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Coronavirus as a Catalyst for Digitalisation and Public-Private Partnership in Medicine

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ABSTRACT

The article focuses on the impact of the COVID-19 pandemic on digitalization and public-private partnerships (PPPs) in medicine. The epidemic of this disease has intensively affected Russia, and the viral economic crisis has highlighted the need for structural reforms in many sectors of the economy, including medicine. The Russian Federation's budget regularly lacks funds to solve much pressing health care and science problems. In this regard, PPP is of particular interest, promoting better management and higher medical services quality. Therefore, the purpose of the work is to consider the forms of interaction of advanced medical institutions with entrepreneurship, scientific organizations, regional administrations, civil society and the possibility of increasing the potential of such cooperation. A methodological basis of our research was a synergistic approach to scientific knowledge, institutional, cluster, general scientific analysis of sources, which made it possible to establish key aspects of the interaction of agents, and the SWOT analysis method made it possible to show, with some examples, the impact of PPP not only on the development of medical institutions but also on efficiency activities of the company.

Keywords: pandemic; coronavirus; public-private partnership in medicine; digitalisation; high-tech medicine; viral and economic crisis; a new paradigm of healthcare management; precision medicine; telemedicine

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INTRODUCTION AND PROBLEM STATEMENT

The digitization of the economy is gradually leading to an inevitable change in the social and economic paradigm of the development of society and of certain areas of its activity, including medicine. The risk of technological lag is one of the major challenges facing the Russian economy. After all, the share of the digital economy in the total GDP of the Russian Federation is now only 3.9% compared to 11% in the United States [1, p. 42]. The digital economy must become a pivotal factor affecting not only economic growth but also the well–being and health of the population.

In this connection, the digitization of medicine is of particular importance, and it contributes to the reduction of costs and the improvement of the quality of both free and paid services, better diagnostics and the extension of life and working capacity of the population. The digitization of medicine, which began 10 years ago with the universal computerization of health facilities, now poses the challenge of using artificial intelligence (AI). Information technology assumes accelerated development of bioengineering, which will contribute to the development of completely new drugs and the prevention of potential infections. Central to this is a more in–depth study of genome editing technology, which will help to cure the majority of known diseases [2, p. 100]. Modern medicine will be equipped with cellular–level disease control technologies involving the accurate delivery of drugs [3]. The topicality of this problem is increasing due to the "viral–economic" crisis, epidemiological and political situation in the country and the world, which require technological breakthrough in medicine and the introduction of modern innovations in everyday life.

Digitization — is not only the use of artificial intelligence and other digital technologies, but also a persistent struggle for advanced systems and/or management models in medicine, including the nurturing and attraction of talent, their ability to work as a team with big data systems. At present, the qualifications of many senior and middle managers in medicine do not allow for such tasks. This resulted in a number of systemic errors, such as the mismanagement of material and human resources and high–tech equipment (and sometimes his simple), lack of permanent internal quality control, which was especially acute during the period of coronavirus pandemic and economic crisis, which the famous economist V. T. Ryazanov called "viral–economic" [2, p. 95].

It should be noted that a huge part of the damage caused by COVID-19 is due to the lack of preparation of managers at various levels for rapid mobilization. In Russia, this was complicated by failed reforms in the field of health care, when market concepts were introduced: "medical services" and "educational services". In this connection, it should be emphasized that health care — is a social institution for the maintenance and protection of public health. Medicine — is the treatment of disease with the best clinical results. Today, however, the challenge is not only to treat diseases, to diagnose them early, but also to prevent them. Systemic failures of medical power structures result in a high number of medical errors and inefficiencies throughout the country. In Russia, according to the information of the public organization Coalition for Patients' Rights, 50 thous. people die every year from medical errors [4, p. 226]. Thus, the digitization of the entire medical sector must begin with a sustained effort to reorganize the management system, while preserving the best medical traditions, schools and personnel.

The quality of medical care in the regions varies considerably — the best medical services are provided in Moscow and the

Republic of Tatarstan. The health–care system in Krasnodar Krai, Murmansk, Novosibirsk oblasts, Bashkortostan, Tyumen oblasts is not effective [5, p. 116]. Reforms in the medical sector have not eliminated regional disparities in the provision of resources and personnel to health institutions. In many villages, even paramedical centres have been dismantled, and the population has been left without medical assistance. The number of rural health organizations closed between 2005 and 2016 was 2,653 unit or 72% of the total [6, p. 70]. In small towns, even in Moscow Oblast, electronic registration to a doctor did not eliminate large queues, especially to "narrow" specialists. In most cities, the equipment of hospitals and clinics remained the same, and many even lack the Internet.

Health management requires a special approach in view of the fact that life and health are at stake. Society disagrees that the market has gone from being an economic mechanism to a self–defeating system that imposes its values [4, p. 62]. The economy therefore suffers immense losses from poor health and premature death. The mortality rate per 100 thous. people (for the working–age population) in Russia is three times higher than in developed countries, and for cardiovascular diseases — fourfold [1, p. 42].

The restructuring of the health care system should be carried out on the basis of the national project "Health Care" from 24.12.2018 No. 16, which provides for the reduction of mortality, control of cardiovascular diseases and cancer, completion of the establishment of a high–quality primary health–care network.[1] It covers the period 2019–2024 and requires not only huge medical efforts, but also significant financial outlays by the state, whereas today in Russia only about 5% of GDP is devoted to health care, compared to 10% in Europe and 17% in the USA. On health financing and its share of GDP, Russia ranks 140th out of 200 countries [1, p. 42].

PPPs are therefore of particular interest for the transition to high–tech medicine, which is particularly needed in problem regions where budgets are limited, investments are inefficient and most of them — have low management skills. The institutional framework for PPPs is being developed in the Russian Federation. Involvement of entrepreneurs in PPPs will allow for new financing mechanisms for health facilities and facilitate a faster and more complete transition to digital and high–technology medicine. Entrepreneurs, in cooperation with the State, are given the opportunity for stable business development.

Foreign experience in the introduction of public–private partnerships in health shows that there are great opportunities for such cooperation, which helps to solve a wide range of critical health and social problems. In Europe, private sector participation in financing, providing health infrastructure and delivering services through PPPs is most frequent because business is better at managing risks [7, p. 110]. L. Kostyak and his co–authors note that in low–income countries, private sector participation in financing medical innovation helps to ensure skilled care [8, p. 120].

The impact of income on health is highlighted by P. Braveman and his co–authors, who noted that better–off citizens are healthier than the poor, and PPPs help to reduce these disparities [9, p. 190]. K. B. Adan, after analysing the public–private partnership in health, concluded that it improves the management skills of health professionals and facilitates the provision of better–qualified health care [10, p. 316]. He noted that PPPs, for example in the United Kingdom, accounted for 12% of all sectoral projects.

[1] National Project "Health Care". URL: https://futurerussia.gov.ru/zdravoohranenie.

A. Lundström and L. Stevenson also point to improvements in the quality of health services through the interaction of business and the health sector [11].

A. Hira and K. Reilly highlight the need for entrepreneurship to work with civil society, including the medical community [12, p. 190]. R. Felix and J. Garcia –Vega, in considering the quality of life in Mexico, pay attention to health, noting its strengths and weaknesses [13, p. 237]. F.D. Castro stresses the innovative nature of Cuban medicine and its link to science, and he also talks about the use of nuclear radionuclides in the treatment of cancer [14, p. 13]. Such treatment is widely used in this free and affordable island State, which WHO describes as the best in the world. T.N. Yudina writes about the achievements of Cuban medicine and biopharmacy [15].

Excellent health system, considered by P. Downward and S. Rasciute, contributes to a better quality of life of the population, a more comfortable living environment and encourages people to participate in sports, especially with higher incomes [16, p. 213]. So, most foreign authors attribute PPPs to the possibility of a transition to modern medicine, better management, better health care and better living standards. In Russia, such interaction is just beginning, so that the issues of adaptation of medical institutions to the digital economy and the mechanisms of their cooperation with business are not sufficiently covered in the literature.

USING THE POTENTIAL OF THE NATIONAL PROJECT "HEALTH CARE" FOR A NEW PARADIGM OF HEALTH MANAGEMENT AND IMPLEMENTATION OF INSTITUTE FOR PUBLIC–PRIVATE PARTNERSHIP

In recent years, the health–care system in the Russian Federation has undergone a substantial reform, the results of which can be assessed in a mixed but largely negative manner. These include, first of all, a deterioration in the quality of medical care, a reduction in the number of medical staff and an increase in the workload of the remaining staff, and a reduction in the number of in–patient beds. 726 health organizations were dismantled under the optimization programme from 2015 to 2018, while the number of private health facilities increased (https://expert.ru/expert/2019/ 38/ minzdrav–rasteryal–vrachej/). From 2009 to 2017, the number of hospitals decreased by 30.8%, the number of hospital beds — by 23%, and the number of hospital beds by 10 thous. decreased by 25% [5, p. 110].

The gap between large and small cities and between urban and rural areas, as well as between rich and poor regions with lower levels of well–being, has widened in terms of access to health care. This reduces the quality of life of the population and threatens social and political stability and the unity of society. Citizens with limited financial resources are much more likely to have health problems and their health is more dependent on community efforts [17, p. 194].

The viral and economic crisis has led to a huge part of Russia's population becoming increasingly poor and small and medium–sized businesses going bankrupt. While large–scale capital actor had made 62 billion dollars in wealth from the onset of the pandemic to May (https://www.forbes.ru/ milliardery–photogallery/405643–kto–iz–rossiyskih–milliarderov–razbogatel–silnee–vseh–za–vremya?utm_medium=email&utm_source=Uni Sender&utm_campaign=237409834).

Reforms in health have highlighted the urgent need to shift to a new paradigm of innovative governance that is consistent with the genesis of the digital economy. The management of medical institutions should not only learn to manage the industry well, but also become an institution of citizenship

in interaction with business, scientific organizations, authorities and the population to discover the effectiveness of reforms. At the same time, a platform of precision medicine (personalized treatment of diseases based on genetics) should be formed in medical institutions, is needed early diagnosis of diseases through progressive screening methods, establishment of remote patient health monitoring services with wide application of telemedicine technologies.

Today, elements of precision medicine are used mainly for the treatment of oncological diseases. The national project "Health Care" aims to reduce the mortality of the working–age population from cancers that cause the most significant losses. In the country, the incidence of cancer has increased by 40% in 10 years, while the detection of malignant neoplasms is 20–30% lower than in Western Europe and the standardized mortality rate for malignant neoplasms is 10–15% higher [18, p. 168].

In this context, high–quality, up–to–date diagnostics are archived and PPPs have an important role to play. For example, GC MedInvestGrup is engaged in diagnosis and treatment of oncological diseases. Company built diagnostic centres in Balashikha and Podolsk and handed them over to the State, which, under a concession, granted them to companies for use with guarantee of patient flow. Every year, the Ministry of Health of the Moscow oblast sends more than 10 thous. persons for a positronic emission tomography. The company is partnering with regions and choosing forms of cooperation.[2] Partnership with the State has also had a positive impact on the company's performance,— over the last two years she has become a leader in the Russian oncological diagnosis market, has created the most modern network of nuclear medicine centers PET–Technologies, which are in 27 regions of the country and only in 2019 did more than 70 thous. research.[3]

Following the organization of nuclear medicine diagnostic centres "MedInvestGrup" launches a new project to install 100 linear accelerators in different regions of the country — radiotherapy equipment worth 37 billion rub.[4] Radiation therapy — is the most painless way to heal a patient without surgery. In the EU and USA, 70% of patients recover from radiation therapy. It is the most important project on the market of private investments in medicine of the Russian Federation.

Besides the nuclear medicine network, MedInvestGrup in 2019 acquired a share in the network of LabQuest laboratories. Today it has 65 retail outlets in Moscow and Moscow Oblast and 35 offices throughout Russia on a franchise basis.[5] The company plans to expand contacts with the medical industry, which positively influence the results of its activities. It also proposes radionuclide therapy — a treatment using pharmaceuticals that have a positive effect on tumors. It includes radionuclide therapy — it's a treatment with radiopharmaceuticals that have a positive effect on tumors. Today these technologies are used in small quantities in Obninsk, Omsk and Chelyabinsk.[6] However, there are significant obstacles to the company's ability to register drugs, train doctors, find partners.

Genetic research, including the diagnosis and development of modern genetic engineering vaccines, is now in high demand in all areas of medicine. Currently there are 15 independent medical genetic centers in Russia: Saint Petersburg, Republic of Bashkortostan, Krasnoyarsk Territory,

[2] URL: https://expert.ru/expert/2020/29/milliardyi–na–spasitelnyie–luchi/?mindbox–click–id=445011ce–ffde–4b28–aeb7–24b2c4f5da00&utm_source=mindbox&utm_medium=email&utm_campaign=14ePismoIyul20202Massovaya.

[3] See ibid.

[4] See ibid.

[5] See ibid.

[6] See ibid.

Sverdlovsk Oblast. It has been shown that the cost of treating cancer to society is being recovered by further reducing mortality losses and increasing the contribution to gross national product.

The national project Health Care attaches great importance to the treatment of cardiovascular diseases and diseases of the circulatory system (DCS) and the reduction of mortality from them. Combating these diseases and cooperation with innovative enterprises is one of the important areas of activity of the Samara State Medical University (SSMU). A digital project office has been set up in the region at the initiative of the Governor, who has become a communicator for attracting new investors to the most sought–after industries. The project office SSMU together with EMC of Concern Vega set up the production of neurosimulators, a new system for the rehabilitation of motor disabilities using virtual reality technology is being developed as a software and hardware system for the recovery of a stroke patient.[7]

Currently, SSMU has become the hub of the Regional Medical and Pharmaceutical Technology Cluster. It has brought together leading companies in the real economy in the fields of pharmacy, IT medicine, biotechnology, medical engineering. The Institute for Innovative Development at SSMU has established joint scientific laboratories with production enterprises, marketing researches are carried out, partners are searched and products are brought to the market according to the principle of "single window".

Infant mortality is a current problem facing modern medicine, requiring the latest inventions and partnerships with business. Although, according to Rosstat, in 2019 it decreased to 4.9 cases (from 5.1 in 2018),[8] but the problem remains a pressing one. Congenital hereditary anomalies dominate among the causes of infant mortality. A separate annex to the national project "Health Care" from 14.12.2018 No. 3 "Development of Children's Health Care, including the creation of a modern infrastructure for providing medical assistance to children" is dedicated to children's health.[9] The main goal is to reduce infant mortality by 2024 to 4.5 per thous. born. Therefore, the prevention of the occurrence of hereditary diseases, their early diagnosis becomes particularly important, and the innovative genetic service becomes indispensable. 85 regional programmes have been approved for implementation. Construction of 40 children's hospitals envisaged,[10] many of which will be built through PPPs.

To innovative medical and pharmaceutical companies on the ground, regional authorities, officials responsible for cooperation with business should create favorable conditions of activity, establish all kinds of concessions, actively engage with them and promote their involvement in industrial parks and clusters. The public authorities should help them find partners and encourage the creation of industrial parks. For example, in the Republic of Tatarstan, the leadership of the region keeps the problem under constant review, supporting the medical industrial park, which is an experimental industrial for residents of the medical industry [19, p. 349]. It expands competitive advantage through public–private partnerships with the Kazan Federal University, Kazan State Medical University, research organizations, SUE Tattekhmedpharm, group of companies Eidos. The strategic partner of the project is SEZ Innopolis.

[7] Analytical Journal of the Federation Council. 2019;8(722):24–27.

[8] Analytical Journal of the Federation Council. 2020;14(757):5–8.

[9] Child health development, including the establishment of modern child health infrastructure. URL: https://futurerussia.gov.ru/razvitie–detskogo–zdravoohranenia–vklucaa–sozdanie–sovremennoj–infrastruktury–okazania –medicinskoj.

[10] Analytical Journal of the Federation Council. 2020;(751):3–6.

One of the key measures in support of the high–technology sector are clusters that create synergies by creating new linkages and strengthening existing ones, they promote business cooperation with scientific organizations, officials, the medical profession and civil society. On the territory of Novosibirsk region with its high concentration of research, unified research platform and innovative business high–tech medical cluster allows to make the most modern discoveries and quickly introduce them into production. The region's good infrastructure has made it possible to host other innovative clusters such as biotechnology and pharmaceuticals. Because high technology — is the most advanced technology, including convergent (ICT, bio–, nano–, cognitive) technologies that differ from conventional technologies in that they are highly knowledge–intensive [20, p. 27].

The Novosibirsk region has a cluster model based on PPPs that won the Ministry of Economic Development competition for the project "Development of innovative clusters — leaders of investment attractiveness of world level". For this purpose the Scientific–Production Cluster Siberian Science was formed by adding a new direction — "high–tech medicine". He is one of the few clusters in Russia that has a bronze label and a quality assurance certificate of the cluster management to European standards of European Cluster Management Excellence.[11]

Clusters, as a trend in the new economy, enable the rapid development of modern pharmaceuticals, medicines and technologies, lead to reduced transaction costs, effective matchmaking and contracting. Thanks to this, almost all the companies of Koltovo and Akademgorodoka have emerged from the sphere of science and innovation, they actively cooperate with higher education institutions of Novosibirsk, medical organizations, and the administration of the region. It's It is LLC Bio–Vesta, JSC Katren, JSC RPC Bio–Biological Union, JSC Vector–BiAlgam.[12]

One of the largest public–private partnership projects in the field of health in Russia is the agreement on concession construction, financing and maintenance of 7 new polyclinics in Novosibirsk.[13] "Concession" means that the Government grants the right to organize an industrial enterprise to private individuals [21, p. 73]. This involves the construction of modern clinics, which the region urgently needs. Thanks to PPP in this Siberian city 3 vascular centers have been created, and in Yekaterinburg such interaction allows to reconstruct in a short time center "Microsurgery of eyes".

So one of the key measures to support modern high–tech medicine that promotes cooperation of business, scientific organizations, administrations of regions and populations is high–tech medical clusters. They contribute to different PPP options, although the main forms of implementation are concessions. There is also a partnership based on contracts for works, medicines and equipment for public health facilities, contracts for the construction and equipping of hospitals and clinics with public and private investment, etc.

In the health care of the Russian Federation PPPs are just beginning, which is explained both by the bureaucratization of the health care system and by the fact that many companies have just started to digitize and have not had time to change to new mechanisms of interaction. This cooperation is further complicated by the lack of business readiness to invest in long–term health and science. Impact of low investment and innovation attractiveness in the country,

[11] Analytical Journal of the Federation Council. 2019;27(741):15–20.

[12] Analytical Journal of the Federation Council. 2019;27(741):21–25.

[13] Analytical Journal of the Federation Council. 2019;27(741):15–20.

unpredictable institutional changes in the economy and medicine, and deteriorating economic performance of small and medium–sized businesses.

CORONAVIRUS PANDEMIC – PROMOTER OF THE TRANSITION TO HIGH–TECH MEDICINE

The COVID-19 pandemic exacerbated the economic crisis. For the Russian economy, this was particularly difficult, as the average GDP growth rate for the last 10 years was only 1% per year, and the pandemic exposed and exacerbated the difficult socio–economic situation. It clearly highlighted the need for structural reforms in many sectors of the economy and the need to move towards high–technology medicine. The first wave of the pandemic demonstrated the confusion of many officials who were unable to act quickly and effectively against the spread of COVID-19. The country lacked hospital beds, masks, disinfectants, and companies began a fierce battle for profits.

An example of the effective use of digital technology for the benefit of the country's residents, businesses, and the effective fight against coronavirus was provided by South Korea, where when entering buildings there are cameras measuring the temperature of the enters, which quickly track patients. The country has excellent economic and medical management, and feedback from citizens has been widely introduced, so it was able to respond quickly to the outbreak of the virus, and the disease has gone down. South Koreans nowhere allow congestion, effective disinfection, not formal disinfection, where testing is widely available, all of which prevented the spread of infection. Of course, the organization of the population has played a huge role: South Koreans adhere strictly to the rules prescribed by the authorities, trust them, don't consider the information about the coronavirus to be fake. All these measures have resulted in South Korea having the lowest mortality rate among COVID-19 patients, which is only 0.77%, while Italy has 6%, China 3–5%.[14]

The Russian Federation also strives to reduce morbidity from coronavirus, although the population is not highly organized. The National Research Center for Epidemiology and Microbiology named after Honorary Academician N.F. Gamaleya quickly created a vaccine, the development of which was invested by the high–tech company R–Farm and the Russian Direct Investment Fund, which invested 4 billion rub. in the project.[15]

Another company that has completed scientific development of vaccine against COVID-19 is the virology center Vector in Novosibirsk. This high–tech center produces the most advanced preparations for especially dangerous infections, poisonings, oncological diseases, detects molecular predisposition to a disease.

Speaking of the pandemic, during this difficult period, the digital economy and digital companies have helped to effectively combat the spread of coronavirus. Thus, in Moscow, the diagnostic system became operational based on X–ray imagery using AI, developed by the Institute of Computational Technologies SB RAS scientist.[16]

Many innovative companies have started to look for new applications of robots. Microbots are already able to biopsy, deliver medicine. Russian developer Promobot showed a robot capable of conducting

[14] The situation in South Korea today. URL: https://lubimuedoramy.com/situacija–s–koronavirusom–v–juzhnoj–koree–na–segodnjashnij–den/ (accessed on: 15.11.2020).

[15] RDIF and "R–Farm" invest at least RUB 4 billion in the production of vaccines and preparations for COVID-19. URL: https://yandex.ru/news/story/RFPI_i_R–Farm_vlozhat_ne_menee_4_mlrd_rublej_v_proizvodstvo_ vakciny _i_preparatov_ot_COVID-19––b66daa30e1afe91305d2c214f906fc79?fan =1&from=newswi zard&persisten t_id=100037406&wizar d=story.

[16] Russian scientists developed a way to diagnose coronavirus using X–rays. URL: https://xn––80aesfpebagmfblc0a.xn––p1ai/news/20200413–1013.html.

medical examination of patients, performing primary medical diagnostics and deciding whether a given person needs self–isolation.[17] Petrozavodsk company K–Sky has created a system that analyzes electronic medical cards (https://expert.ru/expert/2020/46/iskusstvennyij–intellekt–poka–ne–mozhet–lechit/).

The greatest number of developments (30) are related to social distance. So, Yandex launched an interactive map of the spread of the disease. The holding Schwabe, part of Rostec, has prepared for release a modification of "antique" thermal isors with functions of face recognition and independent decision making.[18]

During the viral and economic crisis, the role of e–health in medical institutions and telemedicine is growing. Thus, the holding Ruselectronics (part of the state corporation Rostec) together with the company Netrika introduced telemedicine consulting service in 8 regions of the country. Such technological solutions allow doctors to provide up to 400 consultations per day, embedding telemedicine support in the process of patient care.

By video link, the consultant diagnoses the disease and is able to modify its treatment. Such remote technologies are particularly important in the context of pandemics and epidemics, as the service is easily integrated into existing health information systems and improve the timeliness, quality and routing of health care. The patient receives treatment 2.5 times faster than when scheduled for a traditional consultation.[19] The system does not require expensive technology and long lead times. It also provides reliable protection of personal data.

Telemedicine services are increasingly available at various clinics in the country, mainly — in private clinics. So, in 2020 telemedicine service Doc+, which invested Yandex, funds VostokNewVentures and BaringVostok, agreed on a merger with the company Doctor ryadom.[20] Telemedicine service Doc+ — is an ecosystem of IT–solutions, which is a mobile application, where there are not only telemedicine services, electronic medical card, but also the possibility of calling a doctor to a home, purchasing medicines in pharmacies.

Another part of the service — is cloud workplaces for clinic staff, data sharing with health facilities. According to the version of Forbes, which has compiled the rating of private medical clinics in Russia, Doctor ryadom is the leader not only of the telemedicine market, but also of the top three private medical clinics.[21]

Gradually, both public hospitals and health clinics are moving towards the AI system, although at a much slower pace than private ones — bureaucratization, more formalized and insufficient funds. This process is being intensified in capitals. Thus, in Moscow polyclinics is introduced the system of AI, which helps to prevent doctors' mistakes in making a diagnosis. Moscow is moving increasingly to "smart medicine", which by 2030 will consist of a single digital platform where diagnostic and treatment patterns will

[17] The first concept of a medical robot Promobot. URL: http://promo–bot.ru/news/d0–bf–d0–b5–d1–80–d0–b2–d1–8b–d0–b9–d0–ba–d0–be–d0–bd–d1–86–d0–b5–d0–bf–d1–82–d0–bc–d0–b5–d0–b4–d0–b8–d1–86–d0–b8–d0–bd–d1–81–d0–ba–d0–be–d0–b3–d0–be–d1–80–d0–be–d0–b1–d0–be–d1–82–d0–b0–promobot/.

[18] "Anticovid" pass system will appear in the Russian Federation. URL: https://radiosputnik.ria.ru /20200823/1576191371.html.

[19] Telemedicine service "Ruselectronics" is implemented in eight regions of Russia. URL: https://iecp.ru/news/item/428620–telemeditsinskiy–servis–roselektroniki–vnedren–v–vosmi–regionakh–rossii.

[20] URL: https://www.forbes.ru/tehnologii/407835–doktor–v–plyuse–zachem–servis–s–investiciyami–yandeksa–obedinilsya–s–liderom–rynka?utm_medium=email&utm_source=UniSender&utm_campaign=239202832 (дата обращения: 10.11.2020).

[21] 20 largest private medical clinics in Russia, rating Forbes. URL: https://basetop.ru/20–krupneyshih–chastnyih–klinik–rossii–reyting–forbes/.

accommodate. The AI as a "second opinion" will monitor the implementation of these norms.

Speaking of the virtues of digitization and digital medicine, its great reserves in the fight against. "Coronavirus Economy" promotes total control over citizens, and human movements can be tracked by hackers who hacked into the service. The more humanity invents and implements, the more it faces challenges and threats to its existence [22, p. 9]. Breakthrough technologies would increase longevity, but that could further exacerbate environmental and social problems. Thus, new technologies are becoming a real threat to traditional human values and social stability.

CONCLUSION

On the basis of the study, it can be concluded that the coronavirus pandemic has highlighted not only the urgent need to transform the entire system and management model of the medical industry on the basis of a new paradigm, but also the need to move to high–tech medicine. PPPs of medical, scientific, advanced educational institutions, business, science, people and regional administrations can play an important role in this, and should help to ensure adequate conditions for companies that create innovative products for medicine. It can therefore be confirmed that in a low–income country PPPs contribute to the transition to high–tech medicine and a new governance paradigm. Such interaction was not only in the interest of the medical profession, the business community, but also of the leaders of the territories, who should guide and revitalize that relationship. After all, PPPs in health serve to improve the health of people in a region and are a tool for their dynamic socio–economic development. It improves the quality and quantity of public sector services through investment from extrabudgetary sources.

However, the view that PPPs improve people's well–being in the Russian Federation has not been confirmed. This may be due to the underdevelopment of the PPP institute in the medicine of the Russian Federation, its genesis, the lack of access of most residents to the best medical practices, the low level of expertise, the lack of digital literacy, the persistence of many companies seeking to maximize profits and even rent–seeking, 200% profit, lack of transparency, and, of course, pandemic.

The COVID-19 pandemic has found that it is necessary to rapidly develop new medical products that are needed to fight epidemics, and be able to instantly test them with patient feedback on the basis of new formats of interaction between doctors and patients. There is an urgent need for a model of innovative medicine, using a platform of precision medicine in health facilities, where high–tech innovations such as heart implants, cancer–killing lasers and viruses play a major role. The State must help launch an effective mechanism of innovation for the transition to high–tech medicine. The management of medical institutions is obliged to become an institution of citizenship in cooperation with business, scientific organizations, authorities and the population, where new forms of medical care (for example, telemedicine) are widely used, and the range of e–health technologies is constantly expanding and the best Russian medical traditions, schools and personnel are not forgotten. Managers need to work more effectively with businesses, health service providers and goods to deliver them quickly to patients. Further research may involve studying the interaction of business and environmental organizations to create a favourable institutional environment for healthy people.

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