

LEGAL ENVIRONMENT AND REGULATORY SUPPORT FOR KNOWLEDGE AND INFORMATION SYSTEMS MANAGEMENT IN THE DIGITAL ECONOMY

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Received 05.06.2024.
Received in revised form 17.07.2024.
Accepted 02.08.2024.
UDC – 005.94

Keywords:

Legal environment, Regulatory support, Legal regulation, Knowledge management, Information systems, Digital economy, Digital technologies

ABSTRACT

This paper dwells on the problem of regulatory and legal support for the processes of knowledge and information systems management, which take place in the conditions of the digital economy. Specific features and theoretical foundations of the regulation of digital knowledge, technologies, and information systems are considered, and their complexity and dynamic character, which require a high level of flexibility and adaptability from the legal system, are determined. Different levels and elements of the legal environment and regulatory support of the studied processes are analysed, and spheres of the normative and legal regulation and examples of their support, adopted in the European Union as one of the leaders in digital transformation, are considered.

The research methodology is based on the dialectic and system approaches, which combine processes peculiar to law, management, state regulation, economics, cybernetics, technical sciences, etc. Focus is made on philosophical and ethical principles of regulating the opportunities for using digital technologies in the modern world. The methodological tools of the research include specific historical method, analysis, synthesis, observation, generalisation, and observation.

The value of this research consists in the generalisation and structuring of the conditions and processes of the legal regulation of knowledge and information systems management in the context of the digital economy and the use of digital solutions. This is manifested through a selection of the key spheres of legal regulation and a description of the complex character of the legal environment of the studied processes, which covers not only imperative legal acts but also dispositive norms, as well as the individual responsibility of developers and users.



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1. INTRODUCTION

The digital economy is one of the main drivers of development in the modern world. It combines material production, service sphere, and information and technological processes, which are integrated with digital tools of AI, Big Data, blockchain, cloud technologies, virtual and augmented reality, automatization, robotization, etc. This leads to an increase in the productiveness of processes in the economy, improvement of the quality of products and management, and forms new competitive advantages and strengthens the existing ones. Thus, the digital economy forms a stable environment with real potential for developing economic, information, technological, and other systems.

The development of the digital economy, in turn, is in close interconnection with the state of intellectual resources and information systems, which are its basic elements. In the conditions of the market economy, the advantages offered by digitalization determine the attractiveness of its tools and their wide use in all spheres of public life. This situation, on the one hand, positively characterises transformation processes, but, on the other hand, forms significant risks, which are connected with the loss of control over economic, public, democratic, and other aspects of human life through the gradual replacement of humans and their labour by technologies in different socioeconomic systems. This leads to the necessity of creating conditions for regulation and control of processes that are connected with the use of information and digital technologies in economic and social systems.

The creation of a clear legal environment with rational normative support of the processes of knowledge and information systems management, which function in the conditions of the digital economy, is important for the development of business and public processes. This forms the possibility for the effective use of digital technologies, an increase in intellectual potential, and the development of information infrastructure. The absence or low quality of such regulatory support, in turn, can be a restraining factor in development, which does not take into account the trends of technological development, causes conflicts between innovators and state institutions, and forms risks for companies and users of information systems.

2. EXPERIMENTAL SECTION

Legal regulation and regulatory support of processes that are connected with the management of knowledge and information systems, which function in the conditions of the digital economy, belong conceptually to different spheres of scientific cognition. Apart from the normative and legal direction, which is considered from the position of law, they include provisions of management, economics, cybernetics, technical science,

etc. Depending on the depth of consideration of problems, they are interpreted from the position of philosophy, social sciences, technologies, and, sometimes, political sciences.

The methodological basis of the research is formed by the system approach, which considers the processes from the position of socioeconomic, technological, and information systems, within which different elements interact. The digital economy is treated as an economic system, which combines traditional production and market processes with digital technologies; knowledge management is treated as a sub-system of management, which ensures development and effective use of intellectual potential; and information systems are treated as totalities of the elements of digital infrastructure, platforms, software, and other assets, which allows solving current problems of business and society.

In these conditions, the legal environment is a macro-system, which contains legal norms, realised at different levels and in different sectors. In turn, regulatory support is connected with specific processes and determines norms and algorithms of their correct implementation from the position of law. Legal environment and regulatory support create a system of legal regulation processes of knowledge and information systems management in the interests of society and economic agents.

An important direction for the formation of the methodology of research is the application of a philosophical view of the problem. The main focus of the problem of regulating processes in the conditions of the digital economy must be not so much on the determination of the object or subject of regulation and the system's ability for management and control as on values that must lie in the basis of this regulation (W. Lance Bennett, 2021). Thus, the main issues that are studied in works on digital technologies are formed around the market of data and its monopolisation, moral aspects of using AI, behavioural engineering and intrusion in personal life, and disinformation and its influence on democratic values.

The methodology of this research is formed under the influence of the dialectical method, which considers processes in their development, and the system approach, which studies them in their interconnection within one unity. Development of the system of legal support for digital technologies is studied from the position of a specific historical approach, and methods that are used for assessing phenomena, processes, and their consequences, come from the general scientific vision and include the methods of analysis, synthesis, observation, comparison, generalisation, etc.

The theoretical basis of this research is formed by scholarly works and regulatory documents that elaborate on the issues of legal regulation and regulatory support of knowledge and information systems management in the conditions of the digital economy. These works cover different aspects of the problem, including substantiation of the complexity of the digital economy and explaining the need for the application of the interdisciplinary approach for its research (Benbya et al., 2020); development of the regulatory framework for research and innovations in the context of the legal theory and observation of ethical principles (De Vanna, 2019; Sindakis, 2024); theoretical foundations of the management of knowledge and innovations in the digital economy (Arokiasamy et al., 2021); study of the specifics of organisation of production and knowledge management in the conditions of Industry 4.0 (Petrenko et al., 2019); study of the management of information systems through the use of data and support of the quality of business (Yuldashev et al., 2023); generalisation of the conditions of global regulation of the digital economy (Beaumier et al., 2020); determination of the conceptual frameworks for the regulation of the leading technologies (Bennett, 2021); substantiation of the need and directions for the regulation of innovations (LaGrandeur, 2021); detailed description of concrete normative and legal acts in the context of their influence on the development of digital technologies (Munier & Kemball-Cook, 2019); the use of digital technologies to solve environmental problems (Kantor et al., 2023); formation and implementation of the agenda for regulatory support of the digital economy development (Meyers, 2024); general overview of regulatory actions and measures on digital technologies (Munier, n.a.); formation of recommendations for the use of certain norms of legal regulation of innovations (Scheele et al, 2023), etc.

The goal of this research is to detailed consideration and structuring of theoretical approaches to the formation of legal environment and regulatory and legal support for the functioning of the system of knowledge and information systems management in the conditions of the digital economy. To achieve this goal, theoretical features of the formation of the legal environment and regulatory support of processes in the digital economy are considered, specifics of knowledge and information systems management from the position of their regulation are studied, and a structure of the legal environment is offered. Also, the totality of regulatory support of the studied processes, which include a wide range of different regulatory and legal acts and provisions, is analysed. These are imposed on ethical principles, the need for responsibility of developers and corporations, and the necessity of organising a dialogue between developers and regulators, which would stimulate constant improvement of the legal and regulatory field within the studied problem.

3. RESULTS

In the context of regulatory support of the management of knowledge and information systems, the problem is of a complex character. It connects several levels and elements. The main elements of such system are systems of knowledge management and information systems of various types, as well as the tools of the digital economy. Thus, the studied problems are implemented within a generalised approach, which combines the above elements, and detailed vision, which studies the regulation processes of the management of knowledge, information systems, and the digital economy.

In the conditions of quick technological changes, knowledge becomes the main resource of economic systems' development. Intellectual capital is an important factor in the formation of competitive advantages, technological transformation, and social and environmental changes. Against this background, the digital economy offers special tools for quality technological changes. Their basis is blockchain, the Internet of Things, Big Data analytics, automatization and robotization, AI, etc. Each of these technologies is based on new knowledge and offers new opportunities for intellectual development. At the same time, they form new risks and threats, which are connected with the conditions of using information, knowledge, ideas, etc.

Normative and legal environment and support of different processes are an objective phenomenon, which defines the order and structure of interrelations between different subjects and objects of systems. It is closely interconnected with characteristics of phenomena, subjects, and objects, the interrelations of which are regulated. On the one hand, relationships within the system determine the need for their regulation; on the other hand, rules and conditions of regulation of relationships transform them, adapting them to the changes in the legal field and other objective conditions.

Digital economy, similar to the traditional economic system, is a complex structured set of different elements, which interact with each other and with the external environment. Unlike traditional economic systems, which are treated predominantly as socioeconomic, the digital economy is a socioeconomic and information system. One of the features of such a system is quick evolution. While evolutionary changes in biological systems take place over thousands and millions of years, in a socioeconomic system this takes decades, and in socioeconomic and technological systems this takes several years or less (Benbya et al., 2020). According to this, one of the features of the digital economy is the high frequency of large-scale transformation changes.

Approaches to the regulation of the management of knowledge and information systems in the conditions of the digital economy accumulate different visions and interpretations of processes connected with the search, generation, dissemination, storing, transfer, and use of knowledge and work of information systems. From the position of the economy, one of the main approaches to the above processes is the resource-based approach. It considers knowledge and information systems as assets or means of company work. According to this, their acquisition, purchase, and use are connected with expenditures and their use – with receipt of certain economic results or effects.

Such vision determines the conditions for the formation of a normative environment which regulates these processes. From the position of knowledge management, assessment of the legal environment of their regulation is based on qualities of knowledge and

systems of knowledge management, which cover the domination of non-material character and low level of structuring of knowledge and the specifics of its formalisation, use, dissemination, etc. The main processes that are connected with knowledge and information systems in the conditions of the digital economy are property rights (intellectual property and all related aspects), security (cyber security), information protection and its confidentiality (restriction of access to information in the most sensitive spheres), conditions of using knowledge in labour activities (labour law), and operations with knowledge using electronic contracts or digital transactions (management of knowledge and information with the help of digital platforms and other tools). All these processes form six spheres of regulation of the management of knowledge management and information systems in the conditions of the digital economy (Figure 1).

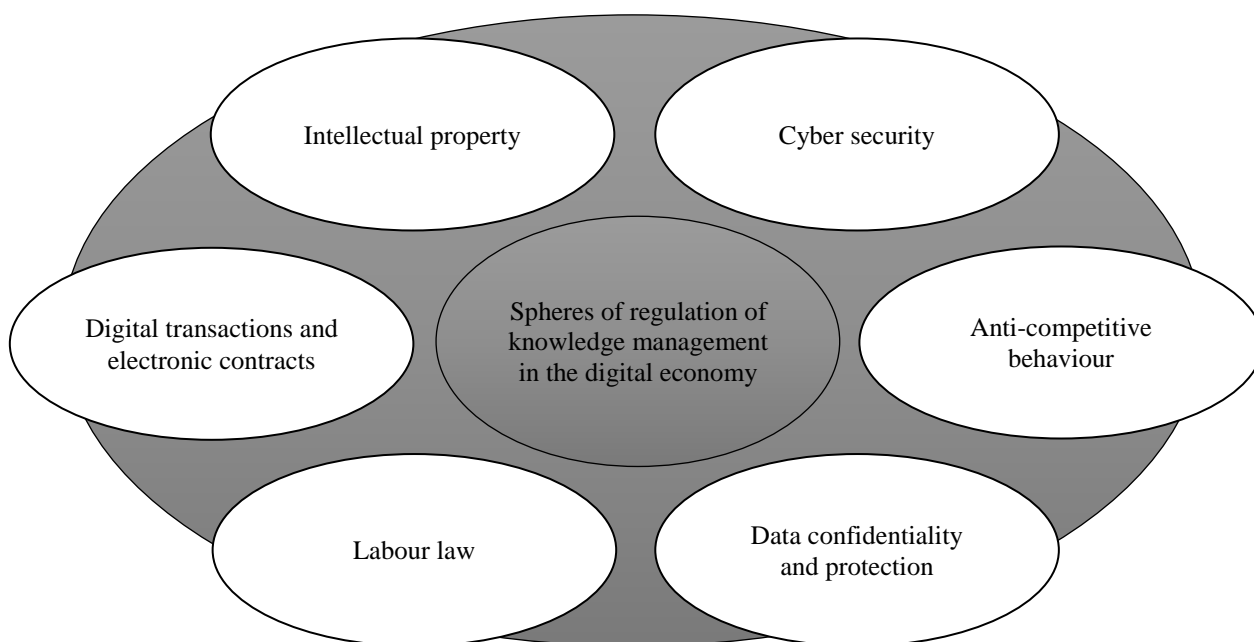


Figure 1. Spheres of regulation of the management of knowledge and information systems in the digital economy

Source: Prepared by the author based on materials by Benbya et al. (2020)

Each of the above spheres has its specifics, being a set of normative and legal acts. The sphere of regulation of intellectual property rights defines the conditions of use and turnover of knowledge and information; the sphere of regulation of cyber security offers mechanisms for the protection of information systems, information, and systems of knowledge management from internal and external threats; the sphere of anti-competitive behaviour regulates integration processes, preventing the excessive concentration of the information services market and violation of the rules of competitive behaviour. Equally important issues are regulated in the spheres of data protection and confidentiality (prevention of unsanctioned access to personal information), labour relations (terms of access to

information and knowledge within labour activities, and protection of companies' intellectual resources), and electronic contracts and digital transactions (acceleration of legal transactions and support for their eligibility due to digital technologies).

Given the large role of digital technologies in social and economic systems, the issue of regulation of processes connected with them becomes more relevant. Regulation of the legal aspects of the mentioned issues is set into a special type of interaction, within which millions of remote Internet users can instantly access each other, and programmes, encyclopaedias, and virtual libraries become a result of joint activities of

many people who do not know each other (Brown and Marsden, 2014).

Together with changes in processes that are connected with the receipt, transfer, dissemination, and use of information, important transformations took place in the system of normative regulation of a wider range of issues. The influence of private interests grew, while the role of the state was reduced. This led to a shift of priorities in the direction of private commercial goals, the formation of tools for avoiding the use of the norms of public law in the sphere of contractual relations, the dissemination of programme code as an alternative to law, and an increase in the influence of non-state authorities on public processes (Brown and Marsden, 2014).

Regulation of any actions in the digital environment cannot be assigned only to state and global institutions. They should deal with the regulation of value-based and conceptual provisions, which would determine general interests, such as Sustainable Development Goals, protection of private and intellectual rights, etc. However, it is much more expedient to involve other users of digital technologies in the regulatory processes, including the individual and corporate levels. Thus, the basis for personal self-regulation of the described processes is responsibility for the decision to use technology instead of human labour and for all consequences of this. The next level of regulation is the responsibility of the developer and innovator, who must be responsible for their inventions and see the impossibility of their use if they deal damage to mankind's interests. The highest level of regulation is comprised of professional corporate and academic communities, which have the deepest knowledge about the possibilities of using breakthrough technologies. Therefore, they must form the main barrier to misuse due to digital technologies. To achieve such effect, it is advisable to establish licensing of companies that would have a right to deal with leading R&D and use new technologies and knowledge (LaGrandeur, 2021).

Digital development transforms the perception of the normative strength of law under the influence of technology. Therefore, the principles of supremacy of law in its traditional understanding gradually lose its role, giving way to norms inherent to cyberspace. Thus, "programme code" may be an independent normative tool with integrated regulatory influence (De Vanna, 2019), which takes us back to the responsibility of developers and innovators.

There is a reasoned position that digital technologies, which form the basis for knowledge and information systems management, are perhaps most problematic from the position of state regulation. The high speed of their development and technological complexity, which are set onto inactivity and locality of state regulation,

are the main arguments in favour of such a statement. As a matter of fact, digital technological solutions are not homogeneous. They have different susceptibility to effective regulation and, in certain cases, are efficient tools of centralised normative & legal and regulatory influence (Beaumier et al., 2020). Therefore, in the context of the study of legal support of the development of the systems of knowledge management information technologies, it is necessary to consider not only unilateral processes on the restriction of undesired directions for technological development but also to assess the possibilities of using digital solutions in the interests of society, state, and global institutions.

One of the main problems in knowledge management is the regulation of relations of property for knowledge (intellectual property) and its use from the position of ethics. These problems concern primarily the regulation of the terms of using patents, copyrights, commercial information, trademarks, etc. The absence of an effective mechanism of protection of these rights reduces the motivation of innovators and developers and reduces the effectiveness of intra-organisational interaction and development. That is why subjects that are most interested in the protection of intellectual property rights are developers and the companies in which they work. Regulation of legal norms of protection and use of knowledge starts at the lowest level. This is manifested in the form of the development of the corresponding provisions and standards, rules and procedures, and a system of motivation and control (Sindakis, 2024).

The European Union is among the leaders in the normative and legal regulation of digital information space. This is primarily due to the EU's striving towards technological and innovative leadership. According to the declared goals, the EU government wants to build a European community that is based on digital solutions. The goal of this is the search for new opportunities for business, the development of new reliable technologies, the creation of a stable economy, and the development of a democratic society. To solve this task, government institutions of the European Union implement a large number of diverse normative acts, which transform the very digital economy, including the processes of knowledge management and the functioning of information systems. The main legal acts that determine the context of Europe's digital transformation are four main laws: the Digital Markets Act, the Digital Services Act, the AI Act, and the Data Act.

In the sphere of knowledge management and development of information systems, the EU offers a set of normative and legal acts that regulate different aspects, from the protection of intellectual property rights to the regulation of the competitive environment in the digital solutions market (Table 1).

Table 1. Key normative documents that determine the legal regulation of knowledge and information systems management in the EU

Sphere of application	Normative documents	Purpose of the documents
Protection of intellectual property	Directive 2004/48/EC on the enforcement of intellectual property rights (European Union, 2004)	Establishes standards and basic conditions for the protection of intellectual property rights
	Regulation (EU) No 608/2013 concerning customs enforcement of intellectual property rights and repealing (European Union, 2013)	Determines the procedures of law enforcement in the protection of intellectual property during the crossing of customs borders in the EU
	Directives for harmonisation of law on copyright, trademarks, patents, etc. (European Commission, 2024b).	Form a unified legal field for the protection of intellectual property objects in EU countries
Access to scientific publications and databases	Commission Recommendation 2012/417/EU on access to and preservation of scientific information (European Union, 2012)	Forms recommendations for the regulation of terms of access to scientific information and databases
	European Open Science Cloud (EOSC) (European Commission, 2022b).	Initiates and defines terms for the functioning of EOSC, which supports the free exchange of scientific knowledge
Confidentiality and protection of data	General Data Protection Regulation (GDPR) (European Union, 2022b)	Establishes terms and rules of personal data processing
	Regulation on the free movement of non-personal data (GS1, 2019)	Simplifies the procedures of information and data exchange between companies
Cyber security	Network & Information Security Directive (NIS) (European Parliament, 2020)	Sets rules and mechanisms for eliminating threats to network and information systems
	Directive on measures for a high common level of cybersecurity across the Union (NIS2) (European Union, 2022a)	Expands the sphere of application of cyber security rules to new companies and sectors
	Cybersecurity strategy (European Commission, 2022a)	Offers a joint approach of the EU member states to information systems protection
Transfer of technologies and development of innovations	New European Innovation Agenda (European Commission, 2022c)	Initiates processes for the support of EU's innovative leadership in the sphere of technologies and start-ups
	Horizon Europe (European Commission, 2024a)	Offers opportunities for cooperation and financing of research and innovations
Anti-monopoly policy	Digital Markets Act (European Commission, 2023)	Prevents monopolisation of the market by the largest information platforms

Source: Prepared by the author based on materials by Meyers (2024)

General Data Protection Regulation (GDPR) is considered to be one of the main normative acts in the sphere of the digital economy from the position of regulation of personal data protection. Its adoption in 2018 caused discussion on preventing progress and development of a digital society. However, as experience shows, the adoption of each document of this level starts a series of discussions and consultations between the representatives of the IT community, business, government, and public organisations. The result of these actions is further improvement of normative acts according to the real needs and problems of the digital economy and society (Munier and Kembal-Cook, 2019).

Normative acts, which are presented in Table 1, are just a small part of the legal environment in the sphere of knowledge and information systems management. They include fundamental documents, such as the General Data Protection Regulation (GDPR), Network & Information Security Directive (NIS), and European Open Science Cloud (EOSC); and technical acts aimed at the development and implementation of operational processes and procedures for the resolution of a specific problem of intellectual property rights protection, harmonisation of the corresponding laws, access to

databases, etc. At the same time, these acts are adopted within the global normative and legal field and, therefore, in certain parts, they necessarily conform to global norms and provisions, such as agreements at the level of the WTO on international trade of IT services, recommendations of the OECD on confidentiality and safe use of digital technologies, international standards on the management of the quality of provision of information services, including knowledge and information systems management, international agreements and provisions on intellectual property rights protection, and various rules, conventions, and resolutions.

An important element of the legal environment of support of knowledge and information systems management is dispositive legal acts, which have a substantiating or recommendatory character. They include declarations, charters, ethical principles, recommendations, etc. An example of such normative acts is the Charter of the Internet of Things of the World Economic Forum, the Declaration on Digital Economy of G20, the Helsinki Principles for the Development and Use of Artificial Intelligence, etc. Apart from this, the legal environment is not limited to normative and declarative acts – it also covers judicial tools, which

form precedents and have a general correcting effect on the legal system, corporate codes and principles, and tools of public influence.

Thus, the general architecture of the legal environment of regulating relations in the sphere of knowledge and information systems management has a complex character and covers normative imperative and dispositive acts of different levels: global, supra-national, national, sectorial, corporate, and individual. This environment is filled by legal and declarative acts of various characters, including laws, directives, declarations, charters, standards, etc.

4. DISCUSSION

The problem of regulation of digital technologies in the context of knowledge management or development of information systems, as well as the wider context of global value processes, is very important and profound. It concerns not only the issues of accessibility of information, knowledge, or rules of their dissemination. As a matter of fact, this is about control over technology. According to this, the main discussion on the formation of legal environment and regulatory support of processes, connected with disruptive technologies, lies in determining the ability to control them. Many active users and processes which take place within information systems complicate the possibility of ensuring such control. Therefore, the normative base for this cannot have a strictly institutionalised character. On the contrary, it must be flexible and dynamic. Such a possibility could be partially achieved due to a combination of the terms of self-regulation of information systems and corporate regulation, which are based on value provisions and principles of regulation which are established at the sectorial, national, or global levels.

Another equally important topic for the discussion is compliance with ethical norms of the development and implementation of digital technologies in systems knowledge and information systems management. Here it is necessary to discuss the problem of replacement of not only human routine labour but also the processes of decision-making, generation of information, etc. The resolution of this problem lies in the determination of the decisive role of human labour and talent in each process, which is performed by technologies with the corresponding preservation of the possibility for coordination of their work and the use of results of the activities.

A general perception of the comprehensive character of the legal environment and regulatory support of knowledge and information systems management forms a lot of debatable topics and provisions. However, the key role in the regulation of the mentioned issues and processes belongs to the problem of establishing the responsibility of each subject of regulation of

relationships in the sphere of the digital economy. This will allow setting preconditions for the regulation of technological processes at the stage of the idea or concept of development. It is in this comprehensive treatment of regulatory support of knowledge management and digital systems, which begins at the individual level and grows – through corporate norms and rules – in national and global institutions, that we see further prospects for the development of the legal environment of regulating the development of the digital economy and its components.

5. CONCLUSION

Normative and legal support of knowledge and information systems management in the digital economy is an important topic of scientific research. This topic has a complex character. It covers principles and terms of regulation of processes that are peculiar to knowledge and information systems management and to the digital economy and digital technologies. A specific feature of the topic of this research is the close interconnection between information, economic, and technological processes and the digitalization of business and the opportunities offered by it. The task of regulatory and legal support for these processes is to ensure support for technological and economic progress and to achieve a high level of control over transformation processes. Achievement of this task is set on the complexity and dynamics of technological solutions and limitations of traditional regulatory tools. In these conditions, essential demands regarding flexibility and adaptability are set for the legal environment and regulatory support of knowledge and information systems management.

From the position of the resource approach, knowledge and information systems are important means of achieving success and competitiveness by companies. In this context, digital technologies are additional tools for strengthening economic power and effectiveness of business activities. That is why tools and mechanisms of legal regulation must take into account market demands and strengthen the economic positions of business structures given the interests of public development, safety, and ethical norms and principles. The main spheres of regulation of knowledge and information systems in the digital economy are intellectual property, cyber security, protection of confidential information, labour legal relations, electronic contracts, and digital transactions. Each of these spheres can be presented by an entire set of normative and legal acts, which determine the terms of knowledge and information systems management given the trends and specifics of the digital economy development.

Regulation of digital technologies in the sphere of knowledge and information systems management requires the application of a well-balanced integrated approach, with the involvement of different tools of

legal influence that are used at different levels. According to this, global and national tools must define conceptual and value provisions of legal regulation of the mentioned processes, while the corporate, sectorial, and individual levels must form conditions for self-regulation and self-control according to ethical norms.

The analysed system of the normative and legal regulation of the digital space of the EU countries partially demonstrated the possibility of compliance with such an approach in the interests of digital development and compliance with the principles of sustainability and democracy.

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