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State regulation of the development of the digital economy infrastructure

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Abstract

The purpose of the study was to base the principles of state regulation of the infrastructure of the digital economy in the current conditions. In the methodological, a systematic approach was used, which allows to consider the state regulation of the infrastructure of the digital economy as a complex system, whose structure is manifested in the relationships and interactions between the components of the economic system. The tools for regulating the development of the infrastructure of the digital economy are highlighted, including: advancement of innovation infrastructure, intensification of risk investment processes of technology companies, modernization of the higher education system, implementation of state digital economy programs, use of public procurement, public investment and concessional loans, communication technologies, coordination of actions between the administrative bodies that regulate the processes of digitalization of the economy. In conclusion, it should be noted that regulation must be based on a clear objective of infrastructure development, foundation of state regulation tools, which provides a comprehensive decision-making apparatus to regulate the development of digital economy

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infrastructure and have, without losing sight of the impact of threats and risks to economic development in general.

Keywords: government regulation; digital economy infrastructure; management methods; management tool; economic policy.

Regulación estatal del desarrollo de la infraestructura de la economía digital

Resumen

El objeto del estudio fue fundamentar los principios de la regulación estatal de la infraestructura de la economía digital en las condiciones actuales. En lo metodológico se utilizó un enfoque sistemático, que permite considerar la regulación estatal de la infraestructura de la economía digital como un sistema complejo, cuya estructura se manifiesta en las relaciones e interacciones entre los componentes del sistema económico. Se destacan las herramientas de regulación del desarrollo de la infraestructura de la economía digital, que incluyen: adelanto de la infraestructura de innovación, intensificación de los procesos de inversión de riesgo de empresas tecnológicas, modernización del sistema de educación superior, implementación de programas estatales de economía digital, uso de la contratación pública, inversión pública y préstamos concesionales, tecnologías de la comunicación, coordinación de acciones entre los órganos administrativos que regulan los procesos de digitalización de la economía. En conclusión, cabe señalar que la regulación debe basarse en un objetivo claro de desarrollo de infraestructura, fundamentación de las herramientas de regulación estatal, que proporciona un aparato de toma de decisiones integral para regular el desarrollo de infraestructura de economía digital y tener, sin perder de vista el impacto de las amenazas y riesgos para el desarrollo económico en general

Palabras clave: regulación gubernamental; infraestructura de economía digital; métodos de gestión; herramienta de gestión; política económica.

Introduction

Modern global relations, their complexity, diversity and multi-vector necessitate the use of extensive information and communication technologies, which provides digitalization of economic processes. The

digitalization of the economy is a platform for economic development that affects all areas of economic activity. Modern relations in such areas as transport, healthcare, retail, banking and finance, education and others cannot be imagined without the use of the digital technology infrastructure. Modern global challenges, such as the COVID-19 pandemic, are increasingly relevant to the development of the digital economy infrastructure under the influence of government regulation.

The development of the infrastructure of the digital economy contributes to:

- Ensuring economic and information security of socio-economic development of the country with the use of the digital technologies.
- Increasing the use of the existing economic potential of the country by expanding opportunities for the use of potential, including humans.
- Increasing the competitiveness of the country's economy in the international market, through faster dissemination of knowledge and information, which contributes to the innovation of economic development.
- Reduction of barriers to the development of business structures and their promotion in international markets through the use of the digital technologies;
- Ensuring the principles of social interaction and improving the living standards of the population of all territories of the country.
- Ensuring increased efficiency of production activities of economic development entities through the use of the principles of Industry-4.0, etc.

Today, the digital economy is seen as a direction of social development, a certain way of life, the sphere of the economy, a new basis for economic development and security, a new platform for business and social development. The purpose of this study is to substantiate the principles of state regulation of the digital economy infrastructure in current conditions.

In the context of the methodological basis of this study, a systematic approach was used, which allows to consider state regulation of the digital economy infrastructure as a complex system, the structure of which is manifested in the relationships and interactions between components of the economic system. The methodology of a systematic approach to state regulation of the development of the digital economy infrastructure involves compliance with such principles as:

- The principle of analysis, which provides for the unity of the theory

of public administration and practice.

- The principle of catalysis, which involves the attractors of the process of public administration of infrastructure development of the digital economy.
- The principle of strategizing, which is the need to build foresight of possible scenarios for the development of infrastructure of the digital economy and get from this socio-economic effect.
- The principle of harmony, which takes into account the existing structure of the economy and the development of new sectors of the economy in terms of using existing potential.
- The principle of synergy, according to which management decisions will help to obtain a synergistic effect on the intensification of the infrastructure of the digital economy and the effect on economic growth.
- The principle of consistency, which provides for the management of decisions to take into account the sequence of structural changes.

The application of a systematic approach and the principles of analysis, catalysis, strategy, harmony, synergy and consistency will help increase the effectiveness of state regulation of the development of the digital economy infrastructure.

1. Literature Review

Many scientific studies have been devoted to the issue of public administration in the context of digitalization and development of the digital economy infrastructure. Among the scientists we would like to mention are the following: Adriaens (2021); Casalino (2010); Cosmulese (2019); Derhaliuk (2021); Djakona (2020); Flensburg (2020); Kholiavko (2021, 2022); Mengs (2021); Novachenko (2020); Popelo (2021); Pujadas (2019); Rukanova (2021); Samoilovych (2021); Sazonets (2018); Shkarlet (2020), Tulchynska (2022), Zhavoronok (2021) and others.

The authors' study (Sazonets *et al.*, 2018) analyzes the most effective practices of the digital public administration in the context of realizing the innovative potential of the national economy. Researchers have studied that China's digital administration system has its advantages in realizing the innovative potential of the national economy, as it significantly restrains the growth of corruption.

The aim of the article (Adriaens and Ajami, 2021) is to analyze current trends and features of infrastructure and the digital economy, namely the

financing and management of basic services for society. The authors argue (Rukanova *et al.*, 2021) that digital infrastructure innovations have the potential to ensure the visibility of circular economy flows. Researchers have shown that there is very limited research on how digital infrastructure innovations can enable and support the management of the circular economy.

In the article (Flensburg *et al.*, 2020), scientists have developed a structure that provides a basis for measuring and comparing digital communication systems in national or regional contexts. Researchers (Pujadas *et al.*, 2019) have found that while digital platforms tend to be seamlessly presented as the infrastructure of a shared economy, the formation of infrastructure boundaries is political and performative, meaning that it is involved in ontological policies that have implications for the sharing of responsibilities.

German scholars (Mengs *et al.*, 2021) are considering modernizing the provision of public services through digitization. The article (Novachenko *et al.*, 2020) is devoted to the research and analysis of the use of information technologies to increase the level of economic efficiency and trust in public administration in Ukraine. The authors applied the concept of the digital management in order to integrate the interaction of municipal and state structures with business, civil society institutions and the population.

Scientists (Casalino *et al.*, 2010) have presented a model of system dynamics, in order to determine the benefits of the digitization process in Italian public administration. According to the authors, the systems approach allows to consider many important aspects of the problem of digitalization and provides a broad analysis.

The study (Shkarlet *et al.*, 2020) analyzes the theoretical and practical aspects of infrastructural and regional development. The article of scientists (Samoilovych *et al.*, 2021) reveals the features of the digital transformation of regions in the context of information economy development. The aim of the authors' scientific work (Popelo *et al.*, 2021) is to study the functions of public administration of regional development in the digital transformation of the economy.

The article (Derhaliuk *et al.*, 2021) deals with the state policy of transformation of potential-creating space in the context of intensification of regional development. The issues of developing methodological approaches (Tulchynska *et al.*, 2022) to the assessment of innovation in the Polish and Ukrainian regions in the light of digitalization are extremely important. The articles of scientists (Cosmulese *et al.*, 2019; Djakona *et al.*, 2020; Kholiavko *et al.*, 2021, 2022; Zhavoronok *et al.*, 2021) reveal the role of higher education in the development of the digital economy and the priority areas for increasing the adaptability of universities to the conditions of digitalization.

2. Results

The digital economy infrastructure includes the branching of platforms, networks and communications, the availability, modernity and state of technical means for communication, equipment to cover the Internet, software and more. The digital economy infrastructure provides the dissemination of knowledge and information, the implementation of social products and services for all members of society regardless of their location, the movement of financial resources, the administration of diverse systems and processes and more.

To develop the digital economy infrastructure, it is necessary to ensure the appropriate quality of institutional support, which consists in the formation of effective and efficient institutional and legal bases, supported by the implementation of the state strategy on state policy of digitalization of the economy.

Also, for effective state regulation of the digital infrastructure development, it is important to branch out and develop state and non-state public institutions, institutions, organizations that provide not only regulation but also stimulate the development of the digital infrastructure. Digital infrastructure provides the development of the digital technologies and their dissemination in all spheres of social activity, which contributes to the digitalization of social development processes.

State regulation of the development of the digital economy infrastructure must include the following elements (Fig. 1):

- Formation of a clear goal to be achieved as a result of state regulation of the development of the digital economy infrastructure and have a positive effect on economic growth through harmonization of economic processes and taking advantage of the digital economy taking into account the security of economic development.
- Substantiation of the tools of state regulation of the development of the digital economy infrastructure should be in accordance with the innovativeness of economic development through the dissemination of knowledge and information with the introduction of specific forms, methods and models of management decisions.
- The principle of comprehensive decision-making to regulate the development of the infrastructure of the digital economy in the context of security of its operation.
- Taking into account the impact of economic threats and risks of economic development in making management decisions to regulate the development of the digital economy infrastructure.

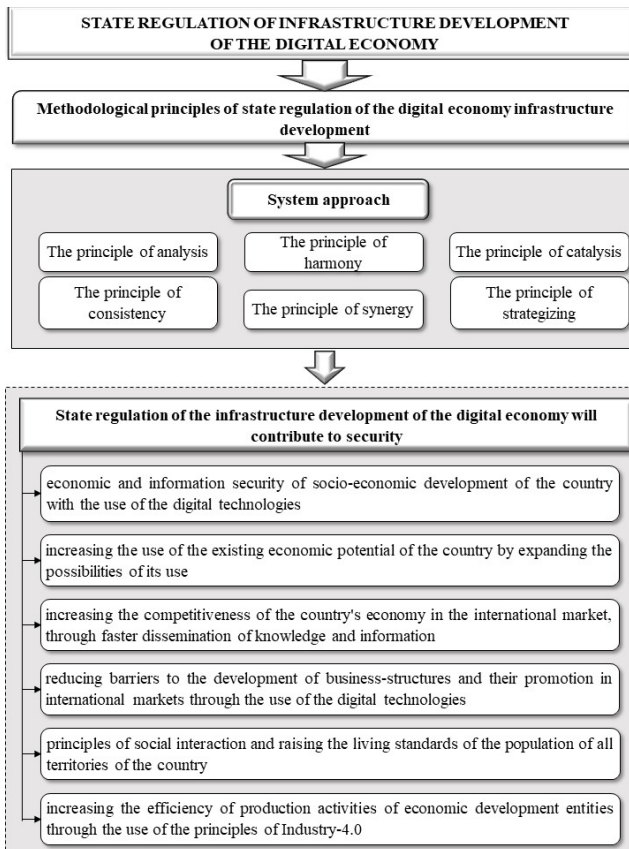


Fig. 1. Methodological principles of state regulation of the digital economy infrastructure development. Source: built by the authors.

State regulation of the development of the digital economy infrastructure should provide for multi-vector methods of state regulation, which should include:

- Firstly, administrative methods of state regulation, involving the use of permits and administrative tools, tools for public administration of digitalization of the economy, the adoption of necessary instructions for digital economies, decisions, orders, issuing permits for activities in the field of information and communication technologies, introduction and substantiation of technical requirements and regulations in the field of the digital technologies.

- Secondly, normative-legal ones, which provide for the improvement of the normative-legal field of the digital economy infrastructure development through the adoption of necessary laws and regulations on stimulating the development of the digital economy infrastructure.
- Thirdly, economic methods related to providing financial and economic incentives in the field of information and communication technologies and the development of infrastructure of the digital economy in general. Economic methods of state regulation of the digital economy infrastructure development may include such tools as direct state financing in the form of budget subsidies and subventions, regulation of credit rates, tariffs, taxation of the digital sector entities, customs regulation, etc.
- Fourthly, organizational methods include the use of tools and means of regulation, organization and functioning of the digital economy, harmonization of global and national standards for the development of the digital economy infrastructure; state regulation in determining the priorities of development of this area and ensuring their implementation through the program-target method;
- Fifthly, socio-psychological methods that involve the development of the digital culture of the population, increasing the competence of the population to use digital technologies, attitude to the importance of information and digitalization.

The use of such methods of state regulation of the digital economy infrastructure as administrative, regulatory, economic, organizational and socio-psychological allows to increase the effectiveness of state regulation, as well as to establish close interaction of all components of the digital economy infrastructure.

In addition to the outlined methods of state regulation, the tools of state regulation of the development of the digital economy infrastructure should be singled out, which should include:

- Development of innovation infrastructure that provides the processes of digitalization of the economy by domestic developments and implementations.
- Intensification of investment processes through the development of collective investment institutions, public-private partnerships, incorporation of financial infrastructure.
- Intensification of venture financing of technology companies.
- Modernization of the system of higher education, training and retraining in the direction of increasing the digital competencies of the workforce.

- Introduction of modern educational programs that combine science, technology, engineering and mathematics, which form a new constellation of specialists in digital economics.
- Creation of a system of informing economic entities about the opportunities and benefits of digitalization of economic processes at different levels.
- Implementation of state programs for the development of the digital economy and coordination of strategies and programs for the development of the digital economy infrastructure.
- Use of public procurement, public investment and preferential lending for the development of information and communication technologies.
- Coordination of actions between regulatory and administrative bodies regulating the processes of digitalization of the economy.

State regulation of the development of the digital economy infrastructure should be based on the following requirements for the management process:

- To use program-prognostic models of management of the development of the digital economy infrastructure of principles of development of the digital economy built on foresight.
- Modernization of the economy taking into account the security of the processes of digitalization of the economy.
- Providing information competencies of representatives of state, regional and local authorities to increase the efficiency of digitalization processes of socio-economic development management.
- Transformation of outdated principles of functioning of the system of social and labor relations, education system, etc. in the direction of using information and communication technologies.
- Purposefulness of state regulation of the infrastructure development of the digital economy, which makes it possible to obtain a synergistic effect for the development of the country's economy.
- Consensus between the authorities, taking into account the processes of decentralization of power in the context of economic security and the development of information and communication technologies to ensure the digitalization of economic processes.
- To take into account the specific features of economic process management based on the experience of European countries on state regulation of the development of the digital economy infrastructure (Fig. 2).

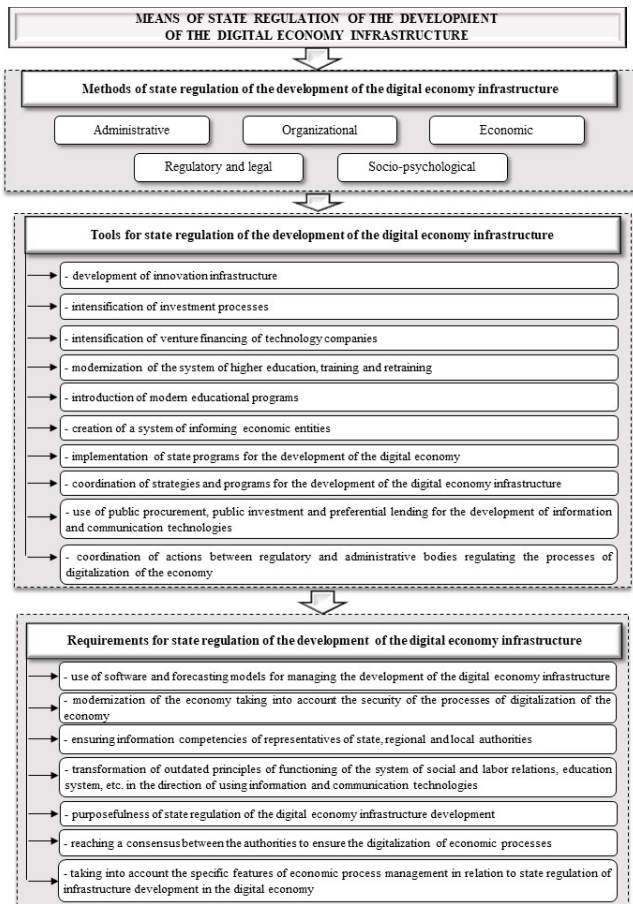


Fig. 2. Means of state regulation of the development of the digital economy infrastructure. Source: developed by the authors

The infrastructure development through government regulation makes it possible to intensify activities in the digital sector and the economy as a whole. Thus, increasing the share of information technology and the digital sector in value added and gross national product. Thanks to the state's regulatory measures in the direction of developing the infrastructure of the digital economy, equal access to all citizens of the country to information, knowledge and services that can be obtained through the use of information and communication technologies should be achieved.

This, in turn, helps to improve the quality of life of the population throughout the territory, regardless of the remoteness of the place of residence to cities and centers of socio-economic development. Ensuring the infrastructure of the digital economy provides benefits for businesses through increased competitiveness as a result of increased production efficiency, resource efficiency and the ability to find partners and consumers using information and communication technologies. Also, the infrastructure development should be focused on European cooperation, activation of European and global markets with a high level of security and trust between partners.

Conclusion

The use of a systematic approach to substantiate the principles of state regulation of the development of the digital economy infrastructure makes it possible to note that regulation should be based on a clear goal of infrastructure development, substantiation of state regulation tools, provide comprehensive decision-making to regulate digital economy infrastructure development and take into account the impact of threats and risks to economic development.

The scientific novelty is the substantiation of the use of administrative, regulatory, economic, organizational and socio-psychological methods, tools of state regulation of the digital economy infrastructure, which under the conditions of using a systematic approach and adherence to the principles of analysis, catalysis, strategy solutions makes it possible to increase the effectiveness of government regulation and ensure the interaction of all components of the infrastructure of the digital economy.

Further research is required on the issues of state regulation of intensifying the use of the advantages of the digital economy in social development in order to increase the competitiveness of the economy on the world market.

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