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DIGITALIZATION AS A KEY TO THE DEVELOPMENT OF THE COUNTRY'S HEALTHCARE SYSTEM

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Abstract

This article discusses the main trends in the development of the healthcare system in Kazakhstan as a digital state. The reasons for the need to strengthen the IT industry as the basis for the digitalization of the socio-economically important system of the country are described. In addition, article provides recommendations in order to improve the efficiency of the process of digitalization of the healthcare system.

Key words: healthcare system, medicine, digitalization, big data, automation, information technology.

ЦИФРЛАНДЫРУ МЕМЛЕКЕТТІК ДЕНСАУЛЫҚ САҚТАУ ЖҮЙЕСІН ДАМЫТУ ЖОЛЫНДАҒЫ КІЛТІ

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Аңдатпа

Бұл мақалада Қазақстанның цифрлық мемлекет ретіндегі денсаулық сақтау жүйесінің дамуының негізгі тенденциялары талқыланады. Еліміздің әлеуметтік-экономикалық маңызды жүйесін цифрландырудың негізі ретінде IT саласын нығайту қажеттілігінің себептері сипатталған. Сондай-ақ денсаулық сақтау жүйесін цифрландыру процесінің тиімділігін арттыру бойынша ұсыныстар беріледі.

Түйін сөздер: денсаулық сақтау жүйесі, медицина, цифрландыру, үлкен деректер, автоматтандыру, ақпараттық технологиялар.

ЦИФРОВИЗАЦИЯ КАК КЛЮЧ К РАЗВИТИЮ СИСТЕМЫ ЗДРОВОХРАНЕНИЯ СТРАНЫ

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Аннотация

В данной статье рассмотрены основные тенденции развития системы здровохранения Казахстана, как цифрового государства. Описаны причины необходимости усиления IT индустрии, как основы цифровизации социально-экономически важной системы страны. А также предоставлены рекомендации по повышению эффективности процесса цифравизации системы здравоохранения.

Ключевые слова: система здравоохранения, медицина, цифровизация, большие данные, автоматизация, информационные технологии.

Introduction

Digital technologies have begun to take over the world. Around the world, countries are implementing digital systems in all areas, such as healthcare, education, economics and finance and so on. To date, digital technologies have combined such processes as data processing and information and communication technologies. Kazakhstan is also developing in the direction of a digital state. For the formation of a digital state, it is necessary to create conditions. The most important condition is the automation of processes in areas of social importance. One of these areas is the digitalization of healthcare. This article discusses the contribution and active participation of private enterprises in this aspect. As well as the importance of developing the IT industry on the way to the digitalization of the country. In accordance with the state programs: health development and "Digital Kazakhstan", the state is actively developing tools for collecting digital technologies for advanced data analysis. This basic solution will provide impetus for the intensive development of the healthcare system.

Research methods

Studying the main models of the transition from the traditional healthcare system to the digital one, it is necessary to note the main patterns. The construction of sketch models of various socio-economic systems directly depends on the general program of states in the digital economy. Much attention is paid to the development of information technology in medical institutions. Using the descriptive research methodology, it can be understood that the introduction of IT systems in the institutions of the class will create in the future the possibility of creating a common mechanism for interaction in the country's unified healthcare systems [5].

According to the scheme, it is well shown that the main components of the system are changing towards improvement of the e-sources. It is important to note the integration functionality of the digital health system model,since it will allow scaling up processes and introducing new technical tools [1]. Due to the fact that technology is developing rapidly, in particular after the onset of the coronovirus pandemic last years, the transition to a digital model is not a choice, it is a necessity (Figure 1).

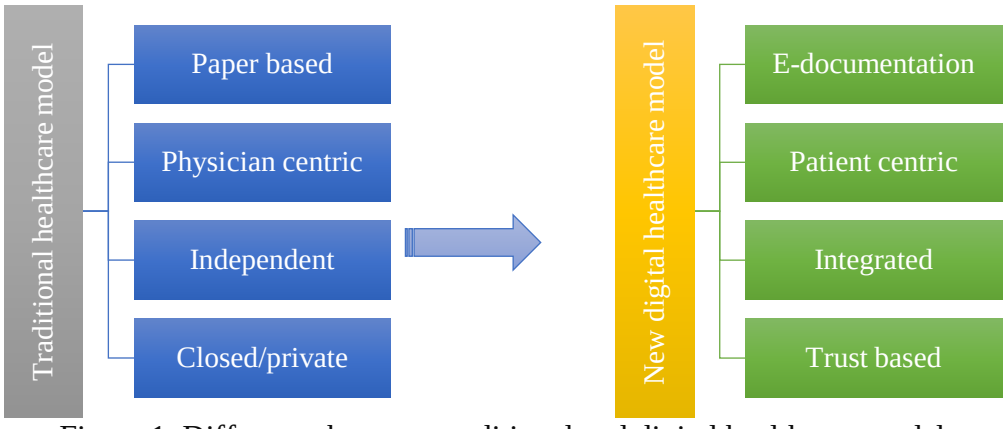

Figure 1. Difference between traditional and digital healthcare models

Results of a research

The key player in the digitalization of health care in Kazakhstan is LLP “Center for Information Technologies “DAMU”, specializing in the development of software and the provision of services in the field of information technology. The company positions itself as an experienced creator of high-tech products in the field of medicine. To date, a large number of

medical institutions use a comprehensive medical information system developed by this organization.

The company uses IT not as a goal, but as a tool to achieve goals. The most important task is the transition from a mechanical model of process management to a digital model, which is what the concept of digitalization implies. Damumed approaches this issue on a large scale and takes into account the interests of all stakeholders in the healthcare system of the country [3]. The company proposes the creation of a full-fledged regional healthcare ecosystem. This ecosystem includes the integration of an information system that will serve as a single field for the database of existing healthcare system entities such as the Ministry of Health, the Compulsory Medical Insurance Fund and the Situational Centers of the regions (Figure 2).

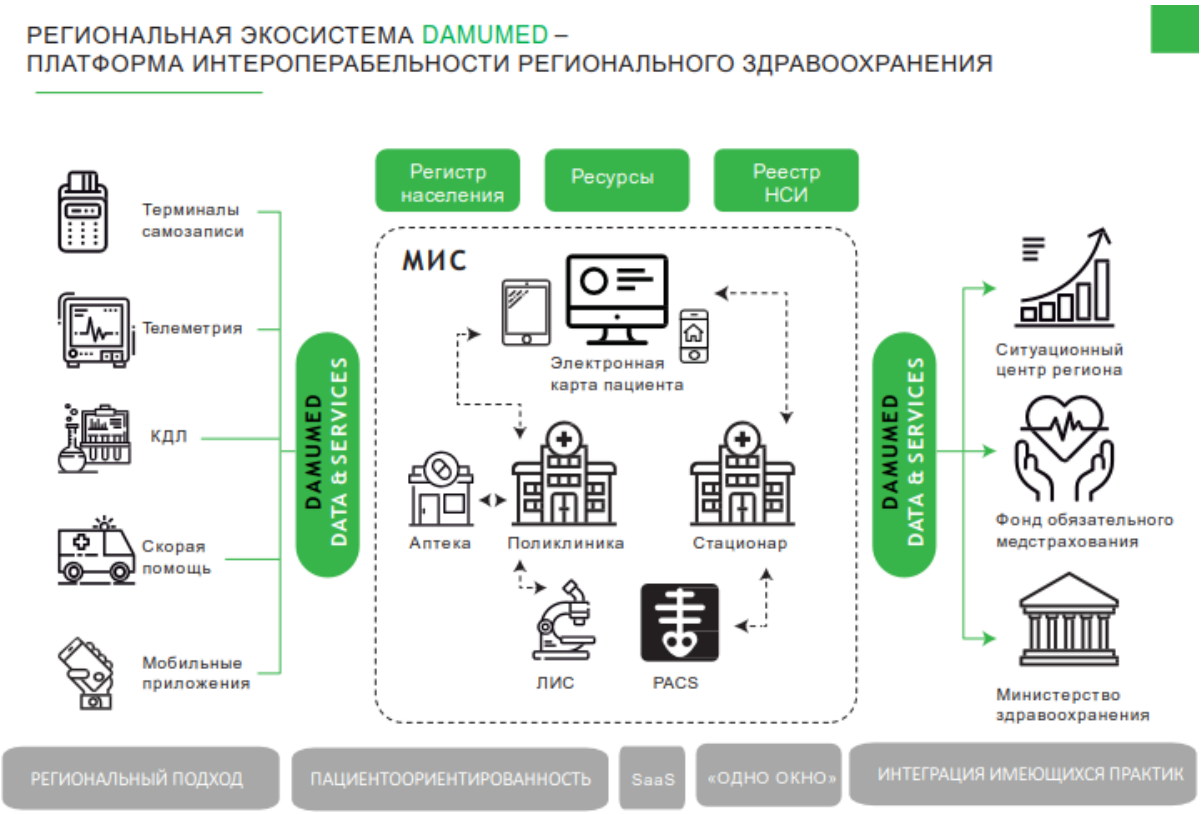

Figure 2. Official ecosystem of the Damumed

First of all, convenience is considered and maximum customer focus for patients, which allows to increase the level of accessibility of information and the receipt of medical services. This goal was achieved by creating the application "Damumed" - which is in the public domain and does not charge a monthly fee. In this application, such functionality as appointments, doctors' schedules, an archive of patient's laboratory tests, prescription of medicines and much more. Thus, creating a new trend "mobile patient" and "mobile medicine". A separate application for local doctors "Damumed.Polyclinic" has also been created, where there is quick access to working documents and records, regardless of location, remote access and the ability to work in field cases [3].

At the moment, the organization has ensured continuity between the levels of medical care, integrated processes between different levels and healthcare services and built a Big Data repository for processing and analyzing information. These results cover 14 regions, more than

700 clinics and more than a million mobile clients. In this information statistics, it is important to note the presence of a Big Data repository, since it is the basement with which other information systems can work in the future.

Considering the impact of Big data development in healthcare business processes, we can note the following basic positions:

– high-quality development of applications necessary for the use of the population, based on data transfer;
– improving the quality of processes for the logistics of medicines;
– the ability to work with personalization and data processing in large volumes;
– expansion of opportunities in the field of scientific research.

If we consider the positive effect of Damumed, it is important to note that the unproductive work of health workers is being eliminated. As well as reducing costs due to digital data exchange and reducing the duplication of studies by more than 300 million tenge and optimizing drug costs are also taking place. Research in medicine is the core of science [3]. Absolutely all countries strive to develop the scientific base through effective and efficient research. In this case, as previously mentioned, big data will play a huge role.

The next key player among private organizations in the field of healthcare in Kazakhstan is I-teka Unified Information Service LLP. This company gained its fame during the struggle of Kazakhstan with the global Covid-19 pandemic. "I-teka" positions itself as a medical portal with the ability to search for information on medicines, medical centers, pharmacies and doctors [2]. However, this portal is more commercial, since through it people can make purchases, deliver medicines and sign up for private clinics with doctors. In general, this portal is a kind of market place where users can find almost everything they need in a very convenient interface. In particular, it is suitable for the population who are accustomed to using private medical services, clinics and independently purchasing the necessary pharmacy products.

Discussion

However, today there is still a problem of access to the basic infrastructure in rural areas; this slows down the process of digitalization of the healthcare system. The state is carrying out work on laying networks in remote areas, as well as work on equipping with computer and medical equipment. This requires a huge investment, since most of the old-fashioned medical equipment does not transmit research results in digital format. In turn, this is one of the blockers in the development of a unified database [2].

According to the studied materials of the domestic healthcare system, development in four directions can be noted (Figure 3):

– In-Hospital
– In-Clinic
– In-Home
– Community

Compared to the traditional healthcare system, there is a variety of choice of category for receiving medical care. The main tools are digital sources of information and applications. It is important to note here that the healthcare system is developing in parallel with the education and technical awareness of the population. The willingness to use information sources makes it possible to launch new mass-use products on the medical market, such as «i-Teka».

By evaluating the structures of the above categories, it can also be seen that medical equipment and systems are at the core of the development of digital health care. Why is equipping with new infrastructure so important? Main reasons are:

– improving the safety of medical care by reducing the risks of technical and human error factors;
– increasing the effectiveness in the tasks of prescribing drug therapy;
– reduction of operating and administrative costs in medical institutions;
– improving the quality of medical care in general.

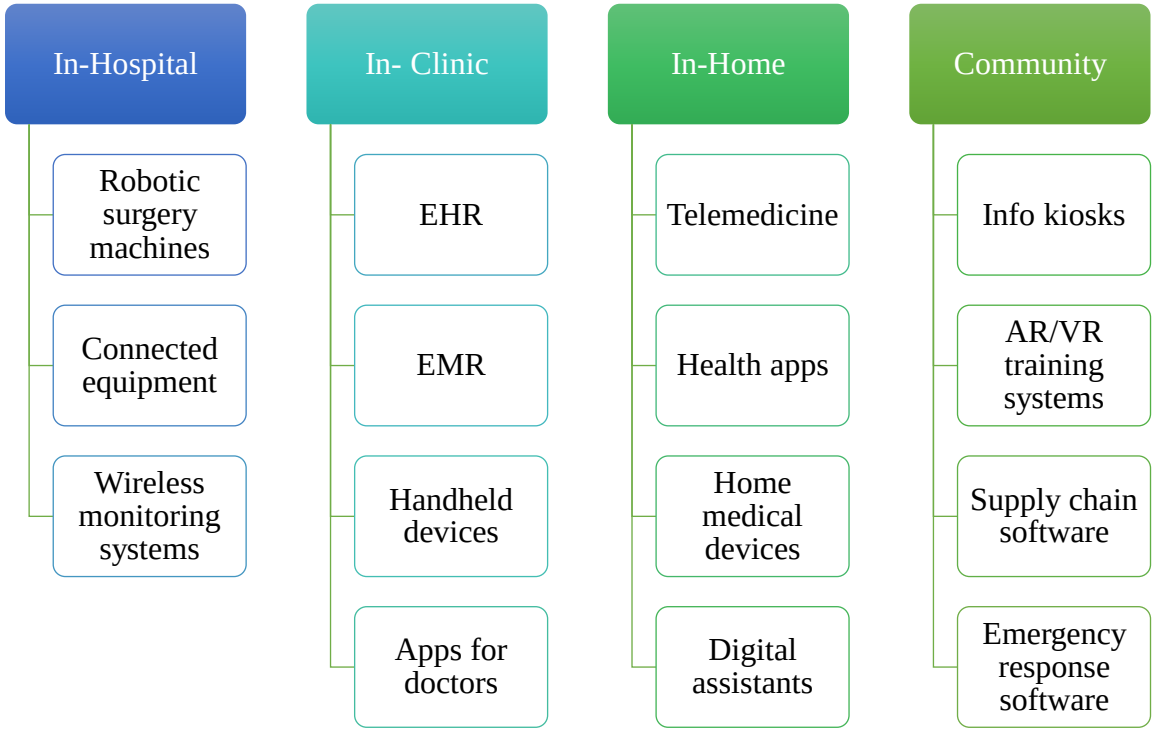

Figure 3. Categories of medical care

Conclusion

The digitalization of the healthcare system, as one of the most important socially and economically important areas, is a strategically necessary process. This process is quite long-term and requires large investments of both financial and human resources. To do this, the state is currently moving towards the development of the local IT industry and improving the infrastructure in medical institutions. One of the main indicators is an increase in the level of transparency in the development of the digital state and data collection.

The presence of domestic IT companies in the healthcare sector is also very important, and we see that IT companies are independently investing in this sector, which shows a great potential for the development of digital medicine. It is also major to note the interest of the state in the development of domestic companies for the development of the scientific base in the framework of public-private partnership. In any projects (investment, public-private partnerships), state regulations are essentials. It can be divided into three main areas (Figure 4):

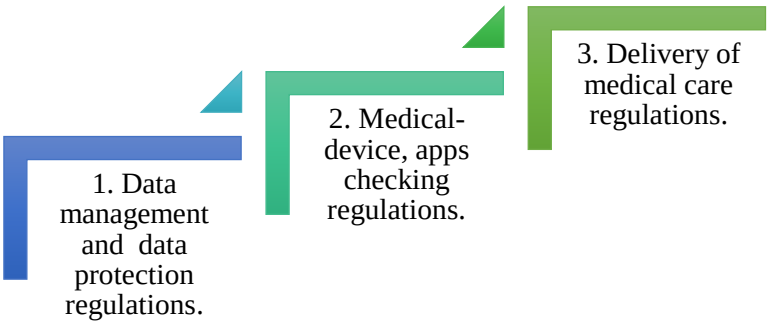

Figure 4. Types of regulations in digital healthcare system

The first and most important step is data management, data protection regulations. As mentioned earlier, working with databases opens up great opportunities, but at the same time creates great risks in the leakage of information and personal data, violation of ethical standards. Therefore, the state should invest special attention in this part of the development of digitalization processes in medicine.

The second stage of regulations is medical-device, apps checking regulations. Prior to the launching and use of a particular product, it is necessary to carry out verification and approval processes. This is important to verify the use of safe, effective IT products by the public and healthcare facilities.

Finally, yet importantly step is the presence of regulations in terms of delivering of medical care. To support and encourage current medical practices to use digital healthcare solutions in a right way.

Moving from the traditional healthcare system to the digital one is complex and laborious process, which requires updating from small medical institutions in remote places to large republican centers of medicine. Thus, by going from small to large, the country will be able to create a truly high quality and functioning unified healthcare system.

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