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# Х А Б А Р Ш Ы С Ы

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## ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК  
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E-mail: 7234275@gmail.com, olkuzya80@ukr.net, nata19951708@gmail.com**PROBLEMS OF INFORMATION AND COMMUNICATION  
TECHNOLOGIES DURING THE FORMATION  
OF THE DIGITAL ECONOMY AND SOCIETY**

**Abstract.** Modern society develops under the influence of scientific and technological progress. New relationships in economy, production, education, personal life, new financial instruments and new threats arise. Relevant issues are identifying problems and prospects of development of information and communication technologies (ICT) during the formation of the digital economy and society. The purpose of the article is to systematize the major problems that arise in the development of ICT during the formation of the digital economy and to identify possible consequences of this process.

It is proved that introduction of the newest ICT and digital services leads to significant changes in the quantitative and qualitative indicators of the life of the society and are of an institutional nature. Singled out a number of problems during the development of ICT in the digital society, including: digital divide; lack of funds for innovative upgrades; inconsistency of modern education and public administration with the requirements of a new society; shortage of skilled personnel; contradictions between traditional and up-to-date management practices and corruption; activation of cybercrime; the need to create a list of social digital services; international migration of highly skilled personnel.

Positive signs in ICT: the continuation of old social and labor activity of citizens; change the semantic content of work towards its intellectualization with the possibility of additional income; increase of ecological economy; creation of new remote jobs; new opportunities for education, tourism, medicine, etc. Systematized negative consequences, namely the growth of cybercrime increasing psychological problems of personality, dependent on ICT networks and energy efficiency, the lack of security of personal space, the need for rapid response to innovative replacement.

The proposed measures are aimed at transforming Ukraine into a center of information and communications and digital services for Eastern Europe that can lead to economic breakthrough and overcoming the existing socio-economic crisis. In further studies are planned to develop a model depending on the pace of digitalization processes of society on the pace of economic development.

**Key words:** information and communication technologies; digital economy; socio-economic problems; innovative transformations.

**Problem statement.** Modern society is a dynamic system that is developing under the influence of several factors, including not least the scientific and technological progress. Humanity is on the brink of a transition to a new generation of society, called information, the hallmark of which is the dominance of information and communication technologies (ICT), not only in production and business processes. These technologies are actively penetrate the social life, medicine, culture, governance and human personal space, resulting in significant changes in the socio-economic, technological and other processes. There are new relations in economy and industry (network economy) and personal life (social networking), generated new opportunities of education (distance education) and employment (remote work), new financial instruments (cryptocurrency) and new threats (cybercrime). These and other forms of information society naturally led to changes in the legal framework of many countries. In particular, in Ukraine, the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 [1] was formulated and adopted, which "provides for measures to implement appropriate incentives for the digitization of the economy, the social and social spheres, awareness of existing challenges and tools for the development of digital infrastructures, acquisition of digital competences by citizens».

However, like any process of transformation, digitalization of the economy and society faces a number of problems that can be both predictable and unexpected. And first of all with various challenges facing the ICT sector, which forms the basis of digitalization other areas of economic and social activity. Therefore, relevant scientific matters now is to determine the basic, most important problems that have arisen or may arise in ICT and related areas during the formation of the digital economy and society.

**Analysis of recent research and publications.** The study of the problems of transitional periods is devoted to the work of many scholars throughout all key changes in socio-economic formations. Here one can recall the works of D. Keynes, K. Marx, A. Smith and other classics of economic science. As you know, they explore the impact of the economy on society. The modern problem is that society from the standpoint of technological development affects the economy. Within these processes, it is worth analyzing more modern works of such scholars as A. Jipp, who formulated the law of proportionally advanced development of the communications industry in relation to the economy of the country (region), which testifies that for the stable economic growth of the national economy should be provided with advanced growth sphere of telecommunications over GDP growth [2]. Later, the theory of A. Jeep developed in his writings L. Varakin [3], which proved that the throughput of communication networks in the  $n$ -th year should be determined by the level of GDP in the next  $(n + 1)$  year, as otherwise there will be a slowdown in GDP growth. Further research has identified the impact of broadband access (ISD) on the Internet for the development of economics and society [4]. Thus, it is established that the state of development of ICT directly influences the development of socio-economic processes.

In the subsequent study of the economic principles of the formation of the future society devoted his work P. Vorobienko [5], identified the main tasks that arise in the process of building a future society, in particular in the educational sphere. L. Kit in his studies has established the stages and manifestations of the evolution of the network economy, proving the inevitability of this process [6]. S. Kolyadenko examines the preconditions and stages of formation in Ukraine and in the world of the digital economy as such [7]. V. Sandoogy investigated how the development of ICT affects the development of the labor market, changes in the patterns of employment of the population in modern conditions [8]. P. Chernyshov defined the state of development of network business in Ukraine [9]. O. Ivanova traced place and importance of ICT in the formation of professional competence of experts in the learning process [10]. The scientific research of I. Ivanova and A. Bodnar discloses the essence of informatization and communications as the basis of economic transformations in society and in enterprises [11], [12]. In the scientific literature, the term "decency" of the economy appeared, the principles, methods and levers of the development of the digital economy were formed.

**Unresolved aspects of the problem.** Thus, the technological, legal and philosophical aspects of the development of the digital economy, the issue of state regulation of network enterprises, methodical bases of application of ICT in education, approaches to determining the status of employees working remotely, etc. are actively considered. However, in view of the novelty of the issue, research papers devoted to the analysis of the phenomenon of the digital economy not only as a technological but also to its social innovation, to the determination of socio-economic problems of the development of ICT in the digital economy, as well as to the possible consequences of these processes, are rare in scientific publications.

Therefore, **the purpose of the article** is precisely the systematization of the main problems that arise in the process of development of ICT in the new socio-economic and technological conditions - the digital economy, as well as the identification of possible consequences of this process.

The following methods are used to solve the above problems: theoretical - for systematization and analysis of scientific and periodical literature; generalization - to systematize the problems and consequences of ICT development; empirical - for conducting experimental research; simulation - for carrying out the prognostic experiment for the approximation method; visualization - for graphical display of results.

**Results of the study.** Under the digital economy it is common sense to understand the socioeconomic structure in which the main means of production (as opposed to material resources) are electronic (virtual) data, which are formed using information and communication technologies and exist in the network space. The ICT are a key resource in the digital economy that provides for the functioning of both real and virtual sectors of the economy. At the same time, the implementation of ICT and digital services on their basis leads to significant changes not only in the area of technological and manufacturing processes. There are

systemic innovational changes in quantitative and qualitative indicators and processes of vital activity of both society and individual. That is, these changes are institutional.

However, like any development, the process of ICT development in the period of the formation of the digital economy faces a variety of problems. This paper focuses on the following issues:

1. The problem of digital inequality, that is, the uneven development of modern ICT in countries around the world and in the regions of Ukraine directly. The discussion of this problem has been going on for quite a long time, its decisions are devoted to both scientific research and applied, in particular, legislative decisions at the international level (decisions and resolutions of the International Telecommunication Union, the UN general assembly, etc.). In particular, it was stated that digital inequality is one of the main problems of the development of modern technologies, and the development of the digital economy is capable of increasing the digital divide between countries [13], [14].

Despite numerous scientific and applied developments, the European integration and innovation vector of economic development, as well as numerous socio-economic reforms, the problem of digital inequality in Ukraine has not been resolved sufficiently, as evidenced by statistical data (table 1).

Table 1 – Means telephony

Indexes	City				Village			
	2015	2016	2017	2018	2015	2016	2017	2018
Phone integrity, teleph. sets per 100 inhabit.	26,0	25,5	20,1	19,1	7,9	7,1	6,1	5,4
Payphones integrity, payph. per 100 inhabit.	0,22	0,19	0,18	0,17	0,008	0,007	0,008	0,007
Volume of realized communication services, UAH million for a man a year	0,18	0,14	0,13	0,12	0,035	0,035	0,033	0,031

Source: Data from [15] and the authors own calculations

The data in table 1 indicates a significant inequality in the development of ICT in cities and villages, that is, there is a kind of discrimination against the rural population about access to these facilities and the volume of consumption of these services. There is also a significant inequality in access to communications facilities and in the regions of Ukraine. In particular, the number of Internet subscribers as the leading means of digitization of the economy, which is given in table 2, makes it possible to establish a significant gap between the ability to use digital economy services (the table shows the limit values for some regions).

Table 2 - Number of Internet subscribers in the country (as of the beginning of 2018)

Regions	In total, thousands of users	Population, thousand people	Density, Internet users, %
Vinnitsa (central regions)	833,6	1568,5	53,1
Lviv (western regions)	1410,3	2524,3	55,8
Odessa (southern regions)	2537,0	2380,4	106,6
Kharkiv (eastern regions)	1377,8	2683,5	51,3
Chernivtsi (Transcarpathian regions)	365,5	905,2	40,0
Chernihiv (northern regions)	599,2	1013,6	59,1
Kiev	3120,4	2937,9	106,2

Source: Data from [15] and the authors own calculations

The data in table 2 indicates a significant inequality in the use of the Internet between regions of the country. Yes, the Transcarpathian regions have the lowest rates. At the same time, Odessa and Kiev region shows an excess of one hundred percent density, that is, some users are simultaneously subscribers of different types of Internet access. On average, nearly half of the population are not active users, which is a very negative indicator, even if we consider that all age groups are considered in the total population (in particular, children from birth who are not users for natural reasons).

Given that the digital economy as such and almost all of its manifestations (e-government, trade, education, etc.) are based precisely on the use of ICT, there is a problem associated with the inability to



ensure equal constitutional rights and freedoms of citizens, as is stated in Section II The Constitution of Ukraine, which is a significant socio-economic problem.

2. Lack of money of economic agents of different levels for innovative equipment upgrade, acquisition of the latest ICT and technical devices. This problem is closely linked to the current economic situation in the country. Permanent budget deficit, state financing policy, low average wages, and many other factors create a problem of lack of funds for the development of ICT at the state level and difficulties with the purchase of office equipment and other personal means of access to digital infrastructure tools by business entities and the general public. State capital investments amount to 1-2%, local budgets - 3-5%. More than 75% of investment in entrepreneurship is made up of own funds by entrepreneurs who are building their own innovative investment policy, taking into account the priority of profitability. In this case, the development of ICT in 2018, in general, directed 3,7% of investment funds, and industrial development – 34,5% [15].

Almost 66.5% of households spend on the purchase of food and the payment of utilities. On average, 2.9% of the family budget is spent on communication services for all kinds of people, while rural residents account for 2.7%. In this case, 4.8% in cities and 10.7 % in village of the population live outside of poverty, which does not allow them to actively integrate into modern digitalization processes, given the problem of purchasing the necessary personal access to digital services.

3. Insufficient publicity and educational activity of the state and local self-government bodies concerning the implementation of the digital society and economy in the development of the state and regions. This problem is partly a consequence of the previous ones, because the lack of funding and access to ICT services and digital services sometimes leads to the inappropriate advertisement of those services that for technical and/or other reasons can not be provided in the region or some segments of the population.

Educational activities aimed at developing and deepening digital competencies of citizens are not just education directly received at educational institutions of different levels. It is necessary to create a network of consultation points for the whole population, which wants to improve its educational level in the field of digital competences and opportunities to use modern means of ICT. This educational activity can be carried out by various measures, in particular within the framework of the project "Education for a lifetime", on a volunteer basis, by allocating air time for educational programs on national TV channels, etc.

4. Lack of skilled ICT professionals. Despite the large number of higher education institutions that train specialists in computer engineering, programming, etc., the volume of labor migration of professional specialists abroad and the departure for training of a significant number of students are increasing each year. That is, there is a situation in which, in the presence of vacancies in the field of ICT, wages are not competitive with the same in the EU countries and other industrialized countries, which leads to the departure of specialists.

Each year, the number of university students who give preference to studying abroad for various reasons is increasing, one of which is the future employment abroad. For example, about 40 thousand Ukrainians study in Polish higher education institutions, but only 5-10% of them plan to return after completing their studies at home [16]. This leads to the inhibition of the development of the digital economy from the point of view of the provision of these processes by specialists in the field of ICT of the relevant qualification.

5. Contradictions between traditional and up-to-date management methods, the presence of manifestations of corruption. New vectors of the country's development are aimed at building a social state and fighting corruption. It is the digital society, in which the link of personal communication between administrative staff is meaningless and replaced by electronic document circulation of ICT-based, can lead to the introduction of the newest methods of management in which it is virtually impossible to manifest corruption. However, precisely because of this, in some cases, the inhibition of the digitization of economic and, especially, of management processes. In order to overcome this negative phenomenon, in our opinion, it is advisable, in addition to the introduction of the anti-corruption court, the rejuvenation of all branches of power, the development of appropriate legal support for combating corruption, the formation of a new outlook for youth in the framework of the project "New Ukrainian School" and for the more adult population. All this, among other things, is possible with ICT by posting information on social networks and other modern media.

6. Limited manifestations of the formation of innovation-oriented policy at enterprises. Socio-political instability of the country leads to the formation of such vectors of entrepreneurship development, which are aimed primarily at preserving the volume of production and counteracting the manifestations of the crisis. Innovative upgrade (in this case, the introduction of digital business formats and new ICT) is not the prerogative of most entrepreneurs in view of the unpredictability of demand for new goods and services, the complexity of funding for the development of digital services, high discount rates for businesses, lack of development of the venture market, etc. In a difficult economic situation, it is expedient to consider the possibility of non-lending financing for the development of digital services for enterprises, for example, based on field-surfing or other platforms. This approach has already proven to be effective for the development of innovative projects in most countries.

7. The problem of cybercrime. Crime, unfortunately, is an integral part of any socio-economic formation. The ICT and the digital world has provided new opportunities for the development of this phenomenon. The manifestations of cybercrime are quite diverse - from fraud to financial transactions to industrial espionage, the use of social networks for the organization of terrorist acts, cyber attacks against state authorities, etc. And with the development of the digital economy, the number of possible manifestations of cybercrime will increase in proportion to the number of new services and services, attacks that may bring unlawful benefits. Therefore, along with the development of the digital economy and society, there is also a need to expand the number of objects to combat cybercrime. This, of course, requires significant financial costs mainly of budgetary origin. However, some functions can be transferred on terms of outsourcing to non-government agencies. These may include procedures for legal and economic support, software, etc. Also effective is leasing agreement for the supply of ICT equipment for businesses and governmental bodies. This will significantly reduce the expenditures of state and local budgets.

8. The problem of creating a list of basic digital services. It is necessary at the beginning of the implementation of the digital economy project to determine which services will be generally available and socially significant, that is, those that will be provided in all settlements at tariffs that are accessible to all segments of the population (especially for the poor). It is advisable, on the one hand, to study the experience of economically developed countries on this issue, and on the other hand, to conduct in-depth studies of the existing and potential demand for digital services in order to determine which services can be obtained by consumers on their own (for example, using their own mobile device), and for which it is necessary to form the appropriate infrastructure. The indicated infrastructure is intended primarily for persons who, for a number of reasons, are not able to obtain the desired digital service on their own, and may consist of the following items: separate collective access points, service departments in the communications departments (medical, educational, public, financial institutions), customer windows in outlets, specialist staff in social services, etc.

9. The tension existing laws of the global telecommunications space, namely the relationship between growth of ICT technologies and GDP. Scientists have proved that in developed countries the growth of ICT services (especially broadband Internet) leads to a proportional increase in GDP. However, in Ukraine, this pattern does not have statistics. Thus, in the table 3 provides some data on volumes and dynamics of GDP and ICT revenues. One can see the lack of stable development dynamics of both indicators.

Table 3 – Statistical data on volumes of GDP and ICT

Years	GDP	ICT volumes		Increase, %	
	million UAH	million UAH	% of GDP	GDP	ICT
2010	1079346	33011	3,05	-	-
2011	1299991	38390	2,95	20,44	16,29
2012	1404669	43379	3,08	8,82	12,99
2013	1465198	48372	3,30	4,31	11,51
2014	1586915	52724	3,32	8,30	8,99
2015	1988544	72596	3,65	25,31	37,69
2016	2385367	89268	3,74	19,95	22,96
2017	2982920	110779	3,71	25,05	24,09

Source: data [15] and the authors own calculations

The authors conducted an experiment using forecasting methods and approximations obtained data showing that GDP growth characteristic exponential dependence (with a probability of about 95%) and increase in ICT linear dependence occurs (probability 90%). These trends will occur in the near future (figure 1).

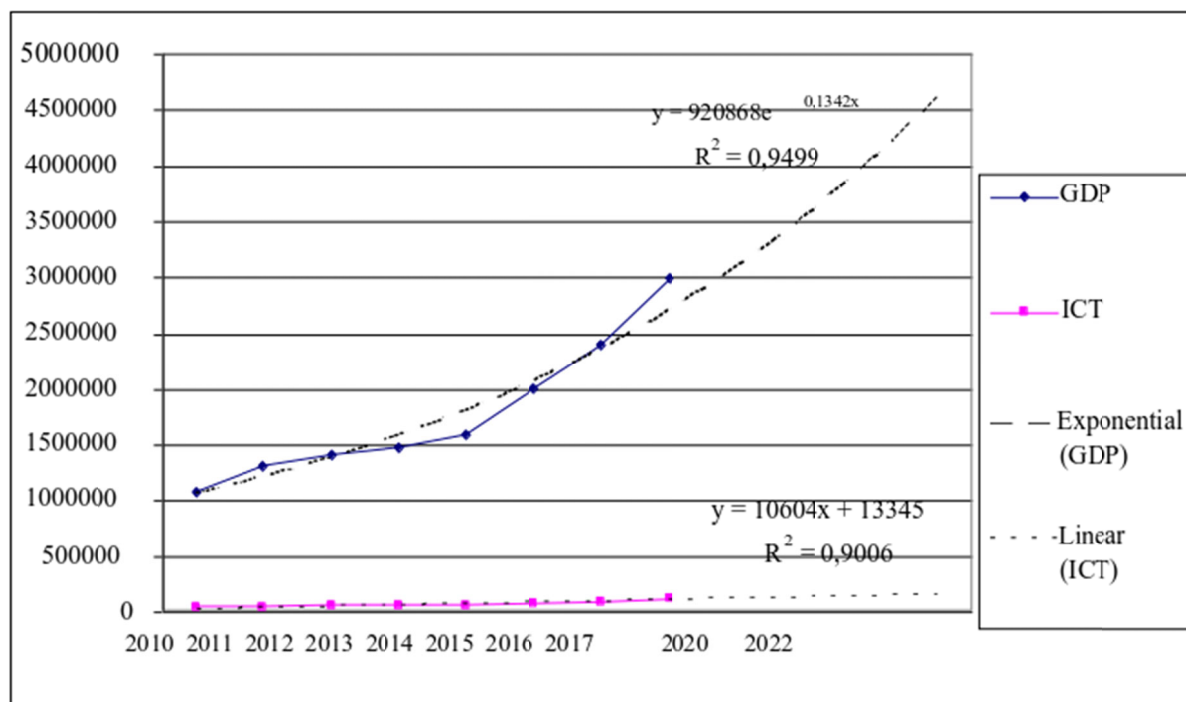


Figure 1 - Results of the prediction experiment (author's development)

The data showed no close relationship between ICT and the dynamics of the GDP in the country.

10. It should also be noted that in the future such a problem as the struggle for migrants may arise. As stated above, specialists from different spheres of activity leave the country today, especially ICT specialists who receive significantly higher wages abroad. But the processes of the development of the digital economy and society will require the presence of these workers. Job vacancies will need to be filled, because without this, it will not be possible to further develop of ICT and the digital society as a whole. Here and there may be a problem of competition in the international labor market for specialists with proper qualifications in the sphere of ICT. Ukraine in these conditions can choose the following scenarios for the development of events:

- promoting the return of their own citizens - ICT specialists. This scenario is possible due to the formation of appropriate financial (competitive wages), social (social services development) and legal (changes in labor legislation) levers. It is also important to ensure overall political and economic stability in the country;
- invitation of foreign specialists from developed countries. This scenario is attractive due to the fact that these experts will have experience of ICT. However, they will require a level of remuneration and social services that are consistent with world standards;
- involvement of specialists from developing countries. This scenario is appropriate in terms of meeting the requirements of such specialists for the domestic wage level. On the other hand, the involved specialists may not have the necessary competencies and perceive employment in Ukraine as a temporary bridge for further employment in more developed countries.

The identified and other problems need to be addressed at the state and regional levels, as they significantly impede the development of the economy and society. However, the ICT and the digital society continues to develop despite the existing problems, so it is advisable to analyze the consequences of this process, which have already manifested itself in society.

The consequences of the development of the ICT, the digital economy and society can be attributed to both positive and negative. To positive we shall mention the following:

1. Continuation of the age of social and labor activity of citizens by acquiring ICT competencies through social networking, distance education in "third-year universities", distance work and other social services of digital society. Thus, society is able to move to the concept of "active aging", which has a number of benefits, including increasing social activity of citizens, raising the overall level of digital literacy, reducing the cost of providing social assistance, which can be obtained remotely and through ICT services so on.

2. Changing the semantic content of work towards its intellectualization, additional income from rent information officer (additional revenues for the use and continued development of the ICT knowledge and competence). This, in turn, leads to the need for continuous self-education and raising competencies. Thus, a certain professional stratum (in the middle class type) is formed that has a steady financial position due to the constant intellectualization of labor and permanent acquisition of skills in the field of leading ICT.

3. Growing greener economy through the formation of a unified system of environmental control and monitoring, integrated with other countries. The digital economy is not denying traditional manufacturing, so ensure completely environmentally safe production activity is currently quite difficult. Today, we are talking about systemic changes in the use of resources and monitoring waste utilization.

4. Creating new jobs, including remote ones. This is unlikely to lead to a significant reduction in unemployment, as there is a shift in production priorities towards the ICT sphere, that is, vacancies in the real economy will be shifted (after the corresponding training) into the network environment. But at the same time, this will increase accessibility to full-time employment of people with disabilities through the ICT.

5. The digital society will give impetus to the development of new opportunities for education, tourism services, medicine, cultural projects, and other social innovations. The development of e-governance will help to reduce the level of corruption and possible sources of its occurrence.

In addition to the positive aspects, of course, it should be noted and possible negative consequences. Among them, first of all, we can state the following:

1. The development of the ICT and the network economy will result in the simultaneous growth of cybercrime. At the same time, such crime easily goes beyond the borders of the state due to network technologies, which will require the involvement of international measures.

2. Increase in psychological problems of the individual, development of sociopathy. The transition of social life into the network space has already affected the personal communication of citizens. Society loses the culture of communication through letters, young people communicate less personally, preferring social networks and other ICTs. This leads to various consequences: psychological barriers in personal communication; difficulties in expressing their own thoughts in society; problems with the creation of a family and the presence of marital aphorism on the network; reduction of emotional intelligence. As a result, there is an increase in manifestations of sociopathy, psychological disorders, depressive states. Lowly controlled youth groups in social networks that promote socially dangerous actions or encourage suicide are also very dangerous.

3. Dependence of ICT by network performance and sustained energy performance, the need for additional costs for backup uninterrupted power supplies. When it comes to smart grid operation, failure of the network will also lead to social consequences in the form of problems of transport logistics, supply of products, impossibility to carry out financial transactions, etc.

4. Electronic identification (eID) and transparency of individual privacy, which on the one hand, simplifies the legal, financial and other aspects of life and activity, while forming an idea of the lack of security of personal space, which is also able to cause some psychological problems. In addition, some religious communities prohibit their members from obtaining electronic documents, which leads to a conflict between the rights and freedoms of citizens.

5. Partial loss of national identity formation through lack of understanding of the boundaries and unification of a number of socio-economic processes, manifestations of globalization.

6. The need to respond quickly to replace innovation in technology, services and digital services. This is not a problem for youth, however, it can lead to negative consequences for the elderly, who for a

number of reasons do not want or are unable to quickly master new knowledge and skills on ICT. Here there is a kind of discrimination on an age-old basis.

The authors conducted a survey of ordinary people of different age groups that are allowed to determine the negative effects of the ICT, digital economy and society:

- change of attitude towards money and planning costs due to the transition to cashless payments. The lack of tactile contact with money in some causes a sense of non-controllability, which leads to increased costs;

- the need to change habits and sustainable outlook, the way of life, approaches to solving social and family-related current problems (for example, obtaining documents and certificates, financial services, etc.);

- availability unfair trade network mail order facilities that offer products and services that do not meet the description of reality that after receiving defective goods mail leads to moral damages to the return of goods;

- the lack of accessible and understandable information for the elderly about the nature and capabilities of digital services, especially in rural areas.

Also, respondents expressed the view that ICT can lead to further stratification of society into those who successfully integrated into the digital space, and those who "remained outside the new life", that is, in fact, confirmed the opinion expressed in [13, 14 ], about the probability of increasing the digital divide.

To overcome the identified problems, there needs to be solid scientific and applied developments, which at the state level must be coordinated with the general programs and strategies of development and innovation of the transformation of society.

According to the authors, taking into account the geopolitical position of the country, the introduction of the digital economy and society is a chance for Ukraine to become the center of information and communication and financial services of a digital nature for Eastern Europe and a bridge for the integration of the EU with the eastern countries. There are prerequisites for this:

- good geographical position;
- availability of advanced ICT network;
- business and cultural ties that historically the USSR;
- availability of stable trade relations and access to international sea and river routes;
- political will to turn the country into a sustainable, innovative and developed European countries, which is based may have been responsible technological breakthrough is not so much industrial as information and communication and digital character.

However, as has been determined, it is first necessary to overcome existing challenges to implementation of Concept development of the digital economy and society in Ukraine.

**Conclusions and perspectives for further studies.** The digital economy and society are a new stage in the development of mankind, which is intended to lead to a new quality of life of the entire world through an innovative upgrade of not only technological but also socio-economic processes. The basis of these processes is the integration of ICT into all spheres of life, business processes and management activities. Like any changes, the global restructuring of society and new principles of existence are facing a number of technological, financial, social and mental issues. The successful solution of these problems depends both on the speed and quality of socio-innovative transformations.

During the transition to the digital economy having both positive and negative effects, which is a natural phenomenon that requires a study and implementation of measures to minimize adverse effects.

Overall, we believe that the development of ICT and the formation of Ukraine in the digital economy and society is a chance for the country to become a center of digital integration for Eastern Europe, able to lead to economic breakthrough and overcome the current socio-economic crisis.

In further research is planned to develop a model depending on the pace of digitalization processes of society on the pace of economic development, namely the dynamics of GDP, income and other indicators.

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### САНДЫҚ ЭКОНОМИКА МЕН ҚОҒАМНЫҢ ҚАЛЫПТАСУ КЕЗЕҢІНДЕГІ АҚПАРАТТЫҚ-КОММУНИКАЦИЯЛЫҚ ТЕХНОЛОГИЯ МӘСЕЛЕЛЕРІ

**Аннотация.** Қазіргі қоғам ғылыми-техникалық прогресс ықпалымен дамып келеді. Экономика, өндіріс, білім беруде және жеке өмірімізде жаңа қатынас орнап, қаржы құралдары мен сын-қатерлер пайда болып келеді. Сандық экономика мен қоғамды қалыптастыру кезеңінде ақпараттық-коммуникациялық технологияларды (АКТ) дамыту мен перспективаларын айқындау мәселелері өзекті болып отыр. Сондықтан мақаланың мақсаты – сандық экономиканы қалыптастыруда АКТ дамыту үдерісінде туындайтын негізгі мәселелерді жүйелеу, сондай-ақ осы үдерістің ықтимал салдарын анықтау.

Жаңа АКТ және сандық сервистерді енгізу қоғам өмірінің сандық-сапалық көрсеткішінде елеулі өзгерістерге әкеледі әрі институционалдық сипатта болады. Сандық қоғамда АКТ-ны дамыту барысында туындайтын бірқатар мәселелер, атап айтқанда: сандық теңсіздік; инновациялық жаңартуға қаражаттың жетіспеушілігі; қазіргі заманғы білім беру мен мемлекеттік басқарудың жаңа қоғам талаптарына сәйкес келмеуі; білікті кадрлардың жетіспеушілігі; басқарудың дәстүрлі және жаңа әдістерінің арасындағы қайшылықтар мен сыбайлас жемқорлық; киберқылмысты жандандыру; әлеуметтік сандық қызметтер тізбесін қалыптастыру қажеттілігі; жоғары білікті кадрлардың халықаралық көші-қоны.

АКТ-ны дамытудың келесідей оң көріністері де анықталды: азаматтардың әлеуметтік және еңбек белсенділігінің жасын ұзарту; қосымша табыс алу мүмкіндігімен еңбекті интеллектуалдандыру жағына қарай оның мағыналық толығын өзгерту; экономиканың экологиялық сипатының өсуі; қашықтықтан жаңа жұмыс орындарын құру; білім беру, туризм, медицинаның жаңа мүмкіндіктері. Теріс салдары жүйелендірілді, атап айтқанда: киберқылмыстың артуы, тұлғаның психологиялық мәселесінің көбеюі, АКТ-ның желі мен энергия тасымалдағыштың жұмысқа қабілеттілігіне тәуелділігі, жеке кеңістіктің қорғалмауы, инновациялық алмастыруға жылдам ден қою қажеттілігі.

**Түйін сөздер:** ақпараттық-коммуникациялық технологиялар, сандық экономика, әлеуметтік-экономикалық мәселелер, инновациялық өзгерістер.

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### ПРОБЛЕМЫ ИНФОРМАЦИОННО-КОММУНИКАЦИОННЫХ ТЕХНОЛОГИЙ В ПЕРИОД СТАНОВЛЕНИЯ ЦИФРОВОЙ ЭКОНОМИКИ И ОБЩЕСТВА

**Аннотация.** Современное общество развивается под влиянием научно-технического прогресса. Возникают новые отношения в экономике, производстве, образовании, личной жизни, новые финансовые инструменты и новые угрозы. Актуальными становятся вопросы определения проблем и перспектив развития информационно-коммуникационных технологий (ИКТ) в период формирования цифровой экономики и общества. Поэтому целью статьи является систематизация основных проблем, которые возникают в процессе развития ИКТ в период формирования цифровой экономики, а также определения возможных последствий этого процесса.

Доказано, что внедрение новейших ИКТ и цифровых сервисов приводит к значительным изменениям в количественно-качественных показателях жизнедеятельности общества и носят институциональный характер. Выделен ряд проблем, возникающих в ходе развития ИКТ в цифровом обществе, в частности: цифровое неравенство; недостаток средств на инновационное обновление; несоответствие современного образования и государственного управления требованиям нового общества; нехватка квалифицированных кадров; противоречия между традиционными и новейшими методами управления и коррупция; активизация киберпреступности; необходимость формирования перечня социальных цифровых услуг; международные миграция высококвалифицированных кадров.

Определены положительные проявления в развитии ИКТ: продление возраста социальной и трудовой активности граждан; изменение смыслового наполнения труда в сторону его интеллектуализации с возможностью получения дополнительных доходов; рост экологичности экономики; создание новых дистанционных рабочих мест; новые возможности образования, туризма, медицины. Систематизированы негативные последствия, а именно рост киберпреступности, увеличение психологических проблем личности,

зависимость ИКТ от работоспособности сети и энергоносителей, отсутствие защищенности личного пространства, необходимость быстрого реагирования на инновационные замены.

**Ключевые слова:** информационно-коммуникационные технологии; цифровая экономика; социально-экономические проблемы; инновационные преобразования.

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