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RESEARCH ARTICLE

Digitalization in the Russian healthcare: barriers to digital maturity

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Abstract

Over the last 20 years a significant progress has been made in the use of digital technologies in the Russian healthcare: a widespread introduction of health information systems (HIS), work with big data, and use of artificial intelligence. Hopes are pinned on IT technologies; it is expected that they will simplify healthcare activities, as well as take the quality of medical care to a new level. Ultimately, it will contribute to a better quality of life for the population. However, certain internal and external factors slow the advance of digital technologies, creating barriers to digital maturity in healthcare. Imperfection of the legal and regulatory framework and insufficient funding of healthcare and innovation have a negative impact on the rate of development and translation of new technologies into medicine.

The article considers a low level of digital literacy among health care providers and low level of motivation to make changes in organizational processes as a serious barrier to e-health promotion. Modern Russian research on this topic has identified significant gaps in basic digital skills among health professionals. At the same time, a low level of digital knowledge and patients' trust create a low demand for e-health product development, and thus cannot act as an additional driver of IT developments.

Health digitalization is an absolute trend in the current development of healthcare in our country, and in view of modern social and demographic trends, the need for medical services will only increase. Introduction of digital technologies into practice should contribute to better quality of and higher access to medical services, therefore health digitalization is a timely and logical stage of medicine development in Russia.

Keywords

barriers to digitalization, trust, digital maturity, digital acumen, digitalization in medicine, IT technologies

JEL codes: I12; I18; I31; I38; J14; J82; M52; O15; O32

A widespread of IT technologies in various sectors of the state system has become a common trend. There are high expectations for digitalization: there is a growing public demand for information, big arrays of data are being accumulated, through which effective artificial intelligence (AI) services can be trained and operated. AI market in medicine and healthcare worldwide is one of the fastest growing and most promising area of e-health development. The Russian market share is about 700 million rubles, or 0.11% of the global indicator. Globally, there are about 2.8 thousand companies creating various AI products for healthcare, of which only 35 are Russia-based (compared to 1,145 in the U.S.). With the onset of the COVID-19 pandemic in 2021, investment in digital technologies in Russia decreased 3.2 times compared to 2020, while in the world it increased 1.8 times (Gusev 2018). These figures indicate a clear general underfunding of the healthcare system, in particular, insufficient investment in the development and implementation of new information technologies.

According to experts, it is expected that by 2025, due to economy digitalization, Russia's gross domestic product (GDP) may grow by 8.9 billion rubles (Dobrynin et al. 2016; Digital Russia… 2017).

Decree of the President of the Russian Federation dated 21.07.2020 No. 474 "On the National Development Goals of the Russian Federation until 2030" defines digital transformation as one of the main development directions of the Russian society for the next decade. "Digital maturity" should be achieved in all major sectors of the state system, including medicine (Decree of the President… 2020).

However, digitalization in healthcare began long before 2020: Federal Uniform State Health Information System (EGISZ) (Resolution of the Government... 2022), has been already created and in operation, as well as a number of large-scale regional systems, in particular the Unified Health Information and Analysis System (EMIAS) in Moscow (Skobnikova & Shishchenko 2017), e-Health project has been implemented since 2016, aimed at improving health care delivery through introduction of information technologies (making an appointment online, electronic document management, health services on Public Services Portal) (Data sheet of the priority project... 2018). Decree of the President of the Russian Federation dated June 6, 2019 No. 254 "On the Strategy for Healthcare Development in the Russian Federation until 2025" indicates development of a single digital healthcare circuit to organize processes of care delivery and integration of regional information systems into it as one of the directions for medical development (Decree of the President… 2019).

Healthcare has already leapfrogged in digital transformation (Belolipetskaya et al. 2020). By 2012, the indicator of access of medical institutions to the information and communication network "Internet" reached 96.5%. In 2007 only 3.9% of hospitals had health information systems (HIS), while in 2021 this figure reached 91%. In 2 years (from 2018 to 2020), the number of job places connected to HIS increased 1.5 times, exceeding 1 million (Gusev et al. 2021). During the same period of time, the number of telemedicine consultations of patients increased 33.9 times adding up to 6,437 (Kobyakova et al. 2021).

A decade ago, the initial stage of digital transformation of the Russian healthcare took place, when paper records were converted to electronic format, and some services for data collection and analysis were created and implemented, etc. Currently, there is an active transition to the next level, therefore, the integration of local developments into a single digital healthcare ecosystem is becoming relevant, which in the near future will be able to provide access to information to a high number of participants: doctors, managers, and patients. Yet, there are certain barriers that slow down a further dissemination of IT technologies in this social sphere.

Imperfection of the legal framework regulating IT technologies in healthcare

Active lawmaking in the field of information technology in medicine was initiated in Russia in 2014-2015. Before that, legislative regulation of the HIS development, implementation and integration was fragmentary and haphazard.

The regulatory basis for by-laws on health informatization was Article 91 "Information support in healthcare" of Federal Law No. 323-FZ (introduced by Federal Law No. 242-FZ dated 29.07.2017 "On Amendments to Certain Legislative Acts of the Russian Federation on Application of Information Technologies in health protection" (Gusev et al. 2021).

In 2021, Order of the Ministry of Health of the Russian Federation dated 07.09. 2020 No. 947n "On Approval of the Procedure for Organizing a Document Management System in Health Protection in terms of Maintaining Medical Documentation in the form of Electronic Documents" came into force, which regulates medical electronic document management, however, an insufficient number of methodological recommendations for their application still significantly hinders the introduction of digital technologies (Ministry of Health… 2020).

At the moment, regulation of relationships in provision of telemedicine services remains one of the most debatable and controversial issues. The procedure for care delivery in a remote format is defined by Order of the Ministry of Health of the Russian Federation dated 30.11.2017 No. 965n "On Approval of the Procedure for Organizing and Providing Medical Care using Telemedicine Technologies", however, it contains limited information and does not answer all questions (Panfilova 2019). Moreover, this regulatory legal act to some extent slows down the use of remote technologies in care delivery: introduction of telemedicine into the work of a polyclinic or hospital is usually associated with difficulties in its application among stuff (Sazonova 2020).

The normative act regulating care delivery using telemedicine technologies doesn't give a direct answer to the question of the rights of a doctor in diagnosis and treatment using a remote format, there is a direct indication of the impossibility of establishing a diagnosis. In addition, there is no official definition of the stages, procedures and standards of care delivery using telemedicine technologies.

The issue of patient identification during telemedicine consultations remains open: provision of false information can lead to erroneous diagnoses and treatment (Ministry of Health… 2017). Also, a direct communication with a health care specialist is difficult, since authentication is required through Single Services Portal (Malysheva 2019). The status of an information system operator is yet to be fully determined: according to the law, the operator not classified as a separate entity, although he or she performs important functions in the process of conducting telemedicine consultation – the operator ensures recording of the fact of data transmission, reception and storage of information, as well as access to data to both the attending physician and the consultant (Dmitrieva 2019).

Lack of understanding of the degree and terms of liability for violations in telemedicine creates obstacles to the development of appropriate judicial practice and establishment of a framework for emerging offenses (Nazarova & Valueva 2022).

According to the definition specified by Law 323-FZ, telemedicine is a technology, rather than a separate medical service or type of care (Zingerman et al. 2017). Therefore, the provision of medical services using remote technologies is not a separate type of medical activity

and does not require licensing, however, services provided through telemedicine must be safe and performed according to all rules and standards of health care. Failure to comply with these rules may increase the risk of providing substandard health care, and during doctor-to-doctor consultations, information may leak.

The issue of reimbursement of medical services using telemedicine technologies is of special attention. According to Federal Law No. 326-FZ dated 29.11.2010 "On Compulsory Health Insurance in the Russian Federation", this type of service cannot be reimbursed through compulsory health insurance funds. However, in 2017, the program of state guarantees of free medical care to citizens enabled its subjects to set the volume of medical care using telemedicine technologies (this applies to hard-to-reach and low-populated areas). It turns out that in practice there is no single mechanism for remunerating medical services using telemedicine technologies.

Therefore, lack of legal consolidation of the principles of reimbursement in the program of state guarantees of free medical care to citizens and in federal legislation, as well as lack of unified standards and tariffs for this type of service significantly hinder their widespread implementation (Nazarova & Valueva 2022).

Limitations of health information systems (HIS)

As of 2007, the HIS market in Russia was represented by 57 developers who offered more than 100 units of various software (Gusev 2018), hampering effective operation of these systems. At the same time, a large amount of investment and budget funds is spent on the development of modern IT solutions in medicine. According to some authors, a market has already been formed in Russia offering software for the healthcare system (Monakov & Altunin 2022). Mainly it is determined by the state: only 10% of the customers are represented by private companies, the rest is federal orders (Gusev et al. 2019). By 2024, a further increase in funding is planned- within the framework of the federal program "Single Digital Circuit", up to 85% of the total allocation will be spent on this (Gusev et al. 2021).

HIS collect information from different sources and in different formats (including without human participation using remote monitoring devices). Yet, there are no uniform technical, organizational and legal procedures to regulate data processing. The problem of interoperability is currently a serious obstacle to successful information exchange and further development of digital medicine (Zhuravlev 2019).

An active implementation of HIS makes it possible to identify disadvantages that hinder further digitalization: lack of system integration and, as a result, failure to exchange information; a conflict between paper and electronic document management; difficulties in using big data in medical decision support processes. Many experts, including specialists from the Accounting Chamber, believe that financing of the health system digitalization is yet to yield the expected results: actual optimization of processes is needed, rather than a shift from paper-based to electronic media (Gusev et al. 2019). This resulted in dissatisfaction of both doctors (due to increased workload) and patients (due to decreased quality of services provided).

Significant disadvantages of existing HIS include limited data management capabilities due to lack of integration of services and the unified system of reference and regulatory information; increased burden on medical workers due to manual data entry, resulting in increased labour time and efforts, and therefore substantiating the need to unite systems,

registries and registers into a cohesive whole (Ministry of Health… 2019). All this eventually leads to increased costs of system administration, compared to a "patchwork quilt": a typical situation when there are several HIS in one subject that are neither connected with each other nor regional services (Gusev et al. 2019).

HIS often do not contain modules for laboratory and diagnostic departments. Laboratory systems are usually focused on working exclusively for diagnostic departments and are not included in the work of the medical system as a whole. Such a situation is fraught with complicated information exchange between modules, duplication of HIS functions or manual data entry (Data sheet of the Strategy... 2021)

In addition, manual data entry increases labour costs of medical personnel, as well as causes errors during data transfer, and due to the fragmentation of the system, statistical reporting cannot be properly generated (Evdokimov 2015).

However, maintaining documentation in a fully electronic format will become mandatory in 2024. As stated by M.A. Murashko, head of the Ministry of Health of the Russian Federation, the ultimate goal of this transfer is the development of a data resource "that allows us to transform healthcare" and is designed to ensure continuity, including between levels of medical care, and patient support (Electronic medical... 2023; Murashko announced... 2023).

The personnel issue also remains important – there is a shortage of technical specialists who would both have competence in creating software products and understand performance of the healthcare system (Monakov & Altunin 2022). A low interaction between medical community and IT specialists complicates the work of health information systems.

Health information has its own characteristics: it is heterogeneous (both quantitative and qualitative indicators, and descriptive characteristics), it must be stored for a long time (for example, to assess dynamics in the patient's condition), it must be protected (patient data are a medical secret). Therefore, the laws according to which non-medical databases are governed and the principles according to which they are analyzed are not fully applicable to it. This substantiates the need for a close cooperation between an IT specialist and a doctor at the stage of the development and implementation of a new software product. Even understanding the needs of the target audience with a clear vision of the final product, without feedback from future users of the product there is a risk of designing an absolutely useless IT solution. Consulting with the medical community and discussing developments at the alpha and beta stages is the best option for creating the most user-friendly and practical software product. User-friendliness, speed, maximum interconnection with other system modules, automation of data entry, minimization of labour costs – it is far from being a complete list of requirements for an "deal" HIS (Resolution of the Government... 2012). Therefore, in order to create a really and truly high-demand IT product, a close cooperation between a doctor and a software developer is necessary.

Digital literacy among healthcare professionals

The most common definition of digital literacy is the ability to use information obtained from an electronic source to solve patient health problems. For example, the Norman and Skinner concept includes 6 competencies: medical, traditional, information, scientific, computer and media literacy (Norman & Skinner 2006). However, it should be understood that digital competencies of a patient and a doctor have different contents: the patient's know-

ledge in the field of e-health is necessary to solve his or her personal health problems, while health care specialists should professionally treat a large number of people with diverse problems using digital technologies to accelerate information processing and improve the quality of services provided.

An ever-increasing role of digital technologies in healthcare leads to the fact that the roles and responsibilities of health care specialists are constantly changing, and there is a need for continuous professional development. Scientists project that over the next 20 years most workplaces will have a digital component (The Topol Review 2019). The COVID-19 pandemic has convincingly demonstrated an enormous potential of care delivery in a remote format. Virtual consultation devices and electronic platforms have become indispensable tools for patients with suspected new coronavirus infection, as well as proven promising in patients with other diseases, including non-communicable (Mian & Khan 2020).

However, according to some authors, today's generation of doctors can be considered as "digital natives" (Aungst & Patel 2020). Low literacy in e-health has become a major obstacle to digital transformation in the developed countries, so training digital skills of health care specialists has been gradually introduced in the U.S. (Adler-Milstein et al. 2014), Europe (Schreiweis et al. 2019), Australia (Evolution of eHealth in Australia 2016).

The most common methods for determining the level of digital literacy of care providers are HITCOMP and TIGER. In particular, HITCOMP includes 5 areas of expertise: administration, research/biomedicine, patient care, computer science, engineering/information systems/information and communication technologies, as well as several levels: entry, basic, intermediate, advanced, expert (EU*US eHealth… 2020).

TIGER describes the relevant competencies for those who provide patient care, including communication, documentation, quality and safety management, teaching, training/education and ethics in health information technology. The relevance of the key competencies was assessed in a survey conducted by 718 professional experts from 51 countries (Hübner et al. 2019).

The International Medical Informatics Association (IMIA) has created guidelines on educational needs in the field of bioinformatics and health systems. The structure of skills is described with due regard to the following three parameters: 1) type of employment in healthcare (for example, doctors, nurses, biostatisticians), 2) specialty and 3) stage of career development (bachelor, master, doctor). Recommendations on competencies are given within the framework of educational programs in medicine, nursing, health management, dentistry, pharmacy, public health, medical records management and computer science. To support education, IMIA suggests issuing a certificate of completed education (Mantas et al. 2010).

One of the barriers to introducing technology - a low level of digital knowledge among health care specialists – ranges with the most important ones, i.e. IT technologies and limited financial resources (Brown et al. 2020). Their competencies are not high enough to implement information technologies (Lupton 2019).

In OECD countries, certain conditions are being created to improve digital literacy among health care specialist (this applies to both doctors and nurses), and this is carried out both in the private and public health system and does not depend on the source of funding (Konttila et al. 2019; Marwaha et al. 2022; Socha-Dietrich 2022).

Despite the fact that digital competencies are becoming more and more important, in Russia they were officially included in the standard of higher education at the bachelor and specialist level only in 2021 (Shapiro & Konovalova 2021). However, the problem of increasing digital literacy among active health care specialists remains unresolved.

According to "Comprehensive monitoring of living conditions of the population – 2020" survey, the majority of doctors and nurses have basic digital competencies (89% of doctors and 91% of nurses use social networks, 78% and 73% conduct financial transactions, 52% and 38% order goods and services online, respectively). However, there is a shortage of specialized skills to work with HIS or with certain tools: 18.2% of doctors and 46.6% of nurses do not use computer technology at work, and 31.1% and 29.6%, respectively, lack knowledge and skills to use information technology as part of their official duties (Comprehensive observation... 2020). Among doctors, there is a low level of digital literacy, and also a reduced motivation to adapt to new methods for organizing the treatment process (Dudin et al. 2022). Although during the entire period of IT technology introduction into the healthcare system health care specialists have passed all stages of training, however, the advantages HIS are still being neglected. Without a habit of working with information technology, there will be errors filling out medical records, more time will be spent on filling out documentation, resulting in incomplete registers for reimbursement and financial losses of the organization.

Monitoring study of digital literacy among medical workers in Russia

From February to April 2022, through the educational service website Medobuchenie.rf a pilot monitoring study with the purpose to assess the level of digital literacy among medical workers was conducted (Bezzubtseva et al. 2022). The project used DigCompSAT questionnaire developed by the Joint Research Center (JRC) of the European Commission (EU) of the Science and Knowledge Service for self-testing, and the integrated digital literacy index was calculated on its basis (Clifford et al. 2020).

In total, 136 doctors signed up for the "Management in healthcare" training on the educational service website Medobuchenie.rf took part in the study. The respondents included residents of 43 regions of Russia, including 47.8% engaged in care delivery in state health care facilities and 27.6% - in private health care facilities. The testing involved the analysis of digital literacy in five areas: information literacy, communication and cooperation, digital content development, security, problem solving. The study authors summarize problem areas in digital literacy among doctors at different levels and offer solutions.

The level of knowledge and skills at three levels of proficiency was measured in each direction: basic, intermediate, advanced. The results are presented in the form of summary tables characterizing various aspects of digital literacy. Let's dwell upon some problems that have been identified and considered critical.

A widespread introduction of IT technologies into everyday life has failed to provide understanding of the risks associated with using devices connected to the Internet: only 4.4% of the respondents have a limited understanding of the issues of personal data protection and security; 49.3% of the respondents do not know about the need to regular update the operating system. Only 11.8% of the doctors install and configure antivirus programs on electronic devices on their own without direction; 24% of the doctors stated with confidence that that digital technologies had an impact on their professional activities. Given the fact that health care professionals work with a large amount of patient data on a daily basis, serious gaps in knowledge about digital security and the role of IT technologies in decision-making increase the risks of leakage and disclosure of confidential information.

Analyzing data on digital competencies, the authors conclude that the majority of the respondents have a basic level of proficiency, while some doctors have demonstrated high results. However, some skills remain extremely undeveloped: 84% of the respondents have a low level of knowledge about checking the reliability of the site; 73.3% do not know how to protect themselves from unwanted materials on electronic resources; 79.6% have a limited understanding of the issues of data systematization using software.

It should be noted that the DigCompSAT questionnaire covers only some aspects of digital literacy. AI, virtual and augmented reality technologies will be widely used in the healthcare system in the near future, however, a low level of digital literacy among medical workers will become a significant obstacle in achieving digital transformation of the industry.

In 2023, the authors conducted several in-depth interviews with doctors of pre-retirement or retirement age, who continue to work. This work is yet to be completed, but the trend is obvious: very many interviewees from polyclinics are "sick and tired" of the restricted time per appointment and the need for electronic card keeping, and therefore they are determined to quit or switch to the format of private consultations.

Patient digital literacy/illiteracy

Achieving digital maturity is almost impossible without a certain level of digital literacy among the population. The 2020 survey of the All—Russian Center for the Study of Public Opinion to determine the level of digital literacy among Russians based on the results of a cluster analysis showed the following results: 32% of Russians have high indicators, 30% - above average, 18% - below average, and 20% - low (RBC 2022).

The concept of e-health includes general concepts of digital literacy and its components (VTSIOM, 2020). The model is based on the Norman and Skinner concept (Nazeha et al. 2020), which has been updated and expanded with the help of the "Patient Readiness to Engage in Health Information Technologies" (PRE-HIT) and the "E-Health Literacy Framework" (eHLF). Additionally, the model included elements that independently affect the level of digital competencies among citizens: motivation, engagement, readiness, anxiety, expectations and beliefs (Norman & Skinner 2006; Koopman et al. 2014). For maximum effectiveness, patient competencies should go beyond the skills in handling equipment and software and include functional and critical skills such as navigation through e-health, communication with healthcare providers and joint decision-making (Dunn & Hazzard 2019).

The most commonly used scale for assessing the level of digital literacy is the eHEALS scale. Respondents assess their own competences in various fields: search for health-related information, its critical assessment, and decision-making regarding their health (Karnoe & Kayser 2015).

In 2017, a study of digital literacy among people aged 50-64 was conducted in Sweden to show that 65% of the respondents had an acceptable level of digital literacy, which directly correlated with the use of electronic medical records by the respondents (OR 1.81 95% CI 1.07-3.06) and the national online health information portal (OR 2.91 95% CI 1.13-7.52) (Sundell et al. 2022).

Similar studies have been conducted in our country. For example, in Yekaterinburg, a study on digital readiness of patients with chronic heart failure (CHF) (n=54) shows that in this group there is a low level of digital competencies and intermediate level of digital literacy. These values depended on age, social status, availability of constant Internet access

and gadgets (phone/tablet). Issues of telemedicine consultations and the use of mobile applications cause difficulties for this group of patients. However, the level of digital trust turned out to be high, and with increasing digital competencies, the level of trust in IT technologies is growing as well (Isaeva et al. 2023).

The introduction of digital literacy programs in healthcare has a positive impact on improving the level of digital knowledge and skills among patients: a study conducted in 2022 showed that the introduction of training courses resulted in better opportunities for patients with CHF in health protection, in particular - higher access to medical care ($p<0.005$). The authors also made an important conclusion about economic feasibility of such training programs and the possibility of their integration into daily activities of nursing staff to enhance patient e-skills (Rodríguez et al. 2022).

There are several options to improve digital literacy among patients: an informal training (based on social networks, in a text or video format) or a comprehensive e-learning program on a separate platform. There are also official training opportunities for patients (for example, at the European Patient's Academy on Therapeutic Innovation) (Pushparajah et al. 2015) and so-called patient academies that provide information about diseases and treatment methods or support communication between doctors and patients (Dierks & Seidel 2009).

Big data are the main element of the development of AI and predictive analytics, but it is difficult to obtain them if there is no trust on the part of the patient. Experience shows that making the community confine in technology is a time-consuming task. In addition, a wider dissemination of digital technologies in healthcare, a more intense discussion on ethical issues, in particular the use of AI for diagnosis and treatment.

Furthermore, big data are used in science and to create digital medical products. By seeking health care and signing a personal data processing agreement, the patient gives consent to the use of his or her personal information only in a specific institution and only for a certain type of care. Then, during examination and treatment, both personal data (gender, age, region of residence) and medical indicators (test results, clinical investigation data) are collected. However, at the moment there is no regulatory framework in our country that allows us to transfer depersonalized patient information to developers or researchers - this is neither stipulated by the list of purposes for personal data processing nor is in the text of the consent. Thus, all medical data that could be used for machine learning and further development of the IT market in the medical industry are unavailable. Also, there is no single federal bank of depersonalized medical data that could be used to create AI, meaning a low level of development in this area.

Conclusion

Population ageing, increased life expectancy, and achievement of social and material well-being substantiate a high demand for health services.

The use of digital technologies in medicine helps to simultaneously solve several important tasks: new information about modern technologies, goods or services are faster to reach the end user; doctors also get access to large arrays of data on the patient's condition and his or her medical history, which has a positive effect on the quality of care: the number of errors decreases, exchange of information between medical institutions gets faster, diagnoses are made within a short period of time, waiting time for planned care is reduced. Medical organizations have already actively joined the processes of digital transformation: business

processes are being automated, health information systems are being created in the regions, patient data are being transferred from paper to electronic format.

It is also necessary to note a significant progress in the field of digital health management, namely, an increasing popularity of the Public services portal, which envisages such functions as patient flow management, personalized registration, preferential drug provision, and a single interface, and for patients – e-booking a doctor's appointment, availability of necessary information about services provided, information interaction with insurance companies, etc., that greatly simplifies the lives of the citizens.

The COVID-19 pandemic has become a huge impetus to accelerate digitalization in healthcare: remote issuance of temporary disability leave, a higher number of telemedicine consultations, and expended possibilities for on-line booking of an appointment for medical procedures.

However, there are certain barriers to e- health promotion. At the very beginning, common basic rules have not been developed and, in fact, each region independently followed its own way to digitize, resulting a huge variety of software products used even within one region, which makes electronic document flow between medical institutions difficult, and practically impossible between regions.

Some gaps in the health regulatory framework can be attributed to such barriers.

The issue of digital literacy among medical personnel is of particular importance. Digital transformation is impossible without achieving a high employee loyalty to modern technologies, changing the doctor's mentality and ensuring a confidential approach to introduce information technology. This is possible if the staff understands real benefits of working with IT, and also has a sufficient level of digital competence. Unfortunately, the monitoring study of digital literacy among medical workers has identified significant gaps in their basic digital skills, which is a barrier to a wide dissemination of digital knowledge and the use of artificial intelligence capabilities, and most importantly, a low level of motivation to develop digital skills.

At the same time, a low level of digital knowledge and trust among patients creates a low demand for digital technologies among the population. Citizens are concerned about safety of their personal data on digital media. In addition, there is a fear of medical errors in society associated with the use of telemedicine technologies, potentially resulting in misinterpretation of clinical data and subsequent improper treatment.

One of the tools to deal with incompetence and create a supportive environment is the establishment of centers of excellence to engage people in digital processes with due regard to age, experience, and existing skills, gradually forming an environment of digital trust, without which any technology will be ineffective. Of course, the issues of regulatory and technical nature will hinder the establishment of such centers, however, this contradiction can give rise to a public discussion of the need of this new infrastructural unit in digitalization. Currently, the level of digital trust is key to creating society of digital maturity.

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