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The role of digitalization in the development of regions and the use of their potential in terms of sustainable development

Роль цифровізації у розвитку регіонів та задіявання їх потенціалу в умовах сталого розвитку

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Abstract

The study substantiates the determining role of digitalization and its tools in the development of regions and the use of their potential in terms of sustainable development. The methodological basis of the study was a systemic and process approach, as well as a dialectical method of scientific knowledge. Clarification of the main features of the potential of the regions and its properties made it possible to highlight the importance of digitalization for the economic development of regions and the achievement of sustainable development goals. The directions of increasing the efficiency of the information and communication environment of the regions are substantiated. The role of digitalization development in increasing the involvement of potential opportunities of regions in their development to ensure the achievement of sustainable development goals and ways to stimulate the activation of the potential of regions through digitalization. It is proved that digitalization contributes to the activation and

Анотація

У дослідження обґрунтовано детермінуючу роль цифровізації та її інструментів у розвитку регіонів та задіявання їх потенціалу в умовах сталого розвитку. Методологічним базисом дослідження виступили системний та процесний підхід, а також діалектичний метод наукового пізнання. З'ясування головних ознак потенціалу регіонів та його властивостей дало можливість виокремити значення цифровізації для економічного розвитку регіонів та досягнення цілей сталого розвитку. Обґрунтовано напрями підвищення ефективності функціонування інформаційно-комунікаційного середовища регіонів. Виокремлено роль розвитку цифровізації у підвищенні залучення потенційних можливостей регіонів у їх розвиток для забезпечення досягнення цілей сталого розвитку та напрями стимулювання активізації потенціалу регіонів за рахунок цифровізації. Доведено, що цифровізація сприяє активізації та трансформації потенціалу регіонів, його

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transformation of the potential of regions, its transformation into capital and the formation of new potential that raises social, economic, environmental living standards of all segments of the population, increasing the competitiveness of regions.

Keywords: sustainable development, digitalization, regional economic systems, potential, information and communication technologies.

Introduction

Current challenges of regional development raise the issue of managing their potential to increase the competitiveness, self-sufficiency of regions and reduce the asymmetry of development in the social, economic and environmental spheres. The principles of sustainable development have shown that economic growth does not lead to automatic social progress and does not solve environmental problems, nor does it help reduce the asymmetry of development between regions. The potential of the region is a complex system that includes natural, intellectual, industrial, labor, social, economic, creative, investment, cultural, educational, recreational and tourist and many other types of potential areas. The potential of the region reflects the ability and willingness of regional systems to use it to enhance the social, economic and environmental aspects of development. Readiness is reflected in the availability of certain potential opportunities of the regions, sufficiency and balance of opportunities to transform capacity into a resource, and capacity reflects certain incentives to turn potential into an efficiently used resource of regional development.

Each potential of the region has its own characteristics and conditions for its use, which contributes to achieving the goals of sustainable development. But today the main powerful impetus for activating the potential of regions and achieving the principles of sustainable development is the digitalization of the economy. This and others call for a more detailed study of the role of digitalization in the development of regions and the use of their potential in the context of sustainable development.

Literature Review

The publications of scientists of national and international levels are devoted to various aspects of regional development in the context of sustainability and the impact of digitalization processes on regional development, namely:

перетворенню у капітал та формуванню нового потенціалу, що підвищує соціальні, економічні, екологічні стандарти життя всіх верст населення, підвищенню конкурентоспроможності регіонів.

Ключові слова: сталий розвиток, цифровізація, регіональні економічні системи, потенціал, інформаційно-комунікаційні технології.

Arefieva O. et al (2021); Bahn R.A. et al (2021); Birnbaum L. et al (2021); Cosmulese C. G. et al (2019); Derhaliuk M. et al (2021); Gonzalez O. et al (2021); Ivanova N. & Butko, M (2016); Kholiavko N. et al (2020); Khubiev B. et al (2021); Pestryakov A. et al (2021); Popelo O. et al, (2021a); Revko A. et al (2020); Samoilovych A. Et al (2021); Shkarlet S. et al (2020); Smirnova O. & Ponomaryova (2021); Suraeva M.O. et al (2022); Trubetskaya O.V. (2021); Tulchynska S. et al (2021); Unbehaun D. et al, (2021); Yankovskaya V.V et al, (2021) and others.

The aim of the article (Suraeva et al., 2022) is to study the impact of digital technologies on approaches to economic security. Scientists have developed a strategy for economic security in the regions, proposed measures to protect information security. According to the results of the study, a system of measures to ensure the country's information security in the field of domestic policy was developed.

In the article (Trubetskaya, 2021), scientists analyze the main provisions of sustainable progress of the country through the factors of regional development. The authors proved that digital technologies can significantly affect the economic and social condition of the region. The article notes that digitalization provides endless opportunities for improving the efficiency of economic processes, increases the competitiveness of the region.

The authors of the article (12) propose a methodological approach to assessing the impact of cultural infrastructure on the regional development of Poland and Ukraine. The aim of the authors' article (13) is to study the theoretical and practical issues of infrastructural development of the region. In the research of scientists (14) the system of economic security in the conditions of transformation of power is analyzed.

The authors (Birnbaum et al., 2021) investigated the attachment to the place in the times of digitization in rural areas. Researchers suggest that the analysis be based on a three-dimensional structure that includes concepts of attachment, space / place, and digitization. The results of the study show that digitization is really important, in particular with regard to abstract, non-localized spatial references to rural areas.

The aim of the article (Reynolds et al., 2021) is to analyze the differences in the digital capabilities of basic and non-core enterprises in urban and rural parts of the region. The authors study that while investing in digital infrastructure and digital technologies can support the fundamental economy, digital barriers run the risk of undermining the benefits of embedding its sectors and widening spatial gaps.

The article (Samoilovych et al., 2021) examines the world experience and Ukrainian realities of digital transformation of regions in the context of information economy development. The works of scientists (Popelo et al., 2021b) is dedicated modeling and forecasting of the integrated index of innovation activity of regions. The authors analyze the functions of state management of regional development in the context of digital transformation of the economy. Scholars (Derhaliuk et al., 2021) study the peculiarities of the state policy of transformation of potential-creating space in the context of intensification of regional development. Within the framework of the research (Ivanova & Butko, 2016), the authors analyzed the current trends in the development of the region's infrastructure, as the basis of its development.

The article (Unbehaun et al., 2021) is based on the processes of digitalization and improving the quality of life in rural and industrialized regions. These processes have been shown to be transformative, essentially dependent on the ability of regions to meet the challenges of modernizing their industrial base, improving their skills, compensating for job losses in key industries, improving welfare and living standards, and improving their contribution to national work. and creating more inclusive and sustainable societies. The authors identify interdisciplinary perspectives on regions in industrial and digital transition in order to achieve sustainability in the context of major shifts caused by globalization, decarbonization and current technological changes.

Digitization determines the development of all processes in the economic and social spheres,

including, as the authors argue (Pestryakov et al., 2021), the issue of strengthening economic security. Researchers are studying the problem of digitization of one of the economic activities of the region. The authors analyze the indicators that determine the economic security of the region and identify problems. As a result of the analysis, the authors developed recommendations for solving these problems and calculated the benefits of implementing certain digital technologies.

In the framework of scientific work (Bahn et al., 2021), the authors analyzed the potential and current contribution of digital technologies in the agri-food sector. It has been studied that digital agriculture is promising in solving the key problems facing the agri-food sector in the countries. The authors are convinced that public policy should not only promote the introduction of digital technologies in the Middle East and the North, but also ensure equal access, transparency, data protection and labor protection.

Scientists (Smirnova & Ponomaryova, 2021) have devoted their article to the study of aspects of sustainable economic development in the light of the development of digital technologies. The authors are convinced that in order to progressively and evenly develop digitalization in the real sector, it is necessary to intensify innovation activity in the regional industrial sector. According to the authors, the government should share the risks of introducing fundamentally new technologies and high technologies with industrial enterprises.

Also, a significant number of scientists dedicate their research to the study of higher education in the context of digitalization as one of the priorities of sustainable development of the regions. Thus, the articles considers the priority areas of increasing the adaptability of universities to the conditions of the digital economy. The authors analyze the role of higher education in the development of the digital economy. Scientists analyze the adaptation of higher education to the digital economy. The authors investigated the investment aspects of the impact of higher education on sustainability. Scientists (Tulchynska et al., 2021) have studied the role of higher education institutions in the development of eco-industrial parks in terms of sustainable development. The article (Cosmulese et al., 2019) is devoted to the analysis of the impact of the digital revolution on the educational system of the EU.

Methodology

For a thorough study of the spatial aspects of regions' sustainable development, it is most appropriate to use a systematic approach. The application of a systems approach makes it possible not only to consider the potential of regions as part of more global and microsystems at the same time, but also to assess the effectiveness of digital impact on spatial development in accordance with the principles of sustainability. The systems approach makes it possible to simultaneously study a large set of constituent subsystems of the regional economy, their diversity and multivectority, taking into account specific properties and relationships, as well as to take into account the impact of the external environment. A systematic approach to determining the role of digitalization in the development of regions and the use of their potential in the context of sustainable development is complemented by a process approach, as the object of study has a branching development processes. It is the process approach that makes it possible to combine multi-vector actions in the direction of obtaining the desired effect on the regions. The interconnectedness of processes and actions gives an overall positive result not only in the spread of digitalization, but also in enhancing the involvement of the potential of regions in achieving the goals of sustainable development.

The dialectical method is also a fundamental method of studying the role of digitalization in the development of regions and the use of their potential in conditions of sustainable development. Which makes it more thorough to identify in the ways of dividing and combining the whole and parts of regional development, determining and secondary, regular and random, abstract and concrete.

The purpose of this study is to substantiate the theoretical and methodological principles of the role of digitalization in the development of regions and the use of their potential in terms of sustainable development in modern conditions.

Results and Discussion

The role of digitalization in the development of regions affects the use of the potential of regions as it affects such vital factors of economic development of regional economic systems as employment, business development. In fact, digitalization is of great importance for the economic development of regions because it not only helps to increase GRP, but also ensures the

achievement of sustainable development goals. World practice proves that digitalization has a positive effect on the growth of GRP and the economies of countries and the world as a whole, it is achieved by reducing production costs, better use of resources, creating new modern sectors of the economy. But in order to have an effect on the sustainable development of the regions, it is necessary to implement the principles of digitalization in all spheres of life. Due to such digital integration, actions and initiatives provide an opportunity to unleash the potential of the region and ensure its use.

Digitalization with the help of information and communication technologies, which are its tool for implementation in everyday life, provide an opportunity to guarantee a higher level of security of regional development and its inhabitants, including economic, social and environmental.

Today, digitalization has become a powerful impetus for the development of culture, education, science, public administration because the use of information and communication technologies provides access to information and knowledge, which improves the quality of educational services, increases the effectiveness of research and innovation, improves governance at all levels of economic systems and ensures the proper quality of social services.

The potential of regions is a dynamic system characterized by the constant transformation of proportions and relationships between its components in both time and space. The transformation of the proportions and dependencies of the components of the potential of the regions leads to constant changes in other proportions of the functional and territorial nature of sustainable development of the regions. Since the potential is represented by a certain system, the transformation of subsystems as a result of digitalization leads to constant changes in regional systems. Also, each region has its own unique specific potential on which the ability of regions to form their own competitive advantages depends. The formation of the region's potential depends on the availability of natural resources, available production capacity and the possibility of their modernization, labor, scientific, technical and innovative potential, etc. That is, from the accumulation of national wealth in the region as a whole.

The potential of the region as a whole is a diverse set of potentials that depend on the historical

features of the development of a particular area, mechanisms and tools for its involvement in regional development to achieve sustainable development goals. Increasing the use of the region's potential in sustainable development increases competitiveness and ensures social, economic and environmental development of the region.

The potential of the region at a certain time under certain conditions can be involved in sustainable development, one of the significant and decisive impulses in activating potential regional opportunities may be digitalization (Fig. 1).

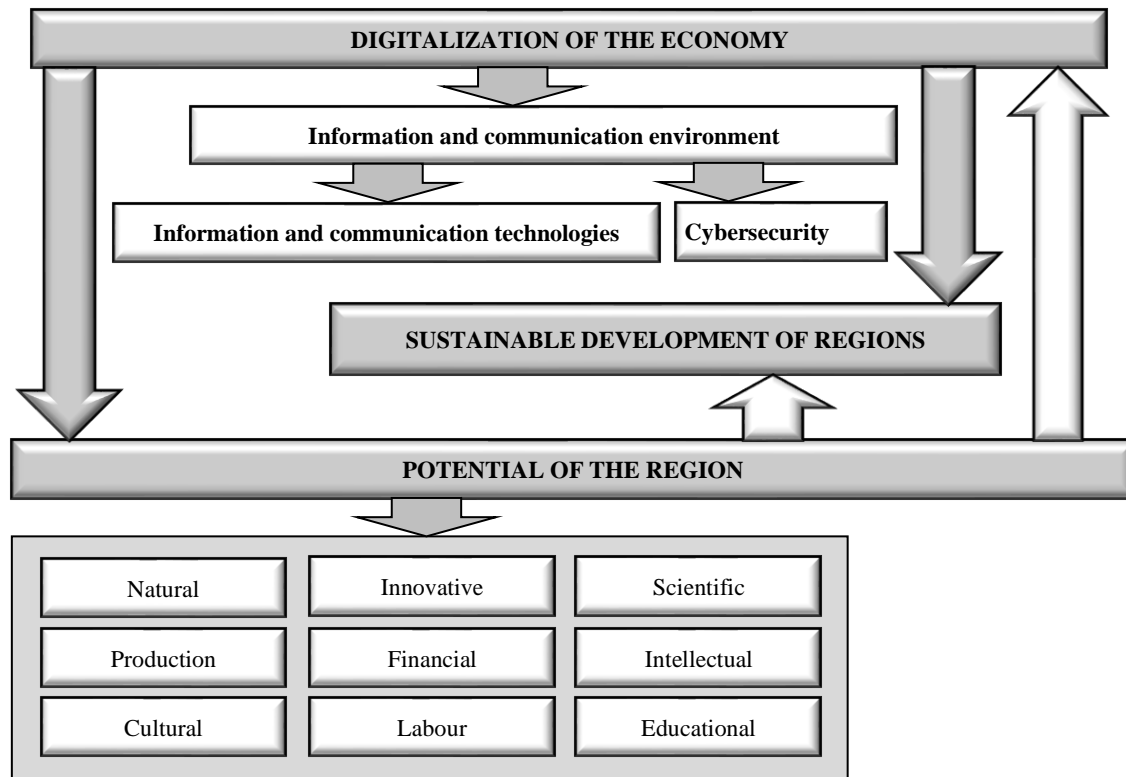


Figure 1. Relationships of digitalization with sustainable development and potential of regions. Source: suggested by the authors.

Digitalization through the introduction of modern information technologies in all spheres of life, development of e-democracy, use of e-government tools increases the efficiency of regional actors, forms an open and transparent system of communication between business, government, households. Thus, the use of e-government tools simplifies people's access to administrative services, not only improving the quality of social life, but also stimulates the intensification of entrepreneurial activity and so on.

The role of digitalization in regional development to tap into the potential of all territories depends on the current information and communication environment, which is provided by information and communication technologies and cybersecurity. The information and communication environment provides an opportunity to attract modern technologies,

software products, specialized networks and systems.

Indicators of the functioning of information and communication environment are increasing the competitiveness of the regional economy, establishing new mutually beneficial relationships between regional actors, forming transparent and virtuous relations between different levels of government and regional actors, reducing economic shadowing, preventing monopolies and transparency of market relations.

To increase the efficiency of the information and communication environment it is necessary (Fig. 2):

- to expand the domestic market of information services, as well as saturation of its domestic information product;
- attracting investment resources to ensure the innovative development of this market segment;
- dissemination of the potential of spatial and structural competition in the information and communication sector;
- increase the level of digital literacy of all segments of the population;
- introduction of electronic document management in all spheres and ensuring the implementation of public services in electronic form;
- introduction of open data at the regional and local levels and their maximum popularization;
- branching out of digital infrastructure by providing quality access to the Internet, telecommunications, etc.;
- development of e-business and e-commerce;
- ensuring the development of e-democracy.

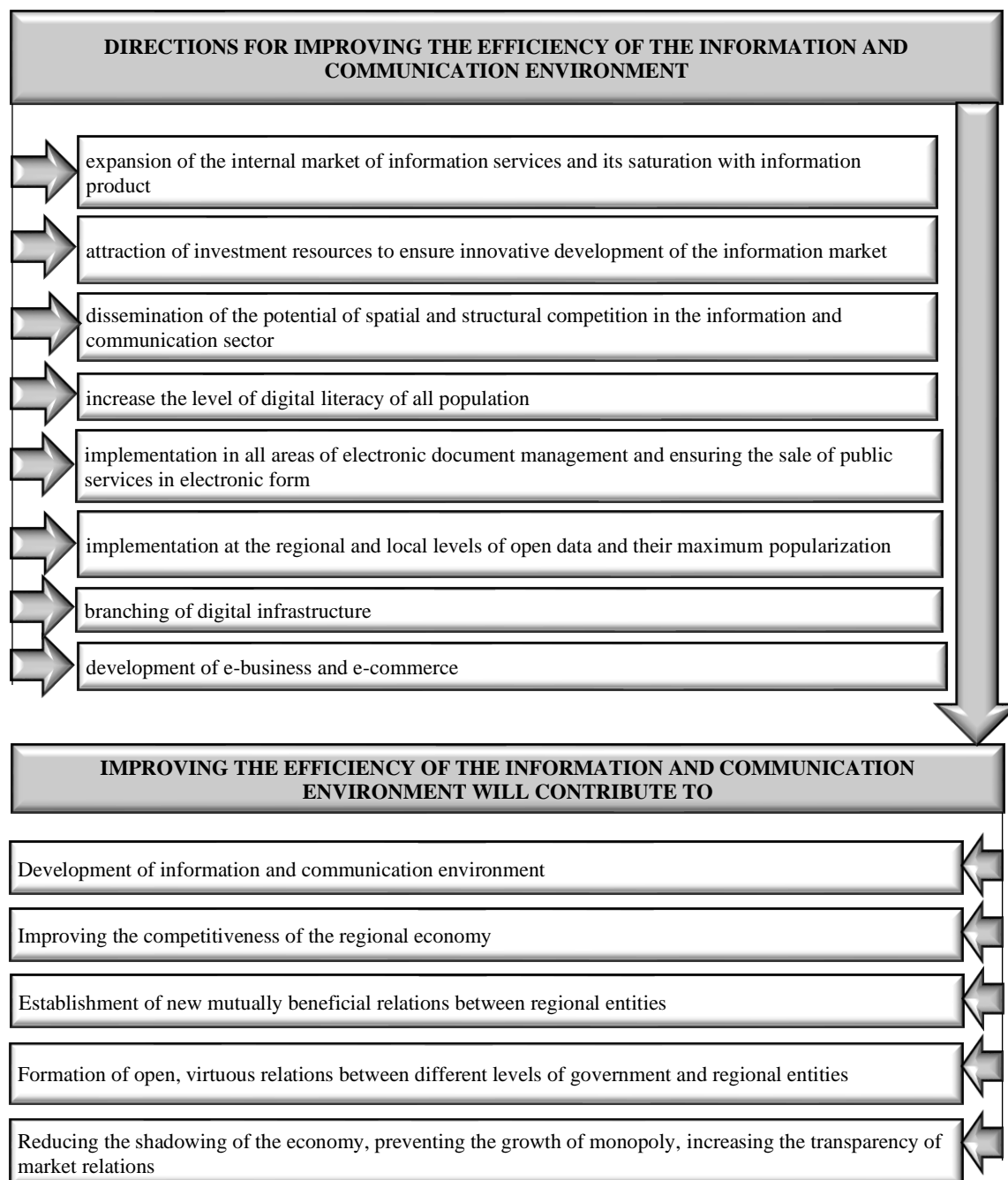


Figure 2. Directions for improving the efficiency of the information and communication environment
Source: developed by the authors

In turn, improving the efficiency of the information and communication environment will contribute to the formation of the digital economy and the use of new potential opportunities to achieve sustainable regional development.

To ensure the development of information and communication technologies, financial and resource support is needed, which can be quite diversified and provided by attracting such diversified sources as own provision of regional systems, attracting credit resources, as well as the use of public-private partnerships and budget funds. different levels.

The role of digital development in increasing the potential of the regions is reflected in the following factors (Fig. 3):

- providing conditions for accelerating and increasing the efficiency of scientific and innovative activities and innovative and technological development of territories. In this direction, digitalization provides conditions for unlimited access to knowledge and information and stimulates innovation through the introduction of new technologies;
 - attracting investment resources in the system-forming spheres of economic activity. The use of information and digital technologies provide an opportunity to increase the efficiency of resource use and
- provide a focus on the use of renewable sources;
 - improving the quality of social services and attracting investment capital in the implementation of social programs of local development. Involvement of digitalization in the social sphere improves the quality of human potential and ensures its embodiment in intellectual, creative, labor and other types of capital;
 - increase the level of economic security and resilience of regions to negative external and internal influences and mitigate the manifestations of adverse global trends. This is possible due to the introduction of the latest methods of analysis and monitoring of the environment, prevention and prevention of hybrid and information wars, etc.;
 - increasing the level of competitiveness of the environment. This is possible by increasing the transparency of the market environment, democracy of economic processes, which is achieved by achieving absolute transparency of relations and processes, leveling all preferences and balancing the capabilities of all regions in all economic processes, which has a positive impact on market competitiveness and monopolization.
 - optimization and automation of processes of regulation of economic processes. Optimization of management processes through the use of information technology tools and providing authorities and businesses with relevant information.

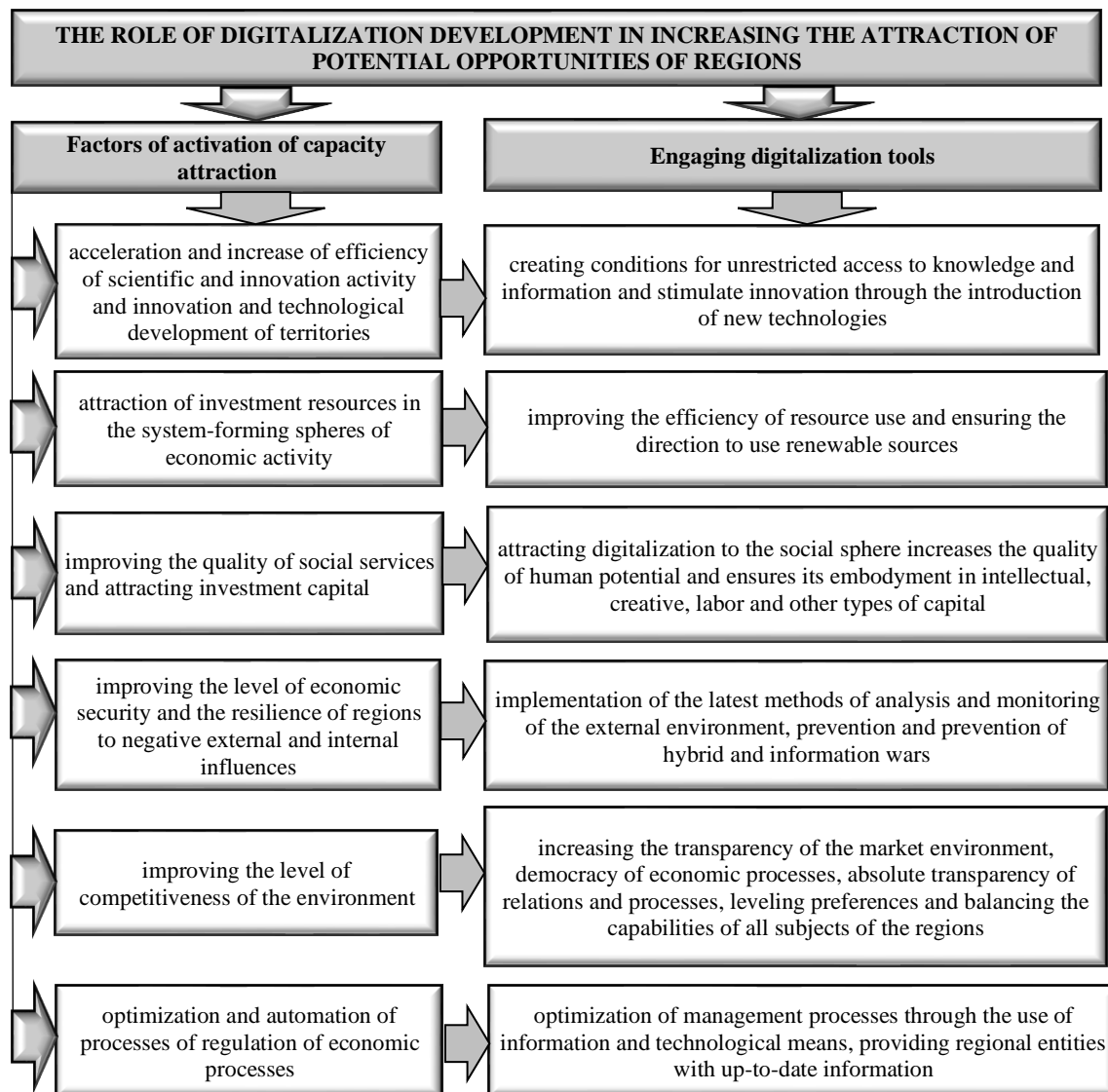


Figure 3. The role of digitalization development in increasing the attraction of potential opportunities for regions to achieve sustainable development goals.
Source: built by authors

To ensure the development of information and communication technologies, it is important to support regional authorities and local governments, which must be strategically balanced and consistent. To promote digitalization at the regional level, it is necessary to provide it with intellectual and human resources, innovation and production and financial and investment components. In turn, the digitalization and use of these components has a synergistic effect on their development and the potential of the regions.

The implementation of the digital economy in the sustainable development of regions can stimulate the potential of regions through:

- establishing closer mutually beneficial cooperation of the territories, including access to foreign partners;
- optimization of the structure of regional development management with the use of geographic information systems;
- improving the efficiency of decentralization and directing the efforts of local and regional authorities to solve local problems and improve the quality of meeting the social needs of the population;
- increasing the economic capacity and self-sufficiency of territorial communities;
- development of entrepreneurial potential of the region with an emphasis on promotion in rural areas;

- development of a system of support, dissemination and activation of innovation activities and involvement of startups;
- introduction of information-analytical systems for regional development management in order to increase the effectiveness of strategic planning of territorial development and achieve sustainable development goals;
- creation of an integrated information space and electronic document management;
- intensification of processes for smart specialization to increase the efficiency of production capacity.

These and other impulses of the digital economy contribute to the activation and transformation of the potential of regions to transform potential into capital and the formation of new potential that raises social, economic, environmental living standards of all segments of the population, increasing the competitiveness of regions.

Conclusions

The digitalization of the economy and the development of its tools in the form of information and digital technologies can enhance and increase the effectiveness of the potential of regional systems, as well as to form a new powerful capacity to achieve sustainable development goals. The use of digitalization makes it possible to increase the competitiveness of regions in domestic and foreign markets, optimize the use of resources and increase their efficiency, improve the quality of life of all segments of the population in all areas.

The scientific novelty of the study is to substantiate the theoretical and methodological foundations of the role of digitalization in regional development and use of their potential in sustainable development, based on systemic and process approaches and dialectical methods of scientific research, highlighting the importance of digitalization for economic development in general, the importance of the development of digitalization tools in regional development, which together made it possible to identify ways to improve the efficiency of information and communication technologies and its role in the activity of the potential of regions to achieve sustainable development goals.

It is substantiated that the implementation of the digital economy in the sustainable development of regions can stimulate the potential of regions

and ensure the achievement of sustainable development goals in the economic, social and environmental spheres.

Further research requires issues related to the development of organizational and economic mechanism for activating the potential of regions in the digital economy to achieve the goals of sustainable development.

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