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DIGITAL DEVELOPMENT OF ECONOMY AND SOCIETY UNDER INFLUENCE OF COVID-19

Introduction. *Current trends in the development of socio-economic processes aim at building the digital economy and society, but the spread of COVID-19 has exposed the major problems related to these processes.*

Problem Statement. *The pandemic has defined a new fundamental and applied problem regarding the need to study crisis phenomena at the intersection of the number of research areas and their impact on economy and society.*

Purpose. *The purpose is to analyze the state of the development and implementation of digital services in the country under the influence of quarantine restrictions.*

Materials and Methods. *State legislative acts and statistical information have been selected as the information base. A number of methods of scientific inquiry have been applied: theoretical generalization, empirical analysis, comparison, abstraction, etc.*

Results. *It has been defined that majority of the priority areas of digital economy development is being formed and not ready for their massive use. In particular, there still exists a significant inequality of access to digital services, the digital competency training system remains unregulated, the digital job creation scheme in the real economy is almost undeveloped, there are significant gaps in the digital public security services, the problem of the national digital educational platforms has not been resolved yet, the system of provision of remote healthcare services has not been formed, and the procedures for estimating tourist migration and for remote financial services have not been settled.*

Several problems that aggravated during the pandemic have been studied: the imperfection of social protection procedures, the existence of hidden unemployment, the activation of cybercrime, the aggravation of individual psychological problems, extremely high level of dependence on reliability of the network services. The directions for increasing financial results in the pandemic conditions have been identified.

Conclusions. *The pandemic has identified bottlenecks in the processes of the digital economy and society formation and allowed determining the priority areas in research and practical actions in order to adapt rapidly to new conditions.*

Keywords: digital economy, problems, pandemic, and development.

The modern world and national trends in the development of socio-economic processes aim at building a society based on information and communication technologies (ICT) and digital services. To this end, the world has elaborated legal documents that define the

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goals of further development of the world economy. For instance, *Sustainable Development Goals for 2016—2030* [1], among other things, recognizes expanding access to information and communication technologies and providing universal access to the Internet and related services, as primary goal. Ukraine has adopted the Concept for the Development of the Digital Economy and Society of Ukraine for 2018—2020 [2], which aims at "... implementing measures to realize appropriate incentives for digitalizing the economy, public and social spheres, recognizing the existing challenges and tools for digital infrastructure, and acquiring digital competencies by citizens." In recent years, several measures have been taken to implement the main provisions of this Concept and to transit to new formats of socio-economic relations in general. For example, e-commerce and financial services platforms have become more active, e-government services and public projects have appeared, cybersecurity systems have been developed, and so on.

However, modern realities, namely the pandemic caused by the spread of COVID-19, has become a litmus test of the current level of digitalization of the domestic economy and formulated a clear research and applied problem that is to study crisis phenomena at the intersection of many research areas. First of all, this crisis is difficult to classify, since it numerous manifestations, from biological (emergence of a new strain of influenza capable of rapid mutation) to socio-economic and political (at all levels from personal to macroeconomic) ones. The world and Ukraine have faced a specific crisis that has not yet occurred in the modern economy and is therefore understudied from a scientific and practical point of view.

Naturally, researchers have carefully studied the theoretical foundations and manifestations of the economic crisis, the consequences and ways to overcome it, identified methods of crisis management. O.B. Vatchenko and R.S. Sharanov [3] dealt with the theoretical foundations and economic essence of the crisis as such, analyzed its impact on the economy and society. N.A. Azmuk [4] assessed and forecasted the digital employment of the population, proposed measures and tools to adapt the national labor market to the conditions of the digital economy. A.M. Kolota and O.O. Gerasimenko [5] suggested that increasing uncertainty about the duration and consequences of the COVID-19 pandemic would lead to a decline in the activity of global supply chains by 35.4 %, reduce interest rates by 30%, and accelerate the introduction of robots by 75.7 % (as alternatives to human labor that in pandemic conditions should be remote).

In recent years, researchers have studied the readiness of enterprises, their assets and employees to work in the conditions of digital transformation. In [6], Yu. Chubatyuk tries to understand the possibilities of economic and social development in the conditions of quarantine restrictions. In particular, strategic cases have been proposed to ensure the effective operation of enterprises in pandemic conditions (online services for telecommuting, training, retraining, etc.). Studies [7—9] deal with analyzing the impact of digitalization on the development of economic systems and processes and provide a theoretical and applied framework for managing the development of enterprises in terms of digital transformation and so on.

Today's crisis has non-economic origins, but leads, among other things, to economic consequences on a macro scale. Assessing these consequences will be possible only after the end of the pandemic. However, today it is possible and necessary to draw the first conclusions about the readiness of the country and the world to resist such global crises from the standpoint of mass transition to digital platforms in most spheres of society and socio-economic processes. in the world and in the country.

Therefore, the purpose of this research is to analyze the state of development and implementation of digital services in the country during the introduction of national quarantine restrictions caused by the COVID-19 pandemic.

The information base of the research is selected legislative and normative acts related to the studied problems, data of international research platforms, and official statistical information. To achieve this goal, several methods of scientific knowledge have been used. In particular, they are as follows: theoretical generalization (for critical analysis and systematization of research material); empirical analysis (for the analysis of statistical data and the formation of appropriate conclusions); comparison (to compare data); abstraction (to highlight the properties of the system that are the subject of this study).

Since the study aims at considering Ukraine's readiness to move towards digital socio-economic platforms, we will take as a framework the Concept of Digital Economy and Society of Ukraine for 2018—2020, the main document that should regulate and guide this process [2]. It should be noted that the Concept is focused on achieving the outlined results by 2020, i.e. now almost all the positions declared in it should function today.

We will conduct a critical analysis of these areas from the standpoint of their compliance with the today's challenges of today, in particular, the pandemic.

1. Bridging the digital gap by developing digital infrastructures to address technical, organizational, and financial constraints and difficulties in using digital service. These measures were planned to be implemented through the development of broadband Internet access and the formation of soft digital infrastructures (open data, blockchain, electronic payments, online interaction of business entities, etc.). This would contribute to the socio-economic and cultural development of rural communities and reduce the migration of rural population overseas rather than to Ukrainian cities. In fact, the level of access to fixed telephony and Internet services remains very unequal. As of the beginning of 2020, landlines per 100 people in the cities numbered 18.48 units, and 0.051 units in the countryside. The share of people who identify themselves as regular Internet users with access to online services from home is 71.6% in cities and 40.6 % in rural areas [10]. That is, the urban population, both in everyday life and in the pandemic, have, if not a full, but a significant level of access to digital technologies and services, whereas the rural dwellers have some problems with access to those services that temporarily are provided remotely. So, the pandemic has exacerbated the problem of digital inequality. Of course, the problem has been partially solved by mobile communication that may be used to receive most digital services. However, the following problems have arisen:

- Low digital literacy of the rural population in terms of skills to use the Internet via mobile phone;
- Low average solvency that leads to limited opportunities to purchase a phone that supports all the necessary digital services;
- Incomplete coverage of rural areas with 4G network by all providers operating in the mobile market.

These and other problems lead to the fact that the share of users of digital services on mobile platforms in villages does not exceed 45 % (of the total number of regular Internet users) [11].

2. Development of digital competencies as a guarantee of digital economy development. Without mass mastery of digital skills by citizens, digitization processes lose their meaning. In the transition to teleworking, it has become clear that many citizens who have permanent access to digital services do not have the necessary digital competence. This has manifested itself in the course of transition of education, financial and public services to teleworking. In conditions when digital competence becomes the main requirement not only for employment, but also for everyday life, the revision of approaches to teaching all segments of the population the basics of digital literacy becomes relevant. Today, according to statistics [11], most Internet users use it for entertainment purposes, including:

- Watching videos and news: 65.4 % in the city and 63.8 % in the village;

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- Access to video or computer games: 32.9 % and 38.6 %, respectively;
- Communication in social networks and other messengers: 50.0 % and 43.8 %, respectively.

Therefore, it is necessary to reconsider approaches to the development of digital competencies of citizens. In particular, the project *New Ukrainian School* should deal with today's challenges and introduce appropriate disciplines, starting with junior classes. At the same time, in our opinion, the security of the use of digital services is as important as the digital literacy, since children are the most vulnerable to cybercriminals. It is also advisable to revise the curricula of secondary and high school, where there is *Computer Science* discipline that focuses mainly on user skills and has a relatively small amount of information on digital competencies and services, including digital educational platforms and skills..

Regarding the digital competencies of citizens of other age groups, it is necessary to review the list of jobs and professional competencies in employment from the standpoint of knowledge and skills to perform official duties both offline and online. For the elderly, *the University of Third Age* program has already exists both in the world and national practice and needs to be implemented, especially in rural areas, where this program enables the mentioned age group to master the skills (including digital ones) for everyday life and contribution to economic development.

3. Introduction of digital jobs. These jobs, first of all, involve remote work. In the conditions of national quarantine, it has been found that the remote work (teleworking) system has almost not been regulated at the legislative level. There are no relevant laws and regulations. The enterprises that use the freelance system, this is formalized by a personal contract. For state-owned and other enterprises that may work remotely (for example, educational institutions) this type of activity for almost the entire personnel has not been regulated. This has led to many problems, namely: accounting of working hours for people with hourly wage/salary, payroll, control over the "attendance" of distance learning for schoolchildren and students, and so on.

For the real sector enterprises (industry, construction, etc.), technological processes do not allow remote work at all and they are forced to suspend works temporarily. In contrast, agriculture may not stop operating and, in some cases, neglecting safety, continued to operate, especially in the agricultural sector, as the first quarantine restrictions in Ukraine fell on the sowing season.

The questions arise: how to organize digital jobs for these activities and is it possible at all? What should be the algorithms of enterprises that do not have digital analogs of production activities? The following considerations give a partially answer to these questions.

4. Digitalization of economy's real sector through the introduction of Industry 4.0 concept based on cyberphysical systems. However, this concept involves, above all, updating those technologies that are already present in the digital space, in particular, the further development of the Internet of things, big data, cloud and fog computing, neural networks and artificial intelligence. These technologies are able to improve some technological processes, supply chain management systems, marketing and resource use. Digital agriculture aims at the use of geographic information systems for the agrosphere development. However, these technologies do not answer the question: how to create digital jobs in the real sector and to protect workers from the risks of a pandemic? During the period of strict quarantine, the real sector of the economy either suspended operation or continued operating despite the existing risks and prohibitions. That is, the question of the viability of the real sector of the economy in crisis situations has become relevant.

Many researchers and practitioners have already mentioned the adverse consequences of economic slowdown [6, 16]. The formation of Industry 4.0 has not been completed in Ukraine, and is almost unsuitable for mass use at enterprises. This conclusion is also based on the fact that the share of large enterprises that have resources to

implement the means of Industry 4.0 accounts for 0.06 % of the total number of business entities in the country [10]; 97.4 % of the country's enterprises are small companies and individual entrepreneurs. First, they do not always have financial resources to implement digital services; second, their field of activity does not involve the active implementation of these services (e.g., coffee shops); and third, the owners do not have complete information about the capabilities and ways of application of digital services in their own businesses. In addition, most small-sized businesses have not yet developed an online service and delivery system. The statistics have shown a relatively low presence of large-, medium-, small-, and micro-sized enterprises in the online environment (Table 1).

For the above and other reasons, most companies in quarantine were forced to suspend operations. Given that most small- and medium-sized enterprises have either no or little financial reserves, long-term quarantine will lead to rapid closure of those enterprises that are unable to transfer production to network platforms. Therefore, the urgent task is to actively involve small and medium-sized businesses in networked forms of doing business.

5. Implementation of digital transformation projects. This part of the Concept needs to be carefully reviewed from the standpoint of complementing the existing projects with new initiatives. Requires developing digital platforms and services directly for those segments of the economy and society, which are virtually vulnerable (in terms of the possibility of safe continuation of activities in the online environment) in pandemic conditions, i.e. addressing the issue described in the fourth block of the Concept.

6. Civil security. In [2], civil security refers to the use of intelligent and digital technologies to create security for citizens and critical (strategically important) infrastructure of cities and towns. Digital technologies, of course, are able to ensure a high level of coordination of the relevant services. However, the pandemic has shown that in the country it is quite difficult from a legal and organizational point of view to realize rather simple measures: mandatory wearing of a protective mask in public places, self-isolation of citizens who come from abroad and or with respect to whom there is suspicion on COVID-19, restrictions on the movement of the elderly, etc.

On the other hand, wearing masks complicates the work of law enforcement agencies in terms of identification. The police contingent is not enough to restrict citizens' access to public places that cannot be physically closed (parks, beaches, etc.). Also, there is no legal framework for the use of digital means of controlling the movement of citizens who should be self-isolated. Therefore, in terms of civil safety, it is necessary to form new priorities that allow ensuring public safety in non-specific crises.

7. Education. Modern education shall meet the needs of the digital economy and society, have a cross-platform nature and intensify the educational process towards its mobility, differentiation, and individualization. The Ministry of Education and Science of Ukraine has declared that

Table 1. **Some Indicators of Businesses Presence in the Online Environment**

Indicator	Share, %
Employees of enterprises who constantly use a computer while doing job	32.8
Enterprises that have ICT specialists among their staff	0.59
Enterprises that use social networks for promoting goods and services	1.5
Enterprises that purchase cloud services for operating needs within one year	0.26
Enterprises that receive orders for goods and services through the Internet, in particular:	5.6
Small-sized businesses	4,8
Large-sized businesses	11,1
Enterprises that purchase goods and services through the Internet, in particular:	21.7
Small-sized businesses	19.4
Large-sized businesses	36.2
Capital investments in purchase of ICT and software	1.1

Source: prepared by the author [11].

the *New Ukrainian School* project will create an infrastructure for various forms of learning, including an online educational platform with teaching and learning materials for students, teachers, parents, and top officials of educational institutions [12].

In the pandemic conditions, educational institutions of all levels have massively switched to the remote system of provision of educational services. This process was quite well-organized. However, each educational institution was forced to organize the digital learning platform on its own (within the limits of academic independence). Only a few weeks after the introduction of the quarantine, there appeared television lessons for schoolchildren. Higher education institutions use those platforms and tools that are more convenient for their conditions and assets base. In this case, the problem is the lack of not only a unified approach, but also appropriate licensing programs, as well as poor computer literacy of some participants in the educational process (primary school students, teachers in rural areas), incomplete access to ICT, and so on.

Great difficulties have arisen in sports, aesthetic, and other educational institutions, as well as in those with a large amount of practical training (for example, industrial specialties). Therefore, in addition to the formation of national educational platforms and relevant content, it is important to develop and to implement production simulators using cognitive and multimedia technologies that are able to form basic competencies for teaching applied specialties.

The lack of a unified system for remote assessment of students' knowledge and certification of applicants for educational and scientific degrees deserves special attention. The absence of such platforms has led to the abolition of the final government attestation of the ninth grade students, uncertainty in terms of the time and procedure for external independent assessment, distance learning methods and assessment of students who do not have permanent access to online services, changes in dissertation deadlines, etc.

8. Healthcare. The provision of medical services in digital format requires special attention. According to [2], digital medicine should "... ensure the interaction between patients and health professionals through digital technologies by translating medical records into electronic format and digitization of medical services through the development of telesystems for remote medical services, on-line diagnostics and health monitoring." In fact, during the pandemic, citizens were offered hotlines and remote telephone communication with doctors (in the case of a contract with a family doctor). At the same time, many medical institutions, especially in rural areas, use mainly paper documents, which complicates the transfer of information about patients to hospitals. The digital medical platform starts only to take shape, which makes it virtually impossible to quickly systematize the population by risk of infection (i.e. to identify people at risk by age, co-morbidities, etc.). Such a base would significantly simplify the procedures for monitoring compliance with quarantine for the above-mentioned persons, providing medical and social assistance at home, and so on.

9. Tourism. Modern digital technologies are in great demand for business and travel purposes. These are financial, logistical services, access to online maps and travel services on the *Smart Tourist Destination* platform. Most travel centers have created their own websites of tourist locations, virtual tours, a network of webcams, QR codes and RFID tags at tourist sites, etc. That is, the tourism sector may be an example of effective use of digital technologies. In the context of the pandemic and the temporary closure of borders, it is possible to get acquainted with tourist sites online.

However, there was a non-specific problem with the evacuation of a large number of tourists. According to the Ministry of Foreign Affairs of Ukraine, about 80 thousand people were evacuated urgently [13]. Those tourists who bought tours through travel agencies could be counted with the help of databases of these agencies. However, the situation was complicated by the fact

that many tourists traveled independently and they had to return home on their own. Only a small number of such tourists used the programs of the Ministry of Foreign Affairs of Ukraine *Zakhyst* (Protection) and *DRUH* (FRIEND) for both recording the travelers and providing assistance to them in difficult situations. Only about 10,000 Ukrainians who registered their trip abroad in the *FRIEND* system and did not have the opportunity to go home because of the pandemic received a message via mobile application or e-mail with instructions on how to seek help through the *Protection* program [13]. Other travelers had almost no support, because of the lack of information about their location and certain problems. Therefore, it is appropriate to form a general database of travelers without prejudice to the rights and freedoms of citizens in terms of freedom of movement and protection of personal information. One possible solution is to integrate the efforts of migration services and insurance companies that provide compulsory health and car insurance for travel abroad.

10. Electronic democracy. In Ukraine, e-democracy is at the early stage of development. Under the quarantine conditions, there were proposals to transfer the meetings of the Verkhovna Rada, courts, and other institutions to digital platforms, which immediately revealed numerous organizational and technical problems. It has been established that these processes require the formation of appropriate legal and technical platforms for the fastest implementation.

The introduction of electronic voting, law procedures, and other manifestations of e-democracy facilitates access to the expression of will, increases the agility of decision-making, and so on. However, this is associated with digital inequality that has already been discussed above. That is, the introduction of, for example, an online referendum will lead to the loss of votes of those segments of the population, which do not have sustainable access to the Internet or relevant competencies.

11. Ecology and environment protection. This paragraph of the Concept aims at forming digital platforms for the control of responsible use of resources, energy consumption, use of terrestrial and aquatic ecosystems, etc. Under the quarantine conditions, when a significant number of citizens lost their jobs, the number of cases of poaching, unauthorized cutting of trees and other manifestations increased significantly. Therefore, the formation of digital mobile platforms for environment monitoring and patrolling is one of the important tasks.

12. Urban life based on the implementation of the *Smart City* platform. Despite the general need to implement this platform as such, the pandemic conditions have exposed the priority problem of large cities, which needs an urgent solution, namely, the transport links. The closure of subway in large cities and the transition of public transport to a special mode of operation near led to a transport collapse. At stops, there was a crowd of passengers, which pretty much complicated keeping social distance. Limiting the number of passengers in the compartment resulted in delays, quarrels, and other negative consequences. Also, the contractual relations with private operators of minibuses (marshrootkas), which massively refused to work on condition of limiting the number of people in the passenger compartment because of unprofitability were imperfect. This problem can be solved by introducing digital tickets for municipal and other transport. Such a ticket (with proper software support) is able to automatically count the number of passengers in the compartment, to set priority when boarding, to identify the persons who should be in self-isolation, and so on. In the future, with the help of such a ticket it is advisable to differentiate the cost of trip depending on the distance, as it has been implemented in the majority of advanced economies.

13. Cashless payments have become quite part of everyday life and business. In the pandemic conditions, cashless payment is a way to protect oneself from the risk of infection and to minimize contacts while making purchases and payments. At the same time, despite the public awareness

of these benefits, there have been significant gaps in ICT literacy of some segments of the population regarding online financial services. Prior to the quarantine introduction, this problem did not exist, since those who did not have the opportunity or desire to use digital services could receive offline services in the relevant institutions. According to [11], only 21.0 % of urban residents and 8.9 % of villagers regularly receive financial services via the Internet. In conditions when financial institutions significantly reduced the number of operating outlets, there was a problem with provision of banking services to the population. There accumulated long queues near the offices, which was dangerous from the point of view of compliance with quarantine rules. Therefore, the transition of the financial sector to the network environment and the intensification of online settlements for the population and business is one of the important elements of security during the pandemic.

14. Harmonization with European and world research initiatives. According to the Concept, within this area, in Ukraine, there should be formed digital infrastructure for science and education in order to ensure open access to scientific data and knowledge, further commercialization of research, creation of innovations, products, and services. To this end, access to scientific platforms *Scopus and Web of Science Core Collection* is open for higher education and research institutions. Naturally, being aware of the world's leading scientific achievements contributes to raising the level of research works of domestic researchers. However, the pandemic has resulted in reducing government spending on research. The border closures and quarantine measures have made it impossible to conduct face-to-face research activities, limit academic mobility, and technology transfer. In our opinion, we should also expect a shift in research priorities and areas of research under the influence of new problems that require scientific justification (for example, bioengineering). On the other hand, it provides a broad platform for the development of domestic science in new priority areas through combining efforts with foreign researchers to solve the most pressing scientific problems.

15. Public administration should be based on digital public platforms that allow receiving public services online. Despite declaring the creation of these platforms in the country, today only 2.1 % of the population in cities and 1.5% in villages interact with public authorities through online services [11]. Under the quarantine conditions, most administrative service centers have significantly reduced the number of services provided or suspended the provision at all. There were no passports issued, marriages registered in person, litigation, etc. Making contracts for the supply of electricity, gas and water supply was frozen. These services were provided mostly offline. That is, the existing potential of social, mobile, cloud technologies for the provision of public services has almost not been used so far. Therefore, for a mass transition to e-government systems, it is advisable to adopt the experience of EU countries having used a blockchain system that is able to ensure almost uninterrupted operation of public administration in various critical conditions.

At the same time, some positive aspects should be mentioned. The need to carry ID when going outside during the quarantine period led to having updated the program of the Ministry of Digital Transformation, which legitimizes the digital analogs of the ID-card, passport, other documents through the *Diia* (Gov&Me) application [14]. This, of course, has simplified some identification procedures. The *Dii Vdoma* (Act at Home) program for monitoring self-isolation of citizens has also been introduced.

In addition to revealing the existing shortcomings of the process of introduction of digital technologies in the socio-economic life of the country, other problems that arose during the pandemic and may be solved through their implementation in the digital space have been identified as follows:

- Social protection of the elderly population who needs self-isolation. The current system of re-

gistration of residence of citizens does not reflect the real situation, as internal and external migration is very active, but almost uncontrolled. Therefore, it is very difficult to identify the elderly who really live separately and need social assistance in quarantine. The data available in the social security departments are stored on paper, sometimes outdated, which leads to the need for personal confirmation of the individual who needs assistance through telephone communication. This, in addition to the need to spend a significant amount of time on telephone conversations, is dangerous in terms of personal data protection;

- Exacerbation of unemployment. Today, 8.6 % of Ukraine's population has been officially registered unemployed at the Employment Centers [10]. Temporarily closed enterprises, depending on available resources, either send employees on leave (paid or unpaid), or reduce the number of staff. According to the survey [15], by mid-April 2020, 40 % of citizens remained unemployed. Moreover, at the government level, it is very difficult to monitor or to prevent dismissals, as there is a phenomenon of informal employment among small and medium-sized businesses. That is, there is a problem of hidden unemployment. Available vacancies in the country (couriers, utility crews, etc.) cannot solve this problem, as the proposed positions are associated with physical exertion and low paid. It is also important to realize that citizens who were employed abroad have returned to the country (almost 200,000 people according to unofficial estimates). After self-isolation, they also join the unemployed. Therefore, potentially after the end of quarantine we can expect a sharp rise in the number of registered unemployed. In order to smooth this wave, it is advisable to actively create digital jobs in the priority sectors and to attract employees who have experience working abroad. In this way, it is possible to adapt the world's leading experience to national economic platforms, to avoid a significant increase in unemployment and, as a consequence, to prevent an increasing burden on social security services and the budget;
- Rise in crime both in physical space and in cyberspace. These processes are natural consequences of most of the previous conclusions. Moreover, in our opinion, we should expect a significant increase in cybercrime as a result of the transition of many activities to the network environment. These crimes include: personal data leakage through online communication between citizens and institutions, crimes in the financial online environment, possible cyberattacks on institutions and enterprises, and so on. The Ministry of Digital Transformation has published an online manual *COVID-19. Online Safety Tips for Parents and Guardians*, which contains tips on protecting children online [16]. Actually, all groups of the population need protection. This especially concerns the elderly who have poor skills in the safe use of network services and are therefore vulnerable;
- Aggravation of psychological problems and development of sociopathy as derivatives from long-term restrictions on social contacts and transition to virtual communication. On the other hand, prolonged isolation leads to depressive states, which, along with uncertainty over further employment and other socio-economic prospects, can increase the number of psychological disorders in various manifestations. Thus, according to preliminary estimates of relevant experts, only in the first months of the quarantine restrictions, in Kyiv, the number of those who sought psychologist advice grew by 20 % in connection with suicidal thoughts caused by unemployment, uncertainty over socio-economic prospects, etc. [17]. In order to stop these negative phenomena, it is necessary to form clear algorithms of actions and procedures related to employment prospects, social assistance, etc. and to inform the public about them through social networks and other digital platforms. This will stop the wave of public unrest;

- Increasing dependence of network services on the sustainable power supply, the need for additional costs for purchasing uninterrupted energy sources and increasing the capacity of equipment, as a result of increasing load on the network. This problem needs to be addressed by increasing the reliability and uninterrupted operation of networks at all levels. However, this requires additional financial resources. Therefore, a temporary solution may be the formation of flexible schedules for the provision of network services to ensure the reliability and acceptable bandwidth of networks, servers, and other equipment.

It is also appropriate to identify those areas of business, which are able to rapidly increase financial results under the transition to networked socio-economic life and quarantine restrictions. These areas that may also be a significant source of new jobs for redundant workers from other sectors of the economy include as follows:

- Online trade and courier activities, which for a short period escalated the output not only due to growing demand not only for goods from online stores, but also for doorstep food delivery from restaurants;
- Online educational services that, in our opinion, will be in demand after the end of the quarantine restrictions. These services are able to provide full access to educational services for temporarily or permanently mobility challenged schoolchildren and students. In addition, these services promote academic mobility, the development of inclusive and dual learning, etc.;
- Development of domestic tourism. According to statistics [11], only for the period from 2017 to 2018, the foreign tourism increased by 75.7 % while domestic tourism declined by 4.2 %. This is a result of the introduction of visa-free regime with the EU and entry of affordable airlines to the Ukrainian that provide services, and many other reasons. The closure of borders and other restrictions on movement of tourists, which have already existed and are likely to appear in the near future, against the background of decreasing solvency of citizens, will lead to rising demand for domestic tourism;
- advertising of new digital services. According to the author's survey conducted during the period of remote communication and work, many citizens of different ages have been quite briefly acquainted with modern digital services. This has been confirmed by statistics on the activity and targeting of users of digital services. More active advertising of these services, simultaneously with training, will lead to improvement of digital competences and acceleration of digital transformation of both the economy and society.

These are just the first conclusions about the problems and prospects of the digital economy and society in Ukraine. The pandemic has clearly identified weaknesses in these processes and has made it possible to formulate priority areas for scientific and applied research.

Thus, it should be recognized that Ukraine, like most countries, was not ready for the rapid transition of the economy and society to the digital format of business processes and public relations in the pandemic conditions. The novelty of the above research is the identification of those critical sectors of socio-economic relations that were worst prepared for such developments, as well as the generalization of the most significant social problems that accompany the pandemic and may be solved with the help of existing digital services. In further research, the author's scientific interest is to form a model of business resistance to crisis (separately for small-, medium-, and large-sized enterprises), where the variables are the financial reserves (as a factor that allows temporary suspension of operation), the material resources (as a factor that may be quickly redirected towards other production processes), the labor resources (as a factor that indicates the presence of digital competencies of staff and potential of their development), and the information resources (the availability of modern ICT and software), with the business stability, depending on avai-

lable resources and given existing constraints as a result. The task is to form such an optimal combination of enterprise's resources, which allows the adaptation of the enterprise to the critical conditions of activity (or suspension of operation) with minimal reservation of temporarily idle resources.

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REFERENCES

1. The purposes of a sustainable development 2016—2030. Materials of jamming of 70 sessions of General Assembly of UN. URL: http://www.un.org.ua/ua/tsili-rozvytku-tysiacholittia/tsili-staloho-rozvytku (Last accessed: 20.03.2020).
2. The concept of development of digital economy and society of Ukraine for 2018—2020. URL: http://zakon.rada.gov.ua/laws/show/67-2018-%D1%80 (Last accessed: 16.03.2020).
3. Vatchenko, O., Sharanov, R. (2019). The genesis of the concept of «crisis» in the development of socio-economic systems. *Business Navigator*, 6.1-1, 147—153 [in Ukrainian].
4. Azmuk, N. A. (2020). Digital Employment in the System of Regulation of the National Economy. *Problems of Economy,* 1, 52—58 [in Ukrainian].
5. Kolot, A., Herasymenko, O. (2020). Labor 4.0 concept: theoretical-applicable principles of formation and development. *Economy and forecasting*, 1, 7—37 [in Ukrainian].
6. Chubatyuk, U. Quarantine on the conditions of digital technologies. URL: https://www.everest.ua/ru/analytics/karantyn-na-uslovyyah-czyfrovyh-tehnologyj/ [in Russian]. (Last accessed: 03.08.2020).
7. Kolomiyec, H. M., Hlushach, Yu. S. (2017). The digital economy: controversity of content and impact on economic development. *Business Inform*, 7, 137—143 [in Ukrainian].
8. Vishnevsky, V. P., Kniaziev, S. I. (2018). How to increase the readiness of ukraine's industry to smart transformations. *Science and Innovation*, 14(4), 55—69 [in Ukrainian].
9. Gudz, O. Ye. (2019). Organizational and informational support for enterprise development management in the context of the development of the digital economy. *Economy. Management. Business*, 4(30), 4—13 [in Ukrainian].
10. The Official site of the state committee of statistics of Ukraine. URL: http://www.ukrstat.gov.ua. (Last accessed: 15.04.2020).
11. *Statistical year-book of Ukraine for 2018*. (2019). Zhitomir: LLC «BUK-DRUK», 2019. 482 p.
12. The formula of New Ukrainian School. URL: https://nus.org.ua/about/formula/ (Last accessed: 22.04.2020).
13. Ukraine on communication despite of distance: mobile operators of Ukraine have joined the program «Zahist». URL: https://mfa.gov.ua/news/ukrayina-na-zvyazku-popri-vidstan-mobilni-operatori-ukrayini-doluchilis-do-programi-zahist (Last accessed: 17.04.2020).
14. The ministry of digital transformations. Program «Diia». URL: https://plan2.diia.gov.ua/ (Last accessed: 18.04.2020).
15. Portal of news «Strana. UA». URL: http://www.Strana.ua (Last accessed: 15.04.2020).
16. Protection of children during quarantine. URL: https://thedigital.gov.ua/news/zakhist-ditey-onlayn-pid-chas-karantinu-mintsifra-prezentuvala-instruktsiyu-z-poradami-dlya-batkiv (Last accessed: 17.04.2020).
17. Khoroschak, K. Interview to the vice-president of the Kiev city state administration M. Chondra. URL: http://life.pravda.com.ua (Last accessed: 21.04.2020).

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ЦИФРОВИЙ РОЗВИТОК ЕКОНОМІКИ ТА СУСПІЛЬСТВА ПІД ВПЛИВОМ ПАНДЕМІЇ COVID-19

Вступ. Сучасні тренди розвитку соціально-економічних процесів спрямовано на побудову цифрової економіки та суспільства, але розповсюдження COVID-19 викрило основні проблеми цих процесів.

Проблематика. Пандемія визначила нову науково-прикладну проблему щодо необхідності дослідження кризових явищ, які знаходяться на перетині низки наукових напрямів, а також їхніх наслідків для економіки та суспільства.

Мета. Аналіз стану розвитку та впровадження цифрових сервісів в країні під впливом карантинних обмежень.

Матеріали й методи. Інформаційною базою обрано державні законодавчі акти та статистичну інформацію. Застосовано низку методів наукового пізнання: теоретичне узагальнення, емпіричний аналіз, порівняння, абстрагування тощо.

Результати. Встановлено, що більшість пріоритетних напрямків розвитку цифрової економіки перебувають в стадії формування та не готові до масового переходу до їх використання. Зокрема, досі присутня суттєва нерівність доступу до цифрових сервісів, неврегульовано систему навчання цифровим компетенціям, майже нерозвинутою є система формування цифрових робочих місць, існують прогалини у цифрових сервісах громадської безпеки, невирішеним є питання загальнонаціональних освітніх платформ, не сформовано систему надання дистанційних медичних послуг, неврегульовано процедуру урахування туристичної міграції, надання дистанційних фінансових послуг тощо.

Окреслено низку проблем, які загострилися під час пандемії: недосконаліть соціального захисту, наявність прихованого безробіття, активізація кіберзлочинності, збільшення психологічних проблем особистості, надвисокий рівень залежності від надійності роботи мережевих сервісів. Визначено напрямки збільшення фінансових результатів в умовах пандемії.

Висновки. Пандемія означила слабкі місця у процесах формування цифрової економіки та суспільства і дозволила сформулювати напрямки наукових досліджень та практичних дії задля швидкої адаптації до нових умов.

Ключові слова: цифрова економіка, проблеми, пандемія, розвиток.