MATHEMATICAL METHODS, MODELS AND INFORMATION TECHNOLOGIES IN ECONOMY

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THE INFLUENCE OF INFORMATION TECHNOLOGIES ON THE SOCIO-ECONOMIC DEVELOPMENT OF TERRITORIAL COMMUNITIES

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Introduction. The intensive development of information and communication technologies (hereinafter ICT), which cover wide areas of human activity, prompts the creation of a global information space, which aims society at the integration processes of socio-economic relations. At this stage, an important task is to define the information economy, as a type of new economy that was formed as a result of the development of scientific and technological progress. The new world economy is leveling state borders while simultaneously increasing the competition of national economic and technical potentials. Modern economic and technical systems contribute to the rapid exchange of economic information, accelerate the movement of capital, contribute to the optimization of macroeconomic policy at various levels, etc. Modern information technologies create new systems of administrative regulation.

One of the main tools for regulating social and economic development is information provision. In the era of technological development, it can be argued that almost all spheres of human existence are based on informational nature. It is information that is a tool for the emergence of new ideas, new tasks, and a new scientific discovery. As a result, there is a dynamic increase in the rate of development of information technologies. Today, the development of ICT plays a significant role in the international arena, and the greater the progress, the more economically successful the country is. That is why the digitalization process in Ukraine can be considered one of the powerful steps towards the economic stability of the country. However, the impact of information and communication technologies on the socio-economic development of territorial communities and the business environment remains an open question.

Overview of the latest sources of research and publications. The study of the issue of the introduction of information space in all spheres of human existence, including the sector of the national economy, opened the door to significant changes in scientific research, both in domestic and foreign works. Approaches to economic stability through the prism of technological progress opened a new vision of economic research. Thus, in his scientific works, S.A. Popov and G.O. Panchenko considered the implementation of innovations in the system of public administration [1].

Research on the formation of a new paradigm of social management was given to the world by scientists M.M. Izha, P.M. Petrovskyi [2–3], V.I. Tymtsunyk, S.G. Seryogina, T.M. Lozytska, Yu.G. Kalnysh [4].

The field of research on the necessity of using modern information technologies for public administration and socio-economic stability was reflected in his writings by A.V. Lipinska, T.V. Town hall [5–6].

Thus, among domestic scientists who made a significant contribution to the development of information support, the creation of a scientific and information base and influenced innovative development, we can identify V. Parkhomenka, B. Kiyaka, G. Kalytych, V. Glushkova, V. Ivashova, A. Kolodyuk, S. Lazareva, A. Tkachova, Yu. Lutsyk, B. Malytskyi, L. Melnyk, O. Popovych, O. Chubukova .

In their monographs, Ukrainian scientists Yu. Sharov, V. Tymoshchuk, I. Koliushko, V. Mamonova, V. Dolechek, O. Molodtsov, V. Averyanov, G. Atamanchuk studied the problems of providing administrative services on the road of information and telecommunication technologies. V. Bakumenko, T. Bezverhnyuk, N. Vasylieva, D. Dzvinchuk, S. Zharaya, A. Lipentsev, I. Lopushynskyi, N. Nyzhnyk, O. Polyak, G. Pisarenko, O. Radchenko [8-9].

Among the foreign researchers, it is worth mentioning Yu. Shrader, O. Bury Shmaryan, Yu. Arskyi, H. Vorobyov, M. McLuen, R. Gilyarevskyi, N. Viner, V. Inozemtsev, P. Otle, N. Hales, A. Chornoy, and others

But most of their scientific works are focused on ensuring the activities of organizational and legal services through information support. The issues of socio-economic efficiency in the development of territorial units, how much the information space formed today has an impact on the interaction of the three main economic aspects of the country: the state, the community and business, are left out of consideration.

Setting objectives. The purpose of the work is to study the role of ICT at the microeconomic level and to determine the tools of the influence of IT technologies on the socio-economic development of the country, as well as to analyze the world rating system of the country's leading economies according to the ICT indicator (IDI: ICT Development Index).

Basic material and results. New economic business environments are definitely emerging on the basis of ICT. The emergence of a new segment of the "electronic commerce" market, which is actively popularized in the world market, contributes to the creation of new trading platforms, the acceleration of trade operations and the expansion of the sales market aimed at meeting the needs of consumers.

Information and communication infrastructure serves to increase the efficiency of the country's financialization. Global instantaneous settlement systems (SWIFT, TARGET), electronic settlements, the functioning of exchange systems, electronic banking systems are the foundation of an effective economic system of financing the country.

Information technology is also the driving force behind the creation of effective business platforms. The automated management system serves to automate business processes, implement an electronic document management system (CRM), increase labor productivity, and provide rapid comprehensive analysis, forecasting, and identification of business risks.

Thus, the introduction of digital technologies and systems into socio-economic processes is the driving force behind the development of effective economic policy in many countries of the world. To date, the development of ICT is considered in the state as one of the national priorities. According to the data of the World Economic Forum, we will consider the ratings related to ICT and analyze the place of Ukraine in them [10].

The Global Competitiveness Index (hereinafter referred to as the Global Competitiveness Index) is calculated according to the methodology of the World Economic Forum (hereinafter WEF) based on a combination of publicly available statistical data and the results of a global survey [11].

Rank	Economy	Score[1]	Diff. from 2018[2] Rank	Diff. from 2018[2] Score
1	Singapore	84.8	+1	+1.3
2	United States	83.7	–1	-2.0
3	Hong Kong SAR	83.1	+4	+0.9
4	Netherlands	82.4	+2	—
5	Switzerland	82.3	–1	–0.3
85	Ukraine	57.0	–2	—

Fig. 1. Global competitiveness index rating according to WEF [11]

IGC consists of 113 variables, which as a result form 12 control indicators: quality of institutions; infrastructure; macroeconomic stability; health and primary education; higher education and professional training; efficiency in the market of goods and services; efficiency in the labor market; development of the

financial market; level of technological development; the size of the domestic market; competitiveness of companies; innovative potential. According to the competitiveness rating, Ukraine ranks 85th out of 141 countries in the world. The strategy of sustainable development "Ukraine – 2020" includes reforms and programs with the implementation of which Ukraine can enter the top 40 countries in the world.

The Networked Readiness Index is a comprehensive indicator that characterizes the level of development of information and communication technologies (ICT) and the network economy in the countries of the world (calculated according to the WEF methodology). The authors of the project proceed from the position according to which there is a close connection between ICT development and economic well-being. The index is aimed at measuring the development of ICT according to 62 criteria, which are grouped into four basic groups: technologies; people; management; influence (Fig. 2).

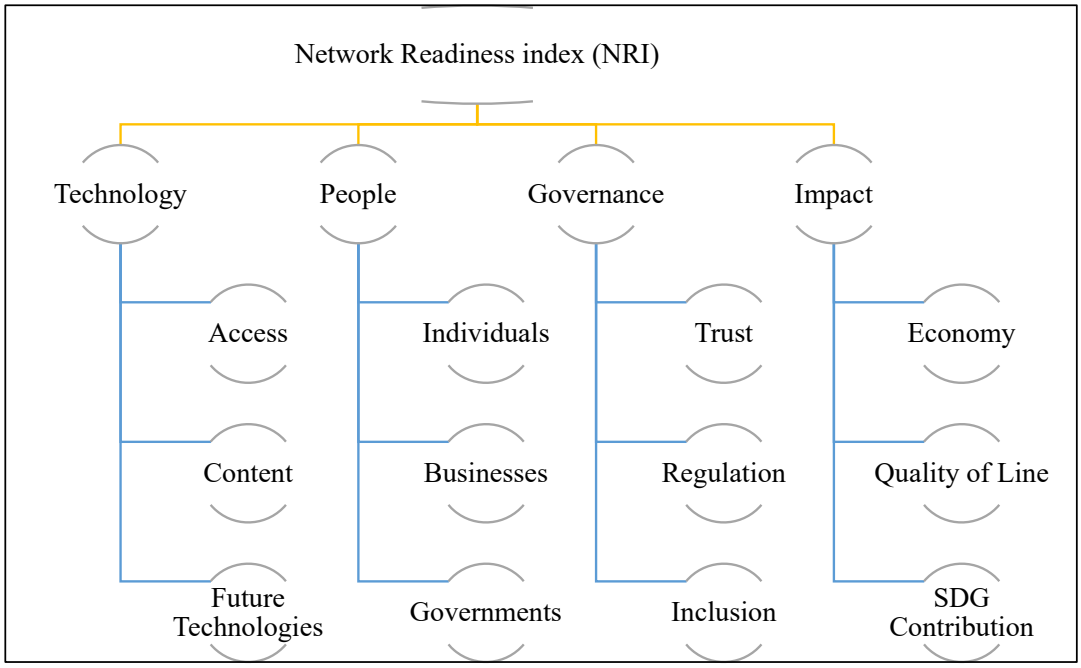

Fig. 2. WEF 2020 network readiness index model [12]

According to the index of network readiness in 2020, Ukraine ranks 64th out of 134 countries in the world (in 2015 it was 71st out of 143 countries, in 2014 it was 81st out of 148 countries), which is currently a low indicator and does not compete with leading countries of the world (1st place – Sweden, 2nd – Denmark, 3rd – Singapore).

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In Ukraine for 2020–2021, the topic of digitalization, or digitization of the provision of administrative services to the population, is actively developing. One of the main priorities of the Ukrainian Government is the provision of "electronic services". As a result, on the basis of state e-services projects, many platforms for interaction between the state and society have become obsolete. On the basis of IT technologies, internal and external communications are simplified, new markets for the provision of remote services are created. For example, the medical reform in Ukraine was founded on the basis of ICT, which operates on the foundation of the information system "HELSI", which is a very relevant platform during the pandemic. Distance education, new fields of science, and new areas of scientific research are being created in the scientific and pedagogical sphere in modern conditions. In addition, it is worth noting the Ukrainian e-service of public services "Diya", developed by the Ministry of Digital Transformation of Ukraine. On the official website of the Cabinet of

Ministers of Ukraine, the e-service service works 24 hours a day, which provides an opportunity for a legal entity or a citizen to receive administrative services, such as the registration of documents, social assistance or license registration, etc.

Researchers point to the "e-service" platform as a tool for public information needs. It is worth noting that Ukraine has taken a significant step forward in the direction of digitalization, because the world community has long been using the "e-platform" method in public administration (Fig. 3) [14–15].

In November 2020, the Verkhovna Rada of Ukraine adopted a bill on the creation of a state electronic portal with the name "Action", while in the context of the bill "online services" as a definition does not appear. However, it is worth noting that in the online service itself, the concept of online service is identified with the concept of "electronic service". It follows from this that an online service is nothing but the implementation of certain actions on the Internet in real time [13].

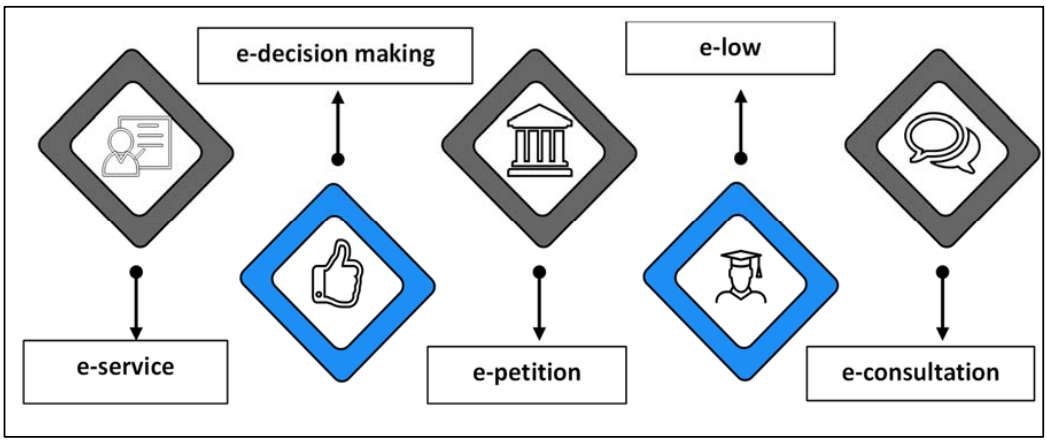

Fig. 3. Popular worldwide electronic platforms of public administration [16]

In direct democracy, as a rule, citizen participation is limited to voting. The "e-decision-making" service allows society to take an active part in discussing state projects, discussing the needs of territorial communities, and making proposals.

E-normation is a mechanism that allows the public to influence the process of adoption of normative and legal aspects. This mechanism makes it possible to convey to citizens the process of norm formation and reflect the transparency of legal decision-making.

Models of information democracy widely use the powerful innovative tool "e-consultation" for interaction between the state and society. Remote meetings, conferences, forums, public hearings, etc. are held on the basis of the electronic service.

A powerful tool of state regulation is the "e-petition" system, which regulates legislative and legal aspects of state regulation based on public opinion. On the basis of this form of communication between society and the state, collective demands on the government are created.

The mechanism for providing public services is the e-service platform, which enables the creation of electronic documents, the provision of public services (electronic queues, the creation of remote electronic documents), digital education, the provision of public consultations, etc.

According to the results of the research of the electronic research center, 30% of state administrations provide administrative services online. However, due to the rather low level of technical support, the quality of the provided services is not high. It is also worth noting the low readiness of local self-government bodies to provide electronic services to citizens. The main reason for these problems can be considered the low level of electronic document circulation in the country. Only 32% of city councils are provided with archival electronic documents, all others use paper media. This situation holds back the provision of electronic services to local self-government bodies. Certain problems are also present in the information protection system in the electronic document management system. It is also important to note not only the software problems of inhibiting digitization in the country,

An important component of organizing the mechanisms of public administration is ensuring the interaction of the state and society in solving organizational issues, however, according to a social survey among visitors

to the administrative services center, only 80% of the population use a computer at home. It follows that 20% of citizens do not participate in public administration, which is another problem before building a digital country. In international practice, this problem is solved with the help of public online kiosks providing administrative services, such online services provide the maximum permissible awareness for different population groups.

Also, one of the most important problems is the low level of public trust in authorities. The tool for solving this problem is the development of electronic services that are more accessible and convenient for citizens not only at the state level, but also at the level of local authorities, especially during the pandemic, when this platform for providing electronic services is in demand [17].

Therefore, for the effective provision of electronic digital services at the level of OTG, it is necessary to:

– provision of basic services, awareness of the population of the community, by providing the OTG with an official web page with up-to-date information and a list of all administrative services provided;

– with the help of relevant web pages, provide the possibility of electronic document circulation, creation of electronic statements;

– Implementation of remote consultations, electronic queue.

In addition, it is necessary to ensure the level of qualification of employees providing administrative services. If the tasks are fulfilled, the level of providing online services to citizens will increase, as a result of which the level of citizens' awareness will also increase.

Conclusions and prospects for the further research. Therefore, in modern conditions, information and communication technologies play a key role in all spheres of human activity. IT technologies were actively integrated into the economy, building a new post-industrial economic idea, which, based on ICT, is transformed into a global economic system with common standards and principles of the world economy. Therefore, today all economic processes that do not include information systems can be unproductive. This is evidenced by the fact that the leading countries of the world have a high level of the index of network and technological readiness.

Solving problems related to the provision of administrative services in electronic form should be based on a comprehensive approach, which will include a wide range of measures, namely:

– improvement of the current legislation, including establishing the equivalence of the legal force of the results of the provision of administrative services in electronic form and in written form on paper media in a single legislative act on the regulation of administrative procedures both at the state level and at the community level;

– formation of mechanisms for effective interaction and integration of information systems of state authorities and local self-government bodies on the basis of the Unified state web portal for the provision of administrative services;

– widely informing consumers of administrative services about the possibility of receiving them in electronic form and developing measures to encourage receiving services in electronic form;

– development of effective mechanisms for electronic identification and authentication of users of administrative services in electronic form for the purpose of safe use of electronic services for the provision of administrative services;

– creation of legal and organizational prerequisites for the provision of cross-border administrative services by public administration bodies;

– paying sufficient attention to special training and retraining of civil servants and other persons who provide administrative services on the basis of the law. Summing up, we can emphasize that the introduction of online services in Ukraine is in demand, but has a number of problematic issues, which we systematized above. The government is taking constructive steps to solve them, but there is still work to be done.

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Oleksandr Kudinov, PhD student, National University «Yuri Kondratyuk Poltava Polytechnic». **The impact of information technologies on the socio-economic development of territorial communities.**

Information and communication technology development (hereinafter – ICT), which has a global trend of development, is being actively transformed into the world's global economy. The leading countries of the world began to actively use ICT in the managerial, financial and socio-economic spheres of life of the population at the macroeconomic and microeconomic levels. And in Ukraine, with the beginning of major reforms, one of the priority directions is digitization (digital transformation of society and economy). The decentralization reform, which is actively developing, requires new approaches to the formation of regional economic policy. Already at the first stages of this reform in Ukraine, they began to actively use digital technologies to work with the population. However, the place and role of Ukraine in the world rankings in ICT development is currently below average. That is why the topic is quite relevant for the scientific community because it is worth identifying the weak and strong sides of the state in the digital socio-economic sphere and identifying the most favorable ways to improve the development of Ukraine in the field of IT economy.

The scientific article examines the influence of information and communication technologies on the socio-economic development of the state. Defining the role of united territorial communities in the digital economy. The directions of the digital transformation of the management system of the development of territorial communities are considered. The place and role of Ukraine in the world rankings in the rating of ICT development in the field of regional management is determined, and the first steps of the state towards the digital transformation of society and the economy.

Key words: information and communication technologies, decentralization, reform, community, socio-economic development.

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Кудінов Олександр Миколайович, аспірант, Національний університет «Полтавська політехніка імені Юрія Кондратюка». **Вплив інформаційних технологій на соціально-економічний розвиток територіальних громад.**

Інформаційно-комунікаційний розвиток технологій (далі – ІТК), що має світову тенденцію розвитку актовано трансформується в світову глобальну економіку. Провідні країни світу почали активно використовувати ІКТ в управлінській, фінансовій та соціально-економічній сфері життєдіяльності населення на макроекономічному та мікроекономічному рівні. Так і в Україні з початком великих реформ одним із пріоритетним напрямком є діджиталізація (цифрової трансформації суспільства та економіки). Реформа децентралізації, що активно розвивається в потребує нових підходів щодо формування регіональної економічної політики. Вже на перших етапах даної реформи в Україні почали активно використовувати цифрові технології для роботи з населенням. Однак місце і роль України в світових рейтингах в розвитку ІКТ на сьогодні є нижче середнім. Саме тому тема є досить актуальною для наукової спільноти оскільки варто виявити слабкі і сильні сторони держави в цифровій соціально-економічній сфері та виявлення найсприятливіших шляхів удосконалення розвитку України в сфері ІТ-економіки.

В науковій статті досліджено вплив інформаційно-комунікаційних технологій на соціально-економічний розвиток держави. Визначення ролі об'єднаних територіальних громад в цифровій економіці. Розглянуто напрями цифрової трансформації системи управління розвитку територіальних громад. Визначено місце і роль України у світових рейтингах в рейтингу розвитку ІТК в сфері регіонального управління та зазначено перші кроки держави до цифрової трансформації економіки.

Ключові слова: інформаційно-комунікаційні технології, децентралізація реформа, громада, соціально-економічний розвиток.