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THE DIGITAL ECOSYSTEM OF A HEALTHCARE ORGANISATION

Olga Voronova, Tatyana Khnykina,
Dmitrii Karaptan ✉

Peter the Great St.Petersburg Polytechnic University, St. Petersburg, Russia

✉ dmitriink2000@gmail.com

Abstract. The international experience of leading countries has proved the high efficiency of using digital platform solutions as part of developing their own ecosystems in many sectors of the economy, including the healthcare system. These solutions have significantly increased the value proposition for the state, business and society by reducing the level of transaction costs for all participants in the relationship. This paper presents a metamodel of medical ecosystem architecture that can become a basis for shaping and developing applied solutions as part of the implementation of strategies for digital transformation of the industry.

Keywords: ecosystem, digital ecosystem, digital platform, health ecosystem, digital ecosystem metamodel, digital ecosystem architectural model

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ЦИФРОВАЯ ЭКОСИСТЕМА ОРГАНИЗАЦИИ ЗДРАВООХРАНЕНИЯ

Ольга Воронова, Татьяна Хныкина, Дмитрий Караптан ✉

Санкт-Петербургский политехнический университет Петра Великого, Санкт-Петербург, Россия

✉ dmitriink2000@gmail.com

Аннотация. Мировой опыт ведущих стран доказал высокую эффективность использования цифровых платформенных решений в рамках развития собственных экосистем во многих отраслях экономики, в том числе в системе здравоохранения. Эти решения значительно увеличили ценностное предложение для государства, бизнеса и общества за счет снижения уровня трансакционных издержек для всех участников отношений. В данной работе представлена метамодель архитектуры медицинской экосистемы, которая может стать основой для формирования и развития прикладных решений в рамках реализации стратегии цифровой трансформации отрасли.

Ключевые слова: экосистема, цифровая экосистема, цифровая платформа, экосистема здоровья, метамодель цифровой экосистемы, архитектурная модель цифровой экосистемы

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Introduction

The cross-cutting transformation of the global economy is now having a significant impact not only on individual sectors, but also on the development of entire countries, making them more competitive and attractive, both in terms of the investment climate and quality of life for millions of citizens. The scale of changes forces us to pay close attention to fundamentally new approaches to organizing and managing information structures based on innovative platform business models.

In the general paradigm of digital transformation, the key role today is played by those companies and countries that build their processes in the key of data-centric, client-oriented platform information ecosystems. Examples here are the BigTech giants represented by the FAMGA group (Facebook, Apple, Microsoft, Google, Amazon).

The leading concept under the influence of which the modern health care system is formed, including in Russia, is the value-based health care model proposed by the American economist, Harvard Business School professor Michael Porter (Porter and Guth, 2012; Porter and Teisberg, 2006).

The relevance of the topic considered in the paper is due to the requirements of modern challenges facing not only a particular medical organization, but also caused by the need to reengineer large-scale transformation processes that face the entire healthcare system of the Russian Federation today.

The article is devoted to the development of a metamodel of the medical ecosystem, as well as to the study of the possibilities of its application in the existing realities of the Russian Federation's digital

economy.

The object of the study is a model of a digital medical ecosystem.

The subject of the study is the architecture of a digital medical ecosystem that can ensure the sustainable development of a medical organization in the existing conditions, contributing to building an effective system of interaction between its participants, reducing the level of transaction costs for each of them, subject to the provision of personalized, client-oriented services and services.

Materials and Methods

1 The term of medical ecosystem

The rapid development of end-to-end technologies and the process of globalization in the BANI world has become a key element in the transformation of not only market relations and business models, but also the socio-economic life of society, behavioral models have changed, new approaches to building social communities in cyberspace have been formed. Previously known types of social relations are acquiring different forms and scales, a completely new specificity in communications is emerging, decentralized network structures are being formed, and the location for communication is shifting to the digital plane (Shlyakhto et al., 2022). The place of interaction of subjects becomes extraterritorial, time boundaries are collapsing, new requirements are being formed for the participants in the interaction and the principles of managing relationships between them (Ilin et al., 2022). All this could not but affect the healthcare system, which today is one of the key elements of the sustainable development of the state, business and society.

Due to the integration of new business models of the healthcare system into a single digital circuit, which are formed taking into account platform and end-to-end technologies, it is possible to achieve important successes in the implementation of the vertically oriented concept of 4P medicine. At the same time, despite the fact that projects in the field of digital transformation of key sectors of the economy are developing at a rapid pace today, the conceptual apparatus of ecosystem solutions in this area is at the stage of its dynamic development.

The analysis of scientific sources (Dong et al., 2007a, 2007b; Dong and Hussain, 2007; Jacobides, 2019; Li et al., 2012; Saleh and Abel, 2016), which provide the authors' definitions of the digital ecosystem, showed the key regularities and common elements inherent in this type of network interaction, which can include: a digital platform, the components of which are IT infrastructure and digital services, business logic of value interaction of system elements and emerging communities.

Aggregating these components, a digital ecosystem is defined as a business model based on a data-centric digital platform that brings together a meaningful number of participants for the purpose of their effective interaction.

2 Components of the healthcare ecosystem

The digital transformation of healthcare is now a global trend, as evidenced by the following figures: according to Statista, the global digital medicine market was estimated at $106 billion in 2019 and is expected to grow to $639 billion by 2026 (Statista, 2022).

The growth dynamics of the telemedicine services market in the Russian Federation from 2017-2019 is illustrative. The volume of the telemedicine services market in Russia in 2019 was RUB 4399.10 million, an increase of 17.8% over 2018. In 2018, the market for telemedicine services was RUB 3,735 million, up 39.5% from 2017 (RUB 2,677.17 million) (GIDMARKET COMPANY, 2022). At the same time, the level of telemedicine in the Russian Federation is at its developmental stage.

The leading countries with a high level of digital maturity of healthcare systems are USA, Australia, New Zealand, Republic of Korea, Japan, England, Israel (Braithwaite et al., 2020).

At the same time, the Russian Federation, too, is paying great attention to the digital transformation

of key sectors of the national economy.

It is noted that as part of the strategy for the development of digital health in the Russian Federation, it is planned to create a unified digital circuit in health care based on a unified state health information system and to develop medical platform solutions at the federal level.

The target model for the functioning of the unified digital circuit in healthcare is presented in Figure 1.

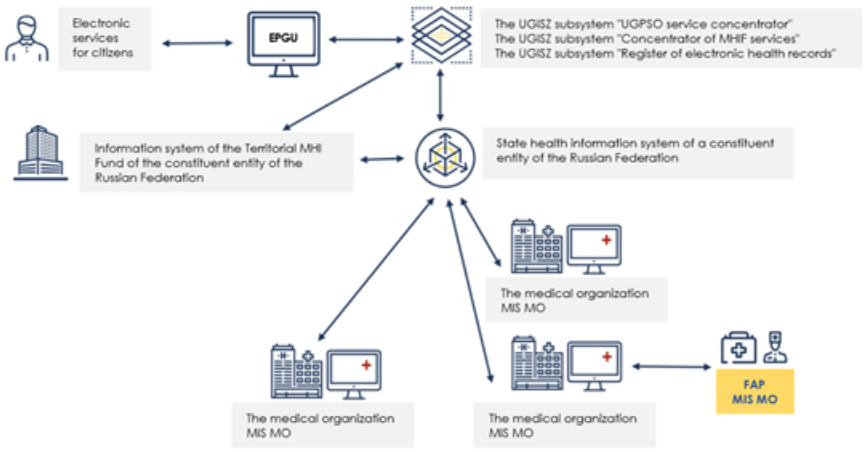


Fig. 1. Targeted model for a single digital health circuit in the Russian Federation (IMIS, 2018)

The key goals of the digital transformation of the Russian Federation's healthcare system are:

1. achieving a high degree of "digital maturity" of the system;
2. optimizing the working time of medical workers through the automation of management processes and the introduction of advanced technologies to improve the accessibility of medical care;
3. ensuring efficient and optimal patient routing;
4. inter-agency cooperation;
5. ensuring the high quality, necessary completeness and reliability of information on the patient's state of health;
6. increasing the proportion of early detection of illnesses.

Based on the objectives of the integrated implementation of the elements of the digital health system, a priority solution has been formulated to effectively manage the communications of digital communities, which promotes the creation of information platforms of various types, allowing for the unification of an unlimited number of participants, with the aim of sustainable development on their basis of medical ecosystems (Popkova et al., 2018).

It is important to note that digital communities formed based on platform solutions allow the creation of unique communication groups for sharing experiences, discussing topical issues, solving complex problems and remote consultation, without reference to the location of its participants (Portuguez Castro and Gomez Zermeno, 2020), which acts as an important element for the progressive development of the health system and each participant in its network community.

The accessibility and ease of use of platform solutions opens new possibilities for targeting the required groups of participants with the required competencies while spending minimal time resources.

The flexibility of the architecture used in the design of digital platforms allows for rapid re-engineering, scaling and repurposing, if necessary, based on the needs of the project being implemented, allowing for a flexible and timely response to the emerging challenges of modern society.

Russian provider of digital services, Rostelecom, distinguishes the following types of digital plat-

forms (Rostelecom, 2022):

Instrumental - software or software and hardware complexes for the development of application solutions. Such platforms include: Java, Android, Bitrix and a number of others;

infrastructure - data-centric IT systems based on end-to-end technologies that allow clients to automate their activities, while reducing the level of transaction costs. Prominent representatives of such platforms are: ArcGIS, Gosuslugi, EraGlonass;

Applied digital platforms are business models that facilitate algorithmic interaction of market participants through their interaction in a single information environment, thus reducing the level of transaction costs for each party. Examples of such platforms are the following services: Yandex Taxi, Avito, AliExpress, the tolling system for heavy vehicles "Platon".

The analysis of digital systems built on the platform model suggests that the elements of digital ecosystems are a digital platform with a microservices architecture, communities formed within the business logic of network interaction and digital data generated by the ecosystem participants. Thus, the conceptual model of the digital ecosystem will be as shown in Figure 2.

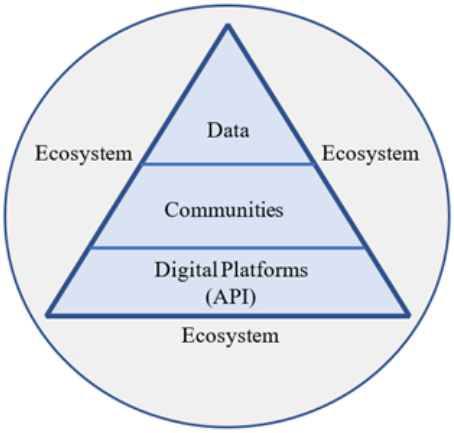


Fig. 2. Conceptual model of the digital ecosystem

Results

1 An architecture of the ecosystem basic elements

Most of the information systems currently used to automate and manage both business and government, in various sectors of the economy, have reached their peak of maturity. Successfully solving the automation tasks, they are still mostly solutions requiring, on the one hand, a considerable "intelligent" staff of IT-specialists to serve them, including the fine-tuning of "box solutions" to specific needs and requirements of the business, but on the other hand, they require continuous training of specialists who work with them every day, because their interface is quite a bulky structure that requires special knowledge and skills of the employee. If there is a need for their finalization or synchronization with third-party information systems, as well as the introduction of new computing systems or specialized application equipment in the IT loop, it may be desynchronization of business processes previously defined by the regulations of the organization, which in turn incurs significant costs for reengineering.

The relevance and timeliness of the solution considered in this paper is supported by the thesis of the President of the Russian Federation, voiced in 2017 at the St. Petersburg International Economic Forum: "The digital economy is the basis that allows the creation of qualitatively new models of business, trade, logistics, production, changes the format of education, healthcare, public administration, communications between people, and therefore sets a new paradigm of development of the state, economy

and all society" (Bashkatova, 2022).

At the state level, there is a demand for a new generation of information systems that will meet the new paradigm of public administration, including in the health care system. In today's economy, digital ecosystems improve the quality of services provided and increase internal efficiency in both the public and private sectors, reducing the administrative burden on business and citizens and making interaction between actors more efficient. There are many views, both at the level of public institutions and academic schools, on what kind of architecture digital ecosystems should have.

This paper will consider one possible implementation of a digital ecosystem metamodel in health, based on which it is possible to create platform solutions for medical organizations of various forms of ownership.

By implementing a management concept based on the application of end-to-end technologies and data as an integral part of digital transformation strategies, additional economic and social benefits for society, business and government can be provided.

The unified digital platform of the Russian Federation "GosTech" deserves special attention.

The overall concept of GosTech platform development can be described as a digital ecosystem for the rapid and efficient creation of public services and information systems, which should become a key tool for the digital transformation of state organizations in the Russian Federation.

Considering the architectural approach to building digital ecosystems in terms of systems and software engineering, let us introduce the definition of the concept of architecture and its structure.

The Open Group Architecture Framework (TOGAF) methodology developed by The Open Group consortium will be used in this paper as one of the most popular and widespread high-level approaches to designing enterprise architectures based on IT solutions (The Open Group, n.d.).

The digital platform architecture modelling language in this paper will be ArchiMate.

When implementing high-load projects in the healthcare system, the architectural approach is a must, helping to achieve the targets of the organization's development strategy, a high level of cooperation and adaptability of all processes to new challenges, thereby contributing to the successful implementation of the process approach in the management of the organization.

To build a high-level architecture of a digital health platform in the ArchiMate language, we will use the conceptual model proposed by the authors Akatkin Y.M., Karpov O.E., Konyavsky V.A. and Yasinovskaya E.D. (Akatkin et al., 2017) conceptual model of digital ecosystem architecture, which can also be implemented in healthcare.

The conceptual model of the digital ecosystem architecture is presented in Figure 3.

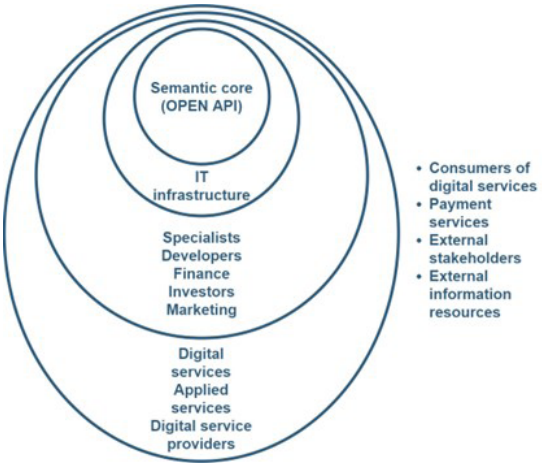


Fig. 3. Conceptual model for a digital health ecosystem architecture (Akatkin et al., 2017)

Before we proceed directly to the design of the digital health ecosystem architecture, let us turn to the key concepts of the ArchiMate.

For example, the core of the language consists of three types of elements: active and passive structure elements, as well as behavioral elements.

A key component of the descriptive part of this language is the multi-layered representation of the architecture of the object being formed, providing a natural way to describe service-oriented models.

In practice, there are three layers: the business layer, the application layer and the technology layer.

The business layer describes the essence of the organization's work and how the value proposition is formed when interacting with the customer. The key elements of this layer are products, processes, information and communication channels.

The application layer is used to describe the services that automate the organization's activities and data processing and is closely tied to the core business processes of the organization.

The technology layer describes the physical layer where application solutions are deployed, such as: computing and network infrastructure, server applications, data services, general services and information security infrastructure.

By correlating the two conceptual models of digital ecosystems discussed above, the new elements (services) that are integrated into an organization’s business model not only exhibit their own individual properties and qualities, but also generate synergies with other elements, enabling the organization to exhibit its emergent properties.

Figure 4 shows a conceptual model of the architecture of a digital health ecosystem platform implemented in ArchiMate.

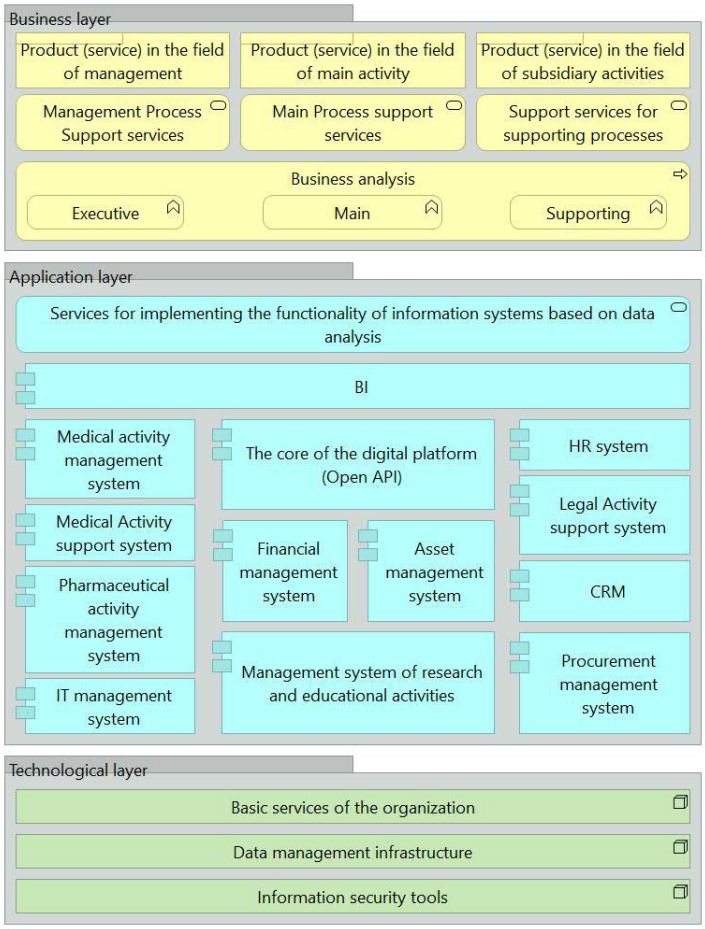
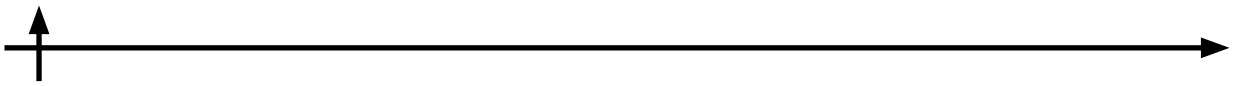


Fig. 4. Conceptual model for a digital health ecosystem platform architecture



An important element of building a successful self-developing ecosystem is designing an architecture that can accommodate the flexibility and adaptability features of modern information systems, thereby creating a client-centered approach in the value chain.

2 Requirements for elements of the healthcare ecosystem

Timely problem-solving, user-friendly interfaces, flexible control and management systems, and a unified digital environment are what advanced IT solutions can deliver today. Their use makes it possible to significantly improve such indicators as the quality of customer service and their satisfaction with the goods/services, reduce the number of hard-copy reporting documents by implementing electronic document management systems, prompt response to emergency situations and emergencies, end-to-end analytics of all business processes, reduce transaction and transactional costs, which have one of the key impacts on financial and socioeconomic indicators not only for organizations but also for the entire healthcare system.

Healthcare, as a strategically important element in the sustainable development of the modern state, has absorbed the most demanded IT solutions that help improve medical care, including ensuring high performance in increasing life expectancy.

A digital organization is nothing less than a networked business structure in which all interrelationships between relationship participants, both internal and external, are implemented in a digital environment, based on modern information and telecommunications infrastructure, enabling it to respond flexibly and quickly to changing market conditions, thereby increasing the effectiveness of the organization in the current reality.

For us, the key element of this definition, in the section under consideration, is the interaction of participants in business processes carried out exclusively using digital communication channels. Thus, we see IT infrastructure as a necessary foundation and one of the key elements in shaping the unified technological landscape of the digital health ecosystem.

Responding to the challenges of the modern world and implementing a unified system approach in shaping the digital medical ecosystem, it is important to consider and foresee the capabilities of the current and future IT landscape at the modeling stage, with the prospect of their flexible adjustment and possible operational scaling.

As stated by the authors Belyshev D.V., Guliev Y.I. and Mikheev A.E. in their paper "The Digital Ecosystem of Medical Care" (Belyshev et al., 2019), a modern digital health system should successfully address such tasks as:

1. digitization of business processes or digital transformation of a medical organization;
2. accumulating, storing and systematizing vast amounts of data of different nature;
3. ensuring the interoperability of different actors and processes;
4. ensuring financial relationships between the various participants in the processes;
5. expanding the range of services provided, not only through internal resources, but also through digital health market offers.

These tasks can be solved by creating a system with such qualities and properties as emergent, self-development, self-control, self-organization, which together can be interpreted as a digital ecosystem. One of the basic conditions for the successful functioning of a digital ecosystem is a seamless relationship between its participants, data availability and a unified digital information environment deployed on a high-performance modern IT infrastructure.

Compatibility and flexibility of software and hardware computing IT infrastructure are important elements in the development of a highly efficient medical ecosystem, allowing it to evolve and include new members, avoiding conflicts at both the service and technology layers.

We conclude by outlining the basic principles that a modern IT infrastructure for digital ecosystems

must comply with:

1. modular structure of all components;
2. ease of use;
3. high speed of change, including redundancy of required capacities and services;
4. scalability;
5. high fault tolerance;
6. relevance to business needs;
7. strict compliance with regulatory requirements, industry and corporate standards; \
8. appropriateness of cost-benefit ratio.

We have thus reviewed the key requirements for elements of the medical ecosystem as part of the development of the medical ecosystem meta-model and the principles that a modern IT infrastructure for digital platforms must meet.

3 A meta-model of healthcare ecosystem architecture

Considering healthcare system and medical organizations from the perspective of digital high-loaded platform ecosystems, the core of which are IT solutions and service-oriented approaches, the issues of metamodel formation of different levels and details remain relevant and require comprehensive research.

The architectural principles on which service-oriented architecture (SOA) methodology is based include three main components: location-independent, implementation-independent and protocol-independent.

Location-independence describes an approach to obtaining a service regardless of the location of the consumer.

This approach has been successfully implemented in platform business models, where it is possible to obtain a service from any location with only two components: Internet access and a mobile device such as a smartphone or laptop.

Independence from implementation, interpreted as the absence of clear requirements for a specific platform or technical (technological) solution, thus giving the possibility to consider different scenarios for the construction of systems.

In line with this principle, the platforms known as low-code and no-code, which are actively developing today, can be considered (Woo, 2020).

This solution fundamentally transforms the software code development model, helping to address programming-related issues, and may also well act as an alternative to quickly solving business problems, such as the shortage of skilled IT professionals and their high cost in the labor market.

The notion of "protocol independence" is clearly represented by application programming interfaces - APIs, including the widespread Open API specification (OAS).

Open APIs allow internal IT systems to successfully establish communication channels with external IT solutions in the form of individual services, systems, platforms or ecosystems, thereby increasing the level of automation and efficiency in solving specific application tasks.

Given the importance of the architectural principles of the service-oriented approach, when implementing data-centric and client-centric digital platforms, including in the healthcare system, further analysis of the platform business model of the healthcare ecosystem will be carried out through the lens of the architectural metamodel.

By metamodel we will understand a model consisting of a set of objects, their properties and relations between them, to determine the possibility of designing a target model based on it.

The application of architectural metamodels helps to increase the efficiency and rationality of activities, leading to increased productivity of the entire organization. This approach helps to maximize the effectiveness of transformative interventions.

In the digital economy paradigm, architectural metamodels are a key element in achieving the goal

of sustainable development of a healthcare organization.

The most common applications of architectural metamodels are:

1. building an enterprise architecture for the subsequent implementation of information systems or digital platform solutions;
2. replication of new business models;
3. analysis of re-engineering activities;
4. benchmarking.

Metamodels are one of the important basic elements in the transformational processes of an organization, and they require adaptation to the specific needs, considering the requirements and constraints of the external and internal environment (Iliashenko et al., 2019).

The development of the medical ecosystem architecture metamodel was carried out using the Archi business process modelling tool in the ArchiMate language.

Before describing the technological layer on whose infrastructure, it is planned to deploy the medical ecosystem digital platform, let us consider the architecture of information systems that can be used as part of the implementation of a medical organization's digital platform.

As described earlier, the basis for the formation of most modern digital platforms is the semantic core, through open APIs which is synchronized with application systems that are expressed by such modules as "Management Information Systems", "Core Information Systems", "Supporting Activity Information Systems" and "BI Systems". The semantic core element is implemented in the form of the "Digital Platform Core (Open API)" module.

The underlying asset of any modern information system is digital data, which is a key element in the sustainable development of platform solutions, as well as a source for making management decisions.

The diversity of data and its structure, as well as the periodicity of updates, require consideration of the process of working with it, applying in practice different approaches.

The Database module is nothing more than a set of structured data contained in an organization’s information systems, with an application view. Relational databases are an example of this view.

The Data Warehouse module is designed to handle large data that is collected and aggregated from different sources, unlike the Database module, and has a different representation. At the same time, this module serves as a key element in the formation and analysis of complex queries.

As a result of evolutionary development and exponential increase in the amount of generated digital data, heterogeneous in its structure and sources, the concept of Big Data was formulated, but despite this, Big Data processing was not a challenge and methods like ETL and ELT were the key to success in this task.

A key and important element in the provision of management activities in today's realities are digital data solutions.

To implement this function, the Big Data Analysis module is provided.

The block "Services for the implementation of functional systems based on data analysis" is responsible for the functionality of the component through various application interfaces.

Thus, as part of the implementation of the medical ecosystem architecture metamodel, we considered a fragment related to information systems. The implemented model is presented in Figure 5.

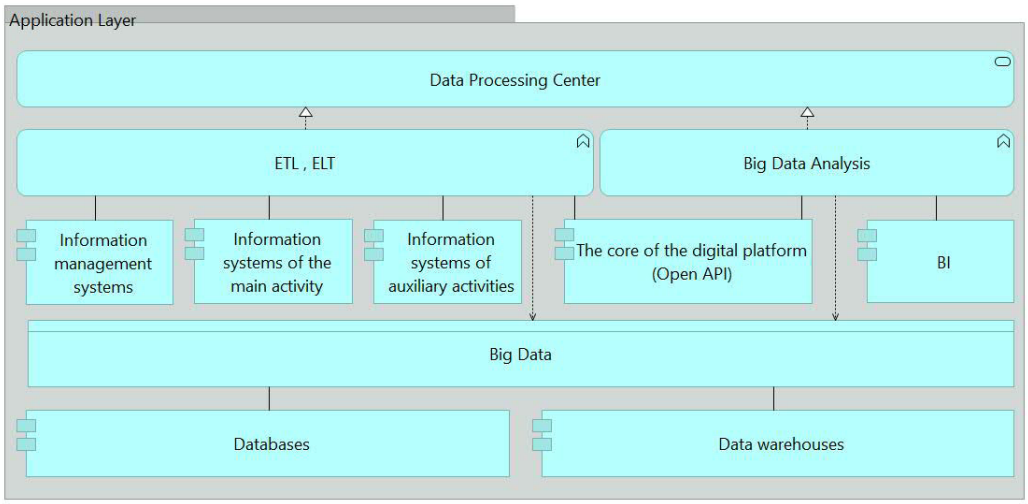


Fig. 5. Application layer architecture of the digital health ecosystem platform

Turning to the description of the basic IT landscape of a medical organization, the existence of which is conditioned by the need to deploy and implement a digital platform of the medical ecosystem, we will highlight several most strategically important elements (technologies) of its sustainable development: Internet of Things, big data, artificial intelligence, end-to-end real-time analytics.

IoT is the technology of interaction between physical objects and systems and the physical world using various communication protocols (Lepekhin et al., 2019).

When implementing platform solutions, the inclusion of physical device (object) infrastructure in the digital organization loop using IoT technology allows the creation of a control system for intelligent equipment, both medical and general purpose.

Thanks to the data collected in this way and its analysis, the entire infrastructure is managed in real time, thereby reducing the risks of biased data, wasted time, etc.

The infrastructure that powers IoT devices is the data collection gateway interfaced to the cloud-based hardware management platform, the API application software interface, the communication channels and the devices themselves.

The Information Protection System node represents hardware and software products that implement comprehensive information security functionality both internally and when interacting with external sources when data is exchanged over unprotected communication channels.

Block "External data sources" describes the structure of data centers as providers of cloud computing or representatives of cloud infrastructure under various models, including cloud.

A technology service in the form of the "Platform or Service API Integration" block represents an element of behavior that provides functionality to access third-party systems or services by interfacing with the semantic core of the digital platform.

In shaping an organization's business model based on digital data, a critical element is the data itself, and more specifically its secure use and storage. To meet the challenge of creating a secure environment, a "Data Centre" is integrated into the organization's internal IT environment as a centralized repository, including all necessary hardware and application services to ensure the successful management, storage and processing of digital data circulating in the organization's information systems, as well as data analytics applications.

The proposed solution is based on the target IT architecture model implementing the integration of BI, ERP and MIS systems presented in the monograph "Management of Medical Organization: Smart Hospital Concept" edited by RAS Academician E.V. Shlyakhto, Professor I.V. Ilyin, RAS Correspond-

ing Member A.O. Konradi (Shlyakhto et al., 2020).

The architecture of the "Data Centre" of the digital medical ecosystem platform formed based on a medical organization is a node in the form of an "Information Systems Database Server" and a "Business Intelligence Application Server" node. Let us consider this solution in detail.

The "Information Systems Database Server" node includes such components as "Management Information Systems Cluster Server Software", "Core Information Systems Cluster Server Software", "Supporting Information Systems Cluster Server Software", and "Metadata" itself.

As presented in (Shlyakhto et al., 2020), the successful integration of an organization's information systems with Business Intelligence systems is possible with a special software solution in the form of the "Connector" capable of automating the processes of working with data to the maximum extent possible.

In addition to Connector, the Business Intelligence Application Server node is supported by the following components: "Data Management Service", "Business Intelligence Solution Processor Service" and "Data Storage Service".

A key feature of modern data centers is their ability to handle both structured data stored in databases of information systems and big data, which have an entirely different nature of origin. While dealing with relational databases is trivial, dealing with big data requires more technological tools in the form of Business Intelligence solutions.

Working with data on the technological level is realized through access, extraction and processing services when it comes to classic structured data and using big data services when we are talking about digital data, different in its architecture and sources, in the form of information systems within an organization or information systems of external organizations, data from various information resources or communication tools, equipment using the Internet of Things technology, including personal media.

The result of the study of information processes in the digital ecosystems of medical organizations and the IT infrastructure of the medical ecosystem digital platform based on such technologies as the Internet of Things, big data, artificial intelligence and end-to-end real-time analytics was a metamodel of the medical ecosystem architecture in Figure 6.

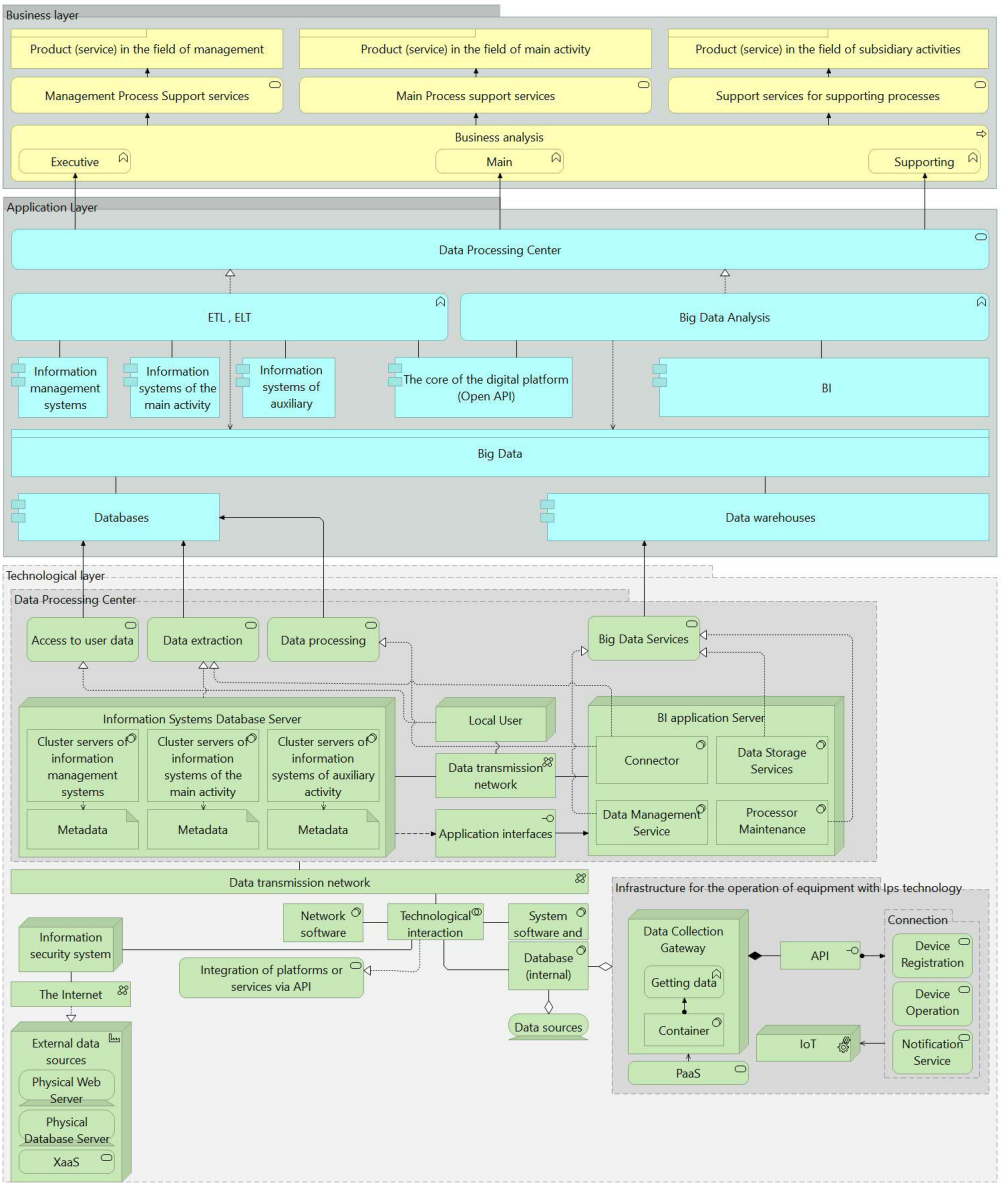


Fig. 6. Medical ecosystem architecture metamodel

The implementation of the medical ecosystem metamodel will enable a significant step in the development of new approaches and business models for medical organizations and become a base in the formation of world-class, high-tech and competitive medical centers.

Discussion

As part of the development of medical ecosystem model, analysis of existing architectural models of digital platforms was carried out, based on which a metamodel of medical ecosystem architecture was proposed.

The comparative analysis allowed to formulate the requirements to the elements of medical ecosystem, which made it possible to describe and develop a graphical representation of the architectural model of medical ecosystem in ArchiMate language.

Despite the relevance of this topic, not only within the framework of achieving the key indicators of national strategic initiatives and transition to digital platform economy in the Russian Federation, but also in the context of continuously improving business models of leading international medical centers,

the degree of elaboration of issues of implementation of integrated IT solutions for medical ecosystems in our country remains at a rather low level.

From this point of view, the application of the developed medical ecosystem metamodel in the healthcare system will make it possible to take the next step in developing new approaches and forming innovative business models for medical organizations, thus contributing to the emergence of world-class medical centers in the Russian Federation.

Conclusion

The process of the emergence of the platform economy and the development of digital ecosystems in today's realities is an integral element of sustainable development of the state, business and society.

International experience of leading countries has proven its effectiveness in the use of digital ecosystems not only in business, but also in public administration, allowing for a significant increase in the value proposition for the customer and while reducing the level of transaction costs for all participants in the relationship.

This thesis is supported by the fact that many countries at the state level have approved their development strategies based precisely on platform solutions for digital ecosystems. The Russian Federation is an active participant in global transformation processes driven by trends in the development of the digital economy.

Considering the digital ecosystem of a medical organization as a key element of its sustainable development, and the IT landscape as a necessary basis for its formation, to correlate these goals and their successful achievement, it is necessary to have an architectural model of IT infrastructure that has absorbed the best practices and successful implementations of major organizations worldwide.

Despite the rapid development of digital ecosystems in various areas of activity, this area is still quite young and requires comprehensive reflection.

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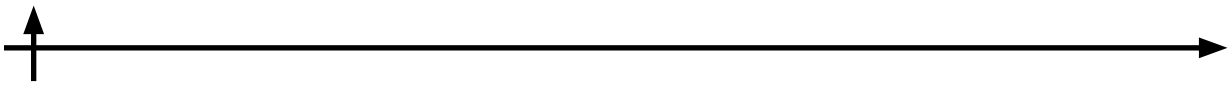

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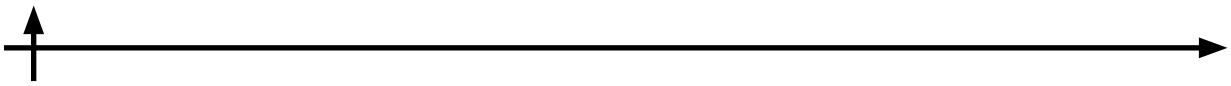
INFORMATION ABOUT AUTHORS / ИНФОРМАЦИЯ ОБ АВТОРАХ

VORONOVA Olga V. – Associate Professor, Candidate of Economic Sciences.
E-mail: ilina.olga@list.ru
ВОРОНОВА Ольга Владимировна – доцент, кандидат экономических наук.
E-mail: ilina.olga@list.ru
ORCID: https://orcid.org/0000-0003-1032-7173

KHNYKINA Tatyana S. – Associate Professor, Candidate of Economic Sciences.
E-mail: khnykin_ts@mail.ru
ХНЫКИНА Татьяна Семёновна – доцент, кандидат экономических наук.
E-mail: khnykin_ts@mail.ru
ORCID: https://orcid.org/0000-0001-8800-5567

KARAPTAN Dmitrii N. – student.
E-mail: dmitriink2000@gmail.com
КАРАПТАН Дмитрий Николаевич – студент.
E-mail: dmitriink2000@gmail.com
ORCID: https://orcid.org/0000-0002-0438-0034



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