently, these states cover more than a quarter of the earth's land and account for at least 40 percent of the world's population. Furthermore, the combined gross domestic product (GDP) of these countries has topped $20 trillion. These countries have created an important international organization known by the acronym BRICS, which stands for Brazil, Russia, India, China, and South Africa. Established on 16 June 2009, this organization is designed to ensure cooperation in thirty thematic areas between the BRICS member states, including health, education, science, and various technologies.[13] If we consider the BRICS association in terms of the scale of the national economic systems of its member countries, it can be argued that this association is one of the most significant on the planet. Suffice it to note that 27 percent of the world's GDP is accounted for by these five member states of this organization. In the coming years, the dynamics of economic growth in all BRICS countries are expected to increase rapidly. This can already be seen in the example of China, which is undergoing tremendous development in terms of both its economic and political relations.

The Republic of Kazakhstan is a neighboring state of the Russian Federation, a member of the BRICS association (the length of the common state border is more than 7,598 kilometers), and shares a small border with the People's Republic of China, also a member of the BRICS union (the total length of the state border with

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[9] Nelson Mandela & David Kaplan, 3 *Building a New South Africa*: *A Report* 109 (2014).

[10] *Тлембаева Ж.У.* О некоторых подходах к правовому регулированию искусственного интеллекта // Вестник Института законодательства и правовой информации Республики Казахстан. 2021. № 2(65). С. 61–74 [Zhanna U. Tlembaeva, *On Some Approaches to the Legal Regulation of Artificial Intelligence*, 2(65) Bulletin of the Institute of Legislation and Legal Information of the Republic of Kazakhstan 61 (2021)].

[11] *Кебисбаева М.* Алматы презентованы два медицинских проекта с искусственным интеллектом // Kazakhstan Today. 2021. 5 фев. [M. Kebisbayeva *Two Medical Projects with Artificial Intelligence Were Presented in Almaty*, Kazakhstan Today, 5 February 2021].

[12] *Вологодская Г.* Медбрат на колесах // Казахстанская правда. 2022. 27 янв. С. 5 [G. Vologodskaya, *Nurse on Wheels*, Kazakhstanskaya Pravda, 27 January 2022, p. 5].

[13] *Шубин В.Г.* ЮАР в БРИКС: последняя по очереди, но не по важности // Вестник международных организаций. 2015. Т. 10. № 2. С. 238 [Vladimir G. Shubin, *South Africa in the BRICS: Last in Line, but Not in Importance*, 10(2) Int'l Org. J. 229, 238 (2015)].

Kazakhstan is more than 1,782 kilometers), which in turn is a neighbor of India, yet another member of the BRICS association. Even though Brazil and the Republic of South Africa are located far from Kazakhstan on different continents (respectively in Latin America and Africa), the Republic of Kazakhstan maintains diplomatic relations and economic ties with them. That is why we have chosen to include "Kazakhstan" in the title of our article, alluding to it as a counterparty state under agreements with the BRICS member states.

Thanks to their economic successes, almost all the BRICS member states are switching to digital technologies, which they are implementing in all spheres of life, including economic sectors, industries, and medicine. BRICS as an association has implemented its own digital platform, which began to function under an international legal document called the Framework Agreement on Partnership in the Digital Economy, adopted on 24 June 2022, at the 14th meeting of the leaders of the BRICS countries. Each BRICS state has its own achievements in digitalization, including in the field of medicine. We are particularly interested in the challenges associated with the production of medical vehicles that are equipped with specialized medical equipment and other medical products with artificial intelligence technologies. "Smart" medical products are being developed worldwide by more than two thousand companies, including information technology (IT) corporations. For example, Russian companies are developing organizational and legal aspects of the federal project "Artificial Intelligence" as part of the "National Strategy for the Development of Artificial Intelligence in the Period up to 2030." Each of these countries is actively involved in solving the legal problems associated with the production of specialized ambulances and their equipment with artificial intelligence systems based on digital technologies. Currently, there are no laws specifically addressing artificial intelligence in either the BRICS countries or Kazakhstan. Therefore, it would be desirable for these countries to develop and adopt a law with a title such as 'On the Introduction of Artificial Intelligence Technologies into the Production Process of Industrial Plants and Factories', including in the production process of specialized medical electric machines and medical equipment inside these transport vehicles. The advent of artificial intelligence has made it possible to set up a factory whose processes will be fully automated. It is artificial intelligence that will take over the implementation of all processes, including the purchase of the necessary raw materials and materials for the manufacture of products (in our case, mobile medical devices) and their shipment to customers, i.e. medical institutions. Artificial intelligence will also oversee the maintenance of production equipment, address pricing issues, and ensure the process of fulfilling the production plans of the plant or factory.

Engineers, digital technology specialists, craftsmen, and factory workers from these countries, together with lawyers, through organizational and legal norms, are introducing big data, augmented reality, 3D technologies, and artificial intelligence mechanisms, taking into account the peculiarities of the production of medical vehicles

with their internal medical equipment for laboratory medicine and mobile specialized buses (electric buses) that serve as polyclinics. Additionally, designers, technologists, and lawyers are jointly working to find ways to solve the legal problems of artificial intelligence technologies related to the production and use of air ambulances and medical unmanned aerial vehicles. The production of specialized medical transport vehicles within the framework of the BRICS countries and in Kazakhstan could be facilitated by a law of approximately the same name, for instance, "On the Features of Digitalized Production of Special Vehicles with Appropriate Equipment based on Artificial Intelligence." Such a law would explicitly address the production of mobile medical devices that are capable of operating in various environments.

In addition, under such a law, manufacturers of mobile medical devices, along with manufacturers of other medical equipment and products, will need to adhere to safety standards as well as technical and legal standards for all types of medical devices to ensure compliance with regulatory requirements and the state standards of the respective country. The introduction of artificial intelligence and digital technologies into the production process can be a very expensive endeavor. That is why it would be useful for such a law to prescribe a norm concerning the need for state subsidies for research, development, design, and production of special vehicles and equipment, with a possible provision of benefits for the relevant taxes. According to this law, manufacturers of special vehicles and medical research, laboratory equipment, clinical preparations, chemical reagents, and other equipment will have to guarantee the high quality of their products and certify them in order for state regulatory authorities to be able to release them to domestic and international markets. The BRICS countries and Kazakhstan should bear in mind that the well-known IT giants Apple, Google, and Facebook have become integral participants in the medical industry as well as clinical research. They use cloud storage for the latest technologies, including artificial intelligence. That is why most biomedical companies have already switched to cloud technologies and are actively using big data analysis. The circumstances mentioned above could also become the subject of legal regulation under the proposed law.

The domestic and international legal norms of these countries in the form of bilateral and regional agreements provide considerable support for the digitalized production of intelligent equipment in the transportation of disaster medicine. Through international legal means, the BRICS countries, through international legal cooperation both within their association as well as with other states and subjects of international law outside the BRICS, including the Kazakh state, collaborate in the production of specialized medical transport, as well as the production of robot chips based on artificial intelligence for the purposes of transporting medicines through the patient's body.

Among the top ten countries in the world in terms of artificial intelligence are two BRICS member countries, China and India. In China, more than 1,000 companies

are working in the field of artificial intelligence, which is more than 20 percent of the global volume.[14] India is one of the largest software producers and exporters in the world.[15] For Kazakhstan, the conclusion of bilateral agreements with these two states on the import of artificial intelligence technologies and software applications from China and India, including those installed on medical vehicles, would be a profitable business. In the same agreements, it may also be feasible to include norms on the possibility of Kazakh students receiving access to world-class IT education that is available in India, including in the field of intellectualized transport medicine.

2. Legal Aspects of the Production and Operation of Emergency Electric Vehicles with AI Systems

It is worth noting that Russian researchers from the company "Urban Air Mobility Technology" have successfully managed to develop new technologies for the purpose of providing promising medical transport: one such technology is a drone called "Ambulance with Artificial Intelligence and 5G." In this name, the term "5G" refers to the fastest possible connection, that enables ultra-fast implementation of emergency medical care using appropriate artificial intelligence technology. In instances where there is an urgent need to save human lives and the use of a helicopter is not feasible, the "ambulance drone" can deliver medicines and necessary medical equipment by air at an altitude of about 150 meters. The main difference between artificial intelligence systems and conventional automated algorithms is that artificial intelligence can learn, generalize, and draw conclusions. Moreover, the essence of the artificial intelligence system is that it can be trained on an extensive array of examples, pictures, and detailed descriptions of patients' diseases. It is this property that allows the system to generalize a large number of cases that are similar to one another and acquire a certain functional dependence. This dependence brings together data about the patient and the corresponding diagnosis of the patient's disease.

At the same time, it should be borne in mind that artificial intelligence cannot yet act independently; in other words, while AI, as the fastest performer on a medical team, is able to provide the doctor with its expert opinion, this opinion is not the final, determining opinion for the doctor but only helps reduce the mental and physical burden on doctors by dramatically increasing the speed and accuracy of diagnosing the patient's disease.

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[14] Где создают искусственный интеллект: топ-10 стран мира // Национальная Ассоциация нефтегазового сервиса. 2018. 16 окт. [*Where Is Artificial Intelligence Created: Top 10 Countries of the World*, National Association of Oil and Gas Services, 16 October 2018] (Jan. 15, 2024), available at https://nangs.org/news/it/gde-sozdayut-iskusstvennyy-intellekt-top-10-stran-mira.

[15] Индия – IT-гуру нового века? // Национальная Ассоциация нефтегазового сервиса [*India – IT Guru of the New Century?*, National Association of Oil and Gas Services] (Jan. 15, 2024), available at https://www.cnews.ru/articles/indiya_itguru_novogo_veka.

Today, there are more than 90 medicines and 80 different types of medical devices in a doctor's medical supplies pack. The location of these items must be known by every employee responding to an emergency call in order to be able to start treating a patient in a matter of minutes.

In accordance with Article 38 of the Law of the Russian Federation of 21 November 2011, "On the Basics of Protecting the Health of Citizens of the Russian Federation," medical devices are divided into three subclasses, namely, tools; instruments and apparatuses; and equipment. All of this, in a variety of ways, is placed inside a medical ambulance and an emergency room. "The basic set of equipment of the ambulance crew in general has been significantly updated over the past ten years. It includes spinal shield, autopulse, electrocardiograph, transport monitor, defibrillator, infusion pump and syringe pump, nebulizer, pulse oximeter, glucose meter, ventilators" (artificial lung ventilation), etc.[16] In the same electric ambulance, an autoclave for sterilizing instruments can also be included in an electric bus polyclinic, such as the one made by the Brazilian company "Baumer," a medical image scanner, telemedicine products, a device for medical imaging, a device for digital radiography such as those produced by the companies "Share Capital" and "JuRong Medical Technology" (in China), and an infectious disease detector developed in collaboration by universities in India, Brazil, and South Africa. All of these different types of high-tech medical equipment are supplied to automobile plants in Russia and other BRICS countries by medical industry enterprises that work closely with scientific and information technology institutions. Representatives of medical industry enterprises frequently offer advice to engineers on the optimal placement and repair of suitable devices and medical equipment products that the doctors should readily have at hand, thereby ensuring that their patients receive prompt and competent assistance. Thus, an electric car equipped with all kinds of medical equipment from different BRICS countries has the potential to become a certain benchmark in the international arena. Kazakhstan could have a similarly equipped medical electric vehicle (electric bus), which it could complement with other digitalized and intellectualized types of medical equipment. The legal manifestation of the resolution for this kind of undertaking could come in the form of interstate agreements on this subject.

Since cardiovascular diseases are the most common cause of death in Russia, other BRICS countries, Kazakhstan, and all around the world (as per statistics, sudden cardiac arrest leads to the death of 250,000 people annually in Russia and approximately 26,000 people in Kazakhstan), scientists, designers, and digital technology specialists of medical and transport industry plants have developed artificial intelligence

[16] Искусственный интеллект – новые стандарты: как изменилась работа московской скорой помощи // Вечерняя Москва. 2021. 22 февр. [*Artificial Intelligence – New Standards: How the Work of the Moscow Ambulance Has Changed*, Evening Moscow, 22 February 2021] (Jan. 15, 2024), available at https://vm.ru/moscow/863163-iskusstvennyj-intellekt-i-novye-standarty-kak-izmenilas-rabota-moskovskoj-skoroj-pomoshi.

technologies primarily in this direction. Survival in sudden cardiac arrest is possible with rapid resuscitation. Smart technology methods and algorithms in the ambulance service can further reduce the number of deaths that occur due to late diagnosis of heart attacks.[17] For instance, digital technologies not only reduce the time of arrival of ambulance crews but also enable ambulance doctors to receive a transcript of electrocardiograms via wireless communication channels. This helps to save as much time as possible and begin treatment right away.[18] For example, over the past two years, doctors working for the Moscow ambulance have been able to quickly get the necessary results in the form of 1.5 million electrocardiograms. In this regard, it makes sense to create and operate specialized electric ambulances in the city with all the necessary stationary equipment, in which professional cardiologists would work alongside traditional ambulances. With this approach, the connection between a cardiologist and a patient would become almost instantaneous.

Today, in Russia, resuscitation teams have portable express analyzers, which allow you to conduct a quick blood test on a patient in a critical condition right in the ambulance itself. The Moscow ambulance, for example, was provided with 70 portable ventilators (artificial lung ventilation) of the newest generation, which is especially important considering the new wave of coronavirus. A total of 53 medical teams received capnographs, which are devices that allow for the online monitoring of the levels of carbon dioxide exhaled by the patient. This device greatly assists emergency doctors in establishing a clear and accurate diagnosis and treatment of the patient's condition associated with respiratory disorders.

In India, there are up to ten ambulances per state; in South Africa, the population is served by 5,000 ambulances (plus private medicine and volunteers); and in China, there is only one ambulance per 50,000 people (for a total of 24,000 ambulances). Against this background, Russia stands out positively, with a fleet of 22,000 ambulances and reanimobiles in operation (which translates to one ambulance per 7,000 people). We think it would be desirable for Russia, in order to solve these problems within the BRICS framework, to resort to such an organizational and legal form of interaction as holding an international scientific and practical conference on the topic "Emergency Medical Care in the BRICS Space: Solving Transport, Digital Problems, and Issues of Artificial Intelligence Technologies in the Future." Such a conference would involve the participation of heads of the countries of the BRICS association, ministries of health, industry, and digital development, heads of ambulance stations, as well as representatives of institutions specializing in artificial intelligence technologies and

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[17] Распознать инфаркт поможет искусственный интеллект // Forbes.ru [*Artificial Intelligence Will Help to Recognize a Heart Attack*, Forbes.ru] (Jan. 15, 2024), available at https://www.forbes.ru/partner-article/453723-sans-na-vyzivanie-raspoznat-infarkt-pomozet-iskusstvennyj-intellekt.

[18] Eric S. Ho & Zhaoyi Ding, *Electrocardiogram Analysis of Post-Stroke Elderly People Using a One-Dimensional Convolutional Neural Network Model with Gradient-Weighted Class Activation Mapping*, 130 Artificial Intelligence in Med. (Article 102342) (2022).

digital technologies in the field of rapid medical care in offline and online modes. This experience could prove useful for the doctors of ambulances operating in the settlements of the Republic of Kazakhstan, and it would be advisable for all interested institutions in Kazakhstan to participate in this conference.

Furthermore, at such a conference, experts from the BRICS countries could share their experience on how artificial intelligence can be utilized to produce more accurate diagnostic recommendations that are based on the description of a variety of symptoms, the speech patterns of patients, their breathing rate, and so on. It is highly possible that Kazakh specialists in digital technologies and artificial intelligence in medicine could soon report that they have created a super-accurate device for diagnosing a particular stage of coronavirus by analyzing radiological images. An entire system has been created, which includes computer networks, servers, and software. This system provides storage and appropriate archiving of radiological images in digital format. This system provides storage and corresponding archiving of radiological images in digital format. Evidently, there appears to be a correlation between this system and the viewpoint of the Indian medical law specialist, Professor S. Sivakumar, who writes that in a pandemic, all doctors have an obligation to "prevent, detect," and make a correct diagnosis as early as the initial stages of medical treatment and "take measures to block the spread of contagious viruses."[19] Professor Sivakumar's speech on this topic could arouse interest among the conference participants. Moreover, it may also be possible to discuss the feasibility of manufacturing electric ambulances, cardiological care, and electric buses-polyclinics in the form of amphibious all-terrain vehicles for off-road rural areas and for settlements with many rivers and canals at transport engineering plants. The recommendations of the conference can be used as a basis for relevant regulations, regional and bilateral conventions, and agreements.

Based on the significant capabilities of the BRICS countries to introduce digitalization into the activities of machine-building plants, Kazakhstan could propose the conclusion of an international agreement with the BRICS member states, which may be titled "On Mutual Assistance in the Implementation of Digital Technologies in the Activities of Each Other's Transport and Medical Industry Factories Producing Ambulances with Medical Devices Containing Artificial Intelligence Systems."

3. Introduction of AI into Medical Vehicles for Laboratory Medicine and Electric Buses-Polyclinics

One of the key elements of public health protection is the preventive orientation of medical screenings, the study of the prevalence of socially significant therapeutic

[19] S. Sivakumar, *Legal Measures for Tackling Pandemic in India: Lessons Learned*, in Legal Measures for Tackling Pandemic in Asia: Lessons Learned and the Way Forward 331, 346–47 (2021).

diseases, and the principles of accessibility of medical care, all of which are facilitated by using specialized electric buses-polyclinics or so-called mobile medical complexes in the form of providing fluorography services for the population. In this regard, it is necessary to improve, through digitalization, the productivity of factories that manufacture mobile medical complexes for general admission, laboratories, functional diagnostics, fluorography, and electric buses-polyclinics, since the need for such medical complexes is only growing.

At this stage of the development of digital technologies within the BRICS countries, there are still unresolved problems related to the digital healthcare system. This concerns the content, nature, quality, and integrity of data collected at the national level. The BRICS countries have yet to establish functioning integrated digital health information systems. For example, more than half of public health centers in South Africa continue to use paper filing cabinets, which limits the ability to exchange and analyze data. In Russia, a quarter of medical institutions do not even have functioning medical information systems.[20] Such issues with the filing and storage of information can significantly slow down the process of medical examination based on mobile medical complexes.

In 2019, the Ministry of Health of the Republic of Kazakhstan, as part of the transition to "paperless," the digital medical records systems in healthcare organizations, created an electronic health passport, which replaces the outpatient card. On the mGov mobile application, it is now possible to access a range of government online services, such as the extraction of information related to passport data, attachments to a specific doctor, and records of the medical services provided, all of which can also be effectively employed in mobile medical complexes serving the population.[21] However, it must be kept in mind that "unless medical records are digitized, such data will be excluded from any future development of artificial intelligence."[22] Based on this experience, the Republic of Kazakhstan could assist in the development of a digital electronic filing system platform by means of bilateral agreements with one or more BRICS countries, which could be named as follows: "On Mutual Exchange of

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[20] *The Future of BRICS*, Observer Research Foundation: The Research and Information System for Developing Countries, New-Delhi (2021), at 92 (Jan. 15, 2024), available at https://www.nkibrics.ru/pages/publications.

[21] Электронный паспорт здоровья можно посмотреть на платформах eGov и mGov // Официальный информационный ресурс Премьер-Министра Республики Казахстан [*The electronic health passport can be viewed on the eGov and mGov platforms*, Official Information Resource of the Prime Minister of the Republic of Kazakhstan] (Jan. 15, 2024), available at https://www.primeminister.kz/ru/news/press/elektronnyy-pasport-zdorovya-mozhno-posmotret-na-platformah-egov-i-mgov-e-birtanov.

[22] *Иванова А.П.* Правовые и этические проблемы использования искусственного интеллекта в сфере здравоохранения // Право, цифровые технологии и искусственный интеллект: сборник статей / отв. ред. Е.В. Алферова [A.P. Ivanova, *Legal and Ethical Problems of Using Artificial Intelligence in Healthcare*, in Elena V. Alferova (ed.), Law, Digital Technologies and Artificial Intelligence] 151 (2021) (Jan. 15, 2024), available at https://www.semanticscholar.org/paper/LEGAL-PROBLEMS-OF-THE-USE-OF-ARTIFICIAL-IN-Ivanova/693fa3a15d108934df093448ceb6cd25b09b2ff8.

Experience in Solving the Problems of Developing and Creating Digitalized Systems of Medical Equipment and Equipment Installed on Mobile Medical Complexes."

In Russia, specialists at the Competence Center of the National Technological Initiative based on Lomonosov Moscow State University's "Big Data Storage and Analysis Technologies" have developed a new software based on artificial intelligence. By using a cloud solution and specialized techniques for processing large data arrays derived from the analysis of medical examination pictures, an attending physician can now create a customized treatment plan for a specific patient. The software is based on an algorithm for automated diagnosis of chest diseases (tuberculosis, oncological, and other diseases) using neural networks and 270,000 X-ray images (fluorograms). The proposed software can also be linked to any radiographic department of inpatient medical institutions of all levels as well as mobile telemedicine complexes (MTCs), specifically designed for mass screenings of the population in rural, remote, and hard-to-reach locations. The Republic of Kazakhstan needs to develop this same software based on artificial intelligence, which can be supplied to mobile medical complexes and all electric buses-polyclinics. In this regard, it is possible to develop and adopt bilateral agreements between the ministries of digital development of the BRICS member countries under the title "On Interdepartmental Cooperation in the Development of Software Based on Artificial Intelligence for Transport Medical Complexes."

4. Solutions to the Legal Problems of AI Technologies in the Production and Use of Medical Aircraft for the Provision of Primary Medical Care and Assistance in Disasters

The Brazilian aircraft manufacturing conglomerate Embraer S.A., also known as Empresa Brasileira de Aeronáutica S.A., is renowned for the production of world-famous aircraft and helicopters under the brand name "Embraer." It also produces special-purpose aircraft and helicopters with artificial intelligence systems, including those that are designed for medical purposes. The Chinese company "Changhe" of the Changhe Aircraft Industries Group is known for the serial production of the "Z-8," "Z-8A," and "Z-11" series of helicopters at its plant in Harbin. Of these helicopters, the Z-8 is most often used in the country's air ambulances. The Mi-8/17 helicopter, developed by the Moscow Helicopter Plant named after M.L. Mil, is fitted with medical equipment in the module. Similarly, the 2-engine "Ansat" helicopter, produced by the Kazan Helicopter Plant of Russian Helicopters Holding, is equipped with special medical modules for the transportation of seriously ill newborns. Furthermore, also in Russia, the Yak-40 aircraft, designed by the Yakovlev Design Bureau, has been built with a special margin of safety to ensure successful landings on unpaved airfields. It is powered by three jet engines installed at the factory, as well as equipped with a reversible braking device in place for safety purposes. These aircraft are successfully operated under the supervision of the National Air Ambulance Service of Russia. In addition, "Hindustan Aeronautics

Limited," as India's leading aircraft manufacturer, specializes in the production of aircraft engines, helicopters, and airplanes, as well as various parts and spare parts for aircraft. The "HAL Dhruv" brands of helicopters produced by this company are also used as medical vehicles. In the Republic of South Africa, medical companies use helicopters of the AW119, AW109 Grand, and Netcare 911 brands.

Within the framework of the BRICS association, its member states could combine their efforts to create a cooperation committee on an international legal basis to establish a joint venture for the design and production of such sanitary helicopters and aircraft for use in the field of medicine, in the process of which the technical achievements of all participating countries would be considered. The possible entities involved in this case could be the Brazilian aircraft concern Embraer and the Chinese company Zhanghe, both of which are successfully implementing digital technologies and artificial intelligence technologies into their production processes. By adopting this approach, we could count on the fact that sanitary airplanes and helicopters (particularly electric helicopters) will become world-class medical vehicles.

Drones (copters) are divided into two types, namely drones with gasoline engines and drones with electric motors. Since the topic of our article focuses on the analysis of problems involving electric transportation, we will turn our attention towards the study of problems related to electric drones. The Brazilian aircraft concern Embraer, together with the Israelis, is engaged in the production of the Harpia drone; additionally, the Unmanned Systems group of companies (Finco LLC – Udmurtia, Russian Federation) produces helicopter and airplane type drones called "Supercam"; Indian companies DN Aerospace and Drona Aviation are developing high-quality drones of the type "DIY kit," world leaders in copters; Chinese firms "DJI," "Ehang," and "UDI R/C" produce "smart" drones, namely, "Mavic 2," "Mavic Mini" (DJI), and "Ghostdrone" respectively, which are equipped with sensors that correct human errors; the South African company, "MILKOR" produces copters "MA 18" and "MA 80," while the Kazakh company "SC Tech" specializes in producing electric drones such as the "IRBIS-4.0," which are used to prevent and assess the scale of emergencies and for medical purposes. Designers and technicians of these companies and firms install batteries and electric motors with stators (windings) on the frame of the copter that power several helicopter-type propellers, a built-in video camera operating online, devices for securing the transported cargo (such as medicines, blood for transfusion, as well as other necessary medical instruments, machinery, and equipment), and a copter control panel (device) along with a monitor for the pilot (including dispatcher and operator).

Since drones are a type of air transport, legal regulation is necessary when launching them into the airspace. These norms on the need to comply with the flight schedules, on the prohibition of drone flights over sensitive (secret) objects, on possible licensing, certification, and registration of the devices, and on the legal responsibility for the use of drones for the transportation of drugs, as well as contraband goods in each state, can be included in the country's air code, in the law on aviation activities,

or concentrated in a separate law titled, for instance, "On the status and flight modes of unmanned aerial vehicles." The BRICS countries, both among themselves and with other states outside the group, could conclude regional and bilateral international agreements such as "On Cooperation and Mutual Exchange of Advanced Experience in the Design, Production, and Use of Unmanned Aerial Vehicles." These agreements could serve as a legal framework for the technical, technological, and intellectualized improvement of drones for various purposes, particularly in the health care sectors and medical institutions of the above countries.

Today, in several countries around the world, drones, or so-called unmanned aerial vehicles (UAVs), have begun to be increasingly used. These drones can provide mobile communication in emergency situations and use GPS to navigate to the place where the incident occurs. Medical drones can be equipped with certain life support equipment and medical supplies attached to them in a "medical toolbox." The goal is to provide fast and high-quality primary medical care to the victims within as little time as possible.

Adopting the experience of advanced countries, Kazakhstan should formulate in its legislation its requirements for drones, specifying under what circumstances they can and should be used. For example, in the legislation of Kazakhstan, the use of drones is regulated by the regulatory order of the Acting Minister of Industry and Infrastructure Development of the Republic of Kazakhstan No. 706 dated 31 December 2020, "On Approval of the Rules for the Operation of Unmanned Aerial Vehicles in the Airspace of the Republic of Kazakhstan"; however, in accordance with this order, a drone is not allowed to transport anything. Considering the benefits, it is worth thinking about creating drones in Kazakhstan that are specifically intended for medical purposes. In this scenario, there may already be concerns regarding the issues of regulating the carrying capacity of drones, which could be resolved by the Law of the Republic of Kazakhstan No. 339-IV dated 15 July 2010, "On the Use of the Airspace of the Republic of Kazakhstan and Aviation Activities."

The Emergency Medical Assistance Service of the Republic of Kazakhstan in emergency situations, established by Government Decree No. 1068 of 27 September 1994, is engaged in providing quick assistance to people in the event of disasters in Kazakhstan that are caused by a sudden natural phenomenon or human action that results in a significant number of human casualties and injured people. This service was renamed the Disaster Medicine Center in 1997. There are similar services in the BRICS countries. The legislative norms of the BRICS member states define disaster medicine as a system of scientific and medical knowledge, the practices of which are aimed at saving lives and restoring the health of people caught in major accidents, natural disasters, and epidemics (pandemics), as well as preventing and treating lesions and diseases that have arisen in emergency situations.

The disaster medicine services of these countries under discussion are, in general, limited to the following tasks: the collection, processing, and exchange of health

information with the goal to protect the population and territory in emergency situations; ensuring the readiness of special state bodies, communication systems, and notification institutions for prompt actions to eliminate an emergency situation or its consequences; the immediate provision of health services to the population[23] necessary in conditions of emergency situation; and participating in the conduct of state examinations, supervision, and control in order to ensure the protection of the population and territory in emergency situations of a natural or man-made nature. In each country, there are several hundred or thousands of vehicles in the form of "reanimobiles" (specialized ambulance vehicles), small aircraft, and helicopters, all of which can be used in providing disaster medicine services. These vehicles frequently come equipped with various types of medical equipment that are based on artificial intelligence technologies.

Much of what is related to the activities of the Kazakhstan Center for Disaster Medicine is regulated by the Law of the Republic of Kazakhstan dated 11 April 2014, "On Civil Protection," which addresses issues of emergency situations, fire safety, emergency rescue services, civil defense, and industrial safety at production facilities. Article 24 of this Law refers to the authority of the disaster medicine service, according to which this service is authorized to use aviation for the purpose of carrying out "flights to provide medical assistance to the population and conduct sanitary measures". Based on this article of the Law, as well as Article 1 of the Law of the Republic of Kazakhstan dated 15 July 2010, "On the Use of the Airspace of the Republic of Kazakhstan and Aviation Activities," by the end of 2021, the Republican Center for Disaster Medicine had played a preferential role in the implementation of 2,586 medical aviation departures, the provision of 4,960 medical services and the transportation of 2,615 patients to medical organizations, and the provision of 1915 remote telemedicine services with the involvement of specialized medical specialists, as well as in carrying out a number of other operations and conducting consultations for patients.

Based on the fact that China, India, Russia, South Africa, and Brazil have solid experience in providing medical services, including in the field of primary medical care through ambulance and disaster medicine (China is one of the world leaders in artificial intelligence technologies in many branches of medicine and stages of rendering it as one of the first countries in the world to found the Institute of Telemedicine, Russia has legislative experience in resolving issues of artificial intelligence in medicine, telemedicine, in particular, in the form of a Federal law dated 1 January 2018, the Republic of South Africa has established the Agency for Technological Innovation by Law No. 26 of 2008, thanks to which it has achieved much success in digitalization in the medical field, particularly in providing primary medical care), Kazakhstan could develop and adopt new laws, such as for instance, "On the Management of Artificial Intelligence Systems, On Responsibility and On

[23] Maxine A. Papadakis et al., *Current Medical Diagnosis & Treatment 2023* 5–7 (2022).

Ensuring Confidentiality and Security in these Systems," including in the fields of emergency and disaster medicine, and medicine in general. Additionally, the country could introduce and develop laws related to telemedicine and research, for example, "On the Introduction and Development of Telemedicine" at the primary and subsequent stages of providing medical care to patients and "On the Establishment of a Research Institute at the Republican Center for Disaster Medicine."

In this regard, Kazakhstan, together with certain BRICS states, could initiate the development and conclusion of international agreements between the BRICS countries on a bilateral or regional basis under approximately the following names: "On Cooperation in the Improvement of Specialized Medical Vehicles at Transport Engineering Plants,""On Mutual Assistance in the Design and Creation of Digitalized Diagnostic and Other Types of Medical Equipment and Equipment at Medical Industry Plants and Related Enterprises on Medical and Sanitary Technologies of Artificial Intelligence,""On the Introduction of Digital Technologies, Artificial Intelligence Technologies in the Production Process of Medical Equipment, Equipment for Equipping Transport-Mobile and Stationary Medical Facilities, Departments and Institutions," and "On Mutual Cooperation in the Provision of Modern Devices for Computer Diagnostics of the State of the Human Body, Digital Devices for Contactless Diagnostics, Functioning on the Basis of Artificial Intelligence Technologies."

Planes and helicopters equipped with special medical devices for accurate and rapid diagnosis of damage and treatment of people affected by emergencies are of great importance for disaster medicine services. Kazakhstan does not produce its own airplanes yet; consequently, it buys medical and sanitary small aircraft from the other BRICS countries, in particular, from Russia. The same country is assisting in the creation of a helicopter industry in Kazakhstan, which will enable the production of medical and sanitary helicopters. Currently, Kazakhstan produces drones that can be used for emergency delivery of necessary medicines to hard-to-reach regions.

Conclusion

The production plants of the machine-building industry of Kazakhstan, together with those of the BRICS countries, can make a significant contribution to the digitalization of medical transport machine-building production. The current new and improved legislation of the Republic of Kazakhstan, as well as international agreements with the BRICS countries on general and specialized issues of digitalization and automation of medical machine-building can accelerate this process. As a subject of international law, the Republic of Kazakhstan actively contributes to the formation and development of international digital engineering law. In turn, the BRICS platform could offer a suitable arena in which to make a worthy contribution to these efforts. Machine-building enterprises in Kazakhstan and the BRICS countries have the potential to produce high-quality medical electric

vehicles and other types of electric medical vehicles based on relevant international agreements. The task of the legislators of the Republic of Kazakhstan and the BRICS countries could be to provide regulatory support for the processes of mechanical engineering that facilitate the complex resolution of special issues related to the production of medical electric vehicles with artificial intelligence technologies. The leaders of our countries could conclude mutually beneficial international agreements on cooperation in this industry. By integrating artificial intelligence systems and equipment into medical vehicles, the process of providing primary health care can be accelerated to the highest level possible. Through the process of digitalization, the latest digital technologies make it possible to improve relations between subjects of domestic law and subjects of international law. In turn, the law actively promotes the development of technological, digitalized processes.

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