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### **ПЕРСПЕКТИВНІ НАПРЯМИ ЦИФРОВОЇ ТРАНСФОРМАЦІЇ В КОНТЕКСТІ РОЗБУДОВИ ЦИФРОВОЇ ЕКОНОМІКИ**

### **PERSPECTIVE DIRECTIONS OF DIGITAL TRANSFORMATIONS IN THE CONTEXT OF DIGITAL ECONOMY DEVELOPMENT**

**ABSTRACT.** *The article is devoted to the research of digital transformation processes to support the development of the digital economy, including the*

*formation of economics digital assets and the regulatory regulation of the digital transformation processes, the development of the digital information and communication infrastructure of the digital economy, and the provision of information security in the transborder space of the digital economy.*

**KEY WORDS:** *digital economy, digital transformation, digitalization, information and communication infrastructure, information security.*

**АНОТАЦІЯ.** *Статтю присвячено питанням дослідженню процесів цифрової трансформації для підтримки розвитку цифрової економіки, в тому числі питань формування цифрових активів економіки та нормативного регулювання процесів цифрової трансформації, розвитку цифрової інформаційно-комунікаційної інфраструктури цифрової економіки, забезпечення інформаційної безпеки в транскордонному просторі цифрової економіки.*

**КЛЮЧОВІ СЛОВА:** *цифрова економіка, цифрова трансформація, цифралізація, інфраструктура інформації та зв'язку, інформаційна безпека*

**АННОТАЦИЯ.** *Статья посвящена вопросам исследования процессов цифровой трансформации для поддержки развития цифровой экономики, в том числе вопросам формирования цифровых активов экономики и нормативного регулирования процессов цифровой трансформации, развития цифровой информационно-коммуникационной инфраструктуры цифровой экономики, обеспечения информационной безопасности в трансграничном пространстве цифровой экономики.*

**КЛЮЧЕВЫЕ СЛОВА:** *цифровая экономика, цифровая трансформация, цифровизация, информационно-коммуникационная инфраструктура, информационная безопасность.*

**Introduction.** In recent years the analysis of the trends in the development of the world economy suggests that digital technologies are the basic component of the digital economy development because they take into account the peculiarities of modern economic processes and can provide their effectiveness [1 — 3].

The digital economy can be defined as an economy based on new methods of data generating, data processing, data storing, data transferring and digital computer technologies, and also includes concepts such as the Internet of Things, Industry 4.0, smart enterprise, 5th generation wireless systems, engineering prototype services and others.

In the conditions of the digital economy, digital transformation of all economics sectors and social sphere is the driving force of economic growth, increasing the competitiveness of enterprises and organizations, improving the life quality of people, sustainable development of the global world community on the whole. According to the leading economists' opinions, the role of digital technologies in the context of the modern economy formation and development will continue increasing [4, 5]. All of these factors determine the necessity

and relevance of research into the processes of digital transformation in the global economic space.

Due to the accelerated pace of qualitative changes that are observed in the global socio-economic system, the role of digital transformation processes, which are becoming truly global, increases. In order to ensure the effectiveness of such processes, increase their efficiency and ensure the digitization of the economy, it is necessary to use such digital technologies that will handle large volumes of information and provide a high level of protection. In this case, digital transformation involves creating new types of innovation and creativity in various sectors of the economy, and not simply improving and maintaining traditional methods and technologies. This will allow for a global synergistic effect while maintaining the ability of economic actors to respond effectively to any external influences both at the national and global levels.

**The purpose of the article.** The main goal of the investigation is to study the processes of digital transformation in the global environment to support the development of the digital economy.

The achievement of this goal has necessitated the formulation and solution of the following tasks:

- normative regulation of the processes of digital transformation and formation of digital assets of the economy;
- development of the digital information and communication infrastructure of the digital economy;
- providing information security in the transborder area of the digital economy.

**The main material.** The digital economy is the result of the transformational effects of new general-purpose technologies in the field of information and telecommunications [4, 5]. It affected all spheres of socio-economic activities, in particular the spheres of production, transport, trade, finance, public administration, education, healthcare, etc., which resulted in qualitative transformations far beyond the field of information and communication technologies.

The digital economy contains three main components that determine and cover the main processes of digital transformation (Fig. 1).

As the impact of the development of markets and economic sectors in the digital economy depends on the availability of developed ICT technologies and platforms, as well as on the level of institutional and infrastructural environments, the processes of digital transformation should focus on the development of key elements of the digital economy, namely: regulatory regulation,

information infrastructure, information security, scientific and educational spheres and others.

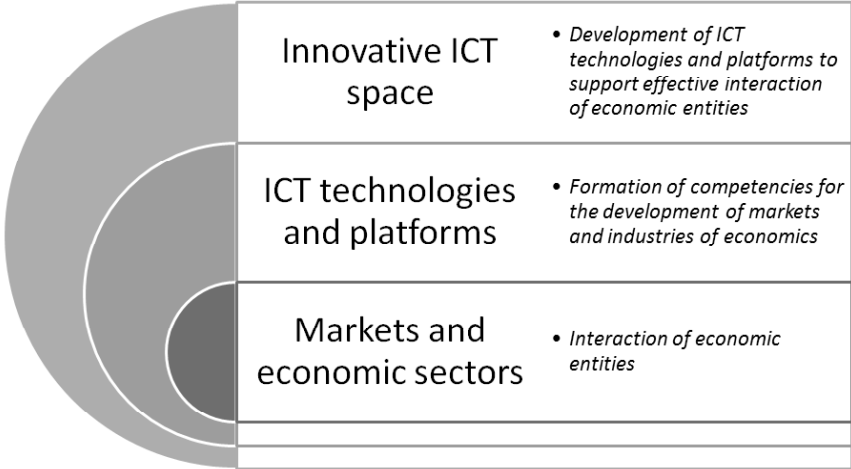


Fig. 1. Structural elements of the digital economy and their interconnections

Let’s consider in more detail the basic tasks of digital transformation in the global socio-economic environment.

*1. Normative regulation of the processes of digital transformation and the formation of digital assets of the economy.*

Normative regulation of the processes of digital transformation involves the formation of a new regulatory environment, which provides favorable conditions for the emergence and development of modern information and communication technologies, as well as for economic activity associated with their use (Fig. 2).

It should be noted that in the context of the development of the digital economy, the role of financial companies and banks, which are becoming truly global and ensuring the formation of digital assets of the economy, increases. Worldwide practice confirms the fact that the banking sector is the main driver for the development and implementation of global digital transformations and information security [6]. Combining the efforts of digital transformation of the banking system with the technological capabilities of the business sector and the state will promote the advancement, formation and development of the digital economy.

**Normative regulation of the processes of digital transformation and formation of digital assets of the economy**

Creation of the permanent mechanism for managing changes and knowledge in the field of digital economy regulation	The removal of key legal restrictions and creation of separate legal institutions aimed at addressing the priority tasks of the digital economy formation	Formation of complex legislative regulation of relations that appear in connection with the digital economy development	Taking measures aimed at stimulating economic activity related to the use of modern ICT technologies and data processing	Creation of a methodological basis for the development of knowledge in the field of regulating the digital economy and the digital assets formation	Formation of the global economy digital assets, development of interregional banking ICT infrastructures, data monetization
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Fig. 2. The tasks of normative regulation of digital transformation processes and formation of digital assets of the economy

Today, in the banking sector, digital assets are formed through the creation and development of interregional banking information and communication infrastructures, including providing free uncompetitive access to banking transactions and open bank information, digital asset information models, as well as access to communication networks and service networks of the Internet of Everything, infrastructure for banking data storing and banking data processing, promising payment instruments. This will provide favorable conditions for the development of both banking and new types of business, based on the monetization of the data provided.

In the long term, it is necessary to develop a policy of digital development of the national banking system in the context of the digital development of the international community based on transborder banking processes, standards for banking and communication equipment, software, services, tariffs, access to banking data and banking services, and security of banking information.

At the same time, in order to achieve the goals, the following tasks must be performed:

- development of a single digital area of the banking sector;
- integration of the general digital area of the banking sector with the information systems of business organizations and public administration;
- use by banks of the centralized architecture of banking information systems;

- creation of advantageous conditions for use of outsourcing services by banks in the field of information technologies;
- wide application of client-oriented technologies and solutions, such as contact centers and customer relationship management systems;
- introduction of modern banking risk management technologies;
- using of methods of intellectual data analysis for the processing of large amounts of information and support for the adoption of managerial decisions making;
- provision of the extension range of banking products from remote banking services;
- introduction of effective methods and advanced technologies of interbank interactions in the general digital area of the banking sector.

It should be noted that in the context of the formation and development of the digital economy for the purpose of joint development of information and communication technologies, digital transformation of economic processes, cybersecurity increasing, processes of formation and development of digital assets will promote rapid digitalisation of the dynamic transborder environment of modern business.

## *2. Development of the digital information and communication infrastructure of the digital economy.*

Information and communication infrastructure (ICT infrastructure) is a system of interconnected information centers, management centers of digital technologies, databases and knowledge-bases, technologies for ensuring the processes of data collecting, data transmitting, data analyzing, data processing and data storing, hardware and software tools, systems of communication the organizational structures that ensure the functioning and development of the information space of the digital economy, and also supports the information interaction between the objects in the socio-economic environment.

Creation and development of the digital ICT infrastructure of the economic system should ensure high efficiency in the interaction of different types of stakeholders (business organizations, governmental organizations, banks, individuals, etc.). To do this, it seems advisable to implement four levels of information interaction in the ICT infrastructure of the digital economy:

- 1) *information level* (provides formation, storage and relevance of the information resources);
- 2) *communication level* (is a digital information network);
- 3) *functional level* (provides ICT support processes for the implementation of digital economy and digital services);

4) *user level* (level of interaction of users of digital services with digital ICT infrastructure).

At the same time, the creation of an efficient digital services chain is possible only if users are encouraged to use such products to improve their performance. At the same time, the development of digital ICT infrastructure will be based on the following key components:

- a centralized information-analytical system for supporting normative reference information (international standards of data processing, international classifiers, etc.) on the basis of service-oriented architecture;
- the unique integration platform for regional economic systems of different countries in the global space of digital economy;
- information and communication reserve center based on the use of cloud technologies;
- networks of information systems and web portals of banking systems of different countries.

Together with the positive achievements and undeniable advantages of the development of digital ICT infrastructure and the development of digital services in the framework of ICT support to support the development of the transborder digital economy, there are still a number of issues that require further elaboration, in particular:

- the existence of different and not always well-coordinated systems of regional and international standards concerning the provision of information interactions in the transborder digital economy area;
- low level of compatibility of information systems, which reduces the effectiveness of their information interaction;
- problems of combining different ICT infrastructures of enterprises, institutions and organizations of different countries.

In solving the problem of the creation and development of digital ICT infrastructure, the economic system can mutually benefit from the use of digital development technologies in various sectors of socio-economic activity, including the development of the telecommunication sphere and intelligent communication networks that support the unified international standards of communication protocols and safe transport mechanisms; the digital development of the e-commerce system, which ensures the widespread adoption and development of technologies for the Internet of Everything, and also contributes for increasing the level of confidence in consumer electronic transactions and the development of digital ICT infrastructures.

### 3. Providing information security in the transborder space of the digital economy.

In the modern world, the issue of information security requires increased attention, because according to the PWC study, the average loss of large organizations from cyber attacks is about \$ 5 million. In this regard, the provision of information security becomes a priority task, in which the business invests more resources [7].

According to Gartner forecast, corporations' spending on IT security will increase by 7.6 % and reach \$ 90 billion in 2017 [8].

According to [8], information security is the state of preservation of information resources and the protection of legitimate rights of the individuals and society in the information sphere.

In [9] the following basic principles on which the information security system should be based are highlighted:

- *confidentiality*, the property of information, which consists in the fact that information can not be obtained by an unauthorized user and/or process;

- *integrity*, the property of information that consists of the fact that the information can not be modified by an unauthorized user and/or process. System integrity is the property of the system, that none of its components can be eliminated, modified or added in violation of security policy;

- *availability*, the property of the system resource, which consists in the fact that the user and/or process having the appropriate authority can use the resource in accordance with the rules established by the security policy without waiting for a given (small) time interval, i.e. when it is in the form required by the user in the place required by the user and at a time when he needs it;

- *accountability*, a property of the system that allows to capture the activity of users and processes, the use of passive objects, as well as uniquely identify the identifiers associated with certain events of users and processes in order to prevent the violation of security policy and/or ensure responsibility for certain actions.

In spite of the rapid development of information and communication technologies, effective solution of information security issues for each organization is individual and remains a creative process.

The general scheme of information security system according to standard ISO/IEC 27001 can be represented as such scheme (Fig. 3).

It should be noted that the main criterion for the effectiveness and quality of information security of an organization is the stability of its financial and economic development in accordance with plans and tasks, regardless of the change in the situation [10].

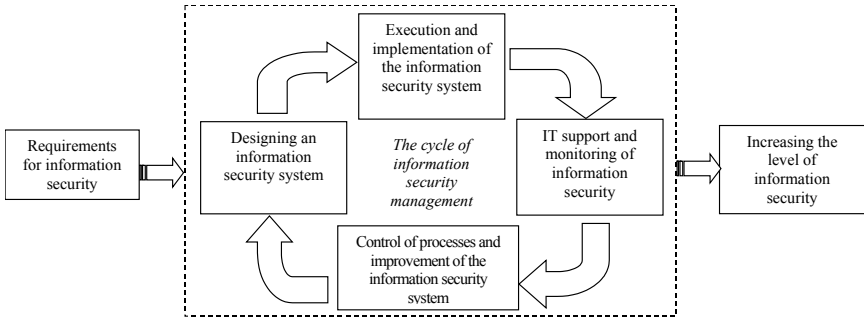


Fig. 3. The scheme of information security system in accordance with the standard ISO/IEC 27001

Consequently, for developing the research concept and solving the problems of digital transformation it is necessary to identify existing problems, to determine and explore the tasks of digital transformation, to substantiate the optimal solutions of given problems, and to ensure the high efficiency of the processes of digital transformation. The implementation of these provisions harmoniously fits into the concept of the emergence and development of the digital economy, which today are coming to more and more countries of the world.

In general, the concept of researching and resolving the problems of digital transformation in the context of the formation and development of the digital economy is presented in Fig. 4.

**Conclusion.** In the context of the development of the digital economy for the purposes of joint development of information and communication technologies, enhancement of cybersecurity, subjects of economic activity seek to share knowledge, exchange experts, jointly develop and apply innovative digital technologies that contribute to digital transformation in the world transborder economic space.

The main objectives of the digital transformation in the context of the digital economy development are the follows:

- the creation of a digital economy ecosystem in which digital data is a key factor in production in all spheres of socio-economic activity, and which provides effective transborder interaction between business, the scientific and educational community, the government authority and citizens;

- creation of necessary and sufficient conditions of institutional and infrastructural nature, elimination of existing obstacles and restrictions for creation and development of high-tech businesses and

prevention of new obstacles and restrictions in the traditional sectors of the economy, as well as in new industries and high-tech markets;  
 – increased competitiveness in the global market as separate sectors of the economy, as well as the global economy generally.

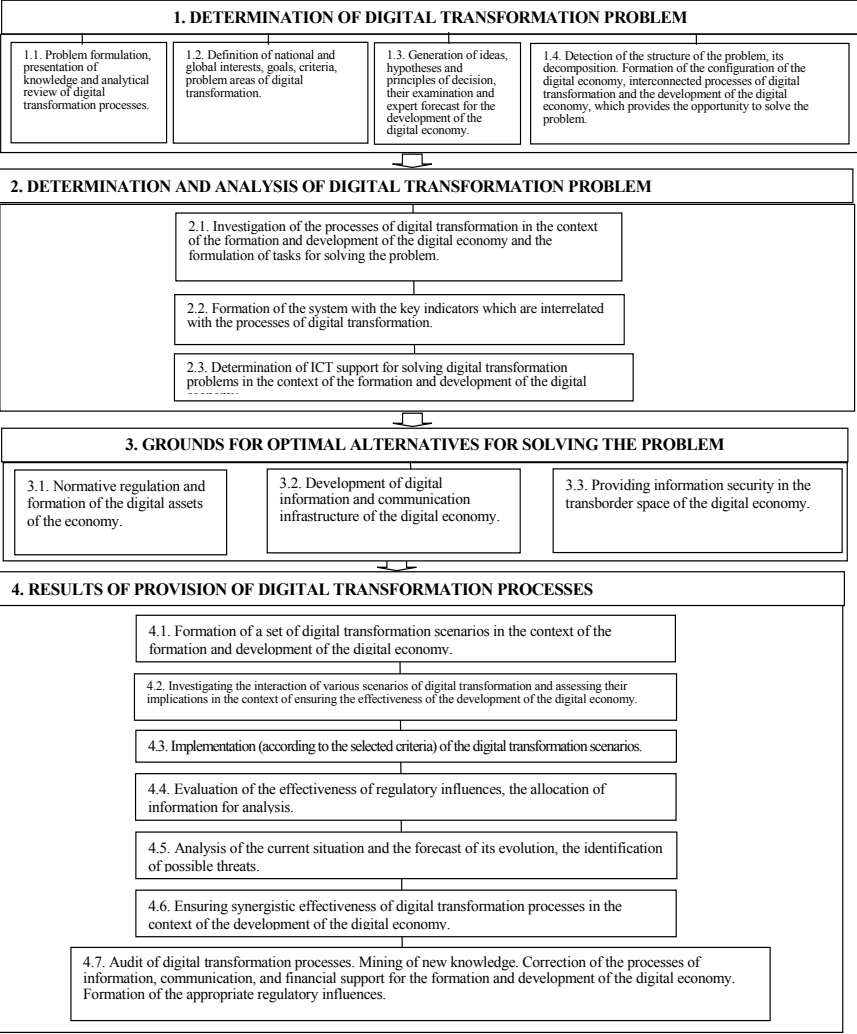


Fig.4. Conceptual provisions for the researching and resolving of the problems of digital transformation in the context of the formation and development of the digital economy

Further research on the development of digital transformation processes in the context of the digital economy should focus on the priorities of digital technology development and digitalisation of all spheres of human activity, which will increase the competitiveness of enterprises and organizations, improve the quality of life of people, and the sustainable development of the global global community on the whole.

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