ATLANTIS PRESS

*Advances in Economics, Business and Management Research, volume 105*

1st International Scientific and Practical Conference on Digital Economy (ISCDE 2019)

# *Health digitalization alternative: is there one or not?*

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***Abstract*** **– The authors ask a question and give an ambiguous answer to it. On the one hand, there is no alternative to digitalization of healthcare, as this is confirmed by the global process of the Fourth Technological Revolution, the experience of foreign countries in testing and widespread adoption of interaction technologies between consumers and healthcare providers, as well as Russian achievements in introducing high-tech medical care, and significant financial flow from federal structures for the development and consolidation of what has been achieved.**

**At the same time, there are concerns that an alternative digitalization is possible, which the authors called "intermediate braking". "Intermediate braking" of the introduction of modern technologies into the functioning of the health care system is the state of the system characterized by "treading" on the spot and declaring the goals and objectives of digitalization while maintaining imbalances in the software and technical, staffing of innovations, as well as maintaining "paper" medicine along with electronic format of its content.**

**Based on the analysis of publications in the scientific field and on specialized sites, a mechanism is presented that allows minimizing the risk of the implementation of "intermediate braking". It is based on the development and implementation of a single format for the technological and infrastructural development of digitalization of healthcare on a domestic and international scale.**

***Keywords – digitalization of healthcare, digital transformation, Information Systems, expert medical systems, expenses, consumer satisfaction.***

## I. INTRODUCTION

Avoiding obsolete and labor-intensive technologies in healthcare is a priority. Foreign practices ahead of us indicate that the successes they have already achieved predetermine even greater efforts to move forward. This is due to the avalanche-like development of technologies, with changes in consumer behavior in the direction of increased demand for reliable and high-quality information, with increased requirements for the quality of medical services by the medical community, and social structures that finance and control the activities of medical organizations, research in related structures. At the same time, in the Russian scientific field there is a clear lack of fundamental analytical materials characterizing the positive and negative of the digitalization process in a significant segment of society. Consequently, an attempt to outline the contours of promising research is becoming increasingly important.

## II. HEALTH DIGITALIZATION ISSUES IN A METHODOLOGICAL CONTEXT

It should be recognized that the healthcare industry in our country is entering into the process of large-scale informatization of one of the latter. At the same time, works are already appearing that describe algorithms for the prospective incorporation of "smart medicine" into the strategy and tactics of creating and functioning "smart cities". So, G.I. Kurcheeva, G.A. Klochkov [1] convincingly argues that according to Frost & Sullivan forecasts, by 2020 "smart medicine" will occupy 15% of the total market of "smart cities". Indeed, according to Global Market Insights, if the volume of the global digital medicine market in 2018 reached $ 51.3 billion, then by 2024 its growth is expected to reach $ 116 billion [2].

We will take into account that, thanks to the informatization of society in the world space, the problems actualized by the participants of various international events held in 2018-2019 were actualized. Thus, D. Herberding believes that the leading problems of a global scale are the risks manifested against the background of an aging population, increased international migration and the associated spread of infectious diseases in humans and animals [3]. Along with this, it is indicated that the problem of misinformation of the population regarding the importance of vaccination, the principles of healthy nutrition and maintaining vital activity in connection with practically unlimited information flows is becoming serious.

Due to age-related characteristics, elderly people are indeed extremely vulnerable to infectious diseases [4], they are more likely than other age groups to be at risk of neurodegenerative diseases, problems with the musculoskeletal system and oncology [5]. However, it is about improving the efficiency of the provision of medical services not only to this age group, but to the entire population of any country.

Already today, many patients use mobile services to make an appointment with a doctor, purchase medicines, and familiarize themselves with the results of laboratory tests. The figure shows the relevant aspects of the national vision of the digitalization of healthcare (based on the experience of St. Petersburg).

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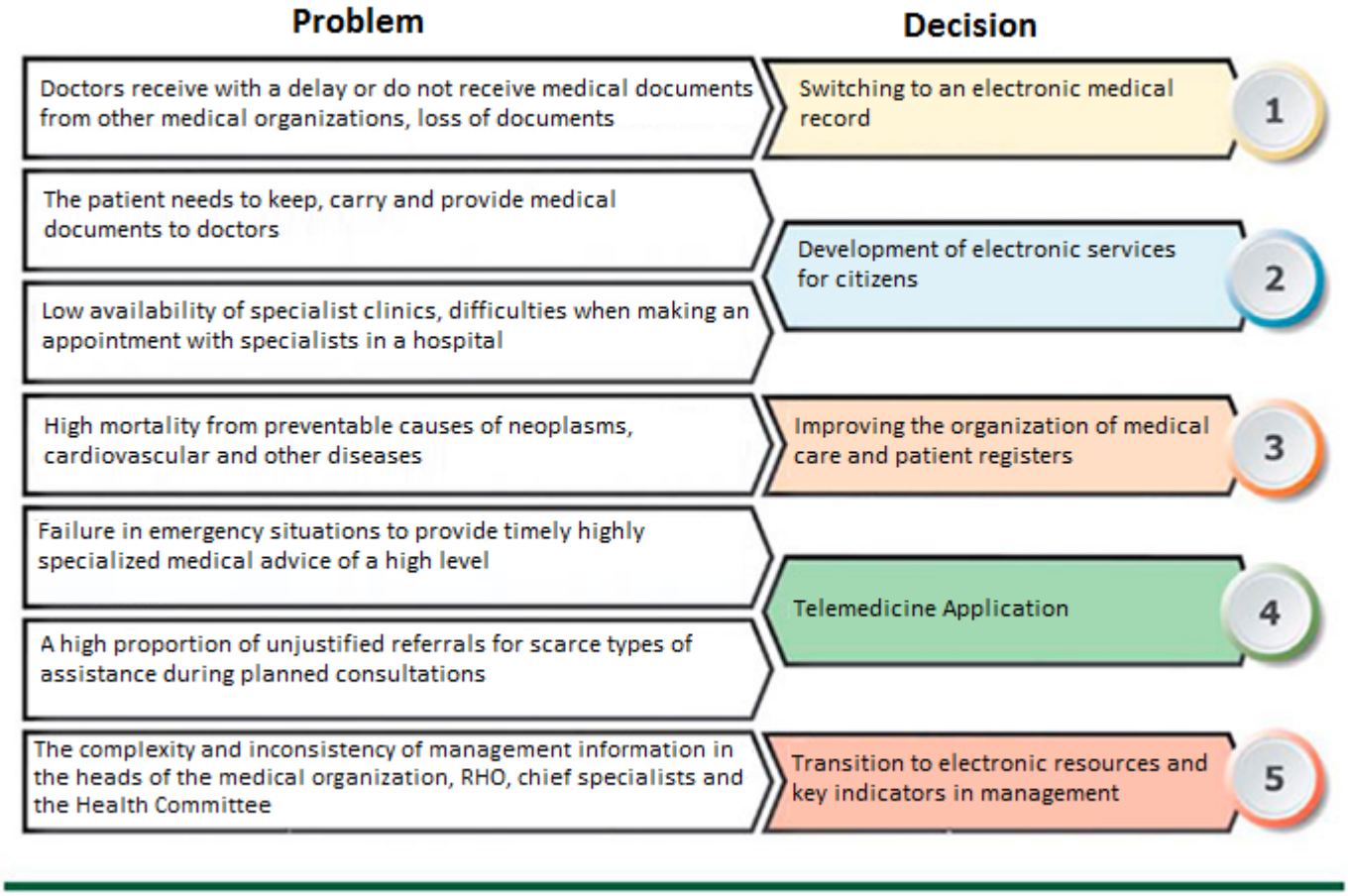


Fig. 1. Health problems solved through digitalization (http://www.iksmedia.ru/articles/5434116-Prakticheskaya-polza-informatizacii.html)

A feature of current Russian practices is the implementation of national projects, with the help of which by 2025 it is planned to achieve the inclusion of almost all medical organizations of the country in the Unified State Health Information System (EHIS). This correlates with the Decree of the President of the Russian Federation No. 203 dated 09.05.2017, where the base of the digital economy is specified. Its subjects identified structures that have the ability to implement business partnerships to ensure the interaction of technology platforms, government IT resources, services and channels [6].

Currently, the share of the digital economy in Russia is 3.9%, however, according to experts, due to the digitalization of the Russian economy by 2025, the country's total GDP can grow by 8.9 billion rubles. While significant difficulties arise due to the problems of connecting to high-speed Internet in many rural and hard-to-reach settlements, the need to adapt the regulatory framework to expand the process of informatization [7].

Thus, in Russia, the law on telemedicine came into force. It allows to more actively use the capabilities of distance consultation, to give expert assessments in various medical situations. However, the researchers point out that there are no standards of technical equipment for medical organizations that are verified and substantiated by practice; there are no rational regulations for the provision of high-tech services. In addition, the "diversity", "diversification", and "multilevelness" of technological support and the activities of individual specialists, clinics, and treatment facilities became a serious problem. Particular attention is drawn to the absence of regulations for remote consultations of children, which are no less specific than elderly patients, population groups. Researchers describe the lack of development of a remote mechanism for identifying a patient's personality, and the lack of qualified personnel to ensure the safety and efficiency of using IT systems.

The healthcare system also needs administrators with experience in managing innovative structures that can combine internal knowledge of the specifics of the medical profession at all levels of the hierarchy with the skills of information startup management. On the basis of the First Moscow State Medical University named after Sechenov the country's first department of information and Internet technology in medicine was created in 2016. Today we talk about the opening of similar departments in 22 universities. But the problem is that it is doctors who are not deeply trained to use digitalization tools.

Computer specialists are trained to work in medicine even in technical universities, but the healthcare system needs doctors who possess the necessary skills. Moreover, the prospects for digitalization in healthcare are indicated: It is planned to introduce help systems that allow any specialist to quickly find information on the compatibility of drugs, to compare their actions with a high-quality and proven database of similar data. A special place can be taken by the electronic

formats of the recommended treatment protocols and algorithms for the sequence of actions of the physician, containing structured information on the issues of prevention, diagnosis, treatment and rehabilitation, according to the description of the sequence of actions of the doctor, taking into account the course of the disease, the presence of complications and associated diseases.

Unfortunately, the process of healthcare digitalization is still fragmented: There are regions in which both patients and doctors are actively mastering new roles; niches are presented in which innovations are introduced in a high-speed mode. The "gaps" in the technological, organizational and infrastructural plans in many territorial structures are significant.

There are problems of a theoretical nature: the term "digitalization of health care" itself is interpreted differently today. In some studies, both 4P medicine (preventive, prognostic, patient-oriented, personified) and medical blockchain rise under digitalization. This also includes strengthening the role of mobile applications for smartphones, telemedicine, artificial intelligence systems [8].

T.V. Skrill, A.S. Paramonov speaks of a combination of software and hardware tools, databases and knowledge that allow to realize the goal of automation and digitalization of document management and the provision of information "for the needs of medical staff at all levels of their implementation" [9].

There are similar contradictions in foreign theory [10]. For example, J. Bloomberg claims that three different approaches to the interpretation of the essence of digitalization used in foreign practice, based on the appeal to the opinions of different authorities, can not only "confuse" scientists, but also lead to serious negative transformations in any organizational structure, jeopardizing its survival [11].

Specialists of the Boston Consulting Group argue that digitalization can be characterized by using the capabilities of online and innovative digital technologies by all participants in the economic system - from individuals to large companies and states. The World Bank reports on the structure of the economy, in which the ability to apply digital skills not only expands the possibilities of each member of the society, each entrepreneur and state, but is formed and developed [12].

As you can see, we are talking about a very wide range of digitalization tasks in healthcare, which, on the one hand, force citizens and organizations, the state to change the strategy and tactics of interaction in the process of providing medical services, and, on the other hand, it is a natural development process and consumers and suppliers, as the new formats for the functioning of medicine and the concretization of individual life goals are actually included in the value context of each subject of society. It is no accident that the rather innovative term "Internet of things" is being used by researchers to actively include in the process of understanding the results of technological changes in healthcare [13].

## III. EXPERIENCE IN IMPLEMENTING THE PROCESS OF HEALTHCARE DIGITALIZATION IN THE SVERDLOVSK REGION: OBSERVATION RESULTS

The positive effect of healthcare digitalization in the Sverdlovsk region has already been presented in a number of areas. Indeed, an excellent opportunity is for high-level professionals to remotely consult colleagues working in areas where high-tech equipment is available, but the qualifications of specialists are not high enough, for example, according to the results of computer, radiation diagnostics. Fast and high-quality data transfer helps to accelerate the provision of medical services and, most importantly, helps to find the right algorithm for assisting the patient.

In parallel, the problem of staff shortages is being addressed. For example, there are not enough pathologists . But with the help of modern technologies, an experienced specialist can provide analytical services for the evaluation of histological preparations at a remote distance.

Pay attention: today in the country 10 billion rubles are allocated for remote monitoring of patients with cardiovascular diseases. The Ministry of Health of the Russian Federation intends to provide 2.5 million patients with high blood pressure with personal blood pressure monitors by 2020 [14]. The goal should be realized: using technology, information about the slightest malfunctions in the patient's condition should immediately go to the attending physician. A great idea - especially if it concerns people with pacemakers, and it is practically being implemented today in the Sverdlovsk region.

However, the solution of this issue requires additional rates of duty specialists and, accordingly, additional funding.

There is also another side to the problem - while there is no understanding of the role of the patient himself: for example, a person must learn to independently control his condition in diabetes. This also applies to the understanding of what should be the complicity of patients "in the cardiovascular segment" to support individual activity. It seems that it is impossible to relieve responsibility from a patient who, with the help of doctors, must learn to correct his condition.

So far we are faced with the braking that arose between the achievement of the tasks set by the Fourth technological revolution and the real capabilities of the system. In addition, we see that a doctor who has mastered innovative technologies, after moving from one region to another, is forced to retrain, because so far there is no single software space and software throughout the country.

The practice of using information technology in counselling patients is also just taking shape.

Thus, teleconsultations in different regions make up 3-7% of in-person consultations. At the same time, up to 20-22% of patients who are sent from the regions of the Sverdlovsk region to regional institutions do not need an in-person meeting with a doctor far from their place of residence. Such problems could be addressed by implementing ethics and adjusted labor standards to ensure the interaction of young and experienced colleagues with the help of information technology.

It should be noted the well-considered position of the Territorial Compulsory Health Insurance Fund, which adopted the regulation on payment for services and consultants, and those who refer patients for consultation, using the potential of digitalization. This accelerates the process of counseling patients, saves their strength and money that they have to spend on travel to the regional center. In addition, the additional labor costs of attending physicians to organize consultations are compensated.

Do not forget about promising problems. So, foreign colleagues talk about the difficulties with identifying patients, with the accuracy and correctness of the organization of work with electronic medical records and individual cards, which we still do not have in most medical organizations.

In our situation, it should be recognized that many structures operate on outdated equipment. Therefore, the solution to the problem of widespread use, for example, of electronic sick leave, prescription of medicines for dispensary patients is still "slowed down". Moreover, not all enterprises are ready to accept electronic sick leave, and pharmaceutical structures - electronic prescriptions.

We can conclude that there is a process that can be called "intermediate braking". the task is modern, at the country level, significant funds will be allocated for its solution, but now many processes are being hindered by a “double” load: parallel progress in introducing informatization and “paper” duplication of information.

## IV. CONCLUSIONS

The presented experience of implementing digitalization of healthcare in the country, the world and the Sverdlovsk region confirmed the hypothesis stated earlier: on the one hand, there is no alternative to digitalization. But, most importantly, to avoid the problems associated with the phenomenon called by the authors "intermediate braking". the delay in introducing innovations due to the administrative, personnel, regulatory, technical and technological unavailability of the system for entering a new era.

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