



INDEX OF ECONOMIC FUNCTIONALITY IN DIGITIZATION OF

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Article history:	Abstract:
Received: 3 rd October 2023 Accepted: 3 th November 2023 Published: 4 th December 2023	The article analyzes and compares the concept of the digital economy and identifies problems in its application. The process of using the totality of economic resources in the national economy in the digital economy is considered from the point of view of digital technologies. A methodology for quantitative and information analysis and a mechanism for its operation in assessing digitalization has been developed, and it has also been proposed to use the concept of an economic functionality index in the digitalization of information resources.
Keywords: Digital economy, digital technologies, information processes, global indices, economic functionality index..	

INTRODUCTION:

The processes involved in the transition to a modern global knowledge economy in world practice demand the transformation of knowledge and scientific discoveries into products. At the same time, innovation, adaptation, and the potential to use new technologies are considered the primary growth factors for the local, national, and global economies.

With the widespread adoption of digital technologies (artificial intelligence, predictive analytics, 3D technologies, Internet of things), a large-scale array of digital data is being formed about the entities involved in economic relations and the processes they implement. A characteristic feature of economic development in the digital economy is that this array of data requires continuous, complete, and effective movement in all social and economic systems at the same time. As a result, traditional sectors of the economy are experiencing uneven development, while differentiating aspects between related industries are changing, new areas of activity are emerging that were previously unavailable, and new business models are emerging that have fundamentally different characteristics.

The global economic processes taking place in the world today require attention to the main factors in the development of the national digital economy. In particular, it is necessary to constantly stimulate innovative developments that focus production on products and services that can satisfy existing individual needs in the market, and create a favorable business environment that makes it possible to increase the country's competitiveness.

Digital transformation processes are characterized by great complexity and multidimensionality. In particular, it is influenced by many different factors that need to be identified and assessed in a timely manner in order to make the most important and correct strategic decisions and evaluate their effectiveness, develop strategic plans in key areas, and implement editorial influence based on feedback.

Although the world community has accumulated a lot of experience in evaluating the effectiveness of the development and use of digital technologies, little attention is paid to the statistical evaluation of several new technologies and phenomena of the digital economy. In turn, modernization and universalization of international monitoring standards, assessment of various aspects of the digital economy, and development of procedures for determining its size require international cooperation.

Although Uzbekistan lags behind the leading countries in most cases, significant measures have been developed in recent years to develop the information society and digital economy. In turn, it is necessary to identify the causes of the backlog and develop measures to eliminate it, to conduct research on further development of the digital economy. A more detailed and comprehensive analysis of the level of readiness for the use of digital technologies in all sectors of the economy, as well as the need to assess their direct impact on economic and social processes, remains relevant.

An analysis of the current state of development of the digital economy in Uzbekistan must be carried



out taking into account the experience accumulated in world practice. In particular, the analysis set should consist of key indicators related to ICT infrastructure and ICT use, the ICT market, the information industry, innovation capacity, trust and security in the use of ICT, and the level of use of ICT for the development of major economic sectors. At the same time, this set of indicators should be constantly improved and expanded taking into account the emergence of specific new phenomena and technologies, taking into account the improveability properties of the digital economy.

At the moment, when developing a methodology for assessing the current situation related to the development of the digital economy in Uzbekistan, the integrated use of the methodology for assessing the digital economy, developed for different countries of the world, prepared in collaboration with the Institute for the Development of the Information Society of the World Bank, is of particular importance. When developing a methodology, it is necessary to rely on research results obtained by international organizations (OECD, International Telecommunication Union (IEU), World Economic Forum (WIF), etc.), the world's leading consulting companies, industry representatives and the World Bank.

The direction of developing such a methodology should be focused on a large-scale analysis of the current situation, and it is of great importance to use the results of this analysis when forming a plan for further actions and directions.

In turn, there are a large number of global indices that help assess the development of the digital economy in world practice. However, these indicators do not allow for assessing the extent to which the latest achievements in the development of telecommunications infrastructure are being introduced into the practice of the country. At the same time, it does not allow for assessing the country's contribution to the development of so-called advanced innovative technologies, such as artificial intelligence, blockchain, the Internet of Things, and quantum technologies.

In addition, it is worth noting that all indices are global in nature, that is, these indices assess the general state of the country in the development of the digital economy. It should also be noted that the data for the calculation of all calculated indices are provided directly by national and international statistical organizations or are based on data from national surveys.

Today, as a result of the deep penetration of digital technologies into the banking business, various opinions are being expressed about the possibility that fintech companies will soon displace banks from

financial markets. Digital technologies are actively being introduced into the field of medicine, and it is in this area that many examples of the effective use of advanced technologies for the use of robots, consultations, and diagnostics can be given. However, a comprehensive solution has not yet been developed for such issues as how to measure the degree of digitalization and at what level this indicator can be, how to compare the level of penetration of digital technologies in economic sectors.

LITERATURE REVIEW

Currently, there is no generally accepted definition of the concept of digital economy in domestic and foreign literature. In 1994, Canadian scientist Don Tapscott for the first time in scientific research used the concept of «digital economy» to describe a virtual economic system. [11]. A little later, in 1995, Nicholas Negroponte in his scientific article «Being Digital» proposed to understand it as a digital economy based on «the use of bits instead of atoms» and a new technological mode of the economy based on digital technologies [8].

When considering the digital economy from the point of view of economic sciences, first of all, the object of analysis is the impact of these innovations on the activities of participants in market interaction. X. Varian notes in his study five main changes: the active introduction of data collection and analysis in the activities of business entities as a result of the introduction of digital technologies, individualization and customization, experimentation, and continuous development, innovations in the conclusion of contracts (new types of business transactions - electronic money, carsharing, etc.), coordination and communication [1].

Most of the published scientific publications are directly devoted to the technological aspects of the implementation of digital technologies based on big data, machine learning, the Internet of Things, blockchain, artificial intelligence, and fully digital platforms [5; pp. 5-6, 12; pp. 53-55, 3; pp. 127-128]. However, most of these studies were carried out in the direction of analyzing the principles of operation of specific technologies. As a result, it remains relevant to analyze the totality of the effects that they can have on socio-economic processes that make it possible to reveal the nature of the digital economy.

When the digital economy is considered only from the point of view of technologies, the following interpretations expressed in foreign literature can be summarized:

– a complex consisting of companies, resources, and services that increase the volume of gross domestic product and net assets, as well as



virtual resources and digital transactions carried out in the markets [10; pp. 97-99];

- a combination of qualitatively new business models and network computer technologies, allowing the emergence of economic entities with new characteristics of economic activity and the creation of new industries and markets [7; pp. 429-431];

- an economy characterized by mobility and interaction of several groups of users on a digital platform, which, on the one hand, leads to the formation of positive or negative external effects, and on the other hand, information has the quality of a source of value [9].

An analysis of the existing definitions of the concept of «digital economy» in international practice leads to the conclusion that there is no agreed and generalized strict definition of the digital economy. In particular, in approaches to the definition of the digital economy in international sources, attention is paid to the direction of changing the methods of engineering and innovative technologies. At the same time, in all approaches, the basis for the transition to the next technological order is ICT (primarily the Internet), the most important elements of the digital system are the exchange of knowledge and technologies that provide it; it is emphasized that people who can participate in this exchange must also have the ability to control [2].

Therefore, the main difficulty in defining the concept of «digital economy» is that it can consist of an infinite number of elements. Analysis of the classified content of the essence of the «digital economy» allows us to determine the presence of the following approaches in them:

- a type of economy in which digital technologies are fully and actively introduced into the processes of collecting, storing, processing, converting, and transmitting information in all spheres of human activity and are constantly used in practical terms [2];

- this is a system of socio-economic and organizational-technical relations based on the operational use of digital technologies and networks [6; S. 112-114];

- is a branch of the national economy that produces and sells digital goods and services in a virtual environment [4; S. 26-27];

- is a complex organizational and technical system, the structure of which is represented by interrelated elements and which ensures sustainable economic development as an addition to the real economy [2; 4; S. 28-29].

However, the concepts and definitions of the digital economy differ from each other in subsequent research and the development of theoretical approaches to understanding, analyzing, and interpreting this development.

The above points allow us to conclude that the digital economy is not just an economic activity, the purpose of which is the production of digital (virtual) goods and services. Therefore, the digital economy can be explained as follows - it is an economy in which the growth of socio-economic indicators is ensured by fully satisfying the individual requirements of the consumer, integrated into digital processes; development of innovative cooperation in the markets using information networks to create digital ecosystems; technological improvement of products and services based on digital solutions; digital restructuring of business processes and organizational forms of company management in order to achieve economic efficiency. The most important point is that the question of «what» is being digitized at all needs to be answered in terms of economic thinking.

Digitalization processes, which are the basis for creating a digital economy in the country, should become the main factor in the socio-economic development of the regions. An assessment of the state and potential of the level of digitalization can be considered at the macro level (digitalization of the country), meso level (province), submeso level (city, district, district centers).

METHODOLOGY

To solve the questions posed in the study, the dialectical method of scientific knowledge was used, as well as general scientific and special research methods: complex analysis and synthesis, a systematic approach, and comparison methods using tabular and graphical tools.

ANALYSIS AND RESULTS

The processes of digitalization of the national economy are a complex of multifaceted and important issues, and the need to analyze and evaluate these processes is increasing day by day. Digitalization is by its very nature purposeful. But the same goals at the same time have different forms and essences, especially in the economy.

The essence of the existence of such logical thoughts is that digitalization is literally aimed at the formation and development of the digital economy at the level of the national economy. Digital technologies are the main tool here. Therefore, the formation and development of the digital economy take place within the framework of digital technologies. The aforementioned economic target results in various forms and essences should be associated with a correct and scientifically sound understanding of the digital economy.

To do this, it will be necessary to develop a methodology for quantitative and informational

analysis of their assessment in a certain sense. To illustrate our approach in this matter, we propose to use the following scheme developed by us (Fig. 1).

Considering that digital technologies and information processes are focused on any economic development, let us explain our methodology.

Considering that the totality (availability) of economic resources of the national economy is the basis of any economic process and social relations, we present them in the form of labor, natural, information and capital resources.

Here we emphasize the most important aspect - the need to use economic resources from the point of view of developing the digital economy. At the same time, we emphasize that such use is based on a logical connection arising from the state of social relations,

economic relations and the development of the digital economy. From this point of view, let us mention the elements that make up social relations.

These include socio-spiritual, socio-legal, and socio-economic relations. We emphasize that economic relations consist of organizational-economic, economic-legal, and economic-financial relations.

The existence and development of socio-economic relations in the digital economy can be seen from the fact that in these relations there is a process of using the total economic resources of the national economy. But in the digital economy, such use happens differently. The main reason for this is that digital technologies and information processes affect the above relationships uniquely.

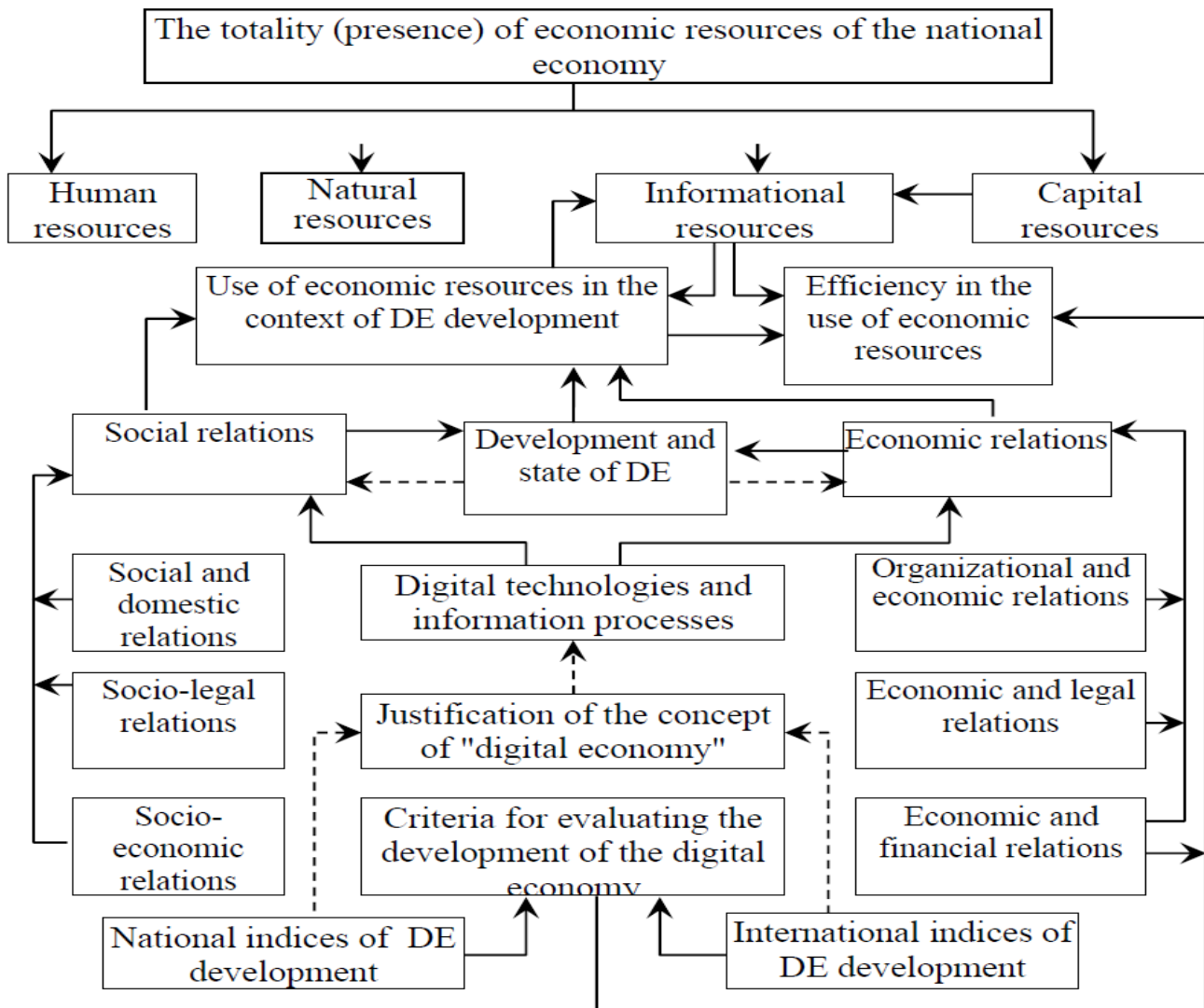


Figure 1. Methodology for the quantitative and informational analysis of the assessment of the digitalization of the national economy



We express this effect as follows.

The fact is that digital technologies and information processes have a direct impact on the above relationships by various concepts of the digital economy. The most important point here is that the criteria for assessing the development of the digital economy are determined based on the validity of the concept.

The need to develop these criteria is based on determining the efficiency of the use of economic resources. The reason for this is the existence of national indices of the development of the digital economy and international indices of the development of the digital economy, which are developed on the basis of different principles.

These principles determine how efficiently economic resources are used. It should be noted here that economic resources are distributed differently in different countries and regions, and this situation, in turn, raises the question of the correct definition of criteria for assessing the development of the digital economy.

The main question mentioned above goes back to the question of the validity of the concept of the digital economy. Here it is necessary to pay special attention to the issue of determining the degree of interdependence between national and international indicators of the development of the digital economy. The reason for this, as we noted above, is due to the fact that the criteria for assessing the development of the digital economy are different in terms of determining the efficiency of the use of economic resources.

Now, from the scheme we have proposed, we express what the main information process should be, because the methodology of quantitative and information analysis represents exactly the processes that occur in the digital economy. The reason for this is that the most important element of this scheme is digital technologies and information processes, which is based on the consideration of this methodology as a methodology for the development of the digital economy. In addition, this means that the development of the national economy is currently taking place directly in the digital economy.

In this regard, the question arises of the need for quantitative measurements in all the processes we have mentioned. Most importantly, this raises the question of exactly what quantities should be used.

It is known that the adequacy of a quantitative assessment is closely related to the data system used in it. Here, in the proposed scheme, the need to highlight the data involved in the quantitative assessment information analysis system is expressed by the rationale for creating a data set in accordance with them in the form of a table.

I would like to say that such justification can be achieved by showing the place of information resources (IR) and capital resources (CR) in the totality of economic resources of the national economy (ERNE) in the digitalization of the national economy, i.e. showing a place in the methodology of quantitative and informational analysis.

First of all, it should be noted the importance of determining the role of R&D and KR in the use of economic resources in terms of efficiency and development of the digital economy.

This means that we must justify to what extent the evaluation criteria can reflect the development of the digital economy (DE).

As shown in the diagram, these criteria determine the efficiency of the use of economic resources. At the same time, it is necessary to determine the relationship between the use of economic resources in terms of meeting the digital economy, and most importantly, which data sets should be involved in these processes. This, in turn, determines the technology of the proposed method.

Now let's move on to the analysis of the data set, which is the basis for a quantitative assessment, and the formation of the necessary mechanism for a comprehensive assessment.

To do this, we used the new concept «Index of economic functionality in the digitalization of information resources» (IEFDIR), introduced by us for the first time in the theory and practice of digitalization of the economy. To consider its general methodological nature and practical aspect, the following scheme was proposed (Fig. 2).

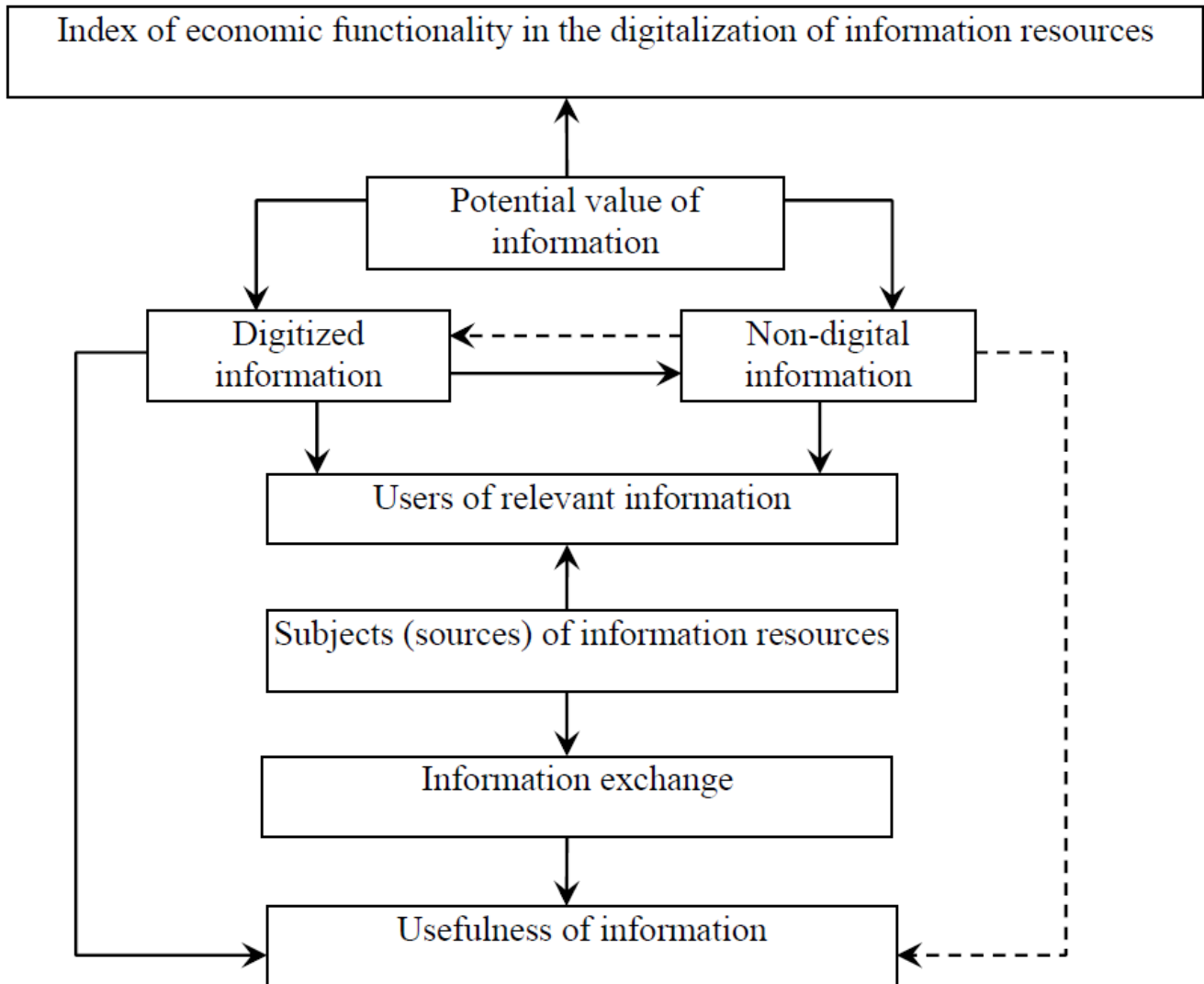


Figure 2. Index of economic functionality in the digitalization of information resources (IEFDIR)

As can be seen from this diagram, elements are presented that represent the basic degree of logically continuous dependence of this index. If we consider IEFTSIR as a systematized category, then the solution of the task to implement the «Potential value of information» is the basis of this systematized category.

At the same time, it is worth noting that the existence of such potential value is objective; the whole problem is to become aware of this objectivity. For this, the place and importance of the digitized information are presented by direct and backlinks. In turn, the introduction of the element «Users of relevant information» into this scheme ensures the functioning of the element «Digitized information». The inclusion of the «Non-digital information» element

ensures the permanent existence of the «Digitized information» element, that is, the need to digitize information at any time interval.

The implementation of the digital economy is based on the presence (inclusion) of the element «Subjects (sources) of information resources», that is, the functioning of this element (within the «Index of economic functionality in the digitization of information resources») requires the presence of the element «Information exchange», which is considered the fundamental basis of the digital economy.

Such an exchange should be associated with the element «Usefulness of information»; at the same time, the exchange of information is the main goal of any subject of the digital economy, while this



exchange allows you to evaluate the usefulness of information, that is, it is thought that utility has a direct relationship with digitized information and feedback with non-digitized information.

CONCLUSIONS & RECOMMENDATIONS

Based on the above analysis and research, it can be concluded that today, with the help of various international composite indices, a fairly wide apparatus has been formed to assess the level of development of the digital economy. But international methods for assessing the development of the digital economy are not without drawbacks, they are mainly related to the ICT infrastructure and the involvement of the population in the Internet. In this regard, there is a need to develop an index for the development of the digital economy, which makes it possible to identify problem areas of the digitalization process in the Republic of Uzbekistan, eliminate existing problems, and thereby improve its position in various global digital rankings.

In this regard, the issue of developing a national index for the development of the digital economy is considered relevant, which identifies problem areas of the digitalization processes implemented in the Republic of Uzbekistan and allows to eliminate existing problems. On the other hand, this allows Uzbekistan to take high places in various international digital rankings.

The disadvantages of international indices assessing the development of the digital economy in countries include the failure to take into account the specifics of individual countries and the need to adapt the indicators achieved in the country to the requirements for calculating these indicators.

The existing methodologies, in our opinion, do not allow for a comprehensive assessment of the level of development of the digital economy in the country. These methods mainly assess the technical aspects of digital development in general and determine the technological development of the digital economy, the level of ICT infrastructure, and the readiness of the population. But the digital economy is a complex phenomenon associated with the transformation of the socio-economic institutions of society at the micro and macro levels. In a word, the assessment of the digital economy in terms of many indicators, which allows for a large-scale analysis at different levels at the same time, leads to a solution to the problem.

Just as digitalization cannot be fully implemented without innovation, the innovative development of the modern economy cannot be

realized without digitalization. Therefore, it is necessary to look at the digitalization of the economy as the main factor determining the level of development of the innovative economy. This determines the feasibility of a comprehensive study of methodological aspects of assessing the level of digitalization and innovative development of economic systems. In the future, a detailed study of the recommended indicators for assessing digitalization and innovative development, as well as conducting research in the direction of improving the procedures and rules for organizational assessment, will remain relevant.

Due to the fact that digital technologies and information processes have a direct impact on socio-economic relations in the national economy, the processes of using the totality of economic resources in the digital economy are different. That is, digital technologies and the information process directly affect these relationships according to each concept interpreted by the digital economy. The most important point here is that the criteria for assessing the development of the digital economy are determined depending on the validity of the concept.

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