

INNOVATIVE DEVELOPMENT OF HEALTHCARE IN LEBANON IN THE CONTEXT OF DIGITALIZATION OF THE ECONOMY

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The article discusses the theoretical platform for constructing a model of innovative development of healthcare in Lebanon (the concept of human and inclusive development, the theory of the information society and the digital economy), the key elements of the methodology and the main stages. A conceptual approach to the innovative development of healthcare in Lebanon is formulated, an algorithm is presented for identifying the prerequisites and problems of the innovative development of healthcare in Lebanon based on the digitalization of management processes and the results of its testing, taken into account when creating an organizational model for the digitalization of healthcare in Lebanon and a roadmap for its implementation.

Keywords: innovative development, human development, inclusive development, information society, digital economy, algorithm, electronic medical record, unified database, organizational model, road map.

ИННОВАЦИОННОЕ РАЗВИТИЕ ЗДРАВООХРАНЕНИЯ ЛИВАНА В УСЛОВИЯХ ЦИФРОВИЗАЦИИ ЭКОНОМИКИ

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В статье рассмотрена теоретическая платформа построения модели инновационного развития здравоохранения Ливана (концепции человеческого и инклюзивного развития, теории информационного общества и цифровой экономики), ключевые элементы методологии и основные этапы. Сформулирован концептуальный подход к инновационному развитию

здравоохранения Ливана, представлен алгоритм выявления предпосылок и проблем инновационного развития здравоохранения Ливана на основе цифровизации управленческих процессов и результаты его пробации, учтенные при создании организационной модели цифровизации здравоохранения Ливана и дорожной карты ее реализации.

Ключевые слова: инновационное развитие, человеческое развитие, инклюзивное развитие, информационное общество, цифровая экономика, алгоритм, электронная медицинская карта, единая база, организационная модель, дорожная карта.

The purpose of the study, the results of which are presented in this article, was to develop the theoretical, organizational and methodological foundations for forming a model of innovative development of healthcare in Lebanon in the context of digitalization of the economy. During the study, tasks were set, the solution of which made it possible to formulate a conceptual approach to the innovative development of healthcare in Lebanon in the context of digitalization of the economy, to develop and test an algorithm for identifying the prerequisites and problems of innovative development of healthcare in Lebanon based on the digitalization of management processes and on this basis to create an organizational model for the digitalization of healthcare in Lebanon and a road-map for its implementation [1].

The research methodology included taking into account world experience and *national context*, the use of various sources of information (scientific publications; regulations of the Lebanese government, its ministries and other documents reflecting state policy in the field of health; statistical databases and publications of international organizations; economic and sociological materials research, etc.), as well as various *methods of collecting, processing and analyzing data* (general scientific, economic and statistical, monographic and comparative analysis, sociological research, triangulation, modeling, road mapping). The use of various sources of information and scientific methods made it possible to create a sufficient information array to understand the current situation and substantiate the model of innovative development of healthcare in Lebanon in the context of digitalization of the economy.

Innovative development is the most productive direction for improving modern healthcare and other sectors of the economy. According to *the concept of human development*, for human development and achieving a high quality of life, not only increased well-being is important, but also *good health* and education. *The concept of inclusive development* states that *development should not exclude any person*, regardless of his religion, place of residence, level of education and other characteristics. This determined the expediency of their use as the initial components of the research paradigm.

Next, the world experience and prospects for the development of healthcare in the context of digitalization of the economy were examined. An appeal to *the theories of the information society*, as well as *Tapscott's concept of the digital*

economy, revealed the advisability of their inclusion in the research paradigm. They allow us to consider the information society as an environment that ensures human development based on the digitalization of the economy, creating conditions for facilitating access to goods and services and improving the quality of life of the population. Both theoretical concepts are based on the recognition of the importance of ICT for achieving economic and social progress. The study allowed us to conclude that the digital economy is the result of the formation and functioning of the information society, which seeks to automate all processes, and the digital economy is based on the automation of economic processes. In this regard, the concepts of “information society” and “digital economy” were clarified in context. *An information society* is understood as *a society* that widely uses ICT to achieve social progress and human development, which creates a favorable environment for the formation of a digital economy that ensures better use of all types of resources and obtaining higher economic and social results, the natural criterion of which is the preservation of public health. *The digital economy* is an economic activity based on the use of ICT, networking and electronic means that provide people with digital access to various sectors of the economy, which allows for improved management of processes and increased efficiency. The success of the digital economy relies on the rapid spread of innovation to all interconnected processes and entities. Refined definitions, in contrast to those proposed in the literature, highlight the role of healthcare in the development of society, the characteristics and criteria of this development, as well as *digitalization as a key direction in the innovative development of the economy and healthcare as its sector* [2; 3].

Within the framework of the designated theoretical paradigm, the concept of innovative development of healthcare in Lebanon was formulated, in which *the intensification of digitalization of management processes in healthcare* is considered as a key direction for the integration of information about the health and medical care of citizens/patients and more efficient use of the resources of medical institutions of various types and forms of ownership in the interests of all stakeholders, carried out taking into account the development of Lebanon, the state of the healthcare sector and the ICT sector of Lebanon, and global experience in the functioning of national healthcare systems. The implementation of this concept is intended to contribute to human development in Lebanon and the inclusive development of Lebanese society by providing equal opportunities in access to the health care system for all citizens regardless of region, religion, level of education, financial, political, social and other differences, which will allow achieving better social-economic results.

In order to implement this concept, it was necessary to identify the prerequisites and problems of innovative development of healthcare in Lebanon based on the digitalization of management processes. For this purpose, a four-stage analytical algorithm was proposed and tested.

The first stage of the analysis involved *an analysis of human development and the development of the information society in Lebanon* based on the UNDP human development indicators and the author’s system of indicators based on

Webster's information society criteria. To test the proposed approach, statistical data presented on the websites of UNDP, ILO, IMF, WHO, World Bank, etc. were used.

An analysis of the dynamics of human development indicators has shown a decrease in life expectancy in recent years, with stability in the duration of education and a sharp drop in per capita gross domestic product (GDP) due to the action of a number of factors that are likely to have an adverse impact on human development in subsequent years. This actualizes the implementation of programs and projects to restore and improve human development indicators and the quality of life of the population in order to prevent large risks [4].

Analysis of the development of the information society in Lebanon gave contradictory results. Economic indicators have shown high levels of unemployment and a large proportion of patients without health insurance, whose costs are partially covered by the Lebanese Ministry of Health (MoPH), draining its budget. Spatial and technological indicators indicate the readiness of the ICT infrastructure to implement innovations. The political situation in the country is unstable, while in the cultural aspect the situation is favorable, the society allows cultural diversity and freedom. Physical infrastructure has problems, the main one being the inability to provide a stable electricity supply, but healthcare has a stable supply of electricity, which is a prerequisite for the rapid digitalization of this sector.

The second stage involved an analysis of the health and ICT sector in Lebanon based on international rankings, comparative analysis and documentary observation.

The ranking analysis showed Lebanon's high position in ratings reflecting the effectiveness of national healthcare systems: according to the Healthcare Effectiveness Index (The Economist Intelligence, 2014) – 31st place out of 166 countries, ahead of the United States; according to the Healthiest Countries Index (Bloomberg, 2017) – 32nd out of 168; on the Health Index (World Economic Forum, 2016) – 34th out of 137; according to the Healthcare Access and Quality Index (2016) – 31st out of 196.

A comparison of Lebanon's healthcare status with Arab countries in the MENA region showed that Lebanon was ranked 3rd in the Arab Healthcare Competitiveness Index (2017), after Saudi Arabia and the United Arab Emirates.

A comparative study of the healthcare development of Lebanon and Belarus in terms of human development and healthcare development indicators showed, along with a higher life expectancy in Lebanon (81.2 versus 74.5 years), a higher level of infant and maternal mortality, as well as positive dynamics in the Lebanese population compared with negative in Belarus, fewer beds per person (35 versus 111), *higher* healthcare costs in GDP (7.1 % versus 6.1 %) [5].

A study of the structure of the Lebanese healthcare sector (including the distribution of hospitals by type of ownership) *and the investment of this sector* in medical technologies showed the predominance of the private sector (136 private hospitals versus 29 public ones), which contributed to the high level of medical technology in healthcare by world standards.

Thus, the rating and comparative analysis showed a high level of healthcare in Lebanon despite the presence of certain problems (maternal and infant mortality). However, the complication of the political and socio-economic situation in the country may lead to the loss of existing positions.

A retrospective analysis of ICT adoption in Lebanese healthcare was carried out based on documentary observation. Legislative acts since 2002 were analyzed, as well as hospital accreditation standards containing requirements for the digitalization of management processes and the policies of medical institutions in this regard. Documents related to the implementation of 17 initiatives for the digitalization of management processes undertaken by the Mop, but not fully implemented due to the lack of integration and coordination of the actions of the MoPH with other stakeholders, were studied.

The study also *analyzed the state of the ICT sector* in Lebanon. Lebanon does not produce ICT hardware, but has a large share of software development in the country and abroad. The contribution of ICT to Lebanon's GDP, Lebanon's readiness to increase the use of ICT compared to neighboring countries, and the country's high ranking in the MENA Innovation Index have led to the appreciation of the results achieved by this sector.

At the third stage, to obtain an idea of the readiness of specialists in healthcare institutions for the digitalization of management processes and the associated risks, an analysis was performed using the triangulation method. Initially, documents and paper records containing patient records were analyzed. Then interviews were conducted with those responsible for managing the healthcare sector and the management of guarantor institutions to clarify their attitude towards the digitalization of medical records. After this, a survey of specialists was carried out on their readiness to interact and use EHR using 8 closed questionnaires developed for specialists at various levels (managers, including ICT, personnel, quality, doctors, nurses, technicians, pharmacists), as well as citizens/patients. The results of the study were encouraging, however, some experts expressed their concerns regarding the computer literacy of specialists and patients, and the confidentiality of information [6].

At the fourth stage, the experience of implementing projects on digitalization of management processes in healthcare in developed countries (USA, EU countries), as well as *in developing countries* (India, African countries, etc.) was analyzed. The analysis showed the possibility of digitalization of healthcare in Lebanon, given the necessary commitment, resources and funding, and helped to determine the contours of the national healthcare system

At the end of the chapter, it is concluded that the Lebanese healthcare sector is ready for the digitalization of management processes, and the ICT sector, with high availability of equipment on the Lebanese market, is able to provide the necessary software, and a *systematized presentation of the prerequisites and problems of digitalization of Lebanese healthcare is provided*.

Based on the results of a multi-stage analysis, it was revealed that with a low level of infrastructure development in Lebanon, healthcare is in a better position than other sectors of the economy, and medical institutions are able to

provide the necessary conditions for further digitalization of management processes. *Prerequisites for expanding the use of ICT* include continuous power supply (24 hours a day), the availability of ICT equipment at medical institutions, a constant connection to the Internet, the functioning of an internal network connecting all computers, the ability for entities that do not have software to access a special portal for data entry, availability of trained ICT staff.

The challenges hindering the digitalization of healthcare in Lebanon are political instability, lack of continuity of plans in the sector, insufficient funding, immaturity of some organizations, dominance of the private sector, weakness of automation directly in the MoPH, poor infrastructure for the application of ICT, bureaucracy and conflict of interests, resistance to change, weakness legal and regulatory environment. With this in mind, *the main problem is multiple personal identification in Lebanon (lack of a unique citizen/patient identifier)*.

Next, based on the obtained theoretical and analytical conclusions, a model of innovative development of healthcare in Lebanon was developed, focused on the formation and functioning of a unified medical information base at the MoPH based on the use of an electronic unified health record (EHR). The developed conceptual approach to the innovative development of healthcare in Lebanon made it possible to formulate the principles of forming an organizational model for the digitalization of healthcare in Lebanon: focus; inclusiveness of citizens' access to health care; progressiveness; continuity; adequacy; integration of medical information; differentiated access of stakeholders to medical information; confidentiality of medical information, analytics. Based on these principles, the general configuration of the model was determined, the main elements of which are the institutional structure of healthcare, the framework design of e-health, the concept of creating a unified medical information database, and the roadmap for the digitalization of healthcare [7; 8].

The model is based on the existing *institutional structure of Lebanese health care*, the units of which are divided into three groups depending on their role. The first is represented by *stakeholders*: authorities and management in the healthcare sector, local authorities, medical institutions and healthcare-related organizations, patients and their relatives, and the public. The second includes *guarantors* that finance medical and health procedures for their patients: the national social insurance fund, a cooperative of government employees, military programs, insurance companies, etc. They will provide data about their beneficiaries and are interested in receiving medical information from a single center. The third group consists of *medical institutions of various types and forms of ownership*, providing medical and health services to patients and receiving payment for their services from guarantors (hospitals, outpatient clinics, diagnostic centers, pharmacies, etc.). They will ensure that medical data is sent to the information processing center using special portals in accordance with position, privileges and responsibilities. Trained personnel (doctors, nurses, pharmacists, technicians, etc.) will receive authorized access to enter, transmit and receive data.

The e-health framework design, formed on the basis of a synthesis of best practices in the digitalization of healthcare, is a set of basic components (strat-

egy and implementation; leadership and management; applications; technological infrastructure; legislation and standards; qualified workforce; technical support), defining the stages of digitalization of healthcare in Lebanon, reflected in the road map.

A fundamental diagram of the formation and functioning of a unified medical information database at MoPH, reflecting the interaction between all participants in medical care and other stakeholders. The database will ensure the integration, storage, use of medical data, as well as the exchange of information of all stakeholders and direct control of MoPH over medical and financial procedures. The functioning of this base is based on the use of an EHR, which will contain all historical and current information about his health, providing unique identification of the individual and providing stakeholders with differentiated digital access to medical information, maintaining its confidentiality, but allowing specialists to access vital authorized information for the provision of medical care, which reflects the exchange of information both within medical institutions and with external organizations, as well as the passage of information through a single data processing center for storage and monitoring.

The roadmap for digitalization of healthcare in Lebanon was developed taking into account 17 initiatives already undertaken, identified prerequisites and problems, and global experience developed in the implementation of similar projects. Includes 16 stages: 1) gap analysis; 2) analysis of financing options; 3) ensuring the technological readiness of the MoPH data processing center; 4) assessing and ensuring the technological readiness of stakeholders and communication methods; 5) determining the mechanism for transmitting data from hospitals and medical centers and related institutions; 6) determining the mechanism for generating a unique citizen/patient identifier; 7) adoption of legislative decisions; 8) unification of EHR components by creating a template; 9) collection of data on citizens/patients from guarantors; 10) designing a unified database in the MoPH data center to store all medical information; 11) study of safety measures; 12) creation of a portal for each type of stakeholder; 13) training of instructors (IT managers); 14) stakeholder training; 15) testing the availability and use of the digital solution; 16) implementation of a digital solution. To reflect the sequence of these stages, *a calendar schedule for the digitalization of healthcare has been developed. A brief description of each stage* is given: the necessary resources, duration, estimated cost, performers and their coordination, *a system of indicators for monitoring the digitalization of healthcare* [8].

Since the MoPH should stimulate the digitalization of management processes, *a new formula for accreditation of medical institutions* has been proposed, characterized by the introduction of a variable reflecting the use of ICT and the participation of medical institutions in the formation and operation of a single medical data center. This formula will allow MoPH to monitor the digitalization of management processes and determine its relationship with medical institutions in accordance with their obligations (level of funding (quota), support and cooperation, etc.).

The implementation of the model of innovative development of Lebanese healthcare based on the digitalization of management processes will allow it to solve a number of problems and provide a number of social and economic benefits (unique identification of citizens/patients, timeliness of medical care, transparency of accounts, reduction of bureaucratic and paper procedures, centralized control by the MoPH, overcoming the immaturity of organizations and resistance to change on the part of personnel) by covering all stakeholders with the electronic health system, on this basis, improving the quality of medical care and the efficiency of using the resources of medical institutions, which will help preserve the health of the population and how consequence to human development and inclusive development of Lebanese society.

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