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Development of the national market for healthcare services in the Republic of Kazakhstan in the context of the digitalization of the economy

Abstract

Object: The aim of the study is to identify the effects of the influence of the processes of digitalization of society on the development of the healthcare services market. The object of the research is the healthcare services market in the Republic of Kazakhstan. The subject of the research is managerial and economic relations that mediate the processes of development and functioning of the health services market in the context of digitalization of society.

Methods: Statistical and comparative analysis.

Findings: The article examines the economic effects of the introduction of digital technologies in the healthcare sector, both from the point of view of medical organizations and from the point of view of patients. These effects are expressed in monetary and non-monetary terms (e.g. reduced waiting times). The scale and rate of introduction of digital technologies, qualitative characteristics are shown. The rates of computerization of the work of medical institutions, equipping with the Internet, the transition from paper information carriers to electronic ones, an increase in the number of users with special mobile applications from medical institutions, SMS notifications are traced. The problems of introducing digital technologies into the healthcare sector of Kazakhstan are identified.

Conclusions: During the period under review, the provision of medical organizations with computers and access to the Internet increased significantly. In Kazakhstan, medical information systems have been introduced. They have created electronic health passports for each patient, in which employees of medical institutions have entered data about patients. Likewise, other objects of primary medical documentation were transferred to an electronic format, which led to savings in paper and other carriers of medical information, increased the speed of document circulation, and reduced the waiting time for receiving a service. The creation of the National Telemedicine Network made it possible to solve the problems with the shortage of doctors in remote regions and with the speed of providing medical consultations. Introducing special mobile applications to use also creates convenience for recipients of medical services. Thus, the digitalization of healthcare services has improved the quality of life of the population of Kazakhstan. At the same time, there are certain institutional problems that need to be addressed.

Keywords: healthcare market, healthcare service in Kazakhstan, digitalization of healthcare services, telemedicine, e-healthcare, medical information systems, effects of digitalization.

Introduction

The development of the health care services market in the country has a number of positive economic effects: Firstly, it contributes to the saving of human capital by reducing morbidity and mortality, especially of the working-age population, which directly affects the rate of economic growth; Secondly, affordable and high-quality medical services are one of the key factors in the attractiveness and choice of a city (or other settlement) for a place of residence, especially by the most competitive segments of the population, which are the basis for the development of a modern economy, i.e. the uneven development of regional and national markets for medical services is one of the catalysts for labor migration; Thirdly, the development of the healthcare system itself can be a catalyst for economic growth through attracting direct investment, generating additional demand by increasing demand for medical tourism, as well as creating incentives for the de-

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velopment of related sectors of the economy: The pharmaceutical and medical industry, the construction sector, industrial science, etc.

The modern economy has undergone an information technology revolution, manifested in the digitalization of all social and economic processes. This digitalization manifests itself in two fundamental vectors: technical (an increase in the scale of programmed data exchange) and social (an increase in the intensity of social interactions). Each of these vectors has an important impact on economic processes. This influence is more significantly manifested in the service markets, which have significant non-economic specifics.

One of these markets is the market for healthcare services, which can be considered not only in the general economy but also in the sectoral and social aspects, on each of which the impact of the digitalization of society is significant. This requires the development of conceptual ideas about the functioning and development in the updated conditions because the ongoing changes lead to the rapid obsolescence of the formed theoretical views. From a practical point of view, the creation of a decent level and quality of life of the population requires a developed market for health services, and therefore, the presence of effective mechanisms for its regulation and self-regulation.

Digital health plays a significant role in achieving mass health coverage by providing rational and effective models for delivering quality care that is equally accessible to everyone. It is also important to ensure that investments in the development of digitalization of the healthcare market are directly linked to solving public health problems.

Literature Review

The issues of digitalization of healthcare in Kazakhstan are presented in the publications of Esenbaev B.S., Andarova R.K., Smailov B.T., Omir A.S., Abilkayir N.A., Krest'ianinova O.G.

Certain issues of the impact of technological changes and digitalization on the social sphere are disclosed in the publications of the authors: Satybaldin AA, Alibekova G., Bapiyeva M., Mambetova S., Ayaganova M., Kalykov A., Akhmetova A., Yeskerova Z., Morozova, M. , Isupov, P., Korchevska, L.

The problems of organizing the development of modern health care were considered by Gulis G., Aringazina A., Sangilbayeva Z., Zhan K., de Leeuw E., Allegrante J.P., Tret'iakova E.P.

In addition, materials are available on the topic of digitalization of health care, published based on the results of research by analysts at the World Health Organization.

Methods

The degree of validity and reliability of the results, conclusions obtained is confirmed by: Using the official data of the World Health Organization; using materials from the Ministry of Health of the Republic of Kazakhstan, the Ministry of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan; statistical and analytical data of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan; analytical reporting on the implementation of the State Program “Digital Kazakhstan”.

The methodological base is presented by analysis, synthesis, analogy, and systematic approach.

Results

Key trends in the development of the healthcare services market are associated with overcoming the existing problems in this area: An increase in the territorial mobility of patients; state support for the growth of the level of territorial distribution of medical infrastructure; increasing the level of professionalism of doctors and other medical personnel; an increase in the level of computer equipment in medical institutions, including the development of telemedicine; stabilization of the level of government spending on health care (according to which Kazakhstan is at the level of developing countries); an increase in the average cost of medical services and a general outstripping (in comparison with other sectors of the economy) growth in market volumes; changes in the market structure due to the increased demand for the services of narrow specialists; the growth of customer loyalty, which is reflected in an increase in the number of repeat appointments. Due to the significant territorial differentiation of Kazakhstan, the national market of medical services in the territorial aspect continues to develop asynchronously and asymmetrically.

At the beginning of 2019, the provision with computers of medical organizations was 94.1%. At the level of cities and regional centers, 65.8% of medical organizations are provided with Internet access. In health care organizations in Kazakhstan, the introduction of medical information systems has reached 65.1%. At the regional level, 16.3 million electronic health passports have been created and driven into medical in-

formation systems, which covers 89% of the total population (The State program of healthcare development of the Republic of Kazakhstan for 2020–2025, 2019).

Responsible for the implementation of the creation of a common digital health space are: The Ministry of Health of the Republic of Kazakhstan, the Ministry of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan, local executive bodies.

During the operation of the National Telemedicine Network over 210.8 thousand telemedicine and video consultations were carried out. Today, the National Telemedicine Network unites 217 healthcare facilities of the Republic of Kazakhstan at the district, regional and republican levels, including:

- 145 regional hospitals;
- 37 regional and city hospitals;
- 35 republican clinics and other healthcare organizations (Esenbaev, 2021).

Tasks solved by the National Telemedicine Network:

- increasing the availability of the rural population to consultative and diagnostic medical care;
- accelerated introduction of new methods of treatment and diagnostics;
- advanced training of medical personnel;
- an increase in the life expectancy of the rural population;
- decrease in mortality of the population (Esenbaev, 2021).

According to the data for the first quarter of 2019 compared to the same period in 2017, there was an increase in the equipping of workplaces with computer equipment, considering duty and shift, by 23.7%. Internet access in healthcare organizations increased by 21.9%. The coverage of medical organizations with information systems up to the district level increased by 30.5% (Table 1).

Table 1. IT infrastructure in healthcare organizations

Indicator name	2017 year	2018 year	1 quarter of 2019	Rate of increase, %
Equipping workplaces with computer equipment, taking into account duty and shift	79242	90916	91843	23.7
Internet access	2785	3894	3976	21.9
Coverage of medical organizations with medical information systems up to the district level.	545	697	693	30.5
Maintaining forms of primary medical documentation in electronic format in regional medical organizations	115	662	693	6 times magnification
Note – Compiled by the authors based on the source (Esenbaev, 2021)				

At the beginning of 2019, compared to the beginning of 2018, the maintenance of forms of primary medical documentation in electronic format in regional medical organizations increased 6 times. Those all 693 medical organizations have switched to paperless records management.

According to Order No. QR DSM-48 of December 29, 2018 “On amendments and additions to the order of the Acting Minister of Health of the Republic of Kazakhstan dated November 23, 2010 No. 907” On approval of forms of primary medical documentation of healthcare organizations”, the following was carried out:

- 62 forms of primary medical documentation were excluded;
- 12 forms are outlined in a new edition: 5 in 1 notification forms are unified, 8 in 1 directions for analyzes (Order on approval of forms of primary medical documentation of healthcare organizations, 2018).

There is a continuous growth in the number of users of mobile applications (Table 2). Currently, the following mobile applications are available to customers in the Republic of Kazakhstan: “DamuMed”, “Smart Astana”, “Oncoscreen”, “Early Childhood Care”, “People’s Control”, “Therapist’s Guide MedElement Co”, “Visiting Nurse”, “KDL Olimp”, “DARIGER Pro”. These mobile applications accelerate medical care, mediate interaction between clients, medical organizations and the Ministry of Health of the Republic of Kazakhstan.

Table 2. The number of users of mobile applications in healthcare in Kazakhstan, 2019

User category	Number of persons
Actual number of users	3235351
Among the Internet active population (20–60 years old)	2904142
Among pregnant women	216428
Note – compiled by the authors based on the source (Esenbaev, 2021)	

If in 2017 the writing of prescriptions on paper was almost completely practiced, now the transition to the issuance of prescriptions in electronic format is underway, all information is entered into specialized databases (Table 3).

Table 3. Dynamics of the transition from paper prescriptions to electronic prescriptions

Indicator	For 2018	For 2019
Number of written prescriptions on paper	12423784	3580234
including for outpatient drug provision	11605114	3341213
Note – Compiled by the authors based on the source (Esenbaev, 2021)		

Good governance requires open but critical thinking. Digital health strategies must be based on proven solutions and assess the innovation lifecycle to continue to advance towards health policy goals. There is some risk that new technologies and treatments will increase health care costs and widen the equity divide (Smailov, Andarova, 2019).

The database records the mobile phone numbers of patients (or proxies), which makes it possible to use an automatic electronic SMS notification system (Table 4).

Table 4. Implementation of SMS notifications

Период	SMS notifications sent	Recorded patient reviews	Replies received confirming the status of not receiving a private message
As part of a pilot project from 12 to 19 December 2018	191000	2881	483
From 12 to 30 April 2019	158231	5447	644
Note – Compiled by the authors based on the source (Esenbaev, 2021)			

Instead of the traditional paper hospital cards, electronic health passports are now used (Official Information Source of the Prime Minister of the Republic of Kazakhstan, 2020).

Organizational changes are needed to reform the health care system, but there are a number of challenges associated with them:

- the need to create a basic infrastructure;
- unwillingness of people to perceive technological changes;
- problems of adapting digital health care methods to the needs of different population groups (Satybaldin et al., 2021).

Kazakhstan is another example of a country where the primary health care system has been redesigned to achieve universal health coverage based on digital health. At the same time, a completely digital ecosystem was created in which each person, on the basis of his identity card, can receive all his medical documentation (Alibekova, Bapiyeva, 2019). In January 2019, Kazakhstan introduced a system of national electronic medical cards, which can be accessed from any smartphone.

The context for digitalizing healthcare is shaped by a governance system that contains many different national models that have proven to be effective. The effects of digitalization of healthcare services in Kazakhstan in quantitative terms are presented in Table 5.

It should be recognized that some digital solutions may not be suitable for implementation in a particular national health system. In addition, the government should develop mechanisms to ensure that the industry is held accountable for demonstrating the effectiveness of digital innovation in healthcare. This means that the industry must prove that the technology delivers on the promised goals so that public funds are not spent on “buying promises” (Assessing the impact of digital transformation of health services, 2019).

Table 5. Effects of digitalization of healthcare services in Kazakhstan

Effect parameter name	Meter	Quantification of the effect
Savings on purchasing paper for medical paper records	Million tenge	336.5
Reducing the number of purchased consumables for medical imaging (fluorography, X-ray, mammography, etc.)	Million tenge	252.6
Reduction of human queues due to pre-registration through electronic services	%	30
Reducing the time for obtaining laboratory results due to electronic services	%	44
Reduced visits to the clinic	%	8.3
Reduced time when transferring an asset to a clinic	%	64.3
Reducing the time a patient spends in the clinic before receiving services	%	50
Saving time for doctors and patients by reducing the average time of servicing patients in polyclinics	minutes	From 25 to 15 minutes
Reduced travel time for ambulances	%	23
Reducing the processing time of a call received at the dispatch office	%	25
Optimized jobs	units	387
Note – Compiled by the authors based on the source(Esenbaev, 2021)		

The public sector faces significant challenges in regulating this rapidly developing area. Large sections of the population provide their data and help develop digital health as an area, but private companies are primarily benefiting – both financially and via the huge amount of voluntary data obtained from the population. Public data should not be provided to companies, and government services should maintain their independence from the industry sector. Compliance with ethical principles is vital. This reason alone is enough to substantiate the leading role of the state in the further formation of the digital healthcare space (Abishev, Spatayev, 2019).

Among the new technological trends in the medical services market, telemedicine is singled out as a priority. The development of telemedicine was influenced by the development of computer technologies and the Internet. At the same time, the development of telemedicine is caused not only by new technological capabilities, but also by the lack of doctors, free time for patients, and an increase in the number of patients. When it comes not to performing medical actions related to the physical contact of a doctor with a patient, but to counseling, doctors using remote medical technologies could provide care much more efficiently and more economically, especially for patients in remote areas (Tret'iakova, 2020).

The development of the telemedicine market abroad is proceeding rapidly. As for Kazakhstan, the potential for the development of this sector of medical services is also significant, but country-specificities must be taken into account. In particular, institutional restrictions are associated with the specific legal regulation of the considered segment of the medical services market: ensuring the security of personal data, creating material and regulatory conditions for storing personal information on electronic media, the possibility of telemedicine consultations on a multi-level scheme, creating electronic offices, etc. (Mambetova et al., 2021).

New medical information technologies aimed at the development of medical services should develop in the following main directions:

- formation and improvement of patients' special technical skills in biomedical information management;
- development of motivation for citizens suffering from chronic diseases to purchase electronic devices that allow them to monitor their health remotely;
- implementation of the organization and operation of clinics in which the human body is monitored for various characteristics, etc. (Krest'ianinova, 2019).

The emergence of new technologies has a positive effect on the development of the medical services market.

The complete digitalization of healthcare services is a strategic goal that has yet to be achieved. According to analysts' forecasts, within the digital transformation, new professions will appear, and the requirements for holders of classical specialties will change. The field of information technology is currently recognized as the fastest growing. For this reason, it is difficult to predict that a certain final stage will be reached, when it will be possible to admit that the healthcare system is completely digitalized. The markers of "digi-

talization" of healthcare used in international practice are constantly changing, and the fundamental task is not to achieve a conditional maximum, but to continuous development (Omir, Abilkayir, 2021).

At the moment, in our republic, some medical documents are already kept only in digital format, certain types of services are provided in electronic form, but there are whole areas ahead that are not covered by digitalization. In particular, work with genomes and personalized medicine. The Ministry of Health, nevertheless, has certain strategies until 2025 within the framework of the implemented State Program for the Development of Healthcare, as well as the State Program "Digital Kazakhstan" (The state program "Digital Kazakhstan", 2017). Within this period, it is important, on the basis of the provided digital data collection tools, to introduce tools for patient verification and advanced analysis of medical data. This will give an impetus to the accelerated development of the health care system owing to the internal resources, and not through attempts to constantly increase the number of hospitals and clinics, doctors and equipment.

The implementation of digital platforms is supervised by the Department of Health Digitalization of the Ministry of Health of the Republic of Kazakhstan.

In recent years, efforts to informatization have been focused primarily on the provision of medical care. In a short time, Kazakhstan was able to introduce a number of technologies, including medical information systems and mobile applications. This was accomplished by transferring this activity to a competitive environment, active joint work of state medical organizations and private providers of information technology. However, the project on the formation of a common platform at the national level, where medical data about a particular patient obtained from various sources would be integrated, has not been completed. This platform is necessary for both the patient himself and the doctors providing him with medical care, government agencies and funding (Gulis et al., 2021). The public health sector is also poorly covered by digitalization, and this became especially acute against the backdrop of the COVID–19 pandemic.

Despite the critical negative consequences of the pandemic in early 2020, COVID–19 has become a kind of driver that made the service sector develop more actively, which, most likely, would not have happened normally (Morozova et al., 2021).

Not enough attention has been paid to the collection of depersonalized data for the purposes of scientific and practical research. Many of the initiatives related to digitalization of healthcare remained at the pilot stage. This can be explained by the fact that it is difficult to capitalize private investments or to recognize their payback, because the health care system in the republic remains socially oriented.

However, all these processes at the same time will not cancel the traditional visit to polyclinics. People who are accustomed to seeing doctors in person will still be able to go to consultations.

Discussion

Medical service is an economic (considering the rather strict legal regulation of medical activity and legal, which, however, does not contradict the provisions of modern institutionalism (the economic theory of contracts, a category), and medical care is a professional, moral, social category.

Conclusions

The quality of medical services is an essential component of the social well-being of the population. First, the availability and quality of medical care, as well as issues of disease prevention, are important here. Introducing digital technologies in healthcare will help to solve improving the quality of medical services requires the development of e-health and the transition to paperless document flow.

Digital modernization of healthcare is currently considered one of the main mechanisms for modernizing domestic healthcare. Despite the obvious success of individual projects, the massive introduction of digitalization methods into the daily work of most healthcare institutions in the country remains insufficient. The main problems are the lack of a clearly regulated financing mechanism and regulatory support for digitalization, a scientifically grounded algorithm for the use of electronic technologies, a lack of technical equipment and trained personnel.

The technological evolution of the healthcare system is a fundamental part of the development of society, owing to which the transformation, storage and generation of information in the digital space takes place. Modern medicine is increasingly using electronic capabilities, improving the quality of service and adjusting to the fast pace of life of citizens. Kazakhstani companies are actively introducing digital platforms to promote new generation medicine.

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Л.А. Корчевская, М.К. Асанова, Р.А. Рахимжанова, Г.А. Райханова, Г.К. Рахимжанова

Цифрлық экономика жағдайында Қазақстан Республикасының денсаулық сақтау қызметінің ұлттық нарығын дамыту

Аңдатпа

Мақсаты: Зерттеудің мақсаты — қоғамның цифрландыру процестерінің денсаулық сақтау қызметтері нарығының дамуына әсерін анықтау. Зерттеу объектісі — Қазақстан Республикасындағы денсаулық сақтау қызметтерінің нарығы. Зерттеу мәні қоғамды цифрландыру жағдайында денсаулық сақтау қызметтері нарығының дамуымен жұмыс істеу процестерін делдалдайтын басқарушылық және экономикалық қатынастар болып табылады.

Әдістері: Статистикалық және салыстырмалы талдау.

*Қорытынды:*Мақалада медициналық ұйымдар тұрғысынан да, пациенттер тұрғысынан да денсаулық сақтау қызметтері саласына цифрлық технологияларды енгізудің экономикалық әсері зерттелген. Бұл әсерлер ақшалай және ақшалай емес өлшеуіштерде көрінеді (мысалы, күту уақытының қысқаруы). Цифрлық технологияларды енгізу ауқымы мен қарқыны, сапалық сипаттамалары көрсетілген. Медициналық мекемелердің жұмысын компьютерлендіру, Интернет желісімен жабдықтау, ақпаратты қағаз тасымалдаушылардан гөрі электрондық тасымалдаушыларға көшу, медициналық мекемелерден арнайы мобильді қосымшаларды пайдаланушылар санының көбеюі, СМС–хабарламалар қарқыны байқалды. Қазақстанның денсаулық сақтау саласына цифрлық технологияларды енгізу проблемалары анықталды.

Тұжырымдама: Қаралған кезеңде медициналық ұйымдардың компьютерлермен және Интернет желісіне қолжетімділікпен қамтамасыз етілуі айтарлықтай өсті. Қазақстанда медициналық ақпараттық жүйелер жұмыс істейді, онда әрбір пациентке электрондық денсаулық паспорттары жасалған, оларға медициналық мекемелердің қызметкерлері пациенттер туралы деректерді енгізеді. Сондай-ақ бастапқы медициналық құжаттаманың басқа да объектілері электрондық форматқа ауыстырылды, бұл қағаз бен медициналық ақпараттың басқа да тасымалдаушыларын үнемдеуге, құжат айналымының жылдамдығын арттыруға, қызмет алуды күту уақытын қысқартуға себеп болды.

Ұлттық телемедицина желісін құру шалғай өңірлерде дәрігерлердің жетіспеушілігімен және медициналық кеңес беру жылдамдығымен проблемаларды шешуге мүмкіндік берді.

Арнайы мобильді қосымшаларды пайдалануға енгізу медициналық қызмет алушыларға қолайлы жағдай жасайды.

Осылайша, денсаулық сақтау қызметтерін цифрландыру Қазақстан халқының өмір сүру сапасын жақсартуға мүмкіндік берді. Сонымен бірге институционалдық сипаттағы белгілі бір проблемалар бар, оларды шешу қажет.

Кілт сөздер:денсаулық сақтау қызметтерінің нарығы, Қазақстанның денсаулық сақтау жүйесінің қызметі, денсаулық сақтау қызметтерін цифрландыру, телемедицина, электрондық денсаулық сақтау, медициналық ақпараттық жүйелер, цифрландырудың әсерлері.

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Развитие национального рынка услуг здравоохранения Республики Казахстан в условиях цифровизации экономики

Аннотация

Цель: Целью исследования является выявление эффектов влияния процессов цифровизации общества на развитие рынка услуг здравоохранения. Объект исследования – рынок услуг здравоохранения в Республике Казахстан. Предметом исследования являются управленческие и экономические отношения, опосредующие процессы развития и функционирования рынка услуг здравоохранения в условиях цифровизации общества.

Методы: статистический и сравнительный анализ.

Результаты: В статье изучены экономические эффекты от внедрения цифровых технологий в сферу услуг здравоохранения как с точки зрения медицинских организаций, так и с точки зрения пациентов. Данные эффекты выражены в денежных и неденежных измерителях (например, сокращение времени ожидания). Показаны масштабы и темпы внедрения цифровых технологий, качественные характеристики. Прослежены темпы компьютеризации работы медицинских учреждений, оснащения сетью Интернет, перехода от бумажных носителей информации на электронные, увеличения количества пользователей специальными мобильными приложениями от медицинских учреждений, СМС-уведомлений. Выявлены проблемы внедрения цифровых технологий в сферу услуг здравоохранения Казахстана.

Выводы: В рассмотренный период обеспеченность медицинских организаций компьютерами и доступом к сети Интернет существенно выросла. В Казахстане внедрены медицинские информационные системы, в них созданы электронные паспорта здоровья на каждого пациента, в которые сотрудники медицинских учреждений

внесли данные о пациентах. Так же и другие объекты первичной медицинской документации перенесены на электронный формат, что вызвало экономию бумаги и других носителей медицинской информации, увеличило скорость документооборота, сократило время ожидания получения услуги. Создание Национальной телемедицинской сети позволило решить проблемы с нехваткой врачей в удаленных регионах и со скоростью предоставления медицинских консультаций. Внедрение и использование специальных мобильных приложений также создает удобства для получателей медицинских услуг. Таким образом, цифровизация услуг здравоохранения позволила улучшить качество жизни населения Казахстана. В то же время есть определенные проблемы институционального характера, которые необходимо решать.

***Ключевые слова*:** рынок услуг здравоохранения, сервисизация здравоохранения Казахстана, цифровизация услуг здравоохранения, телемедицина, электронное здравоохранение, медицинские информационные системы, эффекты цифровизации.

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