

ECOSYSTEM APPROACH TO THE LEGAL REGULATION OF DIGITAL ECONOMY

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Abstract. This article discusses several aspects of Digital Economy. Firstly, the term «ecosystem» is analyzed according to the concept of «ecology». Secondly, ecosystem approach is viewed as the concept that describes the evolution of the nature of interactions of economic agents, models of their innovation activity and their relationship with the environment of functioning. Thirdly, current issues for Digital Economy are identified. The paper concludes that ecosystem approach considers innovative systems of all levels (national, regional, cluster, etc.) as living social organism subjects. The ecosystem approach puts forward a number of important economic principles: firstly, the ecosystem has its own, market mechanisms of self-development; secondly, it focuses mostly on the nature and dynamics of interactions (with each other and with potential participants), emphasizing that it is the collaboration that creates and diffuses the flow of knowledge, the transformation of these flows into innovation and further spread of innovations throughout the economy. We emphasize the role of openness for uniting the efforts of the community interested in the development of a digital industry, extension of public-private partnerships and building a competitive environment in order to ensure the rapid growth of available digital services, as well as to improve their quality. The emergence of the issue of digital economy has introduced a new driving force to the transformation of international society. The principles of ecosystem management and the principles of the ecosystem approach should underpin any decisions taken at the universal, regional and national levels.

Keywords: digital economy; ecosystem; digital ecosystem; transformation of society, ecosystem approach, ecosystem management, International Economy Law.

1. INTRODUCTION

The global way from information to digital economy took over 30 years. Since 1982, OECD has developed standards for protecting information and regulating transboundary data flows. This was the basis for developing Internet Economy, announced by OECD in 2000. In 2008, the Ministerial Conference in Seoul adopted the Declaration on the Future of Internet Economy, and in 2014 OECD introduced the term "Digital Economy". The declaration "On the Digital Economy: Innovation, Growth and Social Prosperity" was adopted in 2016 in Cancun as well. The Declaration sets the task of disseminating digital technologies, promoting open Internet as a catalyst for trade and innovation, building confidence by protecting privacy and consumers' rights.

In 2017 OECD has identified four key technologies for developing digital transformation: the Internet of Things, technology for analyzing Big Data, artificial intelligence and blockchain technology. At the meeting in Düsseldorf on April 6 - 7, 2017, the G20 Ministers responsible for the digital economy, Spain, Norway, the Netherlands and Singapore adopted a strategic declaration "Shaping Digitalization for an Interconnected World".

Recently our life has become more saturated with various technologies. The growth of software has a huge impact on the development of society. Software products have now become an integral part of our lives (Evdokimov et al., 2018). In this regard the problems arising in the process of creating software related to the complexity of their structure, cannot remain without our attention. So there is an urgent need to simplify and correctly distribute the load on information systems (Evdokimov, Kovalenko and Melekh, 2017). Scientists found a solution: the structure of software and natural ecosystems is similar in many respects. This analogy is conducted by Manuel Castells. As a result, the term "ecological approach" has appeared. It refers to the methodology of software research as a whole (systemic) part of the environment, considered in the form of an ecosystem, taking into account sustainable development (Sidorov, 2010). The huge influence of the ecosystem approach should be firstly described with analyzing the "ecosystem" concept as a whole.

2. DISCUSSION

2.1. Ecosystem

The "ecosystem" concept is borrowed from biology with the "ecology" concept as well. Both terms are

usually applied in combination, within the framework of the ecosystem approach, and are viewed as concepts that describe the nature evolution of interactions between economic agents, models of their innovative activity and relationship with the functioning environment (Mercan and Goktas, 2011).

Ecosystem is a complex self-organizing, self-regulating and self-developing system. Ecosystem is an open system and is characterized by input and output streams of matter and energy. Functional ecosystem concept provided by F. Evans is applicable to objects of different size and complexity, in which there is a natural interaction between the living and the lifeless - "as to the biosphere or the World Ocean, and to rotting stumps or a drying puddle with its inhabitants" (Evans, 1956). Criteria that allow to establish the boundaries of the ecosystem are not predetermined in advance, therefore the number of ecosystems and their location for any territory is not regulated in advance and depends on the goals and objectives of the study.

The "ecosystem" concept is at the center of the "ecosystem approach". It was announced by A. Tansley in 1935 to designate a relatively stable system that includes the community of living organisms and their habitat (Tansley, 1935). Clarifying in this definition was made by Eugene Odum: "Ecosystem is any unity that includes all organisms (i.e. society) in a concrete area and interacts with the physical environment in such a way that the energy flow creates a clearly defined trophic structure, species diversity and the cycle of substances inside systems» (Odum, 1975).

Ecosystem approach considers innovative systems of all levels (national, regional, cluster, etc.) as living social organisms' subject to continuous variability under the influence of new motivations of participants and new circumstances. In this perspective, the innovative (including digital) ecosystem does not only look like a dynamic combination of organizations and institutions, but also as a mogul combination of their multidimensional internal connections (Bramwell et al., 2012). According to one of the interpretations, it includes economic agents, their mutual relations, as well as an innovative environment consisting of ideas, technologies, game rules, social interactions and culture (Mercan and Goktas, 2011).

The concept "Industry 4.0" (the fourth industrial revolution) provides for end-to-end digitalization of all physical assets and their integration into the digital ecosystem along with partners involved in

the value chain (Industry 4.0, 2018). It corresponds to new digital technologies - cloud services, mobile devices, augmented reality (portable gadgets), Internet, geolocation (location), improved interfaces for interaction between the individual and the computer, authentication and fraud detection, 3D printing, intelligence, analysis of big data and advanced algorithms, personification by client profile. The result of the fourth industrial revolution will be the space of digital ecosystems, where in the interaction of stakeholders, collective network competencies will be formed.

The processes in the ecosystem are characterized by the variability of time parameters and the possibility of delayed consequences. Every digital ecosystem needs to be well-managed. The ecosystem approach requires flexible management, which anticipates possible changes and events and adapts to them. Today there is no legal regulation in this sphere. Such standards should be provided by World International Organizations.

2.2. Ecosystem management

Ecosystem management is one of the six cross-cutting thematic priorities in the work of the United Nations Environment Program (UNEP), as set out in its Medium-Term Strategy for 2010-2013. The six priorities are: climate change; catastrophes and conflicts; ecosystem management; environmental management; harmful substances and hazardous waste; efficient use of resources - sustainable consumption and production.

There is diversity in defining ecosystem management, depending on the scientific sphere of researchers. A general and comprehensive definition was given by the American scientist C.A. Wood: "Ecosystem management is the integration of environmental, economic and social principles for the management of biological and physical systems so as to protect environmental sustainability, biological diversity and environmental productivity" (Wood, 1994). Its main advantage lies in the definition of the main components (ecological, economic and social principles of management of biological and physical systems) and the goals of ecosystem management (environmental sustainability, biological diversity and environmental productivity). Another definition of the ecosystem management concept was developed in the United Nations Environment Program (UNEP). Ecosystem management refers to natural resource management that focuses on the ecosystems sustainability in order to ensure

environmental and humanitarian needs in future. This approach can be called new and complex both for economy and law.

Ecosystem management is characterized by the following features: focus on the long-term resources sustainability; biodiversity maintenance and improvement; thinking in a wide spatial and temporal scales; Integration of economics, sociology and ecological systems into the planning process; adjustment of management plans in connection with monitoring and new information; recognition of the complexity and interaction of "ecosystems"; recognition that people are part of the ecosystem.

On "Ecosystem Management" section in the Medium-Term Strategy for 2010-2013, UNEP set a goal for States to use the ecosystem approach to improve people's well-being. Ecosystem approach is considered as a methodological basis for many areas of science and practice in the nearest future, as it provides an opportunity to foresee not only direct but also indirect effects of human impact on natural objects, and retrospectively reproduce the genesis of these objects with all their connections.

Legal aspects of the ecosystem approach have not been discussed in detail. It is expressed in the perception of legal regulation objects as part of a unified natural environment. Measures to protect natural objects, rules for the use of certain types of natural resources should not lead to unjustified damage to other natural objects and resources.

For the purposes of analysis and assessment it is important to determine the boundaries of ecosystems. In a general sense, the entire Earth's biosphere is an ecosystem, as its parts interact. On a smaller scale, it is necessary to be guided by the principle that in a well-defined ecosystem there is a strong interaction between its components within ecosystem boundaries and weak interactions with ecosystems beyond their borders. The ecosystem boundary that is acceptable for practical use is a place where spasmodic changes in a number of ecosystem characteristics are observed.

On a larger scale, regional and even global ecosystems can be distinguished by the commonality of their basic structural units.

Well-being of people depends directly on the state of ecosystems. Humanity has always depended on the services provided by biosphere and ecosystems - ecosystem services. G.C. Daily defines ecosystem services as conditions and processes through which the natural ecosystems and species that make them,

support and implement human life (Daily, 1997). They preserve the biological diversity and production of ecosystem goods such as sea products, feed, biomass fuels, natural fibers and many medicines, industrial products and their predecessors.

The Convention on Biological Diversity considered the application of 12 principles recommended for the ecosystem approach:

1. The tasks of managing land, water and living resources are determined by society.

Different sectors of society view ecosystems in terms of their own economic, cultural and social needs. Ecosystems must be managed in accordance with their true values, on a fair and equitable basis, in order to obtain both tangible and intangible benefits for the individual.

2. Management should be decentralized.

The management system should involve all stakeholders, and it must ensure that local interests are balanced with wider public interests.

3. Ecosystem management bodies should consider the impact of their actions on other ecosystems.

Intervention of management structures in the ecosystem can often have an unknown or unpredictable impact on other ecosystems; so we should carefully evaluate and analyze the possible consequences.

4. While recognizing the possibility of positive management results, one should nevertheless understand the functioning of the ecosystem and manage it in an economic context.

5. One of the priorities of the ecosystem approach is to preserve the structure and functions of the ecosystem in order to maintain ecosystem services.

The functioning and sustainability of the ecosystem depends on the dynamics of interrelations within species, between species, and also between species and their abiotic environment.

6. Ecosystem management should be carried out only within the limits of natural functioning.

When assessing the opportunities to achieve basic management objectives, particular attention should be paid to environmental factors that limit the natural productivity, structure, functioning and diversity of ecosystems. The functioning of the ecosystem may be affected to varying degrees by temporary, unforeseen or artificially created factors,

which should be adequately taken into account in the management.

7. The ecosystem approach should be implemented at appropriate spatial and temporal scales.

The ecosystem approach should be applied at those time and spatial scales that are appropriate for the purpose. The boundaries of management should be determined in practice by users, ecosystem management bodies, scientists and indigenous and local peoples.

8. The objectives of ecosystem management should be long-term.

9. When managing ecosystems, the inevitability of change must be considered.

10. The ecosystem approach should ensure an appropriate balance between the conservation and use of biological diversity and their integration.

At present, there is a need to consider the situation more flexibly when conservation and use are considered in a single context and the whole complex of measures is applied all the way from strictly protected ecosystems to human-created ecosystems.

11. The ecosystem approach should take into account any forms of relevant information, including scientific data, as well as knowledge, innovations and practices of indigenous and local communities.

To develop effective ecosystem management strategies, any information is important.

12. All interested groups of society and scientific disciplines should be involved in the implementation of the ecosystem approach.

Most biodiversity management problems are complex with a large number of interactions, side effects and consequences, therefore, they require the use of the necessary expertise and involve stakeholders at the local, national, regional and international levels as needed.

When forming a legal mechanism for the conservation and restoration of natural ecosystems and its assessment, it is methodologically important to proceed from the assumption that the sustainable functioning of natural ecosystems is assessed as one of the indicators (criteria) of a favorable environment.

At the World Summit on Sustainable Development in Johannesburg (2002), the ecosystem approach

was recognized as an important tool for achieving sustainable development. The adoption of such a decision was influenced by the Millennium Ecosystem Assessment Program, proclaimed in 2000 by the UN Secretary-General Kofi Annan. The goal of the Program was to assess the impact of changes in ecosystems on human well-being and to develop a scientific basis for activities necessary to enhance the conservation of ecosystems and their sustainable use.

Ecosystem management has found its application in UNESCO's activities, especially in its "Man and the Biosphere" program. In February 2008, Madrid hosted the third international congress on biosphere reserves, at which the Madrid Action Plan was adopted. In this document, a separate item (14.1) in front of all biosphere reserves was tasked with expanding the application of the ecosystem approach for assessing the state of ecosystem services, ensuring conservation of biodiversity and sustainable development.

At the UN Conference on Sustainable Development in Rio de Janeiro on June 20-22, 2012, the leaders of the countries reaffirmed the importance of the ecosystem management. They noted that "... we commit ourselves to effectively apply the ecosystem approach and prudence when organizing activities affecting the marine environment in accordance with international law in order to realize all three aspects of sustainable development".

An important role in the process of spreading the ecosystem approach is also played by the UNEP Ecosystem Management (Subprogram 3). This subprogram is based on the Millennium Ecosystem Assessment mandate of UNEP to improve the scientific understanding of the functioning of ecosystems. It is designed to disseminate an approach that considers an integrated environmental unit to be a unified system.

UNEP's own contribution is significant, including, in particular, the results obtained from programs such as the Poverty and Environment Initiative, the UNEP Regional Seas Program, the UNEP Water Policy and Strategy and the Global a program of action concerning activities on land.

Thus, the principles of ecosystem management and the principles of the ecosystem approach should underpin any decisions taken at the universal, regional and national levels. This is the only true path of humanity to sustainable development.

The ecosystem approach puts forward a number of important legal and economic principles: first, the

ecosystem has its own, market mechanisms of self-development, that is, it is managed from below, which creates the preconditions for the continuity of innovation processes, eliminating excessive state interventions; secondly, the ecosystem approach focuses not so much on the participants of the system as on the nature and dynamics of their interactions (with each other and with potential participants), emphasizing that it is the collaboration that provides the creation and diffusion of knowledge flows, the transformation of these flows into innovation and further spread of innovations throughout the economy (Townsend et al., 2010). Innovative ecosystem is one the ways of implementing ecological approach into economy.

2.3. The concept of an innovative ecosystem

An example of the development of this approach is the concept of an innovative ecosystem (IES) was proposed by Charles V. Wessner in 2004. It is a tool for creating conditions that increase the competitiveness of organizations / states in global as well as national and regional economies.

The notion of the digital ecosystem is understood as a distributed, adaptive, open socio-technical system with the properties of self-organization and sustainability based on natural ecosystems. Digital ecosystem models are based on natural ecosystems. They are similar in respect of aspects related to competition and cooperation between different actors (Briscoe and De Wilde, 2006). With the term digital ecosystems, not only software engineering is familiar, but also other branches of human activity. A wide application of digital ecosystems found in business and economics. In each of them, digital ecosystems actively help and simplify the solution of problems arising in work. For example, in business, the ecosystem introduces clear principles of technical and market behavior. Also ecosystems solve security issues and offer complex solutions to emerging problems. They introduce clarity, relevance in the relationship between automated systems and economic entities (Goponenko and Iskhakova, 2018).

The digital economy is formed on three levels, which in their close interaction affect the lives of citizens and society as a whole:

- Markets and sectors of the economy (traditional areas of activity), where direct interaction of specific subjects (suppliers and consumers of goods, works and services) is carried out;

- Platforms and technologies, where competence is formed for the development of markets and industries (spheres of activity);

- Environment that creates conditions for platforms and technologies development and the effective interaction of market entities and economic sectors and encompasses regulatory regulation, information infrastructure, personnel and information security.

The development of digital platforms, technologies and environments is likely to blur the traditional functioning of analogue material-intensive markets and industries and, on the whole, radically change the basis of human life, which will entail significant changes in the legal regulation of economic relations.

Lack of legal regulating at the International level makes the states provide laws by their own according to socio-economic reality. Russia also tries to adopt new legal ways for implementing International unwritten standards.

2.4. Russian legal experience of ecological implementing Digital Economy

Currently in Russia there is a weak innovation activity, a backlog in the development and implementation of new technologies (including digital economy technologies) (Decree of the president of the Russian Federation, 2017). In contrast to Russia, where the digital economy development program was adopted in 2017, in a number of countries similar programs were adopted about 10 years ago (in Denmark in 2000, in Singapore in 2005, in Australia, in Hong Kong, in the United Kingdom, in New Zealand, 2008 as a whole in the European Union - 2009, Canada - 2010, Malaysia - 2012, South Korea - 2013 India, Kazakhstan - 2015) (EAEC, 2016). The share of the digital economy in Russia's GDP in 2015 is insignificant and is 2.1%, which is 3-4 times less than among the countries that are leaders in digitalization (the EU - 5%, the USA - 6%, the United Kingdom - 8.4% %). The leader in the pace of digitalization is China, in 2016, the digital economy of which amounted to 30.6% (BCG, 2018).

With a view to developing the digital economy in the Russian Federation, the Government decree № 1632-r of July 28, 2013 approved the Digital Economy of the Russian Federation Program. This Program develops the main provisions of the Strategy for the Information Society Development in the Russian Federation for 2017-2030, approved by Presidential Decree No. 203 of May 9, 2017.

In Presidential Decree № 204 of May 7, 1981 "On National Purposes and Strategic Development Challenges of the Russian Federation for the Period to 2024", the Government of the Russian Federation is tasked to make a qualitative breakthrough in scientific, technological and socio-economic development. But still there is a hard way to go in future to the similar legal regulating of digital economy in all countries because in fact digital economy will destroy the economic borders. So there should be an international legal basis.

CONCLUSION

Digitalization is a stage of integration in the world space, in which the freedom of information movement is added to the freedoms of goods, services, capital and labor movement in the long term. At the same time, the processes of digital integration make actual the problems of ensuring state sovereignty and information security.

Analysis of current trends in the digital economy as a whole and in individual industries makes it possible to determine that the basis of digital transformation is efforts in three interrelated directions:

1. Modernization of business processes, technologies and corporate culture to serve customers who are in any place and at any time convenient for them in the usual digital format;
2. Introduction of innovative technologies both in the industry and in the economy as a whole, to ensure the presence on any digital platforms, using mobile platforms and the use of Internet of Things;
3. Creation of an organizational form and normative base for attracting innovations and effective cooperation with developers of digital solutions.

It is necessary to solve operatively the arising problems with the change of the existing legislation, both in industry and digital economy of the countries as a whole, while maintaining a reasonable degree of the state regulation and ensuring an adequate level of state support.

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