UKRAINE IN THE CONTEXT OF GLOBAL AND NATIONAL MODERN SERVISATION PROCESSES AND DIGITAL ECONOMY

Monograph

Edited by

Liubov Kvasniy
Precarpathian Institute named of M. Hrushevsky of Interregional Academy of Personnel Management (Ukraine)

Irina Tatomyr
Drohobych State Pedagogical University after Ivan Franko (Ukraine)

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Iryna Farynovych Senior Lecturer, Department of Finance, Accounting and Analysis, Institute of Entrepreneurship and Advanced Technologies, Lviv Polytechnic National University (Ukraine)

Editors:

Liubov Kvasniy Ph.D in Economics, Associate Professor

Irina Tatomyr PhD in Economics, Associate Professor

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Liubov Kvasniy
Ph.D. in Economics, Associate Professor, Professor of Economics and Management, Ivan Franko Drohobych State Pedagogical University;
Associate Professor of Economics and Entrepreneurship, Precarpathian Institute named of M. Hrushevsky of Interregional Academy of Personnel Management,
E-mail: lg_k@ukr.net
ORCID ID 0000-0001-5248-544X

Yurii Shulzhik
Ph.D., Associate Professor of Management, Precarpathian Institute named of M. Hrushevsky of Interregional Academy of Personnel Management,
E-mail: pimaup_doktorant@ukr.net
ORCID ID 0000-0003-1699-054X

Vasylyna Fedyshyn
Ph.D. in Economics, Associate Professor of Management, Precarpathian Institute named of M. Hrushevsky of Interregional Academy of Personnel Management,
E-mail: vasylyna230193@gmail.com
ORCID ID 0000-0001-7649-6573

Introduction. The tourism business is becoming one of the most profitable components of a market economy every year. In a competitive environment increases the role of ensuring effective functioning and development of tourist enterprises. The tourism industry in the whole world shows positive dynamics of development. However, the issues of ensuring the appropriate level of economic security of domestic enterprises need to be improved on the basis of the implementation of the world experience of the world's leading countries in the field of tourism. The main problems in the development and functioning of tourist enterprises are identified. It is established that the provision of effective management of economic security in tourism enterprises of the world is carried out at different levels, including: tourism enterprises; administration of tourist centers; hotels; local authorities; national tourism authorities and central authorities; international organizations and intergovernmental bodies. Peculiarities of economic security management of tourist enterprises abroad are studied.

Literature review. The world experience of economically developed countries shows that tourism is one of the most profitable components of a modern market economy. Problems related to the management of economic security in tourism are covered in the works of famous experts: Kozachenko G.V., Lyashenko O.M., Oleksyuk O.I., Savina G.G., Tkach V.O., Tsokhly S.Y., Shulgina L.M. However, despite the depth of modern economic developments on theoretical and methodological provisions, methods for assessing the level of economic security of tourism enterprises, issues of ensuring and managing the economic security of tourism enterprises remain insufficiently covered, which determines the relevance of the study.

Results. Under the economic security of the enterprise is understood as a comprehensive system of protection of its economic interests from internal and external threats, created and regulated by a set of measures aimed at maintaining sustainable operation. [1] In the management of economic security of tourism enterprises can be identified the following problems that hinder their development:
- lack of an extensive system of information and advertising support of the industry and tourist offices abroad;

- lack of civilized conditions for crossing the border and unfavorable visa regime for foreign tourists;

- tax legislation that does not promote investment in tourism infrastructure and sanatorium complex;

- interdepartmental subordination of tourism and sanatorium complex;

- shortcomings in the system of regional management of tourist enterprises;

- the problem of the shadow economy;

- the need to transfer part of the powers to local governments.

Thus, economic security in tourism enterprises depends on many factors that must be taken into account when planning tourism services. The system of measures for the management of economic security of tourists includes: prevention of risks for tourists associated with natural and man-made disasters in tourist centers; prevention of epidemiological, bacteriological and other medical risks and compliance with appropriate formalities; organization of safety of tourists on transport; travel insurance of tourists, as well as liability insurance of tourist organizations; creation of services and security systems. In terms of service, it is important to fully inform tourists about possible risks, rules for their prevention, as well as guarantees of their safety. Management of economic security of tourist enterprises provides a range of measures under the national legislation of each country, ensuring the safety of movement of tourists through the territory of the state, their stay, preservation of their health, life and property.

Foreign experience in the development of tourism security measures is studied and summarized by the WTO. Travel safety was declared in the Charter of Tourism. As stated in the Hague Declaration on Tourism, «in order to function and develop properly, tourism needs security for travelers and vacationers, both national and international, and for their personal property. This can be achieved by:
- development and implementation of safety standards for travel and tourist trips;

- informing and raising public awareness;

- creation of institutional bases for solving problems related to the safety of tourists, and, in particular, in extreme situations;

- international cooperation at the bilateral, regional, subregional, interregional and global levels».

In 1994, the WTO Executive Council established a Committee on the Quality of Tourism Services, which is responsible for tourism security. In the same year, the WTO conducted a survey of 73 countries on "Security and protection of travelers, tourists, tourist sites." A number of countries follow the practice of issuing recommendations for visiting certain countries and regions of the world. Thus, the US Department of State regularly publishes a list of countries to which travel is not recommended, and in some cases even prohibited. The safety of tourists, their well-being, as well as the maintenance of high quality service in tourist destinations cannot be considered in isolation from other public or national interests of the host country and the environment as a whole. In the development and implementation of safety standards for tourism and tourist protection, the interests of those who visit and receive must be mutually harmonized.

Tourist safety and protection in the field of tourism are associated with a large number of rules and regulations that must be complied with not only by the tourism administration, but also by a number of other administrative bodies working in various economic and social sectors (finance, health, safety environment, territorial development, energy, employment, etc.), and especially in private. [3]

Thus, the issue of economic security management in tourism enterprises should be considered in the following areas:

- personal security of tourists and their property, ensuring which is the most important task of national tourism development and international cooperation;

- safety of the environment in places of mass stay of tourists, safety of tourist objects;

- security of national interests of host states.

The safety of tourism enterprises in all these areas is the most important concern and priority of all structures involved in tourism. Ensuring effective management of economic security in tourism enterprises of the world is carried out at various levels, including: tourism enterprises; administration of tourist centers; hotels; local authorities; national tourism authorities and central authorities; international organizations and intergovernmental bodies. Each of these levels must contribute to ensuring the safety of tourism. [4]

The coronavirus (COVID-19) pandemic has triggered an unprecedented crisis in the tourism economy, given the immediate and immense shock to the sector. Revised OECD estimates on the COVID-19 impact point to 60% decline in international tourism in 2020. This could rise to 80% if recovery is delayed until December. International tourism within specific geographic-regions (e.g. in the European Union) is expected to rebound first.

Domestic tourism, which accounts for around 75% of the tourism economy in OECD countries, is expected to recover more quickly. It offers the main chance for driving recovery, particularly in countries, regions and cities where the sector supports many jobs and businesses [5].

To analyze the process of formation of tourist cluster in the study area proposed scoring method is a set of attributes that allows to use not only qualitative analysis but also quantitative. Each group includes a primary and secondary symptoms. According to the complex of primary characteristics of regional tourist cluster is defined as objectively existing education. Secondary signs indicate the maturity of the cluster (table 1).

Table 1

Signs of formation tourist cluster

Category features	Primary signs	Secondary signs
Geographical	1.The location and concentration of tourist enterprises on a relatively small area, has natural, cultural, historical, and others resources. 2. Intra tourist division of labor.	1. Provide a meaningful impact of regional tourist economy on the socio-economic structure of the region, promote regional development. 2. The development of related industries, to ensure the functioning of tourist activity.
Economic	1. The increase in the share of tourism in the structure of paid services. 2. Activation of internal and external communications.	1. Consolidation of the tourist sector leaders. 2. Formation of a favorable business environment and innovative, attractive for partnership. 3. Development of new tourist products, routes; 4. Understanding the individual competitiveness of cluster members in the competitiveness of the entire cluster. 5. A significant increase in the share of tourism in GRP.
Social	1. Increase in the number employed in the service of tourism. 2. Formation of the tourist market of labor resources. 3. Creation of universities, research institutions, the opening of specialized departments engaged in the study, the service sector and tourism, training specialists in this direction	1. Preparation of choice varied holiday among the local population (development of specialized types of tourism).
Institutional	1. The development of tourism infrastructure (cycle paths, marinas, airports, etc.)	1. The development of engineering, social and environmental infrastructure.

There are certain health rules to avoid dangerous infectious diseases on the road. These rules must be issued in the form of an information leaflet to customers before the trip. In addition to organizational measures, the tourist enterprise is obliged to inform tourists about possible dangers in a country and about the procedure in case of threat to their safety or damage to their property. When choosing vehicles, the travel company must ensure the safety of transportation of tourists, providing technically sound transport, qualified drivers, and in case of movement of the convoy to ensure its escort by traffic police.

When organizing group tours, the group is often accompanied by a representative of the tourist enterprise. Its tasks are mainly to ensure the completeness of the program. However, the presence of an accompanying or representative of the tourist enterprise in the group should be considered as compliance with safety requirements. The administration of tourist centers is obliged to ensure the safety of tourists and vacationers in these centers. Safety measures should be provided in the event of fire, natural disasters, mass diseases and be sufficient to prevent or minimize the consequences of such hazards, up to the emergency evacuation of tourists. Tourist centers must have a system of internal security that prevents encroachment on the life, health and property of tourists. In addition, the administration of tourist centers must inform tourists about the procedure for their actions in case of danger.

The activities of local authorities are also aimed at ensuring the proper safety of tourists in the region. In most cases, except in special cases, security measures taken at the level of local authorities are to coordinate the activities of the relevant services (police, medical care, fire service, etc.). Relevant tourism organizations in these regions also take part in measures to ensure the proper safety of tourists, informing tourists and assisting them in settling the damage caused by encroachment on their lives, health or property. The world experience in the development of tourism security measures is studied and summarized by the WTO. Travel safety was declared in the Charter of Tourism. As stated in the Hague Declaration on Tourism, «in order to function and develop properly, tourism needs security for travelers and vacationers, both national and international, and for their personal property. This can be achieved by:

• development and implementation of safety standards for travel and tourist stays;

• informing and educating the public;

• creation of an institutional framework for solving problems related to the safety of tourists, and, in particular, in extreme situations;

• international cooperation at bilateral, regional, subregional, interregional and global levels».

In 1994, the WTO Executive Board established a Committee on the Quality of Tourist Services, which is responsible for travel safety. In the same year, the WTO conducted a study of 73 countries on «Security and protection of travelers, tourists, tourist sites». At the initiative of the WTO, the 1st International Conference on Tourism Safety and Travel Risk Reduction was held in the summer of 1995 in Osterund, Sweden. The findings of the study show that in 71% of countries, objects and attractions visited by tourists are provided with protection by special tourist police or security services. International practice shows that a number of countries issue appropriate recommendations for visiting certain countries and regions of the world. Thus, the US Department of State regularly publishes a list of countries in which travel is not recommended, and in some cases prohibited. In 1996, the German Foreign Ministry published a list of 80 countries where German tourists are not recommended to travel, and banned travel to Afghanistan, Angola, Burundi, Zaire, Libya, Rwanda, Somalia and Sudan.

For a number of specialized tours, especially in active tourism, the tourist enterprise is obliged to provide proper control over the health of tourists. Such tours include mountaineering, mountain river descents, extreme tourism, hiking, etc. When organizing trips to countries where there is a risk of epidemic diseases, the tourist enterprise must follow the established procedure for vaccination (vaccinations) with the issuance of appropriate medical certificates. The World Health Organization (WHO) has developed a «Vaccination Certificate Requirement for Travel Abroad», which is a practical guide for tourism businesses and tourists themselves. The WHO also publishes an «Epidemiological Yearbook» and recommendations to reduce the spread of dangerous infections, including through tourism. Among the quarantine diseases of international importance are: plague, smallpox, cholera, yellow fever. There are certain health rules to avoid dangerous infectious diseases when traveling. These rules must be issued in the form of an information sheet to customers before the trip.

The foundations of international legal regulation of the system of tourism and international travel are laid in a number of international treaties, acts, conventions and declarations of international organizations, which are the main tools for regulating international tourism. International acts that directly regulate tourism include:

- General Resolution on the Development of Tourism, adopted in 1963 at the UN Conference on International Tourism and Travel (Rome);

- Manila Declaration on World Tourism, adopted in 1980 by the World Conference on Tourism (Philippines);

- Acapulco documents adopted in 1982 at the World Tourism Conference at the WTO (Mexico);

- Charter of Tourism and its integral part Tourist Code, adopted in 1985 at the session of the WTO General Assembly (Sofia);

- The Hague Declaration on Tourism, adopted in 1989 at an international conference on tourism held by the WTO and the Inter-Parliamentary Union, is a development of the «Charter of Tourism»;

- Resolution of the International Conference on Travel and Tourism Statistics, adopted in 1991 by the WTO and the Government of Canada.

The main activities for the coordination and regulation of tourism are conferences, assemblies, meetings, forums, congresses, seminars held by international organizations. One of the important international legal forms of regulation and coordination of the activities of states to manage the economic security of tourism enterprises are the UN Conference on Tourism, UNWTO conferences, forums of international tourism organizations. The global economy is also characterized by the creation of international organizational governance structures. This also applies to the field of international tourism. The constant expansion and development of international tourism exchange has necessitated its international legal regulation: the development of various legal institutions and the creation of specialized tourism organizations.

Tourist organizations are classified according to the following characteristics:

- national-territorial (international, regional and national tourism organizations; (their activities are global, regional and national);

-social-state (governmental, public, private); (type of activity (regulators, suppliers, market agents, developers, consultants, design organizations, training organizations, publishers, professional associations, trade and consumer organizations); - by field of activity (transport, aviation, bus, railway, automobile and cruise), travel agents, tour operators, local unions).

M. Boyko considers four models of economic security management of tourist enterprises [2, p.223-226]. The first (market) model assumes the absence of a central state tourism administration, a public administration body at the central government level. All issues related to the development of tourism and economic security of tourism enterprises are resolved at the regional level or independently by business entities on the basis of operational regulation and the principles of a market economy.

The main condition for the possibility of using this model is that the country should be attractive to foreign tourists in all respects and not need special advertising of the national tourist product on the world market. A similar model of managing the economic security of tourism enterprises was formed in the United

States, where in order to save budget funds in 1997, the state structure of the U.S. was liquidated. Travel and Tourism Administration (USTTA), which was responsible for the development and safety of tourism in the country. This step was due to the fact that the United States holds a strong position in the international tourism market, and strong private companies are capable of independent advertising in the interests of the entire national tourism market.

Instead of USTTA in the USA there is an Advisory Council on Tourism and Travel (USTTAB) – a very influential body, which includes well-known representatives of the tourism industry. However, the adoption of the first model is possible only in cases where tourism is not needed by the national economy at all or when the subjects of the tourism market are so strong and conscious that they are able to solve all their problems without the participation of the state. This approach is effective in countries with developed market economies, where private travel companies of various sizes and specializations predominate.

The second model of economic security management of tourism enterprises provides for the existence of a special, powerful, authoritative and independent state central body - the ministry, which deals with the development and control of all enterprises of the tourism industry in the country. The ministry has significant powers in the areas of investment, marketing research, training, advertising, and more. Specialized bodies deal almost exclusively with the functioning of the tourism industry. This model of managing the tourism industry is common in many developing countries, countries with economies in transition, for which tourism is one of the main sources of foreign exchange earnings, as well as some highly developed countries that intend to maintain a proper tourism image. In these countries, the economic security of tourism enterprises is important in public tourism policy.

Its implementation requires appropriate conditions, namely: significant financial investments in the tourism industry to create and maintain a national tourism product and tourism infrastructure, providing state support for small and medium-sized tourism businesses, creating a system of tourist security and more.

The third (European) model prevails in developed European countries. It stipulates that the development of tourism and ensuring a high level of economic security of tourism enterprises at the level of the relevant sectoral unit (centralized structure, government agency), which operates within multifunctional ministries (usually economic) or directly subordinate to the government, but has a relatively independent administrative body.

In different countries of the world, specialized sectoral units (governmental or semi-governmental) are called differently, but in fact they are all National Tourism Administrations (NTA), which are responsible for the formation of state tourism policy. Characteristic features of this type of tourism development are: coordination of the interests of the state, local authorities and private business; mutually beneficial forms of cooperation between the governing bodies of the macroeconomic and mesoeconomic levels; in the countries there are many other

organizations dealing with tourism development (are in the administrative order of the above structures or operate autonomously). This scheme of work proved to be quite productive for attracting financial resources from the private sector to address pressing issues of national economy [8, p.146].

The fourth (combined) model of development of tourist enterprises and management of their economic security provides for the creation of a combined ministry, but, in addition to tourism, covers other, related or complementary areas of socio-economic policy.

According to the World Tourism Organization, in more than 80 countries, tourism is mainly within the competence of ministries and departments of the economic bloc (Ministry of Economy, Trade, Transport, Industry, Finance), the rest - to the ministries and departments of the social bloc (Ministry of Culture, Environment, Education, information, archeology [3, p.21].

For countries that adhere to this type of state regulation and management of economic security of tourism enterprises, is characterized by the definition of tourism as a priority area of economic development, which is achieved through a clear division of powers between central and regional administrations. The main objectives of the state tourism policy of such joint ministries are to ensure balance in the development of tourism and other sectors of the economy, as well as security of promotion of the national tourism product abroad.

This model combines the second and third models of tourism development. It has found wide application in those countries that intend to position themselves as receptive tourist markets.

An analysis conducted by the World Tourism Organization shows that in most countries the state tourism policy is implemented directly through the central executive bodies - national tourism organizations, other institutions, as well as indirectly through legal levers, support for tourism infrastructure and international policy. World practice shows that countries, having less potential for the development of their tourism industry than Ukraine has, have turned this industry into one of the main ones. Such countries include Montenegro, Turkey, Egypt, Thailand, Russia and others. Thus, with the application of the program for the development of inbound tourism and the tourism industry in Montenegro, the number of foreign tourists has doubled in just four years. The policies of Thailand, Turkey, Egypt, the UAE, and a number of other countries were similar.

Such programs include, in particular, reducing tax pressures and liberalizing the investment process. Thanks to this policy, the volume of Turkish inbound tourism is almost three times higher than domestic. Today, in the European market, this country offers 40 types of recreation, which is four times more than a decade ago.

Turkey's tourism policy has been marked by increased competitiveness of the national tourism product and growing demand in the world tourism market, which has provided the country with one of the highest growth rates in the world. The country has risen to 18th place in the world in terms of tourism revenues in the

national budget, and its share in the world tourism process is 2%. Tourism in Turkey has always existed, but qualified professionals have calculated and continue to calculate the prospects of not only beach but also beach holidays, given the numerous thermal springs, religious shrines, the diversity of nature. The list of innovations includes winter and air sports, yachting, underwater, speleological, health and many other areas of tourism, including even bird watching in the wild, of which there are 450 species. Under the new 20-year development plan for the industry, adopted in 2006, more attention will be paid to those regions that are endowed with other than marine attractions.

Thus, the third (European) management model is the most acceptable for Ukraine in terms of the scale of international tourism and the form of organization of the tourism industry. However, the effective functioning of this model requires public funding (at least in part), which will ensure a high level of economic security for domestic tourism enterprises and the country's participation in the formation and promotion of national tourism products, marketing research, advertising, organization and holding of international tourism exhibitions. conferences, seminars, formation of a basic package of investment projects in the field of tourism infrastructure development, etc.

Tourism is a significant part of many national economies, and the immediate and immense shock to the tourism sector resulting from the coronavirus pandemic is affecting the wider economy. As governments around the world have introduced unprecedented measures to contain the virus, restrictions on travel, business operations and people-to-people interactions have brought the tourism economy to a standstill. Many countries are now entering a new phase in fighting the virus while at the same time managing the re-opening of the tourism economy. This is a complex and challenging task, and quantifying the impact on the tourism economy is difficult.

Five months into the crisis, the situation continues to evolve and the outlook remains uncertain**.** Recovery is now expected to start later and be slower than previously foreseen. Travel restrictions and containment measures are likely to be in place for longer, and are expected to be lifted only gradually, with the possibility of reversal should new waves occur. Even when tourism supply chains start to function again, new health protocols mean businesses will be operating at restricted capacity. Demand-side recovery will also take some time, given the interlinked consequences of the economic and health crises, and the progressive lifting of travel restrictions, while consumer confidence and travel behaviour will be more deeply impacted the longer the pandemic goes on. This will have knock-on implications for many national economies.

Revised scenarios indicate that the implied shock could amount to a 60-80% decline in the international tourism economy in 2020, depending on the duration of the crisis and the speed with which travel and tourism rebounds. Maintaining the baseline that tourism flows have remained severely restricted up to June, these estimates are based on the revision of two earlier scenarios for international

tourism arrivals for the OECD area, supplemented by a third scenario which would see any meaningful recovery essentially delayed until 2021:

- Scenario 1 (revised): International tourist arrivals start to recover in July, and strengthen progressively in the second half of the year, but at a slower rate than previously foreseen (-60%).
- Scenario 2 (revised): International tourist arrivals start to recover in September, and then strengthen progressively in the final quarter of the year, but at a slower rate than previously foreseen (-75%).
- Scenario 3 (new): International tourist arrivals start to recover in December, based on limited recovery in international tourism before the end of the year (-80%).

In the near term, the expectation is that domestic tourism offers the main chance for driving recovery and supporting the tourism sector. The domestic tourism economy is significant and accounts for around 75% of the total tourism economy in OECD countries. Domestic tourism flows have also been heavily affected by restrictions on the movement of people, but are expected to recover more quickly once containment measures are lifted. Nonetheless, it is unlikely that domestic tourism could compensate for the decline of international tourism flows, particularly in destinations heavily dependent on international markets. This will translate into significant macro-economic effects in countries, regions and cities where the sector supports many jobs and businesses.

Beyond the tourism economy, the pandemic has triggered a global economic crisis, and many economies are falling into recession. Early OECD macro-economic estimates indicated that for each month strict containment measures are in place, there would be a loss of output equivalent to 2 percentage points in annual GDP growth. If the shutdown continued for three months, with no offsetting factors, annual GDP growth could be between 4 – 6 percentage points lower than it otherwise might have been. However, with the outlook becoming gloomier, this in turn will have consequences for the tourism recovery [7].

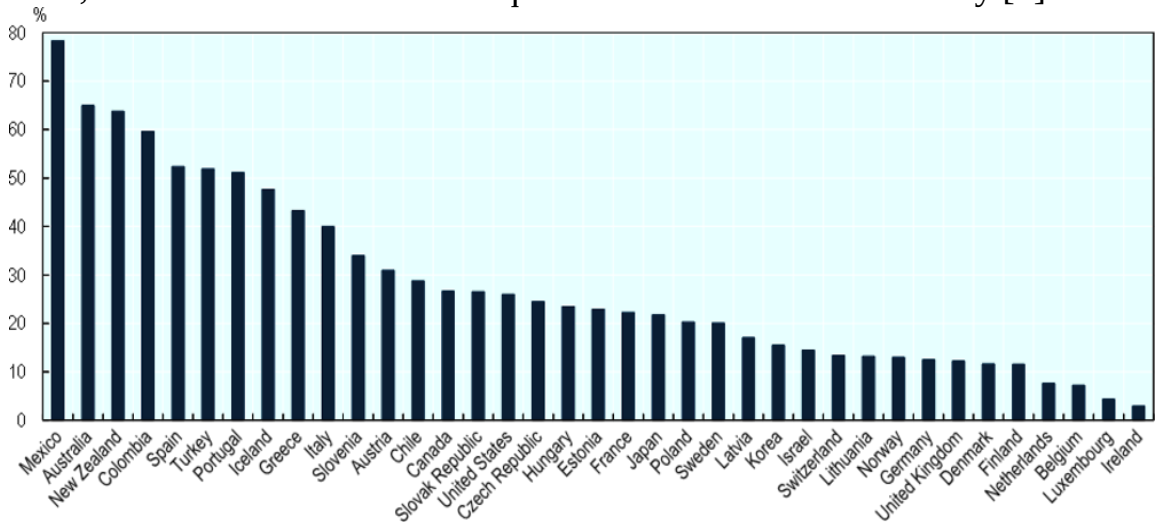

Figure 1. Contribution of tourism to service exports
Source: OECD Tourism Statistics (Database) [7]

As the analysis shows, some elements of the mechanisms of state regulation of the tourism industry of European countries, the effectiveness of which has been tested over time and confirmed by specific achievements in tourism development and ensuring a high level of economic security of tourism enterprises, should be used in the development of Ukraine's tourism industry.

Conclusions. Based on the analysis of foreign experience in managing the economic security of tourism enterprises, we note that the tourism industry of Ukraine, having a strong tourism and recreational potential, has long developed without taking into account the peculiarities of its operation, deep insight into problems and lack of targeted management of economic security of tourist enterprises. In the current conditions of servicing, this has led to a reorientation of tourism to outbound, the destruction of the social tourism system, important components of the infrastructure of the industry. Reforming the system of state regulation of tourism has revealed a number of problems that need to be addressed. This is, first of all, the inconsistency of the current regulatory framework with the needs of tourism enterprises and trends in the tourism industry.

There is an urgent need to improve the legal support of tourism enterprises and bring it in line with international standards. In addition, an obstacle to the effective development and integration of tourism enterprises has been the lack for a long time of a balanced regional policy to overcome the consequences coronavirus and quarantine, which necessitates the creation of a structure of state regulation of economic security of tourism enterprises in Ukraine, taking into account modern realities and experience of countries with highly developed tourism industry.

REFERENCES

1. Kvasny L.G., Popivnyak O.M. (2016). Strategic and tactical planning of the enterprise as the main components of the mechanism of ensuring its economic security. Scientific Bulletin of Mykolayiv National University named after V.O. Sukhomlinsky. Economic sciences: a collection of scientific works. 1(4), Mykolaiv: MNU named after V.O. Sukhomlinsky, 48 p.
2. Boyko M., Hopkalo L. (2005). Principles of formation of priority directions of tourist policy of Ukraine, Regionalna ekonomika. Vol.1, P.222-229.
3. Gerasimenko V.G., Galasyuk C.C. (2008). Management of national tourism in the context of international experience. Bulletin of the DITB. Series: Economics, organization and management of enterprises (in the field of tourism). Vol. 12, P.19-24.
4. Krykhovetsky I.Z. (2008). Tourism as an economic, social and international industry and a source of material and spiritual development of society. Economy and State. Vol.10, P.41-42.

5. Mechanisms and models of development of entities tourist business: collective monograph; edited by A. Berezin, M. Bezpartochnyi (2016). ISMA University. Riga, 204 p.
6. Begoda G.A. (2012) Models of functioning of the tourist industry. Scientific notes of the institute «KROK». Vol. 31, P.144-152.
7. OECD (2020), OECD Tourism Trends and Policies 2020, OECD Publishing, Paris, 321 p. https://doi.org/10.1787/6b47b985-en.

2. The impact of entrepreneurial universities on innovative industrialization in digital economy

Valerii Osetskyi
Doctor of Sciences (Economics),
Professor of department of the economic theory,
macro- and microeconomics
Taras Shevchenko National University of Kyiv
E-mail: val_osetski@ukr.net
ORCID ID 0000-0001-5104-1070

Tetiana Kuzmenko
Candidate of Sciences (Sociology),
Associate Professor of the Department
of Social Structures and Social Relations,
Taras Shevchenko National University of Kyiv
E-mail: Tmk_26@knu.ua
ORCID ID 0000-0001-8620-3850

Irina Tatomyr
PhD in Economics, Associate Professor of department
of theoretical and applied economy
Drohobych State Pedagogical University
after Ivan Franko
E-mail: Tatomur@gmail.com
ORCID ID 0000-0002-3274-7083

Viktoriia Kulish
Ph.D. student of the department of economic theory,
macro- and microeconomics
Taras Shevchenko National University of Kyiv
E-mail: Kulish_v@knu.ua
ORCID ID 0000-0002-5919-2823

Introduction.

Economic processes in the world are characterized by a high level of dynamism, change and innovative approaches to addressing key issues in nowadays [1, p. 59]. The current state of Ukraine's economy is at a fairly low level in terms of its key indicators. In particular, the gross domestic product per capita in Ukraine in 2019 was $3.7 thousand, while this figure for neighboring countries – Belarus, Russia and Poland – was higher by 1.8, 3.2 and 4.3 times (Figure 2). Ukraine needs innovative industrialization. In today's reality, economic

development is possible only through the activation of innovation and technology. In the context of this, the issue of transforming the functions of universities from sole role of a generator of new knowledge and new highly skilled personnel, combined with the role of a participant in networking within the innovation system, is becoming increasingly urgent.

This approach has been dubbed the "entrepreneurial university" and allows universities to become more competitive and more involved in the commercialization of innovation. Thus, the concept of entrepreneurial universities allows institutions to be involved in various kinds of interactions, including the creation of a joint network and collaboration with enterprises, authorities, venture capital funds and other public and private organizations [2, c. 420-421].

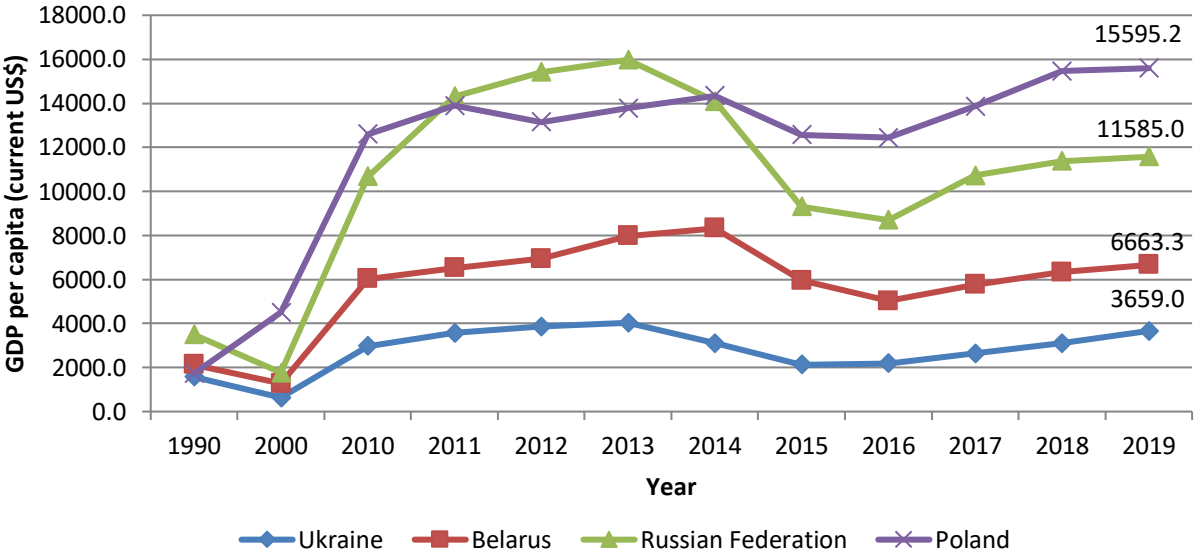

Figure 2. GDP per capita (current US$) – Ukraine, Poland, Russian Federation, Belarus

Source: Developed by the authors based on [3]

The cooperation of science, education, business and state to generate innovation will help to revitalize innovation industrialization, and will lead to an improvement in the socio-economic situation in the country. Therefore, the question of the impact of entrepreneurial universities on innovative industrialization in digital economy is extremely relevant in the theoretical and practical sense, which makes the study relevant.

Literature review.

The issue of entrepreneurial universities and their role in creating innovation has been explored and covered in their writings by a number of scholars, such as: Audretsch D., Keilbach M. [4], Dill D. [5], Etzkowitz H., Webster A., Gebhardt C., Terra B. [6], Golubev S. [7], Konstantinov G., Filonovich S. [8], Leydesdorff L. [9], Palatnikov D., Ratmanova E. [10], Schulte P. [11], Sidorova A., Rumyantsev N. [12], Williams G. [13] and others. In particular, the theoretical

justification of the concept of an entrepreneurial university is associated primarily with the names Etzkowitz H. and Leydesdorff L.[9], who proposed the concept of the "triple spiral" of the innovation cycle, the institutional basis of which is the organic interaction of three subjects of the process of creating innovation in the form of a metaphorical spiral: the authorities (both central and local), business structures, as well as universities.

Dill D. [5] explore the organization and management of American university technology transfer units. The essence of the entrepreneurial university, its features, obstacles to development and prospects were studied by Golubev S. [7], Williams G. [13], and Konstantinov G. & Filonovich S. [8].

Audretsch D. and Keilbach M. [4] explore the knowledge paradox. Based on a data set linking entrepreneurial activity to growth within the context of German regions, their paper shows that entrepreneurship serves a conduit of knowledge spillovers. The paper of Sidorova A. and Rumyantsev N. [12] investigates the essence of entrepreneurial universities, as well as the major theoretical approaches to their analysis. Prospects and problems of innovation activities of higher education institutions were investigated by Palatnikov D. and Ratmanova E. [10]. However, not enough attention has been paid to assessing the likely impact of entrepreneurial universities on innovation industrialization in the digital economy.

Results

The process of creating, implementing and transferring knowledge is based on the close interaction of science and education on the one hand and business and enterprises (which are the recipients of innovation) on the other. Products of higher education institutions and scientific organizations are knowledge, and they, in turn, can also be the subject of purchase and sale. However, today ukraine does not have a market for their products and its main customer is the state. Scientific institutions, together with research universities and businesses, form the so-called «knowledge triangle». The «Knowledge Triangle» – education, research and innovation.

In the mid-1990s. Etzkowitz H. (USA) and Leydesdorff L. (Netherlands) have developed a new modern model of innovation development, called the «triple spiral». The potential for innovation and economic development in today's knowledge-oriented society scientists have seen in the more pronounced role of universities and the close interaction of university, private enterprises and the state to create new institutional and social forms of production, transfer and application of knowledge. Universities in this tri-power take on the separate features of enterprises and government structures and become the basis for innovation, research and practical development and entrepreneurial projects [14]. Today, there are many approaches in the scientific literature to define the concept of an entrepreneurial university, some of which are shown in Table 2.

Table 2

Approaches to the definition of «entrepreneurial university»

	Definition	Author
1.	transfer (transfer) of university technologies is defined as a formal effort to make money on university research by bringing (introduction) of research results into life as a commercial enterprise (capitalization of university research). In turn, formal efforts are defined as organizational units with direct responsibility for promoting (advertising, promoting) technology transfer [5]	Dill D. (1995)
2.	any university taking on activities to 'improve regional or national economic performance as well as the university's financial advantage and that of its faculty [6]	Etzkowitz H., Webster A., Gebhardt C. and Terra B. (2000)
3.	is a natural incubator; providing a support structure for teachers and students to initiate new ventures: intellectual, commercial and conjoint. The university is also a potential seedbed for new interdisciplinary scientific fields and new industrial sectors, each cross-fertilizing the other [16, p. 111]	Etzkowitz H. (2003)
4.	... no more than a knowledge service salesman... [13]	Williams G. (2003)
5.	two ways to implement the entrepreneurial function of the university. The first direction is related to the preparation of future businessmen, people who are ready to start and take responsibility for their own business. The second area is the business activities of the university itself. This is the creation of business incubators, technoparks, subsidiaries, etc. [11]	Schulte P (2004)
6.	it is a higher education institution that systematically makes efforts to overcome constraints in three areas: knowledge generation, teaching and conversion of knowledge into practice, by initiating new activities, transforming the internal environment and modifying interaction with the external environment [8, p. 55]	Konstantinov G. and Filonovich S. (2007)
7.	An entrepreneurial university can be any university that contributes and provides leadership for creating entrepreneurial thinking, actions, institutions and entrepreneurship capital [4]	Audretsch, D. and Keilbach M. (2008)
8.	the university, whose main task is to create and maintain the entrepreneurial environment in its presence, through the wide use of innovative educational programs and the results of applied research [7, p. 17]	Golubev S. (2010)
9.	it is a kind of research centre, where, in addition to the traditional functions of education and science, knowledge is transferred to the practical areas of the economy and society as a whole, the embodiment of knowledge in a product or service [12]	Sidorova A. and Rumyantsev N. (2014)

10.	educational institution, which implements and strengthens the innovative entrepreneurial culture, both within the management process of the university and the actual educational [10]	Palatnikov D. and Ratmanova E. (2018)

Source: Developed by the authors based on [4-8; 10-13; 16]

In general, the concept of an entrepreneurial university involves the interaction of universities and business and the commercialization of new research results. This collaboration also takes place with the help of business incubators, science parks and small innovative enterprises. Effective collaboration between science, education and business should be based on a clear definition of the role of each of the actors in the innovation process. The innovation process involves the "passing" of innovation from scientific idea to its applied research, and then – through design and technological development – embodiment first in experimental, then – in serial production, at the final stage – appropriate support in the field of its use [15, c. 67].

For innovative industrialization in digital economy, development of entrepreneurial universities is very important. The innovations that have been created are critical to moving into the trajectory of sustainable economic growth. "The special importance of the scientific, technical and innovative sphere in the modern world is explained by the fact that it is new knowledge and new technological solutions that become the determining factors of competitiveness not only for individual producers, but also for entire countries. All other things being equal, the national economies that have most favourable conditions for innovation are more successful. By forming a system to stimulate innovation, different countries resort to specific approaches, methods and tools, and as a result become the basis of a national innovation model. Improving the level of innovation is not only a means of active development, but above all a lever to ensure the independence of the country, its competitiveness in today's dynamic environment" [17].

The existing innovative development of Ukraine is not enough. You can evaluate the innovation potential on the basis of one of the main general indicators – The Global Innovation Index [18]. This study is conducted by World Intellectual Property Organization, Cornell University and International Business School "INSEAD" every year since 2007. Global Innovation Index describes the state of a country's innovation potential based on the assessment of such key indicators:

1. Institutions;
2. Human capital & research;
3. Infrastructure;
4. Market sophistication;
5. Business sophistication;
6. Knowledge & technology outputs;
7. Creative outputs.

Table 3

Global Innovation Index of Ukraine

Year	**2015**	**2016**	**2017**	**2018**	**2019**	
GII rank	64 (з 141)	56 (з 128)	50 (з 127)	43 (з 126)	47 (з 129)	
Score/Value	36.5 (max-68.3; min – 15)	35.7 (max-66.3; min – 14.6)	37.6 (max-67.7; min – 15,6)	38.5 (max-68.4; min – 15)	37.4 (max – 67.2; min – 14.5)	
	GII rank				***Rank***	***Value***
1. INSTITUTIONS	**98**	**101**	**101**	**107**	**96**	**53.9**
1.1. Political environment	112	123	122	122	*110*	*38.8*
1.2. Regulatory environment	89	84	82	78	*78*	*61.4*
1.3. Business environment	92	79	78	100	*99*	*61.4*
2. HUMAN CAPITAL & RESEARCH	**35**	**40**	**41**	**43**	**51**	**35.6**
2.1. Education	25	20	30	34	43	55.1
2.2. Tertiary education	31	24	26	26	37	40.6
2.3. Research & development (R&D)	45	50	51	50	54	11.2
3. INFRASTRUCTURE	**112**	**99**	**90**	**89**	**97**	**36.0**
3.1. Information & communication technologies (ICTs)	89	87	68	69	81	58.0
3.2. General infrastructure	127	110	108	89	95	26.2
3.3. Ecological sustainability	121	100	95	115	120	23.9
4. MARKET SOPHISTICATION	**85**	**75**	**81**	**89**	**90**	**43.3**
4.1. Credit	60	58	71	84	91	30.5
4.2. Investment	136	113	107	115	115	31.6
4.3. Trade, competition, & market scale	66	46	48	45	42	67.8
5. BUSINESS SOPHISTICATION	**78**	**73**	**51**	**46**	**47**	**34.8**
5.1. Knowledge workers	52	48	41	41	45	45.4
5.2. Innovation linkages	105	88	72	63	55	27.4
5.3. Knowledge absorption	88	82	63	75	73	31.7
6. KNOWLEDGE & TECHNOLOGY OUTPUTS	**34**	**33**	**32**	**27**	**28**	**34.6**
6.1. Knowledge creation	14	16	16	15	17	42.5
6.2. Knowledge impact	98	90	77	40	47	40.1
6.3. Knowledge diffusion	65	61	54	53	47	21.3
7. CREATIVE OUTPUTS	**75**	**58**	**49**	**45**	**42**	**33.5**
7.1. Intangible assets	82	42	26	13	17	55.8
7.2. Creative goods & services	87	87	92	86	91	8.8
7.3. Online creativity	51	51	47	43	43	13.6

Source: Developed by the authors based on [19-23]

Today, according to Global Innovation Index-2019, Ukraine ranks 47th among 129 countries in the world, is quite a high indicator, taking into account the scientific, technical and human potentials of the country (table 3).

It is worth noting that the country has the best indicators behind the indicator «knowledge & technology outputs» – 28th place in the ranking, «creative outputs» – 42nd place, "business sophistication" – 47th place, «human capital & research» – 51st place. The lowest indicators in the country on such indicators as: «infrastructure» – 97; «Institutions» – 96; «market sophistication» – 90.

That is, among the resource indicators of innovative development, the strongest indicators are those that assess educational potential and characterize human capital and research; and among the performance indicators are those that evaluate the results of the application of knowledge and technology and creative activities [24].

It is the cooperation of universities and business that can significantly affect the country's innovation potential. The current level of cooperation between universities and businesses in the innovation process is reflected in the indicators of the annual survey of the countries of the world on the indicator of economic competitiveness of Global Competitiveness Index. This rating is based on the Methodology of the World Economic Forum and has been held since 1979.

Chapter 12 – «Innovation» (Table 4) highlights a special indicator 12.04 «University-industry collaboration in R&D». In 2017-2018 innovation index, Ukraine ranked 61st out of 137 countries, up 9 positions from the previous reporting year. In 2018 report, Ukraine ranked 58th out of 140 countries, and in 2019 – 60th out of 141 [25; 26]. We do not consider the indicators for 2018 and 2019 more thoroughly, because the reports do not show «University-industry collaboration in R&D» indicator.

According to the indicator "University-industry collaboration in R&D" since 2007, Ukraine has never risen above 49 positions (rank) and has not gained more than 3.6 points (value). In general, the value of this indicator is formed as the average expert assessment of this phenomenon in the range of 1-7 (1 - do not have research cooperation, 7 - a high level of cooperation). The dynamics of interaction between universities and business show the average level of cooperation throughout the study period.

However, the table. 4, country has the best positions in terms of "Capacity for innovation" and "Availability of scientists and engineers". The lowest are in terms of "Gov't procurement of advanced technology products" and "Company spending on R&D". That is, the country has real potential for development and innovation, but the low level of funding and interest from both the state and business inhibits innovation industrialization.

Table 4

Global Competitiveness Index of Ukraine: indicator "Innovation"

Period	2007-08		2008-09		2009-10		2010-11		2011-12		2012-13	
Rank/Value	R	V	R	V	R	V	R	V	R	V	R	V
Global Competitiveness Index	73	4,0	72	4,1	82	4,0	89	3,9	82	4,0	73	4,1
12th pillar: Innovation	**65**	**3,2**	**52**	**3,4**	**62**	**3,2**	**63**	**3,1**	**74**	**3,1**	**71**	**3,2**
12.01 Capacity for innovation	40	3,7	31	3,8	32	3,7	37	3,5	42	3,4	58	3,3
12.02 Quality of scientific research institutions	60	3,9	48	4,2	56	3,9	68	3,6	72	3,6	64	3,7
12.03 Company spending on R&D	67	3,2	52	3,3	68	3,0	69	3,0	75	3,0	104	2,7
12.04 University-industry collaboration in R&D	**65**	**3,1**	**49**	**3,6**	**64**	**3,5**	**72**	**3,5**	**70**	**3,6**	**69**	**3,6**
12.05 Gov't procurement of advanced technology products	75	3,6	54	3,7	85	3,3	112	3,1	112	3,1	97	3,2
12.06 Availability of scientists and engineers	70	4,3	54	4,4	50	4,4	53	4,3	51	4,3	25	4,8
12.07 PCT patents applications/million pop.			65		64		64		71		51	2,1
Period	**2013-14**		**2014-15**		**2015-16**		**2016-17**		**2017-18**			
Rank/Value	R	V	R	V	R	V	R	V	R	V		
Global Competitiveness Index	84	4,1	76	4,1	79	4,0	85	4,0	81	4,1		
12th pillar: Innovation	**93**	**3,0**	**81**	**3,2**	**54**	**3,4**	**52**	**3,4**	**61**	**3,4**		
12.01 Capacity for innovation	100	3,2	82	3,6	52	4,2	49	4,4	51	4,3		
12.02 Quality of scientific research institutions	69	3,6	67	3,8	43	4,2	50	4,2	60	3,9		
12.03 Company spending on R&D	112	2,7	66	3,1	54	3,4	68	3,3	76	3,2		
12.04 University-industry collaboration in R&D	**77**	**3,4**	**74**	**3,5**	**74**	**3,5**	**57**	**3,5**	**73**	**3,4**		
12.05 Gov't procurement of advanced technology products	118	3,0	123	2,9	98	3,0	82	3,1	96	3,0		
12.06 Availability of scientists and engineers	46	4,5	48	4,3	29	4,7	29	4,7	25	4,7		
12.07 PCT patents applications/million pop.	52	2,9	52	3,2	50	3,6	49	3,9	52	3,6		

Source: Developed by the authors based on [27]

In 2018, in Ukraine, 22.4 % of total expenditure on research and development was directed to the implementation of basic scientific research, 91.9 % was financed by budget. The share of expenditure on applied research was 21.3 %, which was financed by 58.1 per cent from the budget and 23.6 per cent by business sector organizations. 56.3 % of total expenditures were directed to scientific and technical (experimental) developments, 36.1 % were financed by foreign firms, 32.1 % by business sector organizations and 12.5 % by their own funds. Almost half of the expenditure on basic scientific research was spent on the natural sciences, 24.8 % in technical sciences and 8.7 % in agricultural sciences. 37.8 % of the expenditures of the field of technical sciences, 23.2 % - natural sciences, 12.9 % - medical and agricultural sciences are directed to the implementation of applied scientific research. Most (88.9 %) the cost of scientific and technical (experimental) developments is in the technical sciences [28]. The amount of

expenditure on research and development by type of work in 2010-2019 is shown in the Table 5.

Table 5

Research and development (R&D) costs for 2010-2019

	The cost of R&D - total, million UAH	Including						Share of R&D spending in GDP, %
		fundamental		applied scientific research		scientific and technical (experimental) developments		
		million UAH	as a percentage of the total cost of R&D	million UAH	as a percentage of the total cost of R&D	million UAH	as a percentage of the total cost of R&D	
2010	8107,1	2175,0	26,8	1589,4	19,6	4342,7	53,6	0,75
2011	8513,4	2200,8	25,9	1813,9	21,3	4498,7	52,8	0,65
2012	9419,9	2615,3	27,8	2023,2	21,5	4781,4	50,7	0,67
2013	10248,5	2698,2	26,3	2061,4	20,1	5488,9	53,6	0,70
2014	9487,5	2452,0	25,9	1882,7	19,8	5152,8	54,3	0,60
2015	11003,6	2460,2	22,4	1960,6	17,8	6582,8	59,8	0,55
2016	11530,7	2225,7	19,3	2561,2	22,2	6743,8	58,5	0,48
2017	13379,3	2924,5	21,9	3163,2	23,6	7291,6	54,5	0,45
2018	16773,7	3756,5	22,4	3568,3	21,3	9448,9	56,3	0,47
2019	17254,6	3740,4	21,7	3635,7	21,1	9878,5	57,2	0,43

Source: Developed by the authors based on [29]

In 2017, the team of authors, edited by Strikha M. and Ilchenko M., published an analytical book "Innovative development of universities and scientific institutions of the Ministry of Education and Science of Ukraine". He illustrated main characteristics of the state of cooperation between universities and enterprises.

«The work states that in 2016 higher education institutions and scientific institutions of the Ministry of Education and Science completed 256 fundamental research projects, 462 applied research projects, 28 science and technical projects, as well as 5186 projects ordered by the industrial sector and business entities. Over two thirds of the total number of the results were implemented in production or became widely used otherwise. Thus, in 2016 higher education institutions and scientific institutions received 4397 documents of title (including 873 mechanical patents, 13 of which were received abroad), sold 49 licenses, issued 1792 monographs, published 8206 articles in journals, peer-reviewed in such scientometrical databases as Scopus, Web of Science and Index Copernicus (the latter being only for the liberal arts provided with facilitated conditions for the transition period), 125 thousand articles were published in specialized journals of Ukraine» [30, p. 16; 31, p. 451-452].

In our opinion, the development and support of entrepreneurial universities

is one of the main conditions for the growth of the country's economy on an innovative basis. The growth of cooperation between universities and the industrial sector will produce qualitative development of human capital. The ability to commercialize innovative products to stimulate innovation and improve the innovation potential not only of higher education institutions or scientific institutions, but also of the country as a whole. All these are drivers of innovative industrialization (Figure 3).

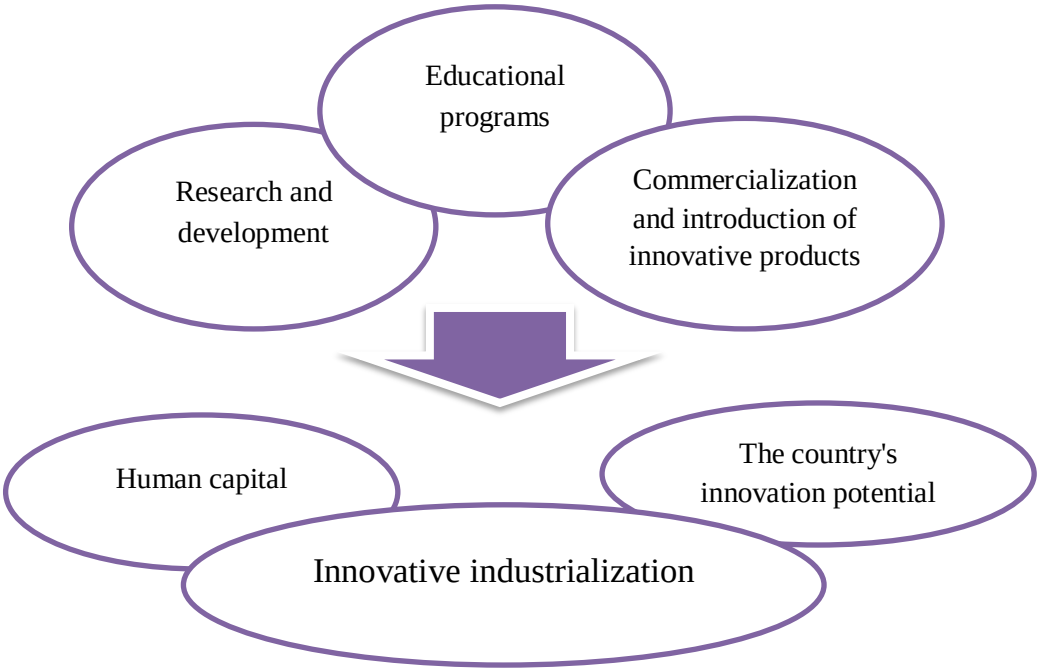

Figure 3. Entrepreneurial University in Innovative Industrialization

Source: Developed by the authors

The U.S., where national universities such as Leland Stanford Jr. and Massachusetts Institute of Technology produce more than 135 million annually, is the leader in academic entrepreneurship in the world gross profit by receiving royalties from the sale of shares in their own start-up companies. During the history of Stanford University, its alumni and employees created about 5,000 companies, which employ about 700,000 man. [32].

In Ukraine, there are already examples of academic entrepreneurship and start-ups that have recently emerged [33, p. 9]:

- MELTA LLC. MELTA is a spinof company of the National Academy of Sciences of Ukraine. Her work is connected with the practical use of the invention of the Institute of Metal physics by him. G.V. Kurdyumova NATIONAL of Ukraine: technology that can change the characteristics of metal alloys. These alloys have specific amorphous and nanocrystal structures. They can be used to increase the energy efficiency of heating systems as well as electric transformers;

- SOVA is a portable water purification system. This is a spinofproject of the National Technical University of Ukraine "Kiev Polytechnic Institute". The project received funding at the pre-chat stage to develop a business model;
- iHUB provides a space for collaboration (coworking) IT startups in Kiev and other cities of Ukraine. iHub is supported by international donors.

These start-ups are a potential basis for development of entrepreneurial universities in Ukraine. However, the necessary condition at this stage is the support of such initiatives by the state, increased implementation, distribution, promotion and efficiency of academic entrepreneurship.

Today, Ukraine is creating the appropriate infrastructure for the activities of industrial universities. The country's leading universities, in particular National Technical University of Ukraine "Kiev Polytechnic Institute named after Igor Sikorsky" and Kiev National University named taras Shevchenko, have founded scientific parks and are investing some of the financial and human resources, using institutional opportunities to support academic start-ups.. In total, there are more than 30 scientific parks in Ukraine [34]: Taras Shevchenko Science Park Corporation; National University of Bioresources and Natural Resources Science Park "Sustainable Nature Use and quality of life"; "Scientific Park of the Kiev National Economic University"; Kiev Polytechnic Science Park; "Scientific Park of the Taurus National University named after V.I. Vernadsky "University Arsenal"; "Scientific Park of the University of Lviv" Innovation and Entrepreneurship, "Science Park of the National University "Lviv Polytechnic" and others.

One of the largest is the scientific park of the Kiev National University named after Taras Shevchenko. Main projects that are in the park's work include [35]:

- LTB – online shopping software company that allows you to provide virtual fitting services to customers;
- Production of a new drug substance – an active vitamin E metabolite for use in medical medicines4
- Municipal GIS: Risk Management Tool, etc.

It is important that the functioning of scientific parks is based on the political support of the leadership of the state and universities. Their activities have resulted in an expansion of the support network for academic entrepreneurship from the private sector and civil society; Forming the conceptual foundations of an entrepreneurial university; growth of the country's innovation potential. «Innovative and active economic development is defined both by the need to survive in a highly competitive environment (increased demands of consumers, suppliers, market globalization), and the development of scientific, technological and technological progress» [36]. «Small and medium-sized enterprises operating on the platforms of innovative and entrepreneurial universities are powerful in private innovation, register more patents and create a large number of new jobs than when they operate outside clusters and platforms» [37].

Conclusion

Thus, in global economy, the introduction of innovative developments and technologies is one of the key factors in improving the competitiveness of countries, the importance of which is significantly increasing in the digital economy. Science and education play a leading role in shaping the innovation economy, and innovation is based on scientific development. Analyzing Ukraine's position in Global Innovation Index and Global Competitiveness Index, we can conclude that Ukraine has a rather bad innovation potential in terms of indicators that characterize the ability to innovate, human capital and assess educational potential. However, the low level of interest and financing of innovation and development by both the state and business slows down innovation industrialization. According to the indicator of The University-industry collaboration in R&D, Ukraine is not in a high position, demonstrates the need for close cooperation between the HIA and industrial enterprises, the activation of the functioning and distribution of scientific parks.

Active implementation of the concept of entrepreneurial university will stimulate innovation, improve the country's innovation potential and business climate. The development of industrial universities will have a positive impact on the labour market, stimulating employment and job growth, as well as reducing "outflow" of highly skilled workers. By intensifying innovation, Ukraine will be able to achieve positive social effects, improve the standard of living of the population, and so on.

Thanks to the cooperation of higher education institutions, scientific institutions and the industrial sector, it is possible to increase the competitiveness of the national economy in the global market, as well as Ukraine's transition to sustainable economic growth.

REFERENCES

1. Osetskyi, V., Kraus, N. and Kraus, K. (2020), "New quality of financial institutions and business management", *Baltic Journal of Economic Studies, [Online]*, 1, 59–66. URL: http://www.baltijapublishing.lv/index.php/issue/article/download/766/pdf. DOI: https://doi.org/10.30525/2256-0742/2020-6-1-59-66
2. Kamenskih, M. (2016). Ekonomika i obrazovanie. *Vestnik UrFU. Seriya ekonomika i upravlenie.* 15(3), 420–433. URL: http://elar.urfu.ru/bitstream/10995/54350/1/vestnik_2016_3_006.pdf DOI: 10.15826/vestnik.2016.15.3.022
3. GDP per capita (current US$) - Ukraine, Poland, Russian Federation, Belarus. *The World Bank.* URL: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?contextual=default&end=2019&locations=UA-PL-RU-BY&start=1987&view=chart

4. Audretsch, D., & Keilbach, M. (2008). Resolving the knowledge paradox: Knowledge-spillover entrepreneurship and economic growth. *Research Policy*, *37*(10), 1697–1705. DOI: 10.1016/j.respol.2008.08.008
5. Dill, D. (1995). University-industry entrepreneurship: the organization and management of American university technology transfer units. *Higher Education*, 29(4). 369-384.
6. Etzkowitz, H., Webster, A., Gebhardt, C., & Terra, B. (2000). The future of the university and the university of the future: Evolution of ivory tower to entrepreneurial paradigm. *Research Policy*, *29*, 313. DOI 10.1016/S0048-7333(99)00069-4
7. Golubev, S. (2010). Sotsialno-predprinimatelskiy vuz: vozmozhnost razvitiya dlya regionalnyih vuzov. *Obschestvennyie nauki. Vserossiyskiy nauchnyiy zhurnal*. 4, 11-21
8. Konstantinov, G., Filonovich, S. (2007). Chto takoe predprinimatelskiy universitet. *Teoreticheskie i prikladnyie issledovaniya*, URL: https://vo.hse.ru/data/2010/12/31/1208183732/p49.pdf
9. Etzkowitz, H., Leydesdorff, L. (2000) The dynamic of innovation from National System and "Mode 2" to a Triple Helix of university-industry-government relations. *Research Policy*, 29(2), 109-123.
10. Palatnikov, D., Ratmanova, E. Perspektivyi i problemyi innovatsionnoy deyatelnosti vyisshih uchebnyih zavedeniy v sovremennoy Rossii. URL: http://yaratiso.ru/index.php?option=com_content&task=view&id=361&Itemid=50
11. Schulte, P. The entrepreneurial university: a strategy for institutional development. *Higher education in Europe*. 29, 187—193 DOI: 10.1080/0379772042000234811
12. Sidorova, A., Rumyantsev, N. Predprinimatelskie universitetyi: suschnost i tendentsii razvitiya. URL: https://docplayer.ru/64269595-Sidorova-a-a-rumyancev-n-a-predprinimatelskie-universitety-sushchnost-i-tendencii-razvitiya.html
13. Williams, G. (2003). The Enterprising University: Reform, Excellence and Equity. *Society for Research into Higher Education: Open University Press*, p. 193
14. Troynaya spiral Genri Itskovitsa. *Erazvitie.org.* URL: http://erazvitie.org/article/trojnaja_spiral_gnri_ickovica
15. Kokhan, V. (2019). Peredacha znan naukovymy ustanovamy u konteksti rozvytku akademichnoho pidpryiemnytstva. *Rozvytok akademichnoho pidpryiemnytstva v zakladakh vyshchoi osvity ta naukovykh ustanovakh Ukrainy : kruhlyi stil.* 128, 67–69
16. Etzkowitz, H. (2003). Research groups as 'quasi-firms': The invention of the entrepreneurial university. *Research Policy*, *32*(1), 109–121. DOI: 10.1016/S0048-7333(02)00009-4

17. Kolosinska, M. (2018). Innovatsiinyi reitynh Ukrainy: shliakhy yoho pokrashchennia na osnovi yevropeiskoho dosvidu. URL: http://global-national.in.ua/archive/23-2018/18.pdf
18. The Global Innovation Index (GII) 2019: Creating Healthy Lives—The Future of Medical Innovation. *WIPO*. URL: https://www.globalinnovationindex.org/Home
19. The Global Innovation Index 2015. Effective Innovation Policies for Development. – Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch [Eds.]. *WIPO*, p. 453 URL: https://www.wipo.int/edocs/pubdocs/en/wipo_gii_2015.pdf
20. The Global Innovation Index 2016. Winning with Global Innovation. – Soumitra Dutta, Bruno Lanvin, and Sacha WunschVincent [Eds.]. *WIPO*, p. 451. URL: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2016.pdf
21. The Global Innovation Index 2017. Innovation Feeding the World. – Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent [Eds.]. – p. 463 URL: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2017.pdf
22. The Global Innovation Index 2018. Energizing the World with Innovation. – Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent [Eds.]. *WIPO*, p. 385 URL: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2018.pdf
23. The Global Innovation Index 2019. Creating Healthy Lives—The Future of Medical Innovation. – Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent [Eds.]. *WIPO*, p. 400 URL: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2019.pdf
24. Osetskyi, V., Kuzmenko T., Kulish, V. (2020). Instytutsiini zasady innovatsiinoho rozvytku sotsialnoi ta ekonomichnoi sfer. *Osoblyvosti sotsialno-ekonomichnoho postupu natsionalnoi ekonomiky v umovakh informatsiino-tekhnolohichnykh vyklykiv: kolektyvna monohrafiia,* 260-269
25. The Global Competitiveness Report (2018). Klaus Schwab, *World Economic Forum*. URL: http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf
26. The Global Competitiveness Report (2019). Klaus Schwab, *World Economic Forum*. URL: http://www3.weforum.org/docs/WEF_TheGlobal CompetitivenessReport2019.pdf
27. The Global Competitiveness Index Historical Dataset (2007-2017). *World Economic Forum*, URL: http://www3.weforum.org/docs/GCR2017-2018/GCI_Dataset_2007-2017.xlsx
28. Naukovi doslidzhennia i rozrobky u 2018 rotsi. *Derzhavna sluzhba statystyky Ukrainy*. URL: http://www.ukrstat.gov.ua/operativ/operativ2019/ni/ndr_2018.doc
29. Vytraty na vykonannia naukovykh doslidzhen i rozrobok za vydamy robit (2010-2019). *Derzhavna sluzhba statystyky Ukrainy*. URL:

http://www.ukrstat.gov.ua/operativ/operativ2017/ni/vvndr_vr/vvndr_vr_u.htm

30. Innovatsiini rozrobky universytetiv i naukovykh ustanov MON. (2017). *Instytut obdarovanoi dytyny NAPN Ukrainy*, p. 278. URL: https://mon.gov.ua/storage/app/media/news/%D0%9D%D0%BE%D0%B2%D0%B8%D0%BD%D0%B8/2018/07/04/Innovative-development-of-universities-and-scientific-institutions-of-the-Ministry-of-Education-and-Science-of-Ukraine.pdf
31. Britchenko, I., Kraus, N. and Kraus, K. (2019), "University innovative hubs as points of growth of industrial parks of Ukraine", *Finansovo-kredytna diialnist: problemy teorii ta praktyky*, 4 (31), 448–456.
32. Lytvyn, I. (2012). Akademichne pidpryiemnytstvo: dosvid Stenfordskoho universytetu. *Problemy ekonomiky ta upravlinnia.* 725, 305-312
33. Knut, A., Krasovska, O. (2015) Akademichne pidpryiemnytstvo v Ukraini.*Berlin Economics GmbH*, p. 32. URL: https://fnst.org/sites/default/files/uploads/2016/08/08/aeinukraineukr4web.pdf
34. Pokaznyky diialnosti naukovykh parkiv. *Ministerstvo osvity i nauky Ukrainy.* URL: https://mon.gov.ua/ua/nauka/innovacijna-diyalnist-ta-transfer-tehnologij/naukovi-parki/pokazniki-diyalnosti-naukovih-parkiv
35. Proekty. *Naukovyi park Kyivskoho natsionalnoho universytetu imeni Tarasa Shevchenka.* URL: https://scp.knu.ua/ua/kataloh-innovatsiinykh-proektiv
36. Kraus, K. M. and Kraus, N. M. (2016), "Implementation of an innovation project by an entrepreneurial structure within the framework of "windmill of innovation" action", *Ekonomist*, 2, 4–8.
37. Marchenko, O. V., Kraus, K. M. and Kraus, N. M. (2020), "Platform economy: a narrative of innovative-entrepreneurial universities and a digitized development philosophy", *Efectyvna ekonomika, [Online], vol*. 1, URL: http://www.economy.nayka.com.ua/?op=1&z=7566 DOI: 10.32702/2307-2105-2020.1.6

3. Industry 4.0 workplace: external and internal transformations

Oleksiy Stupnytskyy
Ph D in Economics,
Professor of Department of International Business,
Institute of International Relations
Taras Shevchenko National University of Kyiv
E-mail:a.stupnitsky@ukr.net
ORCID ID 0000-0001-9004-9307

Nataliya Rylach
PhD in International economic relations
Senior Research Fellow
Institute of International Relations
Taras Shevchenko National University of Kyiv
E-mail:nrylach28@gmail.com
ORCID ID 0000-0002-7200-3978

Introduction The author considers basic components of a new industrial model of the creative economy based on digitalization of emerging Industry 4.0 which make serious changes to 'classical' understanding of the nature of mental and physical labour, working processes and cycles, organization of a workplace, production skills and competencies. The features of job transformation in the main sectors of the economy – industry, service sectors and knowledge economy, which are determined by the symbiosis of work, creativity, training and games, direct contacts between contractors and performers chain through digital networks, a personalized approach to product manufacture and service delivery, and a special ratio of dynamic sectoral and industry-specific indicators of changes in the labour market. As a prerequisite for the study, the author determines that the process of forming a *new architecture* of the workplace can be detrmined by external and internal factors in modern conditions of the globalized creative economy of the 21st century.

Literature Review These days, one of the global problems – the state of the labour market is being actively explored by both theoretical and practical economists. They are exploring its structure and trends for further development, changes in the organization of production, the level of employment and unemployment in the context of changes associated with the introduction of ICT. The analysis of these processes is still based on the concepts of R. Gordon (Gordon hypothesis), R. Solow (the paradox of productivity), P. David (David delay hypothesis), V. Nordhaus, S. Wadhwani, R. Crawford, and R. Freeman. However, while at present no one is denying the fact that ICTs contribute to growing labour productivity in high-tech sectors, the question of their influence

on the qualitative characteristics of jobs in other sectors of the economy remains largely unexplored.

Results If a creative economy involves human imagination and the ability to create something new, then modern cyber economics is an industry based on creation of values within the digital space. While the industrial economy is already coming to its end, the post-industrial economy has just emerged and is only emerging. So far, the very concept of *Industry 4.0* has not been clearly defined, so we can only talk about a set of promising technology packages that will form its basis, as well as about development scenarios in business, economy and social sphere. National programmes for preparing for a new industrial lifestyle have already appeared in developed countries, such as the USA (*Advanced Manufacturing Partnership*), France (*Industrie du Futur*), Japan (*Smart Society 5.0*), China (*Made in China 2025*) and others. Transition to the new industrial model involves creation of integrated production systems that connect the physical and digital space, and not just automation of individual conveyor production lines, where individual devices operate independently of each other. The new industrial model is based on several components:

- The development of industrial robotics allows replacing manual labour in most routine production operations.
- The proliferation of unmanned vehicles is changing logistics at the individual enterprise level and across the economy.
- New materials and additive technologies allow automated systems to print complex parts and structural elements.
- Direct communication between devices through the development of inter-machine communications and the Internet of things are creating new interaction protocols (for example, 'production site – machine – conveyor – supplier').
- The use of self-learning computer networks allows companies to establish a continuous collaboration between subsystems and build interaction with external systems (for example, logistics and sales departments). This means that the elements of the production system are transformed into partially or fully self-governing [1].

The formation of a new industrial model makes serious changes to the 'classical' understanding of the nature of mental and physical labour, processes and cycles of labour activity, production skills and competencies, and contributes to the construction of a *'new architecture'* of the workplace. Firstly, modern ICTs are often indifferent (Teflon-like) in nature with respect to socio-economic and cultural differences – they are transnational and transcultural, although there are differences in the cost of access to them. Secondly, they are not limited to long-term training or a special choice of their users, which helps to reduce the cost of labour without reducing its quality. Since an employee cannot independently operate on big data in real time, the dominant trends in the

sector of modern industry today are automation and robotics. Automation mostly influences jobs that require an average level of qualifications and competencies associated with numerous template components, while the competencies themselves are paid highly enough to recoup the costs of implementing automated solutions. The medium term forecasts suggest that most autonomous factories will be allocated to separate zones of full automation where access will not be allowed to employees, and buffer zones (with certain physical parameters – temperature, lighting, chemical composition of air, etc.), where products are transferred to the consumers and require performing precise or creative tasks. According to the Frey-Osbourne mathematical model, which presents an estimate of the probable impact of automation on most professions, about 47% of jobs in the US economy are at risk [2]. Using the same methodology for OECD countries, the World Bank has established that about 57% of jobs are at risk in these countries [3]. Notably, most of the professions that will be automated are related to the performance of routine physical tasks and standardized operations (clerks, auxiliary workers, operators, accountants, or insurance agents). The *Citigroup's* analysis does not cover the entire economy, but predicts a 30% reduction in US banking offices by 2025, while in the retail sector, layoffs threaten up to 80% of warehouse workers and 63% of direct sales workers [4]. According to *McKinsey Global Institute* study, currently about 30% of functions within the existing professions can be already automated based on the current level of technology development, with the greatest automation potential for professions associated not only with routine physical labour (78%), but also with analysis and data collection (69% and 64% respectively) [5]. At the same time, due to digitalization and ICT introduction, such professions as a banking operator, auditor, and a loan specialist are 98% likely to simply disappear by 2027 [6].

All the existing automation assessment methodologies are based on extrapolating data from the past years to future periods (for example, data on employment, types of tasks performed, or the impact of automation in the past years), but they do not take into account possible '*disruptive changes'* that can lead to reviewing the entire employment market. So, for example, many changes in the labour market may have an avalanche-like character caused by the delayed effect of the introduction of technologies. Therefore, the risk of structural unemployment is quite high: unemployed people will not be able to find work, since the skills they possess will not be in demand in the market.

The proliferation of automated control technologies and production of material and digital products are associated not only with introduction of robots to perform various physical tasks, but with significant automation of routine labour using AIT (Artificial Intellect Technology). According to *Boston Consulting Group* estimates, the parity of salaries and the cost of servicing robots in the production of electronic equipment was achieved in 2018, and by 2023, the furniture manufacturing industry will pass a similar stage [7]. Since

2010, it has been more cost-effective to introduce robots in the US automotive industry than to hire conveyor line workers. At the same time, experts note that achieving parity does not mean an instant transition to mechanized labour – this process acquires mass nature only if the economy-cut is more than 10% [8]. Monitoring and adoption of low-level decisions will go to AIT operating with large amounts of data in real time. Making strategic decisions, introducing innovations and intervening in case of emergency situations is left to group teams of employees with the ability to quickly find a common language, the skills to connect different angles of complex systems without direct physical contact, through remote control of special robots. Communication *'machine-machine'* protocols allow robotics to achieve absolute coordination of actions and maintain a uniform rhythm, and new materials allow autonomous systems to produce various complex structural elements from a single raw material. However, since many tasks in the service sector have not only a physical, but also an emotional, cognitive component, the introduction of robotics contributes to the growing demand for human contact: the service or product should be accompanied by attention to the feelings and emotions of the employee.

Jobs in the services sector are undergoing significant changes. Software and hardware systems based on AIT and the Internet of things are rapidly replacing the work of various mass services in the service sector (medicine, education, entertainment, and finance), as well as working with clients (front office), and internal work (back office), significantly improving the quality of work performed. Working with clients through direct physical contact increases the role of computer programs with TII in creating the so-called '*digital assistants*' that provide a higher level of service due to constant access to a large amount of data ('*high-tech human mimicry*'). As for such component of the service sector as logistics, it is undergoing tremendous changes due to the introduction of AIT and digitalization, which allow tracking cargo at any point around the clock, coordinating all transportation (road, rail, air and water) with minimal participation of operators in planning of cargo traffic, and reducing labour costs, as well as the risks associated with the human factor. Thus, *Starsky Robotics* has developed a system that provides independent movement of trucks along the highway and remote control at their exit from the motorway, while the 'driver' is in the office at the control panel and monitors the routes of 'cargo caravans', taking control if necessary [9].

In the knowledge economy sector, the main trend changing the landscape of jobs is not replacement of a human with a computer, but the increase in the complexity of the tasks to work with, the number of autonomous agents and the relationships between them, the exponential growth in the volume of big data. Work in hybrid supersystems which include teams of people and AIT-based systems requires a special approach to the operational analysis of huge amounts of information and structuring of big data. If earlier scientists had to make efforts to obtain new information, in the near future the role of hybrid

intelligence will grow –*virtual collaborative assistants* will be used for primary processing of information and gradually taught more and more complex tasks in various systems of virtual collaborative work (*amplified collaboration environments*) [10].

When analyzing the influence of trends on the three above-mentioned main sectors of the economy – the industry, service sector and knowledge economy – it is necessary to separate two types of activities. The first is focused on standardized production of goods or services, and the second deals with unique activities, while the principle of this division is connected both with the demand for labour in production and with the formation of skills that workers should possess. The massive introduction of 'ready-made automation packages' by corporations will lead to avalanche-like changes in the labour market in the medium term (total dismissal of the personnel of entire factories or large office complexes). For example, the use of 3D printing technologies allowed the German company Adidas to open two automated shoe factories in Germany and the United States in 2017. As a result, more than 1,000 jobs were eliminated in Vietnam. It is quite difficult to assess the impact of technology on employment, because technological shifts that blur the line between formal and informal employment bring the nature of labour in developed countries and countries with emerging economies closer. Moreover, applying professional categories used to assess the possible loss of jobs as a result of automation in one country is very problematic in other countries. Therefore, the ratio between the indicators of automation and the use of human labour is still uneven in different countries and within the same country, and it is determined by peculiarities of the situation. Thus, automation and innovation are often unexpected by-products of any new breakthrough inventions. For example, the conveyor invented by H. Ford increased the demand for less skilled workers, while the invention of quartz watches contributed to a significant reduction in the number of more qualified personnel. Design, creation of works of art, research, leadership of teamwork are too complex tasks for automation (replacing workers with machines is still easier when performing routine tasks that can be 'codified') and robots have not yet been able to achieve great success in reproducing these skills to compete with a human.

At the same time, a situation may arise in the economy where, thanks to additional stimulating measures, the pace of job creation in new sectors of the economy will be comparable to the pace of reduction in irrelevant work positions. However, it should be borne in mind that most vacancies will require complex skills that are difficult to expect from specialists who are relieved of routine tasks. Therefore, new jobs arise within all sectors of the economy and those types of activities where a personalized approach to product production or service delivery is required, where tasks relate to higher cognitive levels (the ability to analyze, synthesize, make independent decisions, and create something

new) or require emotional involvement. Many of them are focused on realization of the creative potential of an employee, and not only on commercial success according to the common sense logic of the market economy. In the future, the next technological trend will be coordinating these AIT works and maintaining optimal distribution of tasks between employees, and freeing them from solving simple problems.

The term '*network society*' was first proposed back in the 1990s by sociologists J. Dyck and M. Castells, who predicted that the spread of network communication technologies will fundamentally change the structure of the society and the lifestyle of each individual. Currently, in OECD countries, more than 80% of the population is already connected to the global network, and in countries where this figure is lower, there is a steady increase in users. According to *Cisco* estimates, by 2021, global annual Internet traffic will increase 127 times compared to 2005 and reach 3.3 zettabytes, and 10 billion new devices will appear in the global IP networks thanks to the development of machine-to-machine (M2M) communications (3.4 devices for every inhabitant of the Earth will be connected to the network) [11]. Indeed, today's 'new network culture' is manifested in the changing attitude of people to work accompanied by technological progress, simplified resource management. It also allows moving away from the traditional hierarchical administration systems. Increasing the mobility of the Internet, the capacity of digital media channels and data transfer speeds open up new opportunities and allow bringing the experience of online participation as close as possible to interaction (it is assumed that the effect of participation will become the usual working environment by 2025, similar to modern visiting shopping centres). A variety of segments of the labour market provide direct contact in the 'client-contractor' chain through a digital network, and the feedback system helps to build trust-based relationships and virtually eliminates the need for central regulation. A new engineering specialty has arisen in the network world – makers, freelance individuals become entrepreneurs and market their products via the Internet, being anywhere in the world and preferring to work in coworking, where they get access for a moderate fee to the office infrastructure of like-minded 'coworkers'. In fact, the employees are less and less tied to specific 'access points', it is easier for them to integrate 'instant access to information' in the model of their social activity, landscape of Internet content and cloud storage data; and mobility and flexible work schedule are already the working standard for at least 50% of workers in leading OECD countries.

Among the features that determine the structure of the new network economy and the transformation of jobs, one can distinguish the following: a) tight boundaries between work, creativity, learning and play; b) centralization of infrastructure, management and individual development; c) big industrial enterprises as big employers; d) intellectual labour and mediation are replacing manual routine labour in most production and many service operations [12].

However, as technology development is increasingly associated with the challenges posed by these technologies, the ‘collective success’ is directly related to the ability to ‘curb’ the growing technological complexity. Technological solutions both reduce external threats due to the increasing complexity of the *artificial environment* (negative feedback between threats and the complexity of the technosphere), and at the same time generate many internal problems (positive feedback, ‘self-reinforcement loop’). Therefore, at the system level, this leads to the existence of two feedback flows that determine the complexity of the modern workplace – with each turn, environmental factors decrease and internal factors increase (provided that the system does not make any evolutionary transition to cope with growing difficulties). At the same time, digitalization does not directly cause disappearance of jobs (or unemployment) but reduces the demand for workers employed in certain areas. At the same time, there are two important properties of the new economy that have a serious impact on unemployment. Firstly, in the global digital economy, employment in any field of activity has nothing to do with the place of sale of the digital product and the way it is delivered to the final buyer (as a rule, there are no intermediaries, logistics managers, sellers, promoters, etc.). Secondly, the digital economy implies an extremely high effect of economies of scale (for example, the producer’s marginal cost to produce an additional copy of the program is close to zero). This allows achieving tremendous sales with the minimum number of company employees working on creation and distribution of a digital product (capitalization per employee in digital companies is many times greater than in enterprises of traditional industry). Thirdly, the digital environment plays the role of a ‘junior partner’ in many general and working processes and constantly changes the complex intellectual functions inherent in an employee (thereby acquiring quasi-subjectivity). It is already starting to play the role of the ‘external’ psyche (exocortex), taking a number of usual routine actions and functions from employees (‘remote memory’ in mobile devices, supporting activities in research groups and social networks, etc.).

On the one hand, today’s AIT (recommendation services and decision support systems; gaming environments that simulate complex behaviour; systems for analyzing big volumes of data), are used to compose work tasks, styles and trajectories for their implementation. On the other hand, they help to analyze regularly carried out actions, and then repeat them on the basis of the found patterns. In turn, a ‘virtual engineer’ is available 24/7, compiles programs, tests and evaluates them, and an engineer as an individual turns into an ‘expert in difficult cases’ [13]. Currently, a number of prerequisites have been formed for the accelerated development of job virtualization. *Firstly*, interactivity, together with artificial intelligence, can handle complex independent strategies (including socio-economic and military), and *secondly*, the use of virtualization as a ‘director’ and ‘designer’ allows implementing fully individualized game scenarios that are completely adapted to current goals of the company and

features of the employee. As for neuropsychological technologies and natural physiological interfaces (neurointerfaces) that are directly aimed at working with the body and mind, they fundamentally change the model of the workplace – in a certain sense, *thoughts become things* when interacting with a computer. Even today, the development of these technologies, combined with the widespread penetration of augmented reality, causes quite radical changes in the workplace when it becomes possible in any space and on any surface to create video and three-dimensional objects using gestures and voice commands. For example, large corporations have already recognized and are actively using the developing field of neuromarketing which is associated with intentional specific monitoring of the state of the body/mind and adaptation for scanning information about consumer preferences or offering goods suitable for such a state [14]. Using similar technologies at the workplace allows us to evaluate if operators are ready to work, adapt the workplace to the individual state of the employees, thus increasing the productivity of complex labour due to biomonitoring and biological feedback (BFB). The use of the latter allows both to determine what time of day and what conditions are most effective for work of any specific employee, respectively, drawing up individual work plans, and to train the employees in self-management of their own health (concentration of attention, relaxation, rest, etc.).

Information about the workplace, real-time material components, and digital modelling of empirical environmental dependencies contribute to the formation of a modern company management model based on digital workflow management systems (‘digital engineering’). Back in the middle of the XX century, a cybernetician W. Ashby formulated the so-called ‘principle of necessary diversity’, according to which the company's management systems should correspond in complexity to what they manage. For the digital economy, complex management systems are needed using both *big data* and artificial intelligence (*data driven management*), and the enormous potential of human capital (*collective intelligence*), which allows each employee to join the management. This entails new ‘rules of the game’ for market competition, new values, new systems of motivation and forms of leadership. Digital technologies allow us to create new business clusters, contribute to rapid development of trading platforms, and so called global platform companies where production processes differ from traditional ones and generate value by creating a ‘network effect’ that brings together customers, manufacturers and suppliers. For example, relying on digital technologies, the Chinese conglomerate *Alibaba* succeeded to increase the number of its customers to 1 million in two years, and in 15 years – to unite over 9 million trading companies doing business via the Internet on its platform, and to bring annual turnover up to 700 billion dollars USA [15]. Moreover, modern hybrid corporations organize R&D alliances with a wide network of independent small enterprises that interact with each other in sales/investment policies, development of innovation, or relations with product

user groups, which was difficult to imagine 10-20 years ago. The established trend is the transition to open management models when creating new products, allocating a significant part of the development process outside the company into an innovative ecosystem and into a 'cloud' of interconnected companies ('corporate incubators') that become holders of the technological title in access to the relevant market [16]. This is the result of the digital revolution, which has shifted all work on R&D projects to specialized digital environments of manufacturers and suppliers.

New forms of working communities and project teams based on the integration of local experience, global vision and creative disposal in the corporate sector are manifested in the dissemination of new management schemes [17]:

- *agile management* – an approach that involves flexible project management for employees to create a product using a series of prototypes and is based on free co-creation of participants in the work process;
- *holocracy* – an organization management system where powers are distributed over a network of self-organizing teams through creation of common rules, identification of individual roles, organization of small work teams and construction of interaction between them.
- *teal firms* – an approach assuming that organizations are able to evolve into self-governing structures that realize their mission taking into account the contribution of each employee's "whole" individual in accordance with their capabilities.

At the same time, one of the qualitative characteristics of jobs is that external motivation with bonuses and career growth is giving way to the development of internal motivation to "create and implement" large-scale joint corporate projects. The spread of hybrid collective intelligence systems entails introduction of horizontal control systems and further transformation of managerial competencies. At the local level, professional managers carry out work to identify the real needs and capabilities of workers, to structure technical and social protocols for coordination of their interests, after which this information is accumulated in the team (project) work matrix. There is a growing demand for specialists with "digital dexterity" – the ability and desire to use new technologies to improve business results [18]. The ability to cooperate, that is, to work in groups and teams of various types, fulfilling one's own part of the overall task and supporting the group's targeted work, joint creative work – *co-creation* – is a key social competency whose role will only increase in the future due to the synergetic component.

Generation Z expanding entry into the labour market is of particular influence on the quality characteristics of jobs. This generation is characterized by widespread abandonment of a career (after satisfying "basic needs") and

fundamental recognition that it is impossible to follow the old rules when the surrounding reality cannot be changed. The value of creative self-realization and the willingness to demand the necessary conditions for this is a completely logical "movement up the hierarchy of needs of Maslow pyramid" (self-fulfillment ceases to be a valuable prerogative of the elite and becomes a majority value, and excessive attention to material consumption causes social dysfunction, etc.). The movement from consumerism to self-fulfillment is a natural process of social improvement of the workplace, and its first signs are manifested in increasing attention to authenticity in all areas, including the sphere of one's own professional self-fulfillment. The role of *opportunity exchanges*, i.e., spaces where the employee can find their team, and the team can find its new member, is growing. If the main model of the existing employment exchanges is monetary motivation as a condition of work, then *opportunity exchanges* are based on at least three motivations: gaining experience, increasing personal reputation and ambition, moreover, all three of these parameters have their own quantitative expression. As a result, *opportunity exchanges* "sell" to users not employment, but the possibility of self-development through participation in new projects, which resembles the process of forming a baseball team based on the analysis of player statistics (sabermetrics). In addition, within the framework of the crowdsource paradigm, there is a shift from the vertical model, when companies define a circle of problems for employees, to the vertical *problem-sourcing model*, when employees themselves determine problems for themselves and the methods by which they solve them. An employee's reputation can be objectified on social networks, and a number of start-up companies are currently working on searching for models of the "digital" reputation of Industry 4.0, such as reflecting community recognition of the merits of an individual (for example, *TrustCloud, TrustRank, Legit, WhyTrusted*, etc.) [19]. The spread of integrated models of "reputation capital" has a significant impact on work processes (in the context of combining various networks of mutual communication) and, especially, career building.

The modern attitude to work is evolving as a change in the very work image that goes beyond the usual image of the industrial labour market. The digital economy eliminates linear professions (specialities learned in youth, and then used in the form of monotonous work throughout life, slowly moving up the career ladder), and the employee has to relearn several times in his lifetime and move into new areas of activity. The idea of the essense of the activity does not imply retraining of employees to 'professions of the future' (note, constantly changing), but help in finding their vocation (instead of a profession) and training in the principles of self-fulfillment. Already today, Having got rid of the need to constantly worry about money in order to meet basic needs, workers in developed OECD countries regard work as a space for their own development, communication with other workers and actualisation of their individuality. A

key element in the transition to the post-industrial phase is the growing variety of existing skills focused on adapting to global challenges and developing the ability to adjust to their requirements. This is not so much about various work skills based on new technologies, but about skills and knowledge that can be applied in a wide range of professional, social and personal contexts (including those related to technological transformation), in particular those that: 1) help to cope with the volatility, uncertainty and ambiguity of the environment (including cooperation, creativity, and entrepreneurial skills); 2) include systemic and ecosystemic thinking, design, and project and team work; 3) facilitate the use of analytics in programming, retrieval and processing of information (for example, mapping knowledge), information media literacy, etc.; 4) allow showing empathy and emotional (or interpersonal) intelligence, co-creation and dedication. The so-called '4C skills': communication, creativity, critical thinking and coordination, are of great importance in the rapidly changing global landscape of employment and changes in the demand structure for new individual and collective job skills.

In modern management theory, skills are usually divided into *hard skills* and *soft skills*. Hard skills mean the ability to work with equipment and perform specific tasks and their result can be checked and measured. Soft skills include those whose manifestation is difficult to track, verify and demonstrate, for example, time management and the ability to effectively interact in project teams (applicable in broad contexts and not limited to professional activities). Most existing models of professional competencies can be represented in a two-layer form. Inside (or at the core of competence) there are hard skills, and outside (as complementary, modifying, reinforcing the main skill) are soft skills. In modern conditions, the socio-emotional part of the employee's skills is being rapidly formed, which is part of the "four-layer" model, which includes the following levels [20]:

- *Context-specific skills* – hard professional skills of a particular context (for example, programming), physical skills and social skills (for example, video blogging). Competencies are acquired by employees in short training cycles, but quickly become obsolete due to a change in context.
- *Cross-context skills* – skills that are applicable in the broader areas of labour and socio-activity: foreign language skills, time management, and teamwork. Competencies are acquired by employees over a longer development period.
- *Meta-skills* – various modes of controlling objects in the physical world ("modality of intelligence") from logical-mathematical to bodily-kinesthetic and interpersonal. Competencies are usually acquired by workers in the early stages of human life and then rarely undergo changes.
- *"Existential skills"* – universally applied in work and various life contexts (the ability to set goals and achieve them, willpower, self-awareness and ability to self-reflection, and self-development). Competencies are also

usually acquired by employees in the early stages of human life, but may change depending on the psychological and spiritual environment of the employee.

One of the quality characteristics of modern jobs is their "gamification". The fact that the game does not happen "for real" and that there is always a second chance is its most important feature (despite the fact that the game theory is a modern paradigm that describes these activities). If psychologists primarily interpret the behaviour of avid players as Peter Pan's syndrome, then the employees' natural demand for restoring the natural role of the game is expressed in their behaviour. Since the 2000s gamification has become increasingly widespread in the areas of management, marketing, communications, R&D, etc., and this trend is not situational, but is associated with the spread of game models of virtual and augmented reality at the first stage of the era of "game totality". There are also several trends in the process of attracting game mechanics to solving serious problems in the business environment. *Firstly*, games become a form of crowdsourcing which allows organizing mass generation of new ideas among employees, and companies receive valuable decisions in exchange for their pleasure in the results of games. Gaming environments are adapted to task classes that allow employees to formulate competent solutions to real-world problems in game mechanics. *Secondly*, jobs are gaining more and more features of the gaming business environment, especially in cases where the problem concerns tasks requiring routine or increased attention. The decision to implement the game approach in work processes is a secret "revolution from the inside", as it requires companies to critically analyze which organizational processes are routine and insufficiently motivating, and which create a space of high creative productivity for the employees. *Thirdly*, the transition to game models in the organization of labour is a way of creating spaces in which the ability to directed work of an employee is awakened, preserved and developed. In the process of mastering new tools of the *NeuroWeb*, the adoption of the rules of the "total game society" will become one of the factors of the cognitive barrier in the transition to new models of corporate labour organization.

In modern conditions, a new wave of technological startups in most OECD countries and their "cultivation" is a leading investment practice. And investors themselves are playing an increasingly important role as accelerators of 'startup factories' in work processes and training in business skills, project and team work. A fundamentally new industrial landscape is being created in which startups, as new players, can change the markets for goods and services and establish new rules for the game in the next decade. The latter are largely related to the fact that: a) the offer of content or technology to interested companies, consumers and suppliers is determined by the high individualized quality of the product/service; b) many technology platforms bring together interested consumers and resource owners; c) system solutions that create technological infrastructure, and allow combining new financial and investment

instruments. However, the markets with most startups are still derived from industrial production and are based on industrial logic. Currently, the unique competitive advantages for startups are formed due to, *firstly*, integrated use of the digital environment that supports the entire workflow from decision-making practice to the finished product; *secondly*, providing platforms for individual/team experiments and supporting employee motivation for the formation of self-improvement skills.

New technologies are emerging, they ensure decentralization of production of goods and services, primarily mass 3D and 4D printing technologies and subcultures of independent manual production (*do it yourself*, DIY), which are united by the general idea of self-sufficiency and anti-corporate activism. Creation of a material product as a part of the DIY subculture is reduced to mini-factories where production chains are able to realize any idea using rapid prototyping systems. There is an increasing demand for customisation of standardised products (the participation of a new class of consumers – *prosumers*) and additive manufacturing technologies with local power generation capabilities and the availability of amateur engineers. We are talking about unique *hand-made* things created by certain craftsmen (from ceramic utensils and jewelry to items of clothing and furniture) that crowd out affordable mass-produced products, and to provide so-called unique "production services" (*manu-services*) [21]. "New craftsmanship", as an actually lost part of the culture of manufacturing materials to order, motivates authenticity, development of individual and creative energy of the employee and restoration of a sense of personal uniqueness and independence, not spoiled by commercial profit. The modern market for manufacturers of digital models of things that are used as the basis for creating objects includes both large players (*IKEA and Home Depot* who sell not ready-made kits, but digital models and supplies), and many small developers.

Individual self-education of workers occupies a special place in the modern transformation of jobs. An individual educational and career path creates the prerequisites for full-fledged lifelong learning models, that is, the basis for managing educational and career paths is the thesis which suggests that self-education creates the prerequisites for a career, and career sets the preconditions for additional self-education. The symbiosis of self-education and career as a specific aspect of a person's manifesting his/her abilities determines the "personal profile" of competencies that can be created, completed and applied in all areas – work, play, hobbies, volunteering, or networking. Firthermore, re-individualisation of self-education acquires stability precisely when all these areas are naturally and 'seamlessly' integrated into the process of building a personal profile of the employee's competencies. Employers are interested in the early arrival of individualized self-education, as this will give them the opportunity to see the skills and abilities, and real achievements of the

existing workers and new talents. Leading companies are already introducing full-fledged ‘competency portfolios’ that accompany employees throughout their professional career. However, the latter, recognized by international labour markets, require for their maintenance and development of a strong technological platform, expanding the possibilities of targeted investment management in desirable work skills. For example, the *Knewton* company platform provides solutions for personalising the self-educational process. On the one hand, it allows learners to link independent educational products and their users, building a personal self-learning path based on knowledge metrics (*GRE* and *GMAT* tests). On the other hand, it helps to systematise the assessment of the impact of career steps on personal income growth based on *big data* models (“proactive result management” - scenarios of desirable and undesirable routes for development of employee competencies) [22]. Modern leading companies are restructuring training sylabus for their employees (especially middle and senior management and engineering personnel) in the context of teamwork with real joint projects. In addition, as a rule, employees do not participate in one project, but in numerous projects having the opportunity to work in different countries and cultural contexts with changing teams and different leaders (and often in very stressful conditions). This way, companies try to identify their collective competencies, supplement them with reputation management tools (for individuals and groups) based on models of reputation capital in the formats of “predicting environmental conditions” (*wiki*-foresights).

Conclusion Today, ICTs open up new opportunities related to creating conditions for the emergence of new and transforming existing jobs, increasing the need for a new complex of special cognitive skills of the highest order for many specialties – from technology skills and problem solving skills to critical thinking, social and behavioural and interpersonal communication. At the same time, increasing productivity and enhancing the efficiency of bespoke services implies growing demand for skills not related to routine labour, accompanied by a decrease in professional skills related to performing repetitive operations. Meanwhile, the times when it was possible to work within the same specialty or in the same company for decades are becoming a thing of the past. The development of human capital, together with the use of the advantages of new technologies, turns into a significant national competitive advantage, and new models of labour activity and employment, the effectiveness of normative regulation of the labour market determine future scenarios for the development of new jobs and the codification of labour operations. Challenging the old business models of production and the ‘old’ behaviouristic concepts of production organization, digital technologies blur the boundaries between industries (changing the ‘geography’ of jobs) and individual corporate structures of firms in countries with developed and emerging market economies. On the other hand, they contribute to the rapid development of short-term forms of

work through online platforms, and make significant changes to the forms of labour relations that go beyond standard labour contracts.

REFERENCES

1. Da Costa M.B., Dos Santos L.M.A.L., Schaefer J.L. *et al.* (2019). Industry 4.0 Technologies Basic Network Identification. *Scientometrics* 121, 977–994. – Retrieved from: https://doi.org/10.1007/s11192-019-03216-7
2. OECD. Labour Force Statistics in OECD Countries: Sources and Coverage. Last Update: 25 July, 2019. – Retrieved from: http://www.oecd.org/els/emp/LFS%20 Definitions%20-%20Tables.pdf
3. World Development Report. 2019. The Changing Nature of Work. The World Bank. – Retrieved from: http://documents.worldbank.org/curated/en/816281518818814423/pdf/2019-WDR-Report.pdf
4. Technology At Work v 4.0. Navigating the Future of Work. Citi GPS: Global Perspectives & Solutions. June 2019. – Retrieved from: https://www.bluemarasolutions.com/wp-content/uploads/2019/09/CY19-citi-doc-work-4.0-interesante.pdf
5. McKinsey (2017*a*). A Future That Works: Automation, Employment and Productivity. Retrieved from: https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Digital%20Disruption/Harnessing%20automation%20for%20a%20future%20that%20works/MGI-A-future-that-works_Executivesummary.ashx
6. Frey C.B., Osborne M.A. (2017). The Future of Employment: How Susceptible are Jobs to Computerisation? *Technological Forecasting and Social Change*, 114. Retrieved from: https://www.sciencedirect.com/science/article/pii/S0040162516302244
7. Fossen F.M., Zongner A. (2019) New Digital Technologies and Heterogeneous Employment and Wage Dynamics in the United States: Evidence from Individual-level Data. IZA Discussion Paper 12242. Bonn: Institute of Labor Economics
8. Gunning D. (2017). Explainable Artificial Intelligence. Defense Advanced Research Projects Agency (DARPA). Retrieved from: https://www.cc.gatech.edu/~alanwags/DLAI2016/(Gunning)%20IJCAI-16%20 DLAI%20WS.pdf
9. Crowe S. (2020) Starsky Robotics Co-founder on Self-driving Truck Shutdown. *Collaborative Robotics Trends*, March 19. – Retrieved from: https://www.therobotreport.com/starsky-robotics-co-founder-on-self-driving-truck-shutdown/
10. Ghobakhloo M. (2018). The Future of Manufacturing Industry: a Strategic Roadmap toward Industry 4.0. *Journal of Manufacturing Technology Management*, 29(6), 910–936.

11. Skills of the Future. How to Thrive in the Complex New World – Retrieved from: https://worldskills.ru/assets/docs/media/WSdoklad_12_okt_eng.pdf?platform=hootsuite
12. Li Q., Tang Q., Chan I., Wei H., Pu Y., Jiang H., et al. (2018). Smart Manufacturing Standardization: Architectures, Reference Models and Standards Framework. *Computers in Industry*, 101, 91–106.
13. WEF (2018) The Future of Jobs. – Retrieved from: https://www.weforum.org/reports/the-future-of-jobs-report-2018
14. The 7 Most Common Neuromarketing Research Techniques and Tools. *Business & Marketing*, April 8, 2019. – Retrieved from: https://www.bitbrain.com/blog/neuromarketing-research-techniques-tools
15. World Development Report 2019: The Changing Nature of Work. World Bank – Retrieved from: http://documents.worldbank.org/curated/en/816281518818814423/2019-WDR-Report.pdf
16. Bone J., Allen O. & Haley C. (2017) Business Incubators and Accelerators: The National Picture, BEIS Research Paper, No. 2017/7, UK Government, Department for Business, Energy & Industrial Strategy, London. – Retrieved from: https://www.econstor.eu/bitstream/10419/196202/1/2017-07-business-incubators-accelerators-uk-report.pdf
17. Lu Y. (2017). Industry 4.0: A Survey on Technologies, Applications and Open Research Issues. *Journal of Industrial Information Integration, 6,* 1–10.
18. Gartner (2018*a*). 4 Steps to Develop Digital Dexterity in Your Workplace. – Retrieved from: https://www.gartner.com/binaries/content/assets/events/keywords/digital-workplace/pcce13/4_steps-infographics-3.pdf
19. Moeuf A., Pellerin R., Lamouri S., Tamayo-Giraldo S., & Barbaray R. (2018). The Industrial Management of SMEs in the Era of Industry 4.0. *International Journal of Production Research, 56*(3), 1118–1136.
20. ILO (2019) World Employment and Social Outlook: Trends 2019. Geneva: International Labour Office (ILO). – Retrieved from: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/ publication/wcms_670542.pdf
21. Global 3D & 4D Technology Market 2020 by Company, Regions, Type and Application, Forecast to 2025. – Retrieved from: https://www.fiormarkets.com/report/global-3d-4d-technology-market-2020-by-406570.html?mod=article_inline
22. World Development Report. 2018. Learning to Realize Education's Promise. The World Bank. – Retrieved from: https://www.worldbank.org/en/publication/wdr2018

4. National innovation system in the context of the industry 4.0: theoretical approaches

Olena Dovgal
Doctor of Economics, Professor of the Department of International Economic Relations, V.N. Karazin Kharkiv National University,
E-mail: e.a.dovgal@gmail.com
ORCID ID 0000-0003-3219-9731

Georgiy Dovgal
Candidate of Economic Sciences, Associate Professor of the Department of Travel Business, V.N. Karazin Kharkiv National University
E-mail: g.dovgal@gmail.com
ORCID ID 0000-0002-0644-1793

Introduction. The significant increase of proportion of high technology production in the aggregate product of the world economy, as a consequence of the new industrial evolution mid XX-early XXI century, defines a completely new, in terms of world experience, range of system views on the global economic system. Updating of implements, methods of production and improving the level of qualification characteristics of an aggregate worker, goes far beyond the simple renovation of physical capital, increase the efficiency of production and productivity, capital, etc.

The high rates of reconfiguration of the main parameters of productive forces, market «rules of the game» and growth of value of economic relations in the intellectual property sphere, indicates a natural transformation of rare innovations that took place in the past, into a complete differentiated global innovation system. The socio-economic welfare of any modern economy depends on the business activity of national agents in this system, especially in the context of high-tech product commercialization.

Therefore, the purpose of the research is a sequential analysis of innovative concepts and stages of formation of the principles of functioning of global and national innovation systems for the purpose of country`s further participation in the international division of labor, namely effective high-tech product commercialization.

Literature review. D. Breznitz [1], C. Freeman [3-4], J. Kao [5], M. Kastels [6], A. Kleinkneht [7], G. Mensh [8-10], J. Schumpeter [12], J. Van Duijn [13]and others have dedicated their works to the research of national innovation systems functioning principles in terms of world global development. Highlighting previously unsolved parts of a common problem. Despite numerous researches of innovative high-tech systems' economic nature, there are significant differences in

views of different scientific schools, in particular on their factors that shape the system, namely the lifecycle of innovations, i.e. stage of their occurrence in the period of long wave, which causes large-scale discussions on propensity for investment and an importance of investment risk factor, economic relations in the network economy, etc.

These disagreements slow down and sometimes make it impossible the process of forming a slender theoretical base for building integrated models of national innovation systems and their interaction in the contex to the new industrial revolution. The goal of the research is to analyze the development of the theory of global and national innovative high-tech systems in time, considering the hypothesis of the existence of a rigid connection between long waves and the periods of basic innovation occurrence at various phases of the waves, in order to recognize the possible options for the development of events and to model the appropriate reaction to ensure the uninterrupted functioning of the national innovation system in the context of the new industrial revolution.

Another important assignment of the study is to research the patterns of the life cycle of innovations and their diffusion to identify the advantages and disadvantages of a transfer of high technology products for the national innovation system and also to identify the development trends and new factors, which define the essence of modern efficient high-tech system in terms of the new industrial revolution.

Results. Qualitative socio-economic transformations and the modern multi-dimensional innovation system formation and recognition of innovations as one of the main tools for meeting the needs of society is directly dependent on the scientific and technological progress which caused these changes. The emergence of new base (which significantly intensifying the production process) inventions is a qualitatively new stage of social development, it also generates new needs and renewed production changes, which is responsible for it. The term «technical progress» was put into circulation in the XX century, in the context of the substantiation of the traditional scientific and engineering picture of the world, which characterizes the interconnected and mutually stimulating development of science and technology. The goal of technological progress is to meet the ever-growing human needs, and to meet these needs with the implementation of natural sciences and equipment.

At the same time, the prerequisite stage of a slow and independent development of science and technology, and the stage of scientific and technical revolutions are different. According to the researchers, there were three industrial revolutions in the past, and now the world community is experiencing the fourth one. Industrial revolution is a transition to a qualitatively new level of equipment and technology, leading to a sharp increase in productivity and production. The First Industrial revolution occurred in different countries not at the same time, but in general is assumed, that it began in the second half of the XVIII century and

lasted till the beginning of the XIX century and was associated with the invention of weaving machines. The first industrial revolution led to replacement of human hands in almost all areas of production and caused a colossal rise in labor productivity on the basis of the large machine industry. Since the first industrial revolution, the term technology is inextricably linked with the mechanization of production processes.

The Second Industrial Revolution (it is also called technological) is a transformation in the world industry, covering the second half of the XIX century and the beginning of the XX century. The beginning of the revolution is connected with the introduction of The Bessemer process -the first inexpensive and high-performance method of industrial production of fine steel in the 1860-90s. The peak of this revolution was introduction and distribution of conveyor belt production and production lines. In 1860-1870s technological revolution quickly covered Western Europe, USA, Russian Empire and Japan. The Third Industrial Revolution was accompanied by automation, robotics and computerization of production, the creation of automatic factories. It is usually denoted as «digital revolution» - a widespread transition to the usage of information and communication technologies in production, which contributed to the formation of postindustrial society. It continues now on in major industries.

Today, increasing cooperation between industrialized countries in science and technology and systemic technological advancements in most economic sectors have acquired a global nature. Under the influence of information and communication revolution, they have contributed to the emergence and development of techno-globalism that should be viewed as a global trend towards merging national technology systems into a global system of generating scientific knowledge and ideas, production and commoditization of innovative products. The main drivers of techno-globalism are multinational companies actively operating in the international information and innovation environment. Thus, despite the fact that the concept of the third industrial revolution at the beginning of the XXI century has not yet been sustainable, there is already an idea of The Fourth Industrial Revolution.

Industry 4.0 signifies the fourth in a series of industrial revolutions, which are characterized by their ability to transform economies, jobs and even society itself through the introduction of new technologies and processes. Industry 4.0 is driven by a great amount of data and advanced human-machine interaction. All this enables creating cyber-physical systems and mirroring the physical world in a virtual model. German privately-state program Industrie 4.0 is associated with the term. Large German concerns, supported by the Federal government grants, within the framework of the program, create fully automated production, lines and products that interact with each other and consumers, due to CPS, in the factory processes.

There are four key categories that describe Industry 4.0: Cyber-physical systems (CPS), Internet of Things (IoT), Internet services and Smart factory. CPS represent a combination of physical and virtual worlds. They are interactive networks of physical and computational elements, which are involved in the Smart factory and related to AI technologies, integrated in manufacturing. Internet of Things (IoT) is a network of devices such as automobiles, smartphones, household appliances, etc. that collect and exchange data over the Internet. IoT enables you to access the latest data accumulated around the world. A deeper understanding of IoT analytics improves productivity, creates new business models, and generates additional or new revenue streams. This is especially important for manufacturing companies that need to keep up with changing customer needs.

Like IoT, Internet services also represent digital networks, but the main product shared in the network is service. As the economy is moving rapidly towards a service economy, the idea of IoT must be clear and ready for implementation. Internet services cannot exist without the concept of IoT and CPS.

Smart factory can self-optimize and self-adapt in the production process. As a rule, it comprises all the three components described above: CPS, IoT, and Internet services. Smart factory output is characterized by CPS, providing clear standards of quality, timing, resources and costs in comparison with traditional production systems in real time. Smart factory is designed for sustainable and service-oriented business and allows companies to be flexible, responsive, and trouble-free and keep risks manageable throughout the entire manufacturing process. The most important feature of Smart factory is automation driven by digital processes. Digital IoT connectivity enables CPS to be flexible and adaptable to market fluctuations.

The scope of Industry 4.0 is to engage machines with workers and work units in creating intelligent networks with adapted target chains, which could take decisions independently and autonomously, but still rely on a coordinated approach, ensuring integrated transparency and high flexibility for faster response to problems and weaknesses. Thus, similarly to previous industrial revolutions, the impact of changes related to Industry 4.0 could potentially spread to all industries and economic systems. But this time the revolution is advancing at an extraordinary pace, driven by exponential technologies. Against the background of today's demographic changes and unprecedented global connectivity - not only technological but also social and economic - Industry 4.0 may offer more opportunities than any before

CPS is a comprehensive term that is widely used in everyday life, when it comes to integrating small Internet connected devices and mechanical systems. Executives of enterprises do not just reassess the principle of conveyor assembly technology, but also actively create hybrid technological systems that will not only produce goods with fewer errors, but also be able to independently change the production templates, remaining highly effective. In other words, the Industrie 4.0

is the production side, equivalent to user-friendly «Internet of Things», where household items, such as cars and toasters, will be connected to the Internet and managed by artificial intelligence.

In the course of global economy establishment, traditional factors of development, actors and sectors of the world economy, competitive market mechanisms are discredited, which is manifested in certain trends, processes and imperatives. In global context, methodological approaches to the study of national competitiveness towards assigning priority to its innovation imperative require significant adjustments. In today's context, information (access to knowledge, innovation, and communication) becomes a decisive factor in development. «Info-globalism» dominating virtually all world markets enables participants in it to increasingly operate on virtual assets and liabilities, which significantly alters conditions and criteria of international competitiveness, when supremacy in the information and media sphere becomes a decisive factor of global leadership. It stimulates the comprehension of globalization processes in the paradigm of «information society» and «new economy» caused not only by progress in scientific research, but also by real practices.

Currently, more than 40% of the world's population enjoys Internet connection, i.e. there are about 2.9 billion users. This became possible thanks to mobile broadband available on smartphones and tablets. This kind of connection is the fastest-growing technology in the history of mankind. Today, the number of mobile broadband users is three times higher than those using traditional fixed-line connection. In general, under the current conditions, the development of information and communication technologies determines not only the areas of transformation of consumer demand, forms of access to commodity and financial markets, but also innovation and overall competitiveness of countries and regions of the world.

A sharp decline in commodity dependence and partial decline in energy dependence due to recent «de-industrialization» of the economy is becoming increasingly obvious. In postindustrial economies, whose industries have long been dominated by services sectors and technocrats, experts and consultants constituted the leading «class», investments refocus from expanding production and accumulation of assets to human capital development. Already, countries such as Norway, Canada, Germany, Ireland and Austria have shifted the focus of their economies to the production and implementation of modern knowledge, which provides for a 50% increase in national wealth

Obviously, all of industrial revolutions had innovations as driving forces. Innovation economics has also come a long way of development.

J. Schumpeter, Austrian political economist, is considered as a founder of Innovation economics, he investigated long-term Kondratiev waves and linked them with the evolution of science. The patterns of interdependence of science and

economic activity dynamics, determined by Schumpeter, were called the Theory of innovative cycles (business cycles).

J. Schumpeter built his theory on the basis of numerous observations of M. Kondratiev for the dynamics of economic conjuncture, tha the connected with as cending phases of Kondratiev long wave with a mass introduction of innovations. According to Schumpeter, the clusters of innovations cause the destruction of investment demand in modernized basic capital on the ascending phase of the long waves, causing a radical trans formation in the economy and destabilize it, when no recovery is expected; a new cycle will begin with the downard phase (the depression stage) of a large wave, but at a different point of equilibrium, different from the previous one.

Innovations disturb the economic system, unbalance it and brings an element of unpredictability, increase the vibrations, causing a «rocking swing» (accurate explanation of circularity of P. Samuelson), at the same time making a path to a qualitatively new stage of the system development. This process the scientist characterized as a creative destruction, because with the introduction of many innovations, parameters of the system and its main structural elements are modified -economic relations and productive forces, irrelevant and outdated connections and components are reestablished.

Schumpeter suggested a classifying model of business cycles, combining short, medium and long-term cycles of Kitchin, Juglar and Kondratiev together to form a single model of innovative cycles. According to the scientist, radical inventions make the main impetus for the spread of each wave, which greatly influenced the further development of society and formed a new vision of economic configuration of the economy[12].

Radical innovations, designed to carry out a technological coup, by J. Schumpeter, arise in the previous cycle, it means, that the discovery comes significantly earlier, then the stage of its mass consumption, which eventually leads to a decline stage. This feature is explained by inertia in making decisions by the owners of capital, management and state functionality, high risk of investment projects and stereotype thinking of agents: the main motive of a firm is to maximize profits and reduce costs.

An innovative breakthrough takes place in selected countries and industries, with higher risk readily, which causes disproportion of social reproduction. Over time, other entrepreneurs, realizing the success of implemented projects with a high norm of profits, begin to "catch up" competitors in the pursuit of a high norm of profit; as follows, on the market of goods there is a huge number of improving innovations, which in content is analogous to basic (radical) innovation and are carry a few, but noticeable consumer improvements. Such a catching-up policy is typical for markets of monopolistic competition [2].

The Theory of innovations by J. Schumpeter was worked out and augmented by a number of his followers – «neo-Schumpeterians», such as G. Mensh, A.

Klyankhkneht and Y. van Dein. G. Mensh, like J. Schumpeter, explored the dynamics of economic growth based on the theory of long-term Kondratiev waves and connected the cyclical development with the emerge of basic innovations, which have an exhaustive potential. According to G. Mensh, the situation, when the basic innovations exhaust their capabilities, is called the "technological draw", in this case, the economy goes to a depressive state [10].

This situation is explained by the emergence of radical basic innovations leads, in turn, to the emergence of a large number of new enterprises with interconnected development cycles and modifies market infrastructure. First, the demand for new products will significantly exceed the offer, what will be accomplished by the high rate of economic growth, and the high rate of profits will stimulate the transfusion of capital from other industries, new enterprises will enter the market; in course of time, basis innovations will exhaust its potential, and firms, in order to preserve high profit margin, in terms of competitive market (monopolistic competition) will improve products, without affecting its functional characteristics (such innovations were called «improving innovations», or «innovation-process») [9].

At high prices and a large number of competitors, the demand for products will be less than the supply. This situation would force the company to enter unexplored international markets, the rate of return on investmentwill subside, which will lead to a significant transfer of capital to financial markets. Anyway, speculative transactions at the financial markets will reach huge turnover and, as the result, profits compared to the real sector will fall, what will signal the readiness of production to receive investment. In another scenario, speculative operations will be completed by the financial crisis and recession, when the new wave and growth phase begin. G. Mensh believed, that economy becomes structurally ready to large-scale innovations-productsin the stage of depression; at this stage, clusters of innovations are being formed, and they will have an embodiment as new wave products [8].

The scientist associates discrete nature of producing basic innovations with market mechanism particular qualities of functioning and its inherent contradictions, such as: low sensitivity to reorientation of the functioning of companies in the "old" areas and their transition to «new», more risky areas; contradictions between short-term goals, aimed at maximizing profits, and long-term objectives that are essential for new innovations; minimization of innovation costs; contradictions of communication «principal – agent – engineer», which shows a controversy of goals and diametrically opposite understanding of behavior and strategy of a company.

According to G. Mensh, GDP dynamics is S-logistic curve shaped, correlated with long waves phases and appears as a life-cycle indicator of production technology. At the final stage of the old technological method, old

curve smoothly changes into a new one; the imposition of S-logistic curves causes instability, which is the «technological draw» [10].

The economic cycles analysis is also devoted to Y. van Dein, who investigated the theory of long waves and its «Schumpeter» interpretation. Recognizing the importance of the impact of technological innovation on economic development and their dependence on business activity, the scientist has identified three components of the innovation process: technological innovations; life cycle of innovations; market infrastructure [13].

Y. van Dein, similarly to G. Mensh and K. Freeman, highlighted the «innovations-products» and «innovations-processes», emphasized on the importance of restructuring the market's infrastructure and stimulating investments, in order to uniform the innovation processes in time. But the study of circularity of the innovative processes of scientists did not find empirical confirmation.

Based on the achievement of «neo-Schumpeterians» predecessors in the research of the innovative processes of long waves, A. Klyankhkneht qualitatively expanded the concept of innovations, complementing it with a factor of risk: in the phase of a recession of a long wave, new clusters of radical innovations appear, these clusters can replace the existing technological production method and significantly affect the preferences of consumers in future.

This phenomenon is directly related to the increasing tendency to invest and reducing the risk of losing profitability by companies, because entrepreneurs "have nothing to lose" in the stage of production decline. On the other hand, in the phase of growth of consumer demand, stimulated by radical innovations, and, consequently, profitability standards, entrepreneurs are restrained from risky investment decisions in the field of innovation, therefore, firms prefer to improve the technical characteristics of existing products, without affecting the content of the product significantly. Although, A. Klyankhkneht has also noticed, that the period of producing radical innovations tends to continue at the initial stage of the long wave lifting phase, i.e. high concentration of innovations promotes prolongation of the innovation period [7]. Researches of K. Freeman, D. Clark and L. Suyte were an important and logical stage of development of science of innovations in the context of international cooperation [4].

K. Freeman and his followers, in contrast to «neo-Schumpeterians», introduced the concept of technological system, which is a set of interrelated technological and social innovations. The scientists also investigate the life cycle of innovations and associate it with diffusion, i.e. the ability to spread in space-time. Dynamics and uneven dissemination of innovations is observed in this case: the emergence of innovations in certain areas stimulates economic growth and acceleration of production. Further diffusion will facilitate the establishment of unified technological system in a country.

However, the further spatial expansion of innovation, as a rule, takes place at the stage of maturity of the technological system, that is, the flowering of

technological systems in some countries will be accompanied by ageing of these systems in their countries of origin. This explains the uneven development, lags, and exhaustive possibilities of cooperation between countries with different levels of technical readiness. The transition to a new technological conclusion is impossible without reidentification and revision of the basic provisions of the determinants and components of the system, relations between them and the system as a whole.

This process was determined as a change in the technological paradigm and was detailed by K. Freeman: «Technical and economic paradigm is a concentration of interrelated technical organizational and managerial innovations, the advantages of which to look for not only in a new range of products and systems, but most of all in the dynamics of relative structure of costs for all possible investments in production». Each new paradigm has a particular attachment, that can be called a «key factor» of this paradigm, characterized by falling relative expenses and universal availability. The modern paradigm shift can be seen as a transition from a technology, «based on a cheap energy», to a technology, «based mostly on cheap attachments of information, borrowed from microelectronics success and telecommunications technology» [3]. As can be seen from the definition, the analysis of paradigm shifts and innovative transformations led the researcher to an audit of the cost category: the value of innovations depends on is their ability to minimize production costs in the long-term perspective.

There is a significant difference between «neo-Schumpeterians» and K. Freeman and their views: Freeman believed that the base technology cluster is formed not in the recession phase, but in the lifting phase (ascending segment): during the period of rising of employment, prices and volume of costs. Enterprises, expecting further growth of production, will invest into fundamental development (induced investment), which will contribute to the innovation cluster formation and to a new technological system in future.

M. Castels, famous technocrat researcher, highlighted such features of the modern socio-technical paradigm of the global techno-innovation system [6]: information is a new system material; technologies affect information, not vice versa, which has been a characteristic of the previous STR; an embodiment of the new paradigm has a comprehensive effect, because the integral impact of information on the collective and individual consciousness (and consequently, their activity) spreads the paradigm on all aspects of the system functioning; the presence of network logic as a set of relations based on information technology; network morphology easily adapts to the complexity of interactions and unpredictable development models arising from the creative power of these interactions; network logic is designed to structure something unstructured, keeping itself elastic, as unstructured elements are main attractors of development; the technological paradigm is based on elasticity; ability of the system to reconfiguration; growing technology convergence in highly integrated system, and

outdated technological trajectories of development are not different among themselves.

In contrast to the systemic approach of K. Freeman in 1980-ies of the University of Santa Fe (New Mexico, USA) formed a union of scientists whose views are brought together relevant theory of chaos and bifurations; the scientists formulated their joint, epistemological approach, which was identified by analysts as «complexity».

The main attention was paid to the conditions of self-forming structures, which create complexity from the elementary, the highest order from chaos through several levels of interactivity after the formation of the basic structures. The problem of the method is to prevent the construction of integration, structuring frameworks and strong random and functional relations, so the concept of scientists can be understood as a way of thinking about the diverse and ambiguous, both society and the technological system in general; It is the epistemological value of the method [11].

Conclusion. The primary conclusion of the research is the urgency to create a strong national innovation system in Ukraine, considering the specificity of those elements that are now the basis of functioning of innovative systems. It is very important to detect the innovative boom and react to newly created inventions with improving innovations in time, at the stage of the origin of new innovation system.

Another important conclusion is to understand economic relations of the global network system. The fastest access of domestic enterprises to world network markets not only to develop the sales network, but also to search for innovative solutions and creative interactions. These practices are suitable for most countries, which have adopted the experience of world's innovative leaders and now are competitive players of the world market of high technologies.

REFERENCES

1. Breznitz D. (2007). Innovation and the State : Political Choice and Strategies for Growth in Israel, Taiwan, and Ireland. New Haven and London, Yale University Press.

2. Dovgal O., Dovgal G. (2017). Hlobalnyi innovatsiinyi prostir: peredumovy, spetsyfika ta instrumenty formuvannia [Global Innovation Space: Prerequisites, Specifics and Tools of Formation], *Problems of Economy*. 1, 15-20. URL: https://www.problecon.com/export_pdf/problems-of-economy-2017-1_0-pages-15_20.pdf (in Ukrainian)

3. Freeman C. (1987). Technical Innovation, Diffusion and Long Cycles of Economic Development The Long-Wave Debate. Berlin.

4. Freeman C., Clark J., Soete L. (1982). Unemployment and Technical Innovation. Study of Long Waves and Economic Development. London : Frances Pinter.

5. Kao J. (2007). Innovation Nation: How America is Losing Its Innovation Edge, Why It Matters, And What We Can Do To Get It Back. N.Y., Free Press.

6. Kastels M. (2000). Informatsionnaya epoha: ekonomika, obschestvo i kultura [Information age: economy, society and culture] / per. s angl. pod nauch. red. O.I. Shkaratana. Moskva : GU VShE (in Russian).

7. Kleinkneht A. (1987). Innovation Patterns in Crisis and Prosperity: Schumpeter's Long Cycle Reconsidered. London : Macmillan.

8. Mensh G. (1971). O dinamike tehnicheskogo progressa [On the dynamics of technical progress]. *Zhurnal ekonomiki predpriyatiya*, 41, 295–314. (in Russian)

9. Mensh G. (1972). Bazisnyie innovatsii i innovatsii sovershenstvovaniya [Basic innovations and innovations of improvement]. *Zhurnal ekonomiki predpriyatiya*, 42, 291–297. (in Russian)

10. Mensh G. (1979). Stalemate in Technology: Innovation Overcome the Depression. Cambridge : Mass.

11. Santa Fe Institute. URL: http://www.santafe.edu.

12. Schumpeter J. (1939). Bussiness Cycle. A Theoretical, Historical and Statistical Analysis of Capitalist Process. New York : MacGraw-Hill.

13. Van Duijn J.J. (1983).The Long Wave in Economic Life. London.

5. E-commerce as a prospective direction of trade business development

Iryna Vavdiichyk
PhD (Economics),
Associate Professor of Department of Economics
and Finance of the enterprise
Kyiv National University of Trade and Economics
E-mail: irunavavdijchuk@ukr.net
ORCID ID 0000-0002-2787-0327

Oksana Kondratiuk
PhD (Economics),
Associate Professor of Department of Economics
and Finance of the enterprise
Kyiv National University of Trade and Economics
E-mail: kondratk@ukr.net
ORCID ID M-8559-2016

Introduction. One of the key advantages, which is able to ensure the achievement of competitive advantages in the market, to ensure a steady pace of sales growth is the use of modern information technology trade. The use of forms, tools and methods of e-commerce by trade enterprises helps to increase their efficiency and effectiveness. Therefore, the study of development problems and features of e-commerce for trade enterprises is timely and relevant.

Literature review. To date, a large number of works are devoted to the study of the e-commerce market. Thus, the works of H. Shirley and M. Smith, W. Zwass are devoted to the general characteristics and features of the functioning of basic systems and organizational forms of e-commerce. American researcher W. Zwass, gives the following characteristics of e-commerce: the exchange of business information, business relationships, business transactions through telecommunications networks, as well as trade relations. [1]. The work of H. Shirley and M. Smith demonstrates how the implementation of calculations and transactions via the Internet affects the economic situation in the country as a whole [2]. Thus, K. Kohlberg and V. Velamuri [3] explored the possibility of using alternative models: bulletin board and e-auction models or their integration.

Hagyu and J. Wright [4] investigated the advantages of using an e-marketplace in comparison with an e-shop. In their view, such benefits arise when suppliers of goods can provide more information about the product; the goods themselves differ little in price and popularity on the market from a significant

number of analogues; goods have a wide range and small production volumes; goods are in the later stages of the life cycle.

S.Wang explores the differences between electronic marketplaces as governance structures and as business models [5]. Among Ukrainian scientists, who have considered this issue, it is worth noting such as Malovichko S., which reveals the features of the development of e-commerce [6]. Balik U.O. in his work focuses on the forms of interaction between market participants that have become available in connection with the implementation of e-commerce [7].

Results. According to the Law of Ukraine «On e-commerce», e-commerce is defined as part of e-commerce, namely - business activities in the field of e-sales, sale of goods remotely to the buyer by making electronic transactions using information and telecommunications systems [8]. According to A. Summer and Gr. Duncan. E-commerce is any form of business process in which the interaction between entities takes place electronically using Internet technologies. E-commerce is the process of buying and selling goods or services, in which the entire cycle of a commercial transaction or part of it is carried out electronically [9]. That is, e-trade is one of the elements of e-commerce.

Characteristic features of e-commerce are: 1) increasing the competitiveness of the firm by increasing costs for business organization, advertising and promotion of goods (services), customer service, communication support, reducing time spent on interaction with consumers and business partners, expanding to and after sales support; 2) expansion and globalization of markets: for the Internet there are no geographical boundaries, time constraints, days off, the cost and speed of access to information does not depend on the distance to its source (except for transport costs for delivery of purchased goods). As a result, small and medium-sized enterprises can compete successfully in the global market, and users have the opportunity to gain the widest possible access to goods and services; 3) personalization of interaction: with the help of information networks, firms can receive detailed information from each client and automatically provide goods and services at mass market prices; 4) changes in infrastructure by reducing the share or complete exclusion of material infrastructure (buildings, structures), reducing the number of staff and intermediaries; 5) creation of new products and services, for example, electronic delivery and support services, provision of reference services, services for establishing contacts between customers and suppliers, etc. [10].

E-commerce tools can be used by the trade company to purchase goods and sell goods. At the same time there is a decrease in investment in inventories, trade can reduce turnover costs by reducing the number of employees and reducing the wage bill, reduces the need for retail and warehouse space, the company gets access to international markets, and so on. The use of e-commerce provides the trade enterprise with additional opportunities in conducting marketing research of buyers, allows to offer new services, develop new market segments and exert

targeted influence on an individual buyer, increase the level of customer loyalty to its own brand.

The following e-commerce systems can be distinguished according to the forms of organization of sales of goods: online stores, Web-showcases, trading platforms [11]. According to A. Apopiya, an electronic trading platform is a market cyberspace for conducting commercial transactions on-line, related to wholesale purchases and wholesale sales of goods, works and services [12].

For the purchase of goods, the trading company can use independent and internal corporate electronic trading platforms. When using an independent electronic trading platform, the trading company places all the basic parameters of the required purchase. The system selects the necessary offers from the registered suppliers. Independent electronic trading platforms are a higher priority for purchasing goods. Corporate electronic trading platforms are created by trade enterprises independently. The advantage of their use is the maximum consideration of the specifics of the trade enterprise. At the same time, in addition to the high cost, the disadvantage is a certain limited database of suppliers, which is formed by the trade enterprise itself.

Table 6

SWOT-analysis of trade business development in quarantine

Strengths	**Weak sides**
- Firms that had a developed Internet resource have realized that this resource is important, and now it performs a vital function - A strong and recognizable brand, well-established marketing communications, knowledge of its customers - these are the crucial things that keep companies afloat. - Flexibility and speed of decision-making comes to the fore	- Firms that have not developed their Internet resource have faced serious problems and have already closed or are on the verge of bankruptcy. - Goods and a good location are not enough conditions for a profitable business
Opportunities	**Threats**
- Coronavirus put entrepreneurs in new difficult circumstances, which prompted them to develop: online resources, digital marketing, establishing new communications - Online stores have seen an increase in the number of customers - People have the opportunity to spend more time with themselves and their loved ones	- A large number of companies are threatened with extinction - The income of a significant part of the population has significantly decreased

Source: Compiled by the author

The overall economic benefits for all participants in e-commerce through the Internet are as follows: global presence in all markets of suppliers and buyers, continuous operation, the availability of favorable opportunities for continuous sales growth, the presence of a large potential for new segments markets,

providing almost the same technical and technological opportunity to access the Internet market for large corporations and medium and small enterprises, a significant reduction in advertising costs, a significant reduction in operating costs and the cost of creating the necessary infrastructure, personalization of the trading process customer service, the emergence of a real opportunity to stay ahead of competitors [11].

Thus, the commercial business is paying more and more attention to the use of e-commerce, and rethinking its benefits. The beginning of 2020 was a difficult year for business, especially negatively affected by quarantine, which was introduced as a result of the pandemic that caused the covid-19 virus. After analyzing all the consequences of quarantine for the trading business, we identified the opportunities and threats it poses (Table 6).

Anti-epidemiological measures have seriously affected the Ukrainian market in various industries. Due to the coronavirus pandemic, the government imposed severe restrictions on the operation of trade and catering establishments. Therefore, in order to work in such conditions, the trading business began to switch to online sales, the volume of online trade increased at the end of March by 49,2%. Online sales in this quarantine have increased and for many companies e-commerce has remained the only source of income. However, he could not block the fall offline. E-commerce gives businesses the opportunity to make money on a wave of growing demand from consumers who are interested in shopping online. If we pay attention to the data on the number of people who use the Internet as stores, we see growth, especially rapid growth was during the period of strict quarantine (Figure 4).

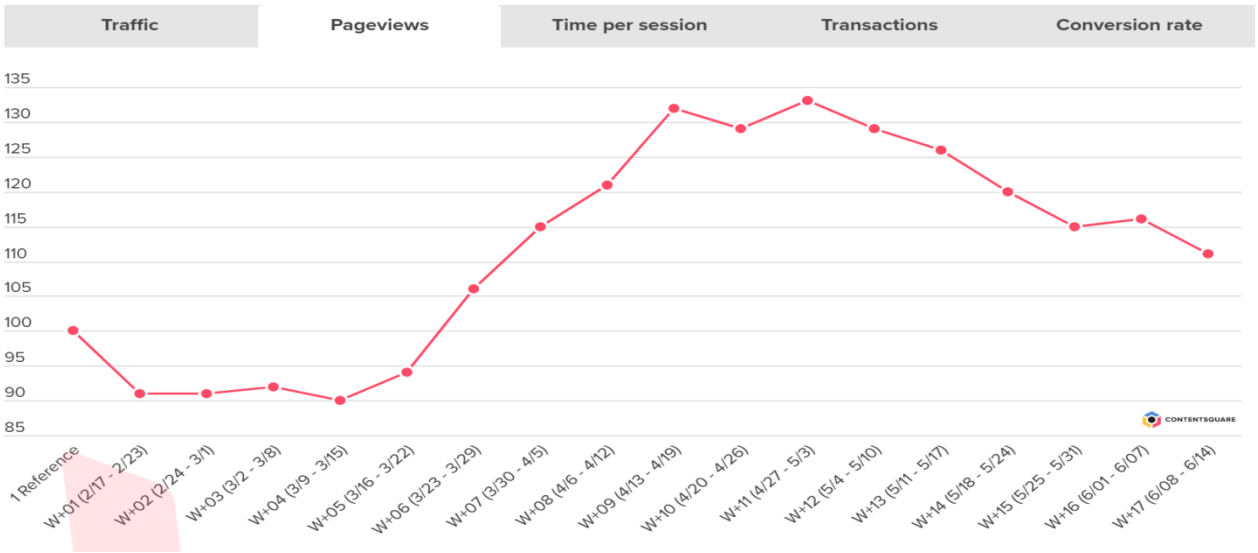

Figure 4. Main KPIs evolution per week (Index 100)

Source: The COVID-19 e-Commerce Impact Data Hub. https://contentsquare.com/covid-19-ecommerce-impact-data-hub/ [13]

Among the leaders in the field of international online trade in 2020 was China, only in the I quarter of 2020, the income of sellers increased by 25%. Online retailers from the United States and the United Kingdom reported an overall increase in sales of 53% in the first quarter of 2020. The Korean e-commerce industry in the first quarter of 2020 increased sales by 45% compared to the same period last year. However, due to the effects of the pandemic, Korean vendors have faced strict border controls throughout Southeast Asia. This has reduced sales in the region by 50%. According to the study, the number of online sellers, compared to last year, in Spain increased by 30%, in France – by 13%, in Italy – by 85% [14].

As for Ukraine, the main threats hindering the development of e-commerce are distrust of online shopping, especially guarantees, security and payment. This distinguishes Ukraine from developed markets, where there is no problem of distrust and more than 90% of goods are paid for by buyers online. According to forecasts, by the end of 2020, the total sales of online stores worldwide will reach the mark of 2 trillion US dollars [15].

There is no doubt that the e-commerce market will continue to grow, as even in the West it is showing positive dynamics, not to mention Eastern Europe and developing countries in Asia. Experts predict the acceleration of digitalization and say with confidence that in the future will succeed only the online seller - whose business will be as digital as possible and optimized. And the use of high-tech online payment solutions is an important part of successful e-commerce business.

More and more trade enterprises in Ukraine are paying attention to e-commerce. Nicheness in e-commerce is becoming a trend and one of the components of success. So positive changes in this direction are declared by such rather successful enterprises in the Ukrainian market, as [16]:

1. «Watsons» which have a male audience thanks to the online store.
2. «Comfy», having transferred a significant part of the range to the Internet has increased sales, and today is a leader in one of the most competitive segments of retail, with the number of stores almost twice less than competitors, makes more sales.
3. «METRO Cash & Carry Ukraine», since the launch of e-commerce in 2017, the average monthly number of online purchases of end customers has increased by 13%, the average monthly amount of purchases - by 25%, and the average check - by 22%.

With the development of e-commerce, and growing competition in e-commerce, it is already in all niches. Now, in order to survive and further increase sales, you need to clearly monitor all the processes of the online store, to

understand whether the right direction of business development. It was necessary to move very quickly, because untimely decisions on the need to develop e-commerce, can lead to loss of competitive advantage and force the company to leave the market. But it should be noted that just launching an online store is not a panacea. If all the shops that are launched on the Internet every month were successful, we would already have our own small Wall Street in each regional center. Relentless statistics show that 10% [17] will survive at best.

Despite all the advantages of e-commerce, offline sales are also an important component in the trading business. As Ivan Bohdan, CEO of Yakaboo, points out, "our offline is a concept store test in response to changing customer behavior. It is an experiment of merging two channels and the point of intersection of two worlds: tactile-real and virtual-digital" [16]. To gain a competitive advantage, it is important to develop omnichannel business models that will increase efficiency and attract new customers. The successful implementation of an arbitrary business model today must be based on the implementation of an omnichannel strategy. Omnichannel is characterized not only by the transition to the use of one to several distribution channels, but the integration of these channels into a single system with a single organization of business processes of inventory management, registration and execution of purchase orders, delivery of goods; a single range, form and content of product descriptions; uniform prices; single programs and loyalty cards, a single history of customer applications regardless of the channel with the possibility of seamless interruption of the transaction and the transition from channel to channel [18].

The omnichannel strategy is based on the growing number of types of Internet access devices. The business model of Ukrainian retail is changing in line with global e-commerce trends. Thus, the Ukrainian startup SvitStyle started with an aggregator model in the category of clothing and footwear, but quickly became a B2C marketplace, which now cooperates with more than 200 Ukrainian online retailers [19]. E-commerce companies use a variety of business models (Table 7).

According to Twenga Solutions, 29% of European retailers use 2 or 3 channels to sell their products, while half of sellers attract buyers through three or more channels. Multichannel is becoming a necessary measure for effective business development [15]. In June 2017, as many as 13,6 million internet users (71 per cent of all internet users who use personal computers and laptops) visited e-commerce websites. This is 1,3 million people more than in the previous year, when this number was 12,3 million people (67,3 per cent) [21].

Table 7

Business models of successful e-traders

Business model name	Activity	Foreign companies	Ukrainian companies
Electronic showcase	Sale of goods of own production through own site	Sony.com; Dell.com; Amazon.com	Online store of Galant factory: www.magazinperchatok.com.ua
Electronic bulletin board	A site where individuals or companies place advertising offers for goods or services	Apartments; Monster; Craigslist; AllBiz	OLX (hybrid); Bezplatka; Kidstaff; Klubok; kloomba.com; Ria.com; Shafa.ua (hybrid)
E-shop / e-supermarket	Sale the goods purchased from various manufacturers, on their own behalf at their own prices, mainly from their own inventories	LandsEnd.com; Amazon.com; asda.com, tesco.com	Allo; Foxtrot; Comfy; www.metro.ua; Rozetka.ua (hybrid): Modnakasta; Leboutique; Eldorado; LaModa
Price aggregator	Search and compare offers of different companies with the establishment of appropriate links with the subsequent implementation of transactions directly between buyers and sellers	Uswitch.com; GoCompare.com; MoneySupermarket.com CompareTheMarket.com	Hotline; Price; EK; MagaZilla; m.ua
Electronic auction	Internet platform for contacting sellers and buyers and transactions; the buyer and seller are traded in the transaction process	eBay.com Priceline.com	bitok.ua setam.net.ua
Electronic trading platform (platform); electronic marketplace	Internet platform for contacting and implementing transactions between sellers and buyers with the establishment of rules for the implementation of transactions and the execution of certain elements of the transaction (payments, delivery, etc.)	Amazon.com (hybrid); Alibaba; Booking; Goat; Google Play; AppStore: Etsy	Prom.ua; Bigl.ua; Goodini.ua Rozetka.ua (hybrid); privatmarket.ua; Kabanchik.ua (hybrid); Skidka.ua; SvitStyle, Shafa.ua (hybrid); Prosto.ua ; Crafta.ua (hand-made in Ukraine)

Source: [20].

The most favored Ukrainian e-commerce website is Rozetka.com.ua, an online store. As many as 6,7 million internet users (35 per cent) visited the site in June. The TOP3 also includes OLX.ua, a website which lists local classified adverts, with 5,5 million visitors (29 per cent), and Prom.ua - a general online store, visited by 4 million people (21 per cent). In total, the three most popular e-commerce websites attracted 10,3 million visitors in June, which amounts to more than half of all internet users (54 per cent). The three most sought-after foreign e-commerce websites in Ukraine reached 4 million people, i.e. every fifth internet user in the country (21 per cent). The highest demand in the category was for Aliexpress.com. With the visitor number of 3,8 million (20 per cent), Aliexpress.com is the most popular e-commerce website and takes the fourth place

in the general ranking. On the winners podium was taken by: Amazon.com with 411 thousand visitors (2,1 per cent) and Ebay.com with 328 thousand visitors (1,7 per cent) [21].

The development of e-commerce in Ukraine is hampered by an underdeveloped legal framework, the possibility of losing their own funds, insufficient knowledge of Internet technologies, low level of purchasing power of the population.

Conclusions. Thus, the use of e-commerce tools, the development of omnichannel business models contributes to increasing sales of goods, improving the results of economic and financial activities. Modern retail enterprises, especially large formats, are actively implementing innovative business technologies. The introduction and use of certain forms of e-commerce due to lower prices, a wider range and faster finding the right product provides significant competitive advantages to trade enterprises. The most expedient is the implementation of the omnichannel strategy.

REFERENCES

1. Zwass, V. (1996). Electronic Commerce: Structures and Issues International. *Journal of Electronic Commerce*, Vol. 1, Issue 1, 3-23. DOI: https://doi.org/10.1080/10864415.1996.11518273
2. Shirley, H., Smith, M. (2009). Impact of Internet Financial Reporting on Emerging Markets. *Journal of International Business Research*, 8 (2), 21–41.
3. Comberg, C. (2017). The introduction of a competing business model: the case of eBay. International Journal of Technology Management. Vol. 73, Issue 1, 39 – 64.
4. Hagiu A., Wright, J. (2014). Marketplace or reseller? Harvard Business School. Working Paper 13-092, January 31, 44 p.
5. Wang, S. (2007). Definition and classification of the electronic market: literature review and clarification. *Enterprise information systems*. Vol. 1, Issue 1. DOI: https://doi.org/10.1080/17517570601088380
6. Malovichko, S. (2015). E-commerce: theoretical foundations, management mechanism and development strategies. Krivoy Rog: Octane print. 428 p. [in Ukrainian]
7. Balik, Y. (2014). E-commerce as an element of the world economy // Retrieved from доступу:http://nbuv.gov.ua/UJRN/VNULPL_2014_811_4 [in Ukrainian]
8. Pro elektronnu komertsiyu. (2015). Vidomosti Verkhovnoyi Rady Ukrayiny, № 45[in Ukrainian]
9. Summer A., Dunkan Gr. (1999). E-Commerce. NYH Publishing, 263 p.

10. Malovichko, S. (2015). Analysis of current trends and dynamics of e-commerce development at Ukrainian enterprises. Retrieved from http://www.problecon.com/export_pdf/problems-ofeconomy-2015-2_0 pages-71_77.pdf.
11. Mazaraki, A. (2016). Internal trade of Ukraine. Kyiv, Kyiv National University of Trade and Economics, 864 p. [in Ukrainian]
12. Apopiy, V. (2016). Commercial activity. Kyiv, 558 c. p. [in Ukrainian]
13. The COVID-19 eCommerce Impact Data Hub. Retrieved from https://contentsquare.com/covid-19-ecommerce-impact-data-hub/
14. How the coronavirus has affected the global e-commerce market. Retrieved from https://hi-tech.ua/kak-koronavirus-povliyal-na-mirovoj-rynok-e-commerce/
15. Interesting facts about e-commerce in the world in 2020. // Retrieved from https://lemarbet.com/ua/razvitie-internet-magazina/interesnye-fakty-ob-internet-torgovle/
16. Retail and e-commerce: only the most agile will survive. Retrieved from https://business.ua/uk/ritejl-i-e-commerce-vizhivut-tilki-najspritnishi
17. Internet marketing and e-commerce in 2020: trends and forecasts. Retrieved from https://lemarbet.com/ua/trendss/internet-marketing-i-e-commerce-v-2016-godu-trendy-i-prognozy/
18. Lisitsa, V. (2017). Omnichannel sales: trends, problems and prospects of development in Ukrainian retail. Problems and prospects of economics and management. Vol. 2 (10).
19. Radishchev M. Marketplaces of Ukraine: Where to run and who is in the extreme queue? // Retrieved from http://igate.com.ua/news/14253-marketplejsy-ukrainy-kuda-bezhat-i-kto-v-ocheredi-krajnij.
20. Glinenko, L. Status and prospects of e-commerce development in Ukraine.// Retrieved from https://mmi.fem.sumdu.edu.ua/sites/default/files /mmi2018_1_83_102.pdf — DOI: 10.21272/mmi.2018.1-06
21. Ukraine: Popularity of e-commerce services. Retrieved from https://www.gemius.com/all/category/ukraine,analysis-infographic.html

6. Financial monitoring of contractors using digitalization as a factor of influence on financial and economic result

Tatiana Zhmurko
Simon Kuznets Kharkiv National University of Economics
E-mail: T.A.Zhmurko@gmail.com
ORCID ID 0000-0003-3162-6738

Introduction. In the conditions of emergency situation, unstable economy, aggravation of crisis phenomena in the world, there is an urgent need to intensify production and economic activities and find tools that would improve the situation and ensure sustainable development of economic entities. One of these tools is the financial and economic results, which are the main source of growth of their own financial resources needed to ensure the production and economic activities of economic entities. In today's context of economic instability, the problem of countering and preventing money laundering, terrorist financing and the proliferation of weapons of mass destruction plays an important role. Therefore, penetration into the legal business of criminal proceeds poses a serious danger to legitimate economic activity, destabilization of existing financial and monetary systems, reducing the security and welfare of the population and more.

The digital globalization of the world is a continuous flow of data, which includes information, knowledge, opportunities, ideas, innovations. Proper use of digitalization of the economy will allow the state, business and society to function more efficiently. An entity should navigate the data, analyze it, and use it to maximize financial and economic performance, including verifying its counterparties. In the context of the global crisis, special attention is paid to the problems of adaptation of production and economic activity of the enterprise to changes in the economic situation, digitalization, which is the most important factor of its sustainable development, and risks of involvement in money laundering schemes. destruction. Therefore, the issues of making sound management decisions and the formation of a monitoring system for counterparties become relevant, including through the digitalization of the economy, which allow to analyze, adjust and control the activities of the entity, to eliminate the negative impact of external and internal factors on the financial and economic result.

Literary review. The issues of financial monitoring and evaluation of the enterprises efficiency are widely studied. The works of MM Proshunin [1], N.V. Moskalenko [2], OA Kramarenko [3], O.O. Balanutsa [4], LM Kashpur [5] are devoted to the directions of these researches. G.G. Dzhenkova [6], L.P. Dovgan, M.V. Radkevich [7], T.V. Romanov, E.O. Darovsky [8]. The issue of digitalization of the economy was considered in the scientific works of foreign and

domestic scientists, including B. Van Ark [9], N. Colin [10], D. Engelbart, J. Licklider, R. Lipsi, D. Stiglitz [11], N M. Kraus [12], OS Krivoruchko [13], DD Burkaltseva [14], MV Rudenko [11]. However, the issue of the impact of financial monitoring of the entity on the financial and economic result, in the context of digitalization of the economy, requires more detailed and in-depth study. The world is changing and the business must form a system of tools and methods for the effectiveness of its activities. However, the issue of the impact of financial monitoring of the entity on the financial and economic result, in the context of digitalization of the economy, requires more detailed and in-depth study. The world is changing and the business must form a system of tools and methods for the effectiveness of its activities.

Results. With constant changes in legislation and economic instability, a positive financial and economic result plays a key role in the activities of any enterprise and socio-economic development of the country as a whole. Increasing the financial and economic results of Ukrainian businesses is a difficult issue. A significant proportion of businesses do not receive a positive financial and economic result at all, which leads to their liquidation and bankruptcy.

The financial and economic result is both a goal, and a result, and an incentive, and a factor of economic security of economic entities. The ability to obtain a positive financial and economic result encourages business leaders to look for more efficient ways to use resources, minimize costs, invent products that may be in demand, maintain a positive image and impeccable reputation, apply organizational and technical innovations that promise to increase production efficiency etc. Working profitably, each business entity contributes to the economic development of society, contributes to the creation and increase of social wealth and increase the welfare of the population, so it is relevant today.

The digitalization of the economy is rapidly penetrating the daily lives of people, providing new opportunities for all the sectors of the Ukrainian economy in terms of modernization of methods of work and management, changing production processes, sales channels and ways of interacting with suppliers and customers. The path to the digital economy and digital society of Ukraine lies through the domestic market of production and most importantly - the use and consumption of information and communication and digital technologies, the formation of consumers (citizens, businesses, the state) motivations and needs in digital technologies.

Digitalization is the saturation of the physical world with electronic-digital devices, means, systems and the establishment of electronic-communication exchange between them. The purpose of digitalization of Ukraine is the digital transformation of existing and creation of new branches of economy, transformation of all spheres of life of Ukraine into new, more efficient and modern ones. The creation of a modern digital space and appropriate infrastructure benefits everyone: citizens, businesses, external investors and the state [15].

The principles of digitalization of the economy are the basic laws, regulations and driving forces of the promotion of information and communication technologies in the daily life of the state, businesses and society. The only main principle of digitalization is the idea of improving the processes of human life through the use of modern technologies in various spheres of public life.

The digitalization of the economy should not be equated with automation. With automation there is a release of workers, because their work is automated, the need for labor is reduced. With the digitalization of the economy at the disposal of a large amount of data with information, knowledge, ideas and for its proper interpretation and processing requires employees who will be based on the data to quickly make management decisions to achieve goals. The basis of the activities of economic entities that operate using the basic principles of digitalization is the need to meet social needs in the most effective - digital way [11].

The overall goal of digitalization processes in the economy is to restructure production into a more flexible and adapted to the nowadays realities, which increases the competitiveness of the business entity. Digitization is one of the means of obtaining the expected result, which meets the requirements and needs of business owners, consumers, society, satisfies producers and other contractors in terms of efficiency.

The digitalization of the economy raises the activities of economic entities in particular and society in general to a new level. In fig. 5 (developed by the author on the basis of [11, 12, 13]) consider the positive impact of digitalization of the economy from the standpoint of two entities: the state and the business entity.

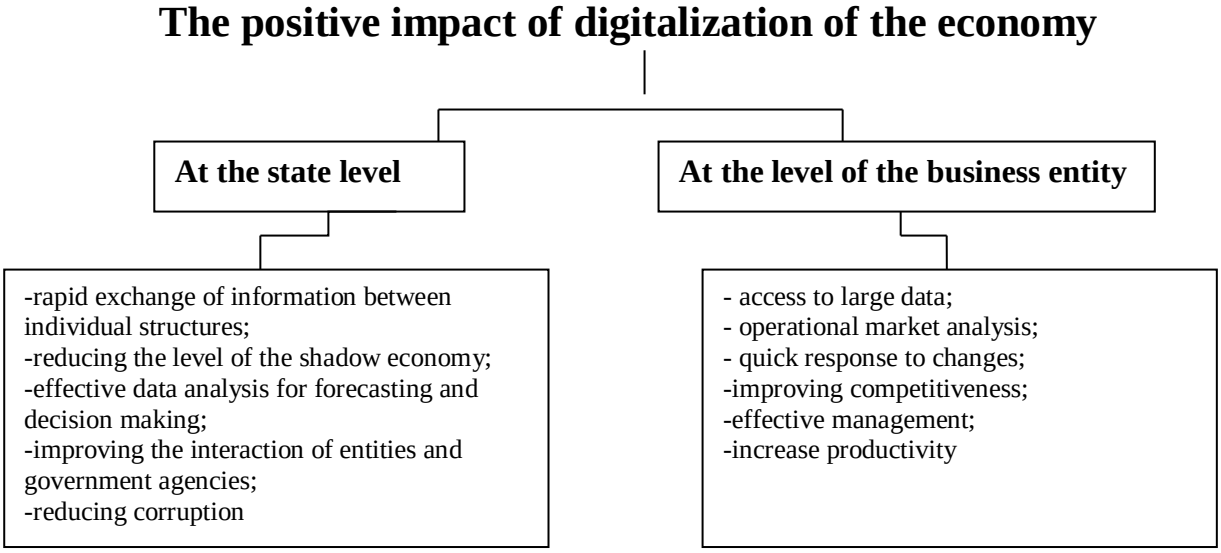

Fig. 5. Positive impact of digitalization at the level of the state and the business entity

According to fig. 5, the digitalization of the economy has a positive impact both at the state level and at the level of the business entity. Digitalization encourages GDP growth, increases information efficiency between government agencies and businesses, the population. This reduces corruption and fraud in the

services of public authorities through the transparency of administrative and information services. The productivity of operations on tax collection, reporting to government agencies, and keeping registers is growing. The level of the shadow economy is declining. The level of trust in government agencies is growing.

At the level of the business entity - the automation of production processes is accelerated, efficiency in making management decisions is increased, the market of contractors and other information data for the analysis of activity and maximization of financial and economic result is expanded.

It should be borne in mind that the level and amount of financial and economic results are formed under the influence of many factors that affect both negatively and positively. Factors influencing the financial and economic result are numerous and varied. It is quite difficult to limit them. With the help of digitalization of the economy to identify and operate factors for analysis and efficiency of the business entity is more accessible. All the factors that affect the result of the entity are divided into external and internal, which are shown in Fig. 6 (developed by the author on the basis of [6, 7, 8].

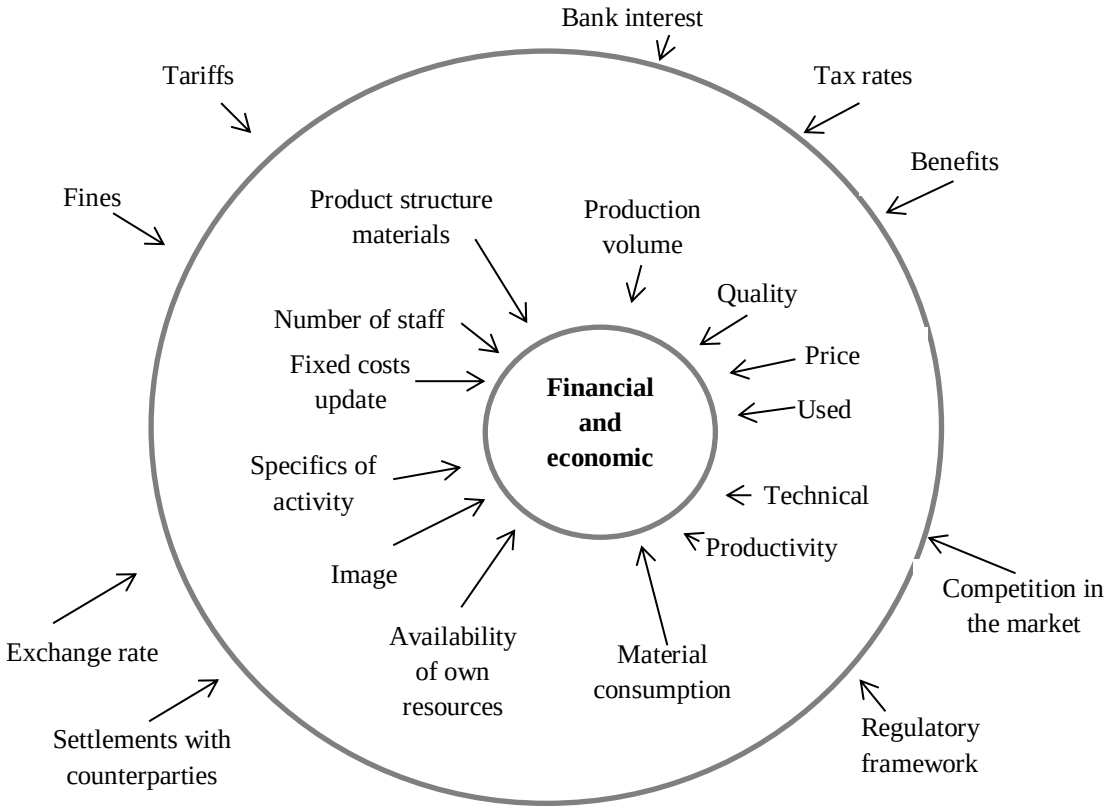

Fig. 2. External and internal factors influencing the financial and economic results in the form of a system

External factors include natural conditions, transport conditions, legal framework, state regulation of prices, tariffs, interest, tax rates and benefits, penalties, competition in the market of goods, works, services and more. These

factors do not depend on the activities of the entity, but significantly affect its outcome. An entity must have sufficient financial stability to function properly without interference from external factors.

To the internal factors, as seen in Fig. 6, include the volume of production and sales of products, goods, works and services, their structure, cost, quality, price, used materials, number of employees, legality of activity, reputation, image and more. Internal factors are divided into productive and non-productive. Production factors characterize the availability and use of means and objects of labor, labor and financial resources. Non-productive factors include supply and marketing and environmental activities, social working and living conditions. The image, reputation and compliance with the law cannot be unambiguously attributed to production or non-production factors, because they are an integral part of the entity itself and will be present there and there.

The image, reputation and compliance of the business entity with the law affect the process of obtaining a positive financial and economic result through qualitative changes: a business entity with long experience in the market, impeccable reputation and image, no criminal cases, tax debt, etc., connection with public figures will be more competitive among others, both on the part of suppliers and on the part of buyers for cooperation. This will give the entity a wide choice of counterparties to optimize operations and, as a result, improve the level of financial and economic performance.

Therefore, the entity should care for and not undermine / neglect the importance of its image and reputation, as it has only internal factors through which it is possible to manage the financial and economic result. Businesses must constantly monitor their reputation and image, conduct financial monitoring of counterparties, because there is always a risk of being involved in schemes to legalize proceeds from crime, terrorist financing and the financing of the proliferation of weapons of mass destruction.

According to the report of the State Financial Monitoring Service, 1.1 trillion hryvnias is the shadow economy of Ukraine in 2018, and the main basis is fictitious entrepreneurship [16]. Information and communication and digital technologies are rapidly developing and spreading. By means of the economy digitalization, the time spent on monitoring tasks will be significantly reduced compared to previous years, the business entity will work more efficiently.

The financial monitoring of an entity should be characterized by continuous tracking, identification and verification of its counterparties for compliance with the law and data from open registers, which are available through the digitalization of the economy. These registers include:

-Unified State Register of Legal Entities, Individual Entrepreneurs and Public Associations;

-Register of single tax payers;

-Register of excise tax payers for the sale of fuel and ethyl alcohol;

-Register of persons who carry out transactions with goods;
-Register of budget grant recipients;
-Register of non-profit institutions and organizations;
-Register of value added taxpayers.

Financial monitoring, to ensure, the business entity can also be carried out in the form of a set of scientific, technical, technological, organizational and other tools that will provide systematic monitoring and observation of the state and trends of development and activities of its counterparties. An entity should focus on automating these processes to improve efficiency. An entity that focuses on «digitization» should aim for effective returns from these processes, through greater employee involvement in management decisions.

In Ukraine, the system of financial monitoring was formed relatively recently, its appearance is due to many objective factors, which can be divided into internal and external. To the first it is expedient to carry constantly growing volumes of the shadow capital and legalization of the means received by a criminal way, to the second - recommendations, and in some cases and pressure of the world community [2, p. 66].

The shadow economy exists in all the countries of the world. The main differences of it in a country are the volume, factors, forms, state of socio-legal control over it and the level of its implementation. According to various estimates, its level is 17% of GDP in highly developed countries, more than 20% in countries with economies in transition and more than 40% in developing countries. In Ukraine, this figure ranges from 30% to 50% of GDP. Differences in the assessments of experts to determine the level of "shadowing" in the country is explained by the fact that there are no clear algorithms for such calculations, the application of each of them has certain difficulties (9 calculation methods) [17].

The input for calculating the level of the shadow economy is statistical reporting of registered businesses, based on accounting indicators, reporting by regulators, auditing, the results of expert assessment of the shadow economy, sample surveys of households and household surveys.

According to independent experts, one of the most common types of shadow activities is tax optimization. Income concealment and tax offenses in Ukraine cover all types of financial and economic activities and are typical not only for commercial but also for state-owned enterprises. The most «shadow2 industries are real estate – almost 62%, insurance – 53%, construction – 40% and woodworking – 32% [18, 17]. And according to research by the Institute of Information and Modeling of the Economy [1, 2], the largest share of «shadow» activity today is concentrated in industry.

Here, the «shadow2 turnover is 32.5% higher than the official one. In other industries, they are slightly smaller, but also significant: in agriculture, the «shadow» sector is 72.5%, in construction – 70.8%, in services – 31.5% [18]. Therefore, businesses involved in these industries need to be more careful in choosing counterparties to protect themselves from being included in the scheme

of legalization and money laundering. The main segments and mechanisms for obtaining illegal income by counterparties can be:

-corruption;

-concealment of real incomes of employees, as well as profits of enterprises from taxation (tax evasion);

-illegal export of capital;

-illegal privatization of state property;

-receiving shadow profits due to the withdrawal from circulation of the difference between official and real prices for goods and services;

-petty theft at state, joint-stock and collective enterprises;

-illegal currency and foreign economic transactions (smuggling);

-production and sale of unaccounted products and provision of unaccounted services;

-criminal offenses;

-financial fraud [3, p. 166].

The entire financial monitoring system in the country is based on the rapid exchange of information between the subjects of primary financial monitoring and the specially authorized body of executive power on financial monitoring. In this regard, the characteristics of financial monitoring through the system of entities are based on their division into two categories: subjects of state financial monitoring and subjects of primary financial monitoring. According to the Law [19], the subjects of primary financial monitoring include:

1) banks, insurers (reinsurers), credit unions, pawnshops and other financial institutions;

2) payment organizations, members of payment systems, acquiring and clearing institutions;

3) commodity, stock and other exchanges;

4) professional participants in the securities market;

5) asset management companies;

6) postal operators, other institutions that conduct financial transactions for the transfer of funds;

7) branches or representative offices of foreign objects of economic activity that provide financial services on the territory of Ukraine;

8) specially identified subjects of primary financial monitoring:

- business entities that provide intermediary services in the implementation of transactions for the purchase and sale of real estate;

- business entities that trade in cash for precious metals and precious stones and articles made of them, if the amount of the financial transaction is equal to or exceeds the amount specified in part one of Article 15 of the above Law;

- business entities that conduct lotteries and gambling, including casinos, electronic (virtual) casinos;

- notaries, lawyers, auditors, audit firms, natural persons – entrepreneurs who provide accounting services, business entities that provide legal services (except for persons who provide services in the employment relationship);

- natural persons – entrepreneurs and legal entities that conduct financial transactions with goods (perform works, provide services) for cash, provided that the amount of such financial transaction is equal to or exceeds the amount specified in part one of Article 15 of the Law;

- other legal entities, which by their legal status are not financial institutions, but provide separate financial services [19].

The above list of subjects of primary financial monitoring shows that financial sector entities predominate among them, although it is expedient to supplement such a list with other economic entities that have suspected their counterparties of dishonesty in conducting business activities. However, it should be borne in mind that it would be expedient for such economic entities to create a separate target department in the State Financial Monitoring Service in order to reduce the workload and to approach the investigation of these transactions in a specialized and narrower way.

Conclusions. Thus, financial monitoring of business transactions with counterparties that precede the final operations of money laundering is a means of preventing illegal financial transactions, as monitoring of possible legalization may be effective if not only at the final stage of financial flows, as provided by the Law of Ukraine «On prevention and counteraction to legalization (laundering) of proceeds from crime, terrorist financing and financing of proliferation of weapons of mass destruction» [19], but also at the opposite stage of the movement of goods, works and services.

With the digitalization of the economy, businesses will be able to reduce the number of steps previously required for the operation and monitoring of counterparties. Improve the timing of work, significantly increase the efficiency of its activities and, ultimately, reduce operating costs. The digitalization of the economy will help society create a reliable digital environment, optimize and scale operations, make them consistent and secure. Due to digitalization it becomes possible to rapidly develop innovations, support startups, teach everyone the basics of programming, implement digital technologies in the field of economics.

The business entity has access to information data, to open state registers of counterparties for their financial monitoring. The implementation of all the above conditions will increase the productivity of the entire economic system of the state and gain additional competitive advantages in the globalized digital world. But it should be borne in mind that the digitalization system in Ukraine is not yet fully established. There are inconsistencies in the work of government agencies on digitization that need to be improved.

Thus, the digitalization of the economy significantly helps the financial monitoring of the entity's counterparties. Conducting financial monitoring by expanding the range of subjects of primary financial monitoring will help to reveal schemes for legalization of proceeds from crime at the last stage of legalization. This will reduce the size of the shadow economy at the state level and minimize the risk of the entity being involved in a criminal money laundering scheme. This will maintain the image and reputation at a high level and thus affect the financial and economic performance.

However, it should be borne in mind that efficiency requires not only that the subjects of primary financial monitoring provide information on suspicious transactions, but also that the State Financial Monitoring Service promptly respond and verify the compliance of transactions with suspects for money laundering. Not only cash transactions but also non-cash payments will deserve special attention of business entities. Banks have only the main details of the documents on which the movement of funds, without additional, detailed, more targeted information on the subject of the contract under which the transaction with money is conducted.

Financial institutions can receive this information only on request, if the transaction, in their opinion, is doubtful, fictitious or the amount of the transaction will be more than 400 thousand hryvnias (for businesses that provide services in the field of lotteries and / or gambling - 30 thousand UAH). Financial monitoring of an extended range of economic entities will help to reveal the interaction between different economic entities, which can be represented by different data on the objects of monitoring, which will be summarized in separate indicators of assessment, analysis and forecast.

REFERENCES

1. Proshunin M.M. (2010). Financial monitoring in the system of counteraction to legalization of criminal incomes and financing of terrorism: Russian and foreign experience: diss. on soisk. scientist. steppe. Dr. jurid. Sciences: 12.00.14 / Russian University of Friendship of Peoples. Moscow. 416 p.
2. Moskalenko N.(2008). Problems of financial monitoring in the banking sector. European vector of economic development. Vol.14, P. 66-71.
3. Kramarenko O. (2013).Ways of tax evasion in Ukraine. Scientific notes of the National University «Ostroh Academy». *Economy*. Vol. 23, P. 165-168.
4. Balanutsa O.(2011). The place and role of financial monitoring in Ukraine as a fundamental factor in the effective fight of the state against legalization (money laundering) and terrorist financing. Collection of scientific works of the National University of the State Tax Service of Ukraine. Vol. 1, P. 35-42.
5. Kashpur L.(2018). Countering the legalization of proceeds from crime. *Investments: practice and experience*. Vol. 3, P. 103-106.
6. Dzhenkova G. (2008). Factors of profit growth of an industrial enterprise. *Culture of the peoples of the Black Sea region*. Vol. 126. P. 30-31.

7. Dovgan L., Radkevich M.(2017). Modeling the influence of factors on the formation of profits of state-owned enterprises. *Priazovsky Economic Bulletin*. Vol. 5 (05). P. 122-128.
8. Romanova T., Darovsky E. (2015). Factors influencing the increase in profits of Ukrainian enterprises in modern conditions. *Efficient economy*. Vol. 4. URL: http://www.economy.nayka.com.ua/?op=1&z=3976. Date of application: Aug. 31, 2020.
9. Inklaar R., Timmer M. P., van Ark B., Carlin W., Temple J.(2008). Market Services Productivity across Europe and the US. Economic Policy.Vol. 23, P. 139-194.
10. Colin N. Landier A., Mohnen P., Perrot A.(2015). The digital economy. Vol. 26, P. 1-12. URL: https://www.cairn-int.info/article-E_NCAE_026_- 0001 - the-digital-economy.htm.
11. Rudenko M.V.(2018). Digitalization of the economy: new opportunities and prospects Economy and state. Vol. 11, P. 61-65 DOI: 10.32702 / 2306-6806.2018.11.61.
12. Kraus N.M. (2018). Digital economy: trends and prospects of avant-garde development. Efficient economy. Vol. 1. URL: http://www.economy.nayka.com.ua/pdf/1_2018/8.pdf.
13. Kryvoruchko O.S.(2017). Imperatives of formation and dominants of digital economy development in the modern paradigmatic context. Paradigmatic shifts in the economic theory of the XIX century: materials of the III International. scientific-practical conf., 2-3 sheets. 2017. Kyiv, S. 681-685.
14. Burkaltseva D.D. (2017). Algorithm for implementing the «digital economy» program. Innovation clusters in the digital economy: theory and practice: VIII International. scientific-practical conf., May 17-22, 2017. St. Petersburg, pp. 141-147 DOI: 10.18720 / IEP / 2017.3.
15. Sokolova G.B. (2018).Some aspects of digital economy development in Ukraine Economic Bulletin of Donbass. Vol. 1 (51). P. 92-96.
16. Persons of primary financial monitoring URL: https: // finmonitoring. in.ua/wp-content/uploads/2019/05/spfm_052019.pdf (access date: 31.08.2020.
17. Dudin M. (2011). The impact of the shadow economy of Ukraine on its economic security. *Businessinform*. Vol. 12, P.4-14.
18. Senyshyn O., Kunditsky O. (2018). Status and prospects of overcoming the shadow economy in the domestic economic system. *Black Sea Economic Studies*. Vol. 36, P. 66–70.
19. On the prevention and counteraction to legalization (laundering) of proceeds from crime, terrorist financing and financing of proliferation of weapons of mass destruction: Law of Ukraine of 06.12.2019 № 361-IX. Date of update: 16.08.2020. URL: https://zakon.rada.gov.ua / laws / show / 361-20 (access date: 31.08.2020).

II. RELEVANT ISSUES OF DIGITALIZATION AND SERVISATION PROCESSES INFLUENCE ON ECONOMIC PERFORMANCE

7. The impact of servation on the results of economic digital entrepreneurship activities

Nataliia Kraus
Dr. Sc. (Economics), Associate Professor,
Professor of the Department of Finance and Economics
Borys Grinchenko Kyiv University
E-mail: k2205n@ukr.net
ORCID 0000-0001-8610-3980

Kateryna Kraus
Cand. Sc. (Economics),
Senior Lecturer of the Department of Management
Borys Grinchenko Kyiv University
E-mail: k23k@ukr.net
ORCID 0000-0003-4910-8330

Oleksandr Marchenko
Cand. Sc. (Economics), Associate Professor,
Associate Professor at the Department of Management and Logistics
National University "Yuri Kondratyuk Poltava Polytechnic"
E-mail: alexmarchenko1954@gmail.com
ORCID 0000-0002-3342-0525

Introduction. Main focus today: optimizing IT for successful digital transformation, cybersecurity, privacy. GDPR: enhanced personal privacy rights, increased duty for protecting data, significant penalties for non-compliance. Under the influence of new Internet technologies and online platforms, the global economy will gradually "get free" from the numerous barriers that divide it and will be characterized by a special "spatial plasticity" designed for the dynamics of communications and the driving force of innovation. Already today we observe both the economies of different countries inherent clustering, direct connection between economic participants; collective way of responding; hyperminous institutional environment. Digitalization of the economy, which is actively taking place today in Ukraine, to some extent "touched" all spheres of business. Its actors, aimed at long-term success and development, are forced to accept the challenges of

the modern economy – only way they can become leaders in business. Digital transformation and servation of economic activity at the micro level can help them.

Literature review. Knowledge of the new and role of entrepreneur in economic development we meet in scientific legacy of A. Granberg, P. Drucker [1], F. Kene, B. Karlof, P. Linholm, J. S. Mill, I. Maier, A. Smith, B. Santo, J. B. Sei, Sh. Tatsuno, K. Frimen, J. Schumpeter. On the modern understanding of the processes of formation and development of innovative entrepreneurship made a powerful influence of the work of A. Barker, A. Greif, A. Denzau, L. Mizes, D. North, P. Sorokin, J. Havstid. In the field of institutional theory, Ukrainian scientists work very fruitfully, researching the formation of digital entrepreneurship and e-business taking into account the economic conditions and peculiarities that are characteristic of Ukraine. In the works of A. Burlutskyi [2], I. Britchenko [3], L. Boldyreva [4], V. Vyshnevskyi, A. Govorin [5], O. Holoborodko [6], Yu. Zaitsev, S. Ivashyna, O. Kryvoruchko [7], N. Kraus, K. Kraus [8–12], I. Malyi, O. Marchenko [13–14], O. Manzhura [15–17], B. Odaygailo and others, on the basis of application of interdisciplinary approach, conducts scientific search for geopolitical, historical, ethnic, moral, psychological and cultural factors of institutional transformation of traditional business into electronic and analyzed the role in this servation.

Results. Cloud services are key to today's its strategies. 1,181 different cloud services are used by enterprises on average. 61 % of cloud applications IT isn't aware of. 75 % of companies consider SaaS tools essentials to their business. 80 % of workers use non-sanctioned cloud apps. Cloud Access Security Brokers (CASBs) are defined by Gartner as: on-premises, or cloud-based security policy enforcement points, placed between cloud service consumers and cloud service providers to combine and interject enterprise security polices as the cloud-based resources are accessed. CASBs consolidate multiple types of security policy enforcement. Estimated to be the fastest growing security market. Top security project planned in the next 2 years. By 2020 85 % of large enterprises will use CASBs.

Elevate the security for all your cloud apps and services. A uniquely integrated CASB: Threat Signal Clustering (Microsoft Intelligent Security Graph), Security Analytics & Guidance (Microsoft Secure Score), Cloud Security Posture Management – IaaS (Azure Security Center), Unified Endpoint Management (Inture), Data Loss Prevention (Azure Information Protection), Identity & Access Management (Azure AD & Conditional Access), Endpoint Detection & Response (Windows Defender ATP).

Shadow its management lifecycle by Safely adopting cloud apps, namely:

1. Discover Shadow IT – Identify which apps are being used in your organization.

2. Identify the risk levels of your apps – Understand the risk associated with discovered apps, based on more than 70 risk factors including, Security factors, industry- and legal regulations.

3. Evaluate compliance – Evaluate whether the discovered apps meet the compliance standards of your organization against factors like GDPR or industry-relevant standards like HIPAA readiness.

4. Analyze usage – Understand the usage patterns and identify high risk volume users.

5. Manage cloud apps – Start managing cloud apps and leverage one of several governance actions such as Sanction, Unsanction, onboarding an app to AAD to leverage SSO, marking them for review or blocking them from your network.

6. Continuous monitoring – Be alerted when new, risky or high-volume apps are discovered in your environment for continuous monitoring and ongoing control over your cloud apps.

Discovery process is as follows:

1. Identify cloud apps and services:

- >16,000 cloud apps and services from catalog;
- Custom apps.

2. Understand usage patterns

- Traffic data Top users and IP addresses App categories;
- Machine-based investigation via native integration with Windows Defender ATP.

3. Understand the risk:

- Assessment across >70 risk factors;
- Regulatory certifications, compliance standards (e.g. GDPR), industry standards and best practices;
- Risk score calculation - can be customized based on the priorities of your organization.

4. Take control:

- Sanction or un-sanction apps;
- Onboard apps to Azure Active Directory;
- Block apps natively with Zscaler;
- C-level report & recommendations.

Cloud Discovery with Windows Defender ATP consists in:

- Discovery of cloud apps beyond the corporate network from any Windows 10 machine
- Single-click enablement
- Machine-based Discovery
- Deep dive investigation in Windows Defender ATP

Protect sensitive files in the cloud occurs as follows:

1. User uploads a sensitive file to a cloud app
2. A classification label is automatically applied to protect the file

3. User tries to share sensitive file with external users

4. External user is not able to access the file due to classification and protection

5. Admin receives event alerts

Contents of work of Unified Data Classification Service consists in: unified labelling with Microsoft Information Protection; 90 built-in, sensitive information types you can choose from; ability to configure custom sensitive information types (supports complex patterns with Regex, keywords and large dictionary).

Azure ad conditional access:

1. Controls: allow access, require MFA, limit access, deny access, force password reset;

2. Conditions: users, devices, location, apps.

Protection against cloud threats is as followed:

1. Malicious Insider. Protect against disgruntled employees before they cause damage

2. Malware. Detect malware in cloud storage as soon as it's uploaded

3. Ransomware. Identify ransomware using sophisticated behavioral analytics technology

4. Rogue Application. Identify rouge applications that access your data

5. Data exfiltration. Detect unusual flow of data outside of your organization

6. Compromised Accounts. Combat advanced attackers that leverage compromise user credentials

Malware Detection happens by:

- Scan cloud storage apps;
- Identify potentially risky files Powered by Microsoft Threat;
- Intelligence.

Automatic detection and revocation of risky 3rd party apps possible in case of: monitor cloud permissions authorized by your users; act on suspicious apps; automatically revoke apps to the entire org or specific users and groups.

Raising the issue of servation, which has a powerful impact on the results of economic activity of digital entrepreneurship, it is impossible not to mention the new European Regulation on protection of individuals in relation to the processing of their personal data, namely General Data Protection Regulation (GDPR), which is mandatory for the implementation and application of all European Union states in the legislation.

The GDPR principles are as follows:

- legitimacy, transparency, fairness;
- goal restrictions;
- minimization of data;
- accuracy;
- limited storage;
- integrity and confidentiality;
- accountability.

We are talking about the following data:

- name, gender, age, race;
- passport data, identification number;
- residence and location data;
- mobile phone number, e-mail;
- IP-address, cookies;
- payment card data;
- biometric data;
- medical information.

As part of the problem of our study, it is worth noting that personal data is any information relating to an individual by which it can be identified. As for understanding the content of the "individual" category, it is a person who can be identified directly or indirectly, in particular by linking to a specific identifier; e.g. name, identification number, passport data, location data, mobile numbers, payment cards, IP-addresses, e-mail, etc.

Grounds for legitimate processing of personal data are as follows:

- consent of the data subject to fulfill the contract;
- public service;
- legitimate interest;
- vital interest.

The reasons why Ukrainian digital business should meet the GDPR are as follows:

- extraterritorial principle of the regulation;
- targeting of clients from the EU;
- international commitments: association agreement with the EU;
- adaptation of the NPA to GDPR liability;
- counterparties from the EU.

In the context of digitalization of entrepreneurial activity, whose companies will be affected by the need to meet the GDPR will be with the following characteristics, namely:

- process, store, transmit personal data of entities from the EU;
- perform works, provide services to citizens or residents of European Union countries;
- have counterparties from the EU.

As for the existing experience of "high-profile attacks", they are as follows:

1. TICKETMASTER

- 23.06.2018 – attack on data of 40 000 clients;
- 27.06.2018 – notice, possible fine of 2 % or 10 million euros, looking that more.

2. DIXONS CARPHONE

- 06.2018 – attack on these risk for 5 million 900 thousand customers;
- possible fine – 4 % turnover, about 423 million pounds.

Violation of the requirements for the protection of personal data in the

world:

- FACEBOOK – data transfer to Cambridge Analityca;
- YOUTUBE – collection of information about children without their parents' consent;
- UBER – 20 million people were injured.

Illegal data transmission in Ukraine:

- banks – sale of customer data;
- postal services – 18 million customers;
- carriers – constant transfer of data to third parties;
- Online stores – data transfer to third parties, further blackmail of the client.

The world's GDPR avoidance options are available in table 8.

Table 8

How to escape the GDPR in the world

Closing globally	Closing EU operations	Blocking EU visitors	Partial closure of some game models
Klout.com; Twitter apps for Roku, Android TV, Xbox; Parity ICO Passport Service; MitoSearch.org; Ysearch.org; Loadout; Cointouch.com; StreetLend.com; Super Monday Night Combat	Drawbridge; Verve; Ragnarok OnlinePayver	Steel Root; Unroll.me; Monal.im; Motosport.com; Lee Enterprises (Arizona Daily Sun); A+E Networks (History.com and FYI.tv); Tronc (Chicago Tribune, Los Angeles Times, Orlando Sentinel)	Hitman: Absolution

In order for the enterprise to fully meet modern requirements of quality functioning it must take main steps in terms of the application of a new service, which is aimed at fully digitizing its economic activity, namely:

- audit of company's activities in terms of the collection of personal data: what data, for what purposes, in what form, including technical audit;
- work with the staff and its training;
- development of typical documents: consent, contract, instructions, private policy;
- development of software for process automation: notification of subjects, logging of incoming queries.

The procedure for the implementation of this process is presented in Figure 7. The first step is the search. At this stage, any data is collected to help identify the person (Name; Email address; Social media posts; Physical, physiological, or genetic information; Medical information; Location; Bank details; IP address; Cookies; Cultural identity). An inventory of determining where personal data is collected and stored is carried out (Email, Documents, Databases, Removable media, Metadata, Log files, Backups).

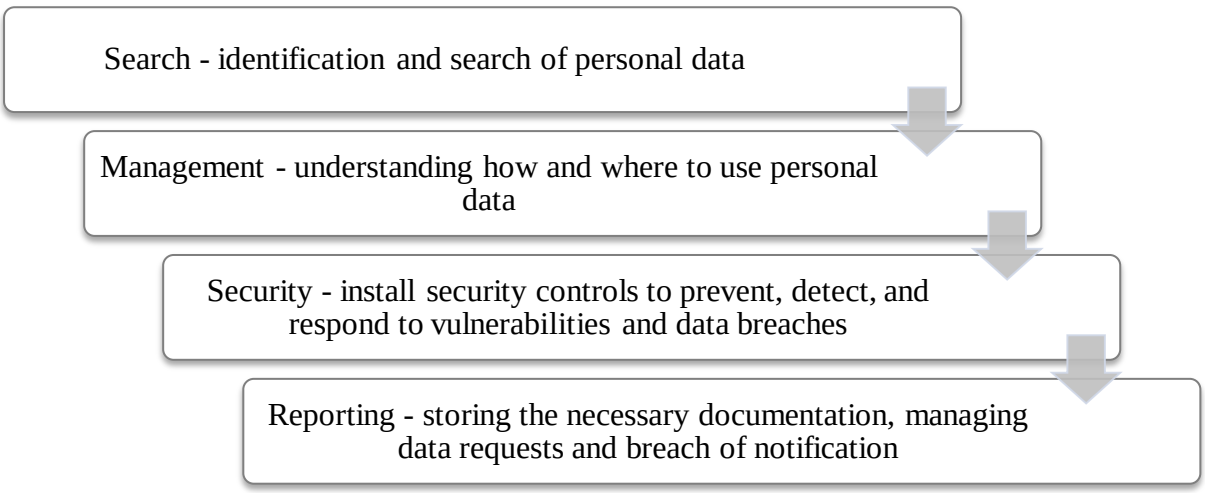

Figure 7. General scheme of servation implementation by modern enterprise in conditions of digitalization

Current examples of solutions can lead to the following:

- Microsoft Azure – Microsoft Azure Data Catalog;
- Enterprise Mobility + Security (EMS) – Microsoft Cloud App Security;
- Dynamics 365 – Audit Data & User Activity; Reporting & Analytics;
- Office & Office 365 – Data Loss Prevention; Advanced Data Govemance; Office 365 eDiscovery;
- SQL Server and Azure SQL Database – SQL Query Language;
- Windows & Windows Server – Windows Search.

The management phase is to manage data through the definition of policies, roles and responsibility for the management and use of personal data (At rest, in process, in transit, Storing, Recovery, Archiving, Retaining, Disposal).

The classification of data at this stage is to organize and label data to ensure proper handling of (Types, Sensitivety, Context/use, Ownership, Custodians, Administrators, Users). Examples of solutions can be specified by the following:

- Microsoft Azure – Azure Active Directory; Azure Information Protection; Azure Role-Based Access Control (RBAC);
- Enterprise Mobility + Security (EMS) – Azure Information Protection;
- Dynamics 365 – Security Concepts;
- Office & Office 365 – Advanced Data Govemance; Journaling (Exchange Online);
- Windows & Windows Server – Microsoft Data Classification Toolkit.

The protection stage should be considered in terms of prevention of data attacks – data protection (Physical datacenter protection; Network security; Storage security; Compute security; Identity management; Access control; Encryption; Risk minigation). Detection and response to violations should be monitoring and detection of system intrusion (System monitoring; Breach identification; Calculation impact; Planned response; Disaster recovery; Notifying DPA & customers).

Examples of solutions:

- Microsoft Azure – Azure Key Vault; Azure Security Center; Azure Storage Services Encryption;
- Enterprise Mobility + Security (EMS) – Azure Active Directory Premium; Microsoft Intune;
- Office & Office 365 – Advanced Threat Protection; Threat Intelligence;
- SQL Server and Azure SQL Database – Transparent data encryption; Always Encrypted;
- Windows & Windows Server – Windows Defender Advanced Threat Protection; Windows Hello; Device Guard.

The final stage is reporting. Entrepreneurs should report in the following areas: Purposes of processing; Classifications of personal data; Third-parties with access to the data; Organizational and technical security measures; Data retention times.

Reporting tools are the prospect of implementing all reporting capabilities using Cloud services (processor) documentation; Audit logs; Breach notifications; Handling Data Subject Requests; Govemance reporting; Compliance reviews.

Examples of solutions are:

- Microsoft Trust Center – Service Trust Portal;
- Microsoft Azure – Azure Auditing & Logging; Azure Data Lake; Azure Monitor;
- Enterprise Mobility + Security (EMS) – Azure Information Protection
- Dynamics 365 – Reporting & Analytics;
- Office & Office 365 – Service Assurance; Office 365 Audit Logs; Customer Lockbox;
- Windows & Windows Server – Windows Defender Advanced Threat Protection.

The existing modern model of solutions is presented in Figure 8.

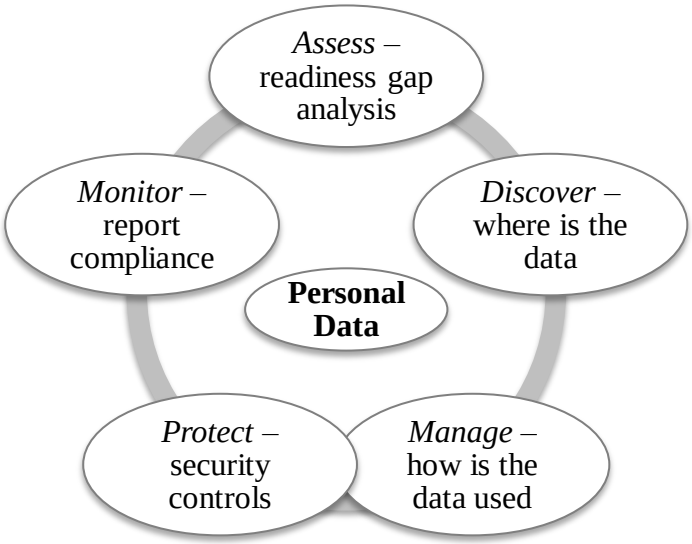

Figure 8. Model of decisions in terms of servation and digitalization of economic activity of the enterprise

What is the value of Software Asset Management (SAM)?

1. Better decision making: SAM provides the picture of where you are, what you have, what you need, what you don't, what is at risk, what can be optimized and the path to transformation.

2. Better planification: SAM also provides the foundation for where you want to go, what key IT investment you want to make for your Digital Transformation, how to stay current, in control and how to get the most out of it.

Software Asset Management is an industry practice, documented by ITIL and supported by ISO standards. SAM is vendor agnostic, supported by the whole IT industry. SAM is now a Board Level imperative (Gartner, IDC).

Microsoft is the IT vendor that fully embraces SAM:

1. Dedicated SAM teams in every market
2. SAM MCP competency at individual level
3. SAM expertise in MPN for our Microsoft Partners, whether consulting or transacting
4. SAM Partner ecosystem/community to serve every market
5. SAM funding available to help perform SAM assessments
6. SAM amendments to existing licensing contracts
7. SAM Managed Services Program for advanced Customers

SAM Value scenarios: a specific SAM project aligned to every customer need:

1. Cloud Productivity – Cloud readiness and implementation path assessment
2. Cybersecurity – Cybersecurity risk identification and mitigation assessment
3. GDPR – GDPR compliance identification and readiness assessment
4. Infrastructure Optimization – On-premise to Cloud server estate optimization (Azure)
5. Server Optimization – On-premise SQL workloads and virtualization optimization

Conclusion. Changing business models in terms of their digitalization provides an increase in customer loyalty through the omnichannel experience; allows employees to provide a popular service; simplifies daily routine work; allows you to manage strategic planning and merchandising; provides integration with supply chain management; unify business processes by different communication channels (websites, directories, mobile applications, contact centers, social media, etc.). Implementation of entrepreneurial activity at an effective level in the conditions of digitalization of the economy is possible only if there is a favorable general social situation, high-quality work of institutes of entrepreneurial environment, market system of relations, as well as personal freedom of entrepreneur, i.e. his "healthy" personal independence, which allows to make such entrepreneurial decisions, which from his point of view will be the most

effective, effective and profitable.

REFERENCES

1. Drucker, P. F. (1984). *Innovation and Entrepreneurship.* New York: Harper Business.
2. Burlutskyi, A. (2018). The consumer of the future – what is it and how to meet his needs? *Digital Evolution Forum* [Online], available at: https://deforum.com.ua/#2018 (Accessed 5 April 2020).
3. Britchenko, I., Kraus, N. and Kraus, K. (2019). University innovative hubs as points of growth of industrial parks of Ukraine. *Finansovo-kredytna diialnist: problemy teorii ta praktyky*, no. 4 (31), pp. 448–456.
4. Boldyreva, L., Kraus, N., Kraus, K. (2019). Digital competencies in higher education: design, implementation, result. *Derzhava ta region. Seriya: Ekonomika ta pidpryiemnytstvo,* vol. 1 (106), pp. 4–9.
5. Hovorin, A. A. (2012). Modern entrepreneurship and innovative economic development. *Vestnik Rossiiskoho ekonomicheskoho universireta imeni H. V. Plekhanova,* no. 3, pp. 14–21.
6. Holoborodko, O. P., Kraus, N. M., Kraus, K. M. (2019). Diagnosis of the impact of higher education R&D on enterprise innovation in Ukraine. *Efectyvna ekonomika,* [Online], vol. 1, available at: http://www.economy.nayka.com.ua/?op=1&z=6817 (Accessed 5 Jan 2020).
7. Kryvoruchko, O. S., Kraus, N. M., and Kraus, K. M. (2017). Innovative landscape" in the coordinates of the world economy. *Hlobalni ta nashionalni problem ekonomiky,* [Online], vol. 16, available at: http://www.global-national.in.ua/issuje-16-2017 (Accessed 8 Jan 2020).
8. Kraus, N. M., Kraus, K. M. (2018). Digitalization in the context of the institutional transformation of the economy: the basic components and tools of digital technologies. *Intelect XXI stolittia,* no. 1, pp. 211–214.
9. Kraus, K. M., Kraus, N. M. (2019). Retrospektyva i suchasnist opodatkuvannia v Ukraini ta za kordonom. Kyiv: Agrar Media Group.
10. Kraus, N. M. (2019). Innovative economy in a globalized world: institutional basis of formation and development trajectory. Kyiv: Agrar Media Group.
11. Kraus, K. M. and Kraus, N. M. (2016). Implementation of an innovation project by an entrepreneurial structure within the framework of "windmill of innovation" action. *Ekonomist,* vol. 2, pp. 4–8.
12. Kraus, K. M. and Kraus, N. M. (2018). What changes does Industry 4.0 bring to the economy and manufacturing? *Formuvannia rynkovukh vidnosyn v Ukraini,* vol. 9 (208), pp. 128–136.
13. Marchenko, O. V., Kraus, K. M. and Kraus, N. M. (2020). Platform economy: a narrative of innovative-entrepreneurial universities and a digitized development philosophy. *Efectyvna ekonomika,* [Online], vol. 1,

available at: http://www.economy.nayka.com.ua/?op=1&z=7566 (Accessed 30 Jan 2020).
14. Marchenko, O. V., Kraus, K. M. and Kraus, N. M. (2020). Digital economy and innovation and entrepreneurship university through the prism of competitiveness. *Efectyvna ekonomika*, [Online], vol. 3, available at: http://www.economy.nayka.com.ua/?op=1&z=7705 (Accessed 10 Apr 2020).
15. Manzhura, O. V., Kraus, N. M., and Kraus, K. M. (2019). The professions of the future in the virtual reality of the innovation-digital space. *Biznes Inform*, vol. 1, pp. 132–138.
16. Manzhura, O. V., Kraus, N. M., and Kraus, K. M. (2019). Diagnosis of the impact of research and innovation on technology transfer in Ukraine. *Efectyvna ekonomika*, [Online], vol. 2, available at: http://www.economy.nayka.com.ua/ ?op=1&z=6873 (Accessed 10 Jan 2020).
17. Manzhura, O. V., Kraus, N. M., Kraus, K. M. (2020). Ecosystem of gig economy and business university: the evolutionary synergies of "innovation virus" and "digital leap". *Efficient economy*, [Online], vol. 2, available at: http://www.economy.nayka.com.ua/?op=1&z=7642 (Accessed 02 April 2020).

8. Peculiarities of the retail digital transformation in coronacrisis conditions

Oleksandra Shaleva
Candidate of Sciences (Economics)
Associate professor of department of entrepreneurship,
trade and logistic,
Lviv University of Trade and Economics
Email: volex2007@ukr.net
ORCID ID 0000-0002-4057-2789

Introduction. Active advancement of information technologies and the Internet provide fundamentally new conditions for the development of commercial structures, due to the emergence of demand for innovative products and services, formation of new markets and innovative mechanisms for the promotion and sale of goods. All this led to the expansion of social and economic turnover and, respectively, directing commercial processes in the direction of global digitalization. According to the latest forecasts of the international company IDC, engaged in marketing research and consulting in the field of IT and communications, gobal investment in digital technology and services to 2023 would be about 2.3 trillion of the USD [1].

The processes of information technologies introduction in the field of retail become especially relevant in the context of its functioning during the COVID-19 pandemic. Only 10% of local offline retailers worked during the strict quarantine period, while the share of those who were able to operate due to the online channel availability was 45%. At the same time, according to a joint survey of the portal rabota.ua and the Association of Retailers of Ukraine, 2/3 of the 306 surveyed companies experienced a deterioration in performance during quarantine, 3% remained to work in the "delivery point" format, and 17% of them were forced to stop working altogether [2]. 38% of respondents indicated they are developing online sales channels, while only 15% of retailers used the omnichannel retail model. Globally, in the first quarter of 2020 (compared to the same period during the last year) online sales of goods in India increased over the year by 8%, in France – by 12%, China – by 25%, South Korea – by 45%, the United States and the United Kingdom – by 53% [3]. Overall, the pandemic has become a powerful catalyst for transformation in the business environment.

At the same time, a heterogeneous situation has developed in trade. On the one hand, the role of online sales has increased even for those who previously used e-commerce only as an image or additional channel. On the other hand, negative changes are taking place in the field of selling goods that have traditionally had significant online popularity: clothing, make-up, electronics, etc. Also, many retailers, even large ones, were not ready to work during the quarantine, which has reflected in their problems with the organization of logistics, replenishment of

stocks, forecasting demand, ensuring the efficiency of the ordering processes, information and payment security. The problematic point was the turnover costs formation, related to rent and loan payments, payment of wages, etc. in the conditions of dramatic income decline. In addition, the issue concerning protecting the health of the trade workers', who are in constant contact with a large number of people, has become extremely relevant. According to the Institute of International Finance forecast, global GDP growth in 2020 may be 1% only. But according to local retailers, it will be possible to restore the turnover to the pre-crisis period level not earlier than in a year. The retail sector, as one of the most dynamic and innovative segments of the economy, must adapt to the new difficult conditions as quickly as possible. In this regard, there is a need not only to transfer a part of the business online, but also in large-scale digital transformations that could increase the companies efficiency and provide them with a stable position in the market for a long time.

Literature review. Among the researchers of digital business transformation should be mentioned Bagatska K., Verba V., Voronkova V., Notarina A., Romanenko T. The specifics of the use of digital technologies in trade were studied by Demkiv J., Ivanechko N., Kushnir T., Protsyshyn Yu., Fedulova L., Chorna M. However, no relevant comprehensive studies of these processes in the crisis period associated with the coronavirus pandemic, and potential ways out of it have not been conducted yet.

Results. The business digital transformation is using new digital technologies to increase its efficiency and value. In general, there are three directions of digital transformation (fig. 9).

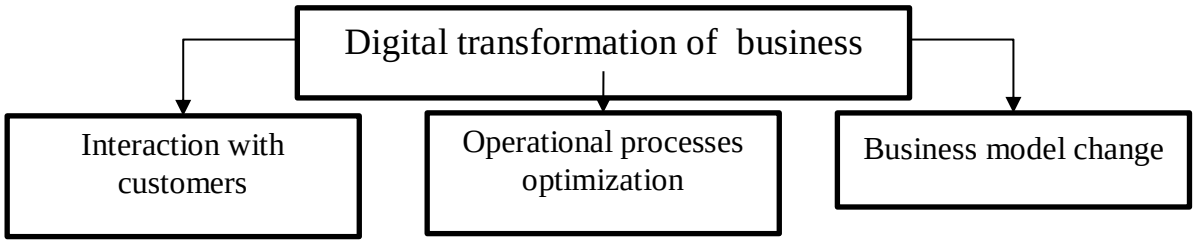

Figure 9. Digital transformation directions

Source: Cherniev Ye. Tsyfrova transformatsiia. Shcho robyty biznesu (2019). Retrieved from https:// https://cutt.ly/RdMFZWe.

In the conditions of digital transformation the rules of doing business change: if in traditional economy a customer had to be satisfied with what was offered to him by manufacturers and sellers, then the consumers of the digital age dictate their own market rules. The digital economy has many benefits. It reduces the cost of payments and opens up new sources of income. By reducing promotion costs, the cost of online services is much lower, and the services themselves (both public

and commercial) are more affordable. It is digital transformations that make cross-selling/upsell-sales possible, enabling companies to reach a new level of customer service and encouraging the purchase of more products. Besides, goods and services in the digital world can quickly enter the global market and become available anywhere in the world, and the offered product can be refined as quickly as possible in accordance with new expectations and needs of consumers. Digital transformations provide much more diverse, faster and better information, commercial, educational, scientific and entertainment content. Therefore, the digital transformation of business is possible through a set of technical, economic and social measures implemented through platforms such as the Internet, as well as mobile and touch networks. All this makes increasing productivity, competitiveness of companies and reducing production and circulation costs possible.

In the context of the coronavirus crisis, all the points, mentioned above become even more relevant. At the same time, those companies which used digital tools previously faced record traffic, which often caused failures and significant decline in customer service quality. To keep the customers loyal, businesses need to bear in mind that users are now even more interested than ever in fast and quality access to goods, services and information.

The american company AppDynamics (productivity application systems and IT-analytics development company) conducted a survey in April and May 2020, which was attended by more than 1000 IT professionals from commercial companies whose annual turnover is at least 500 million USD from 10 countries. This survey allowed to identify the main problems and prospects for the implementation of digital transformations in the activities of business structures (fig. 10).

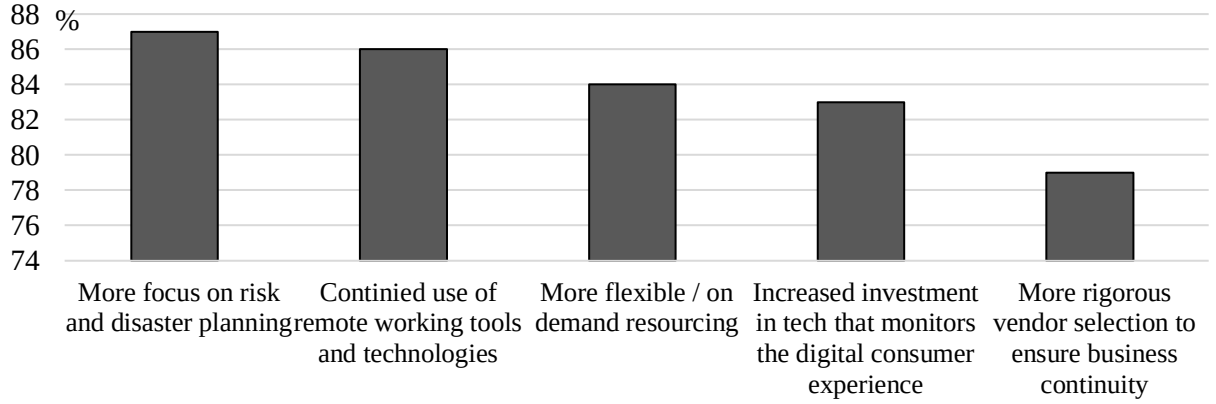

Figure 10. The perspective changes in companies, influenced by the Covid-19 pandemic

Source: The Agents of Transformation Report 2020: COVID-19 Special Edition (2020). Retrieved from https://www.appdynamics.com/blog/news/agents-of-transformation-report-2020/.

As already mentioned, the retail segment was able to withstand the crisis due to the ability to conduct business online. All together, a significant interest in online trade was observed among local individual entrepreneurs during the quarantine period. Thus, on the 17th of March, 2020, Shop-Express opened free access to the creation and administration of online stores on their platform for Ukrainian businesses. By the end of May, more than 2000 entrepreneurs used this service, as a result of which 1271 online stores were created, and the employees of the company received and processed more than 8000 requests by phone, via e-mail and chat support. At the same time, 92% of entrepreneurs who have created their business in this way have not previously engaged in online sales. Almost half of start-ups (46.8%) aimed to increase sales through the use of digital tools, and 12% planned to move entirely to the online segment [4].

The speed of transition of a trading business from offline to online depends on the niche, features of business processes and available start-up capital. This process can be divided into tactical and strategic stages. Quite often, when there are not enough funds to create a full-fledged online store, entrepreneurs create relevant pages on Facebook and Instagram and launch a campaign in targeted advertising. This can be done both independently and using the services of online marketing agencies. The last ones provide customers with high-quality visualization of the product benefits or service result, demonstration of trust triggers (business performance indicators, official documents, certificates of conformity, etc.). What is more, it is possible to form a multi-step model of trading using the sales funnel. Also, the rapid economic and social effects is given by the creation of a one-page site (landing page), which causes trust and keeps attention of a potential customer longer.

The strategic direction, which determines online functioning of the entrepreneur in the long run, may include the expansion of a one-page website to a multi-page website. development of a full-fledged online store and formation of a marketing strategy, which can cover both complex solutions and individual strategies (for example, regarding SEO or the social networks functioning). The emphasis is also not only on the lead generation process, which is aimed at receiving orders as quickly as possible, but also to strengthen the brand, expand the audience and improve conversions.

If an entrepreneur or a trading company has a developed online sales channel, then in the conditions of quarantine and, especially, during the post-quarantine period, when there is a need to expand the scope of activities, encouraging the spontaneous online shopping could be efficient. This approach is traditionally used by retailers in offline stores encouraging consumers to buy high-margin goods impulsively. This requires advanced referral systems, which "guess" what the buyer may be interested in and which are used when surfing the pages of the site.

In order for domestic entrepreneurs to develop their online business as effeciently as possible, the Ukrainian product IT company EVO and the largest domestic online store and marketplace launched a free online platform "Shkola

Ecoma" in July 2020. There they will teach you how to open an online store, outstand your competitors, set up a systematic business, find suppliers, sell profitably, buy, rent property, digitize business, find additional sales channels and enter new markets. You can choose the course yourself or take a test and get recommendations on where to start.

The courses are divided into three levels, according to their difficulty: for beginners and experienced entrepreneurs ready to "break through" or change the direction of business. The pace and format of training is determined by the participant independently – one can choose to move through the topics gradually or selectively to study the most interesting modules. At the end of the course you can take a test, make sure you master the material and get a certificate. 7000 entrepreneurs took part in the first online marathon of the school already.

Successful retailers clearly understood even before the quarantine, that in order to attract purchases to the offline store, they need to appeal them online. According to the American market research company Forrester [5], buyers often search for a product on the Internet before buying it, and interact with the brand through various channels before, during or after the purchase: slightly more than a half of buyers (52%) interact with computer, 26% – via mobile phone and only 8% – communicating with staff in the store. Online stores and marketplaces play a major role in the digital transformations of large-scale retail. The vast majority of large retailers use online versions of their traditional stores actively (fig. 11).

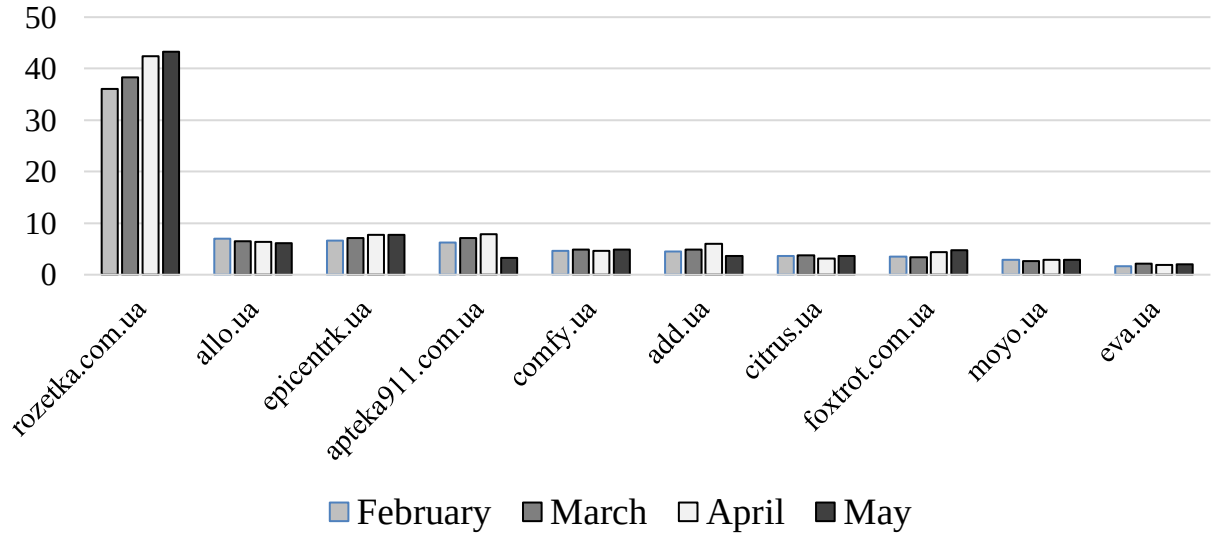

Figure 11. Attendance of the Top 10 online stores of online retailers during the quarantine period in 2020

Source: 1. Samye poseshchaemye internet-magaziny fevralya 2020 goda (2020). Retrieved from https://cutt.ly/dd4nxzF. 2. Samye poseshchaemye internet-magaziny marta 2020 goda (2020). Retrieved from https://cutt.ly/md4nvaG. 3. Samye poseshchaemye internet-magaziny aprelya 2020 goda (2020). Retrieved from https://cutt.ly/Cd4nyAa. 4. Samye poseshchaemye internet-magaziny maya 2020 goda (2020). Retrieved from https://cutt.ly/1d4nFzH.

The strict quarantine beginning in March led to an active increase in the attendance of the largest Ukrainian online sellers – rozetka.ua, where the number of orders almost doubled in April. Moreover, according to the co-owner of the online store V. Chechotkin, the largest increase occurred in the categories of food, basic necessities, pet products, fitness products, but in expensive categories (such as household appliances and electronics, which is typical for other chain stores similar specialization) – sales decreased significantly. The service of delivery of food by couriers "to the door" was introduced during the quarantine period. In addition, Rozetka is now one of the most popular marketplaces.

The increase was also typical for epicentrk.ua, where most buyers bought household goods, household chemicals and gardening tools. The number of online pharmacies visits (in our case apteka911.com.ua and add.ua) has also increased, especially for those which provide home delivery of medicines. However, with the easing of the quarantine regime and improved provision of masks, antiseptics, antivirals, the number of visitors has decreased dramatically.

The boom of orders has also happened on the most popular Ukrainian marketplace Prom.ua. According to the head of this business M. Artemchuk, the number of orders increased by 20% only during April, while in the first half of 2020 this figure increased by 50%. The marketplace expects a partial outflow of customers from online, after the end of the quarantine.

It should be specified that the top ten most visited online stores did not include professional food retailers in Ukraine. Until now, grocery stores have been the least digitized segment of domestic retail trade and at the same time the most promising. This is due to the fact that most food chains, albeit with restrictions, continued to operate during the quarantine period. At the same time, the largest retailers actively used their online potential. Thus, the Varus network has launched an online store go.varus.ua. The Сільпо supermarket chain, part of the Fozzy Group, has started providing home delivery services within the respective locality.

The largest food network АТБ implemented 3 digital projects for more than two months of national quarantine. The service of products delivery and essential goods was launched. More than 1200 settlements were covered in the first two weeks of operation in cooperation with Rozetka and Нова Пошта.To begin with, customers were offered a choice of three options for pre-sets – for 400, 500 and 700 UAH. From the 7th of April, the service of online orders delivery from АТБ covered the entire territory of Ukraine (about 8 thousand cities and towns). These order variants were amended: the minimum (UAH 400) and maximum (UAH 700) pre-sets were replaced by food and non-product (essential goods).

Another online project by АТБ has significantly expanded the capabilities of the buyer. A pre-order option was presented, which is called «Choose and take away» (fig. 12): on the site zakaz.atbmarket.com you can choose products and put them into a virtual basket in any of the supermarkets. Then the buyer comes to the appropriate store, pays for the purchase and receives the already collected package. If one wishes, you can save even more time with the online payment option.

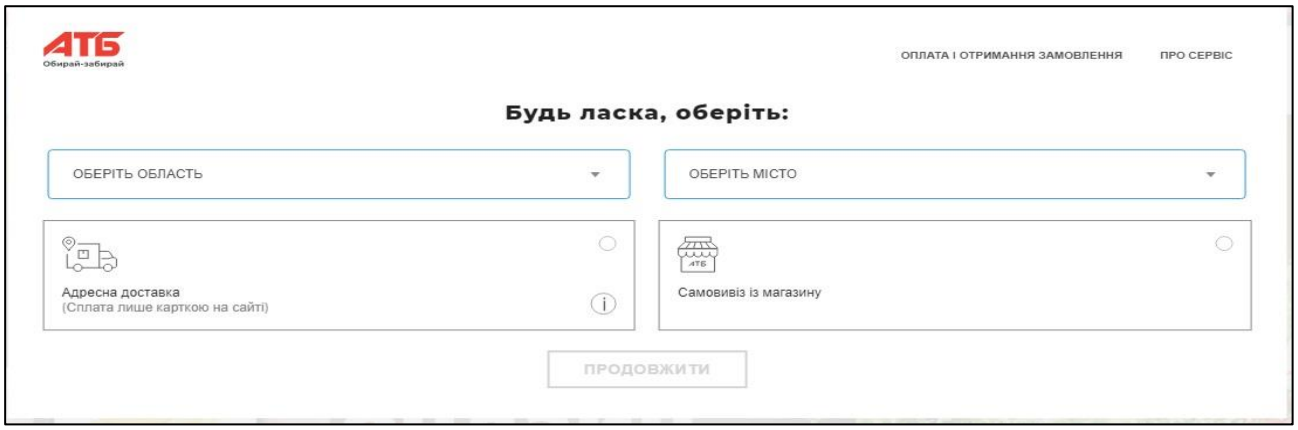

Figure 12. «Choose and take away» service interface of ATB network

Among other innovative digital projects by АТБ, which were implemented during the pre-quarantine period, but proved to be most effective during the strict quarantine, one can specify the intellectual assistant "ATBOT" in Viber and Telegram messengers. The chatbot not only replaced the book of complaints and suggestions, but also became an alternative for calling the "hot line". Also, it is able to provide accurate information about the range, promotions, stores and vacancies in the company in a few seconds.

With the advent of the digital age, communications have become multilevel. If earlier there was a traditional sales funnel according to the classic model AIDA (awareness – interest – demand – action), now the Digital Customer Journey, i.e. digital travel of the client is formed. This is an approach in which the buyer interacts with more and more brands through numerous points of contact at each stage of the path. For example, Google found that about 85% of consumers begin the process of buying on one digital device and end on another.

Therefore, the best option for the development of retail, which provides maximum economic and social effect, are omnichannel sales (fig. 13). Any full-featured online store still needs a powerful offline component: call center, fulfilment, delivery organization, etc. In addition, the capacity of even the largest Internet channels was not always sufficient during peak orders, as it was already mentioned. Therefore, flexibility is achieved by proactively handling of all the business processes or by partners who are non-core to core business and can quickly take over the processes. It is necessary to determine in advance what to concentrate on in case of emergencies, and where to involve professionals.

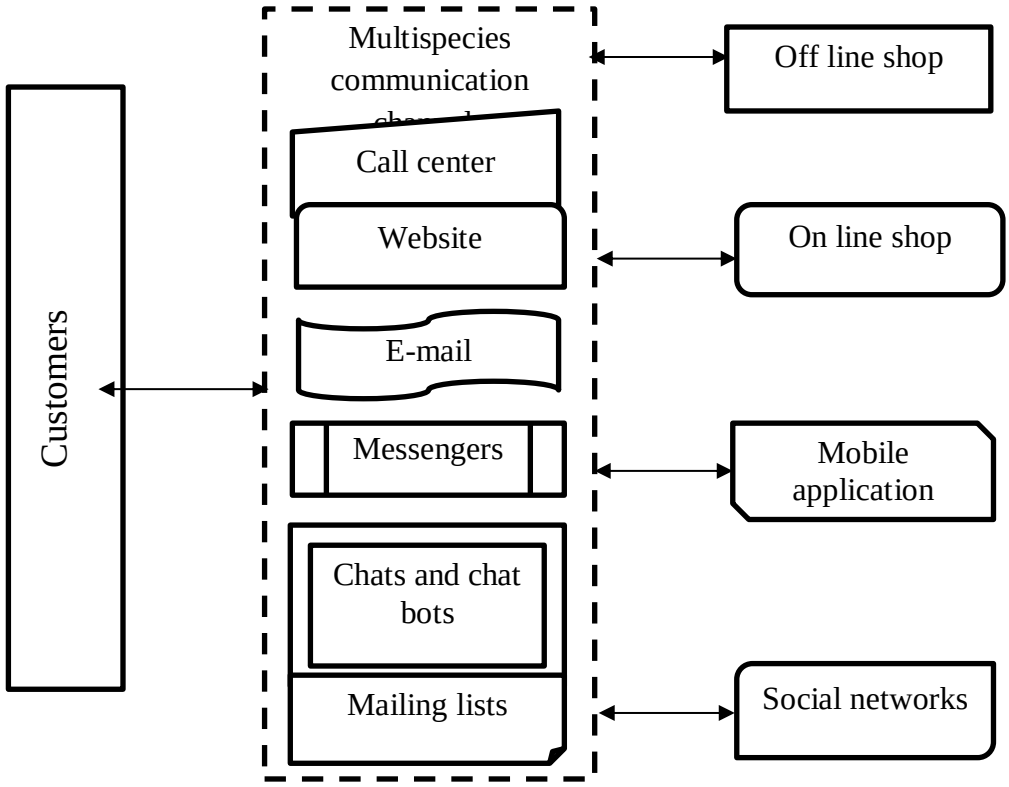

Figure 13. The structure of the omnichannel sales in retail
Source: own elaboration.

At the same time, the main priority of retailers remains to improve the quality of service through all channels (72% of surveyed retailers according to the above study Forrester [5]. The seamless channel interaction, including providing seamless channel interaction (59%), and improving the presentation of data by retailers through channels (58%) is also very important.

Social networks can be quite convenient channels for prompt response to consumer inquiries for retailers. The Ukrainian audience of Facebook grew by 1 million to 15 million users, and Instagram – by 1.5 million (up to 13 million users) in the first half of 2020. Almost 20% of users during the quarantine began to spend more time on social networks according to Nielsen, thus forming a potential retail audience. The most effective networks of Facebook and Instagram worked primarily for those brands that already had developed pages and a loyal audience at this time (table 9).

As it can be seen from the table1, no significant changes in the ranking of popular Facebook pages during the quarantine period took place. However, the number of subscribers during the strict quarantine period from March to May grew more actively (on average by 4.7%), while the growth decreased with its weakening (to 2.4% as of August 2020).

Special attention needs to be paid to ensuring the safety of both trade workers and buyers during the pandemic. This not only forces us to use radically new ways

of development, but also to look at existing solutions from a different angle. An electronic queuing system is a technology that makes it possible to use digital innovations in traditional retail. Its main task is the automatic number coordination of the customers in the trading floor.

Table 9

Top 10 most popular Facebook pages of Ukrainian retailers in 2020

№	Retailer	March		May		August	
		rating	number of subscribers	rating	number of subscribers	rating	number of subscribers
1	Watsons Україна	1	602018	1	625836	1	647739
2	Rozetka	2	569207	2	584741	2	626091
3	EVA	3	541802	3	565368	3	591790
4	Антошка	4	377922	4	395175	4	400187
5	Алло	5	362440	5	366634	5	371705
6	Kochut	6	356688	6	363510	6	365017
7	COMFY	7	331977	7	342326	7	345074
8	INTERTOP	8	272129	8	273906	9	284326
9	Епіцентр К	9	238456	9	261234	8	285550
10	JUSK Ukraine	10	220976	10	226016	10	228833

Source: 1. Rejtyng-2019: Top Facebook-storinok ukrayinskyh rytejleriv i TRCz (2019). Retrieved from https://cutt.ly/AfpfvJN. 2. Top-20 ukrayinskyh ritejleriv i TRCz u Facebook u berezni 2020 (2020). Retrieved from https://rau.ua/novyni/top-20-rytejlerov-v-facebook/. 3. Top-20 ukrayinskyh ritejleriv i TRCz u Facebook u serpni 2020 (2020). Retrieved from https://cutt.ly/8d9AC0x.

Employees do not need to control the number of customers who entered the trading floor. The electronic queuing system generates a personal number for each store visitor. When the corresponding number appears on the screen of the equipment, the buyer can scan his/her QR or bar code on the reader and go inside. When a customer leaves the store, security through a mobile application, terminal or automatic gates signals to the system that you can let the next customer. This technology also allows you to set limits on the number of people who are in the retail space at the same time.

The spread of the coronavirus pandemic has contributed to a significant expansion of contactless payments. In Ukraine, an active campaign of the National Bank and other commercial banks was conducted in support of online operations. The total number of non-cash transactions in the first quarter of 2020 amounted to 1183.2 million (85.4% of all payment transactions), and the amount – UAH 503 billion, or 54.6% of the amount of all card transactions (the corresponding figure was 49.7% for the same period last year). The largest number (50.3%) of card transactions accounted for payments in retail chains. The most significant increase in non-cash payments falls on pharmacies and health food stores – by 51.7%. In

grocery stores and supermarkets the volume of non-cash payments increased by 39.2% [6].

Also, during the quarantine period, Pryvatbank launched the ability to make online purchases through Google Pay for users of more than 12 thousand Ukrainian online stores and online services.

Many large domestic retailers in 2019 began the process of implementing automated payment services, which only intensified with the beginning of the corona crisis. For example, Сільпо and Auchan used self-service checkouts with the ability to scan and pay for goods using a mobile application. And Novus planned to spend more than 1 million USD on 120 terminals of self-service cash registers in 2020. As world practice shows, operators will increasingly use technology to simplify the purchase process and provide a unique customer experience and automation of business processes in the near future.

One of the most effective ways for retailers to survive the crisis is to optimize the cost items. During the quarantine, when the maximum efficiency of business processes and minimization of errors and losses were extremely important, the most appropriate solution is the introduction of electronic document management. Electronic document management allows you to reduce the cost of document management significantly (more than 50%), speed up the processes associated with invoicing, speed up the logistics processes (almost 50%) and reduce the number of errors (60-70%) .

Among the well-known retail players, all industry leaders have used the EDI system: Fozzy Group and all its retail chains, Metro Cash & Carry, Велика Кишеня, АТБ, Novus, Космо, Rozetka, Епіцентр and Нова Лінія, Leroy Merlin, Billa, Рукавичка, Таврія [7].

Another point that all the retailers face is the turnover of primary documents and, above all, electronic invoices, acts of work performed, acts of mutual settlements, and so on. At the same time, in the vast majority of trading companies more than half of such documentation is kept in paper form (77% of retailers) or entered manually in the format of e-mails or PDF (68%).

The comprehensive integrated E-invoicing solution from the Polish company Comarch allows you to optimize and automate all processes related to invoices. The system includes verified documents, their signature, encryption, interaction with local tax authorities and support for various communication channels; they are adapted to the requirements of suppliers (web portal, API, interoperability), as well as various message formats (e.g. XML, IDOC, EDIFACT). With the help of Comarch E-invoicing, the company can fully implement the exchange of legally significant documents and connect to this exchange its business partners: suppliers of services or raw materials, as well as suppliers or buyers of goods through various channels. With the help of Comarch E-invoicing, the company can fully implement the exchange of legally significant documents and involve its business partners into this exchange: suppliers of services or raw materials, as well as suppliers or buyers of goods through various channels. Legally significant

document circulation in Ukraine is in the great demand and is already being implemented on a mass basis between retail chains and their suppliers and on the line of cooperation between the manufacturer and the distributor. It is worth mentioning such companies as Metro Cash & Carry Ukraine, Rozetka, Велика кишеня, Таврія, Novus and Leroy Merlin Ukraine [7].

Conclusion. No modern business will be able to exist in the long run without developing a strategy for digital transformation. Today, we are seeing a rapid acceleration of trends that were gaining popularity very slowly before the pandemic. Most likely, they will determine the future of the business in the coming years. The digitalization of retail, as well as the digitalization of the state and technology in general, have already saved millions of jobs, helped to slow the spread of the virus and allows businesses to cope with new realities.

REFERENCES

1. IDC's Worldwide Digital Transformation Spending Guide Taxonomy 2020 (2020). Retrieved from https://cutt.ly/jdM7dd0.
2. 83% pidpryyemstiv sfery rozdribnoyi torgivli opynylysya v glybokij kryzi (opytuvannya) (2020). Retrieved from https://cutt.ly/sd1qBna.
3. Doslidzhennya Payoneer: yak koronavirus vplynuv na rynok e-commerce v sviti (2020). Retrieved from https://rau.ua/ecommerceuk/payoneer-koronavirus-e-commerce/.
4. Skolko internet-magazinov otkryli ukraincy v period karantina (2020). Retrieved from https://cutt.ly/od1qCZx.
5. Issledovanie: ozhidaniya pokupatelej i ih opyt v onlajn i oflajn-kanalah (2020). Retrieved from https://cutt.ly/zd4x9l1.
6. Za kil`kistyu ta sumoyu v Ukrayini perevazhayut` bezgotivkovi operaciyi (2020). Retrieved from https://buhgalter911.com/uk/news/news-1050448.html.
7. Didzhitalizaciya ritejlu i FMCG: yak reorganizuvaty biznes-procesy kompaniyi v cyfrovyj format v umovax karantynu (2020). Retrieved from https://rau.ua/novyni/comarch/.

9. Organizational and methodical aspects of formation of accounting and information management of human capital of the enterprise

Valerii Bondarenko
Doctor of Sciences (Economics), Professor,
Professor of the Department of Marketing and Advertising
Vinnytsia Institute of Trade and Economics of KNUTE
E-mail: BondarenkoVM@vtei.com.ua, bondarenkovalm@gmail.com
ORCID ID 0000-0001-6182-6760

Vitalii Pokynchereda
Candidate of Sciences (Economics), Associate Professor,
Associate Professor of Accounting and Tax Department
Vinnytsia Institute of Trade and Economics of KNUTE
E-mail: pokynchereda@vtei.com.ua, vitalii.pokynchereda@gmail.com
ORCID ID 0000-0003-2734-8667

Introduction. Globalization of economic processes is accompanied by the establishment of qualitatively new production relations, the rapid development of science and technology, the growing role of the human factor in production and economic activities requires companies to model the management system, which took into account these trends. Thus, representatives of Harvard Business School I. Ruus, S. Pike and L. Fernstrom note that due to the growing interest in human capital, there has come the understanding of the need to approach company management in a different way, including the use of new methods of performance evaluation and information presentation [1]. At the same time, in a survey conducted by the Economist Intelligence Unit, 63% of CEOs said that managing human capital is one of the three most important and simultaneously difficult tasks for a manager to perform [1]. One of the most authoritative representatives in the sphere of human resources management M. Amstrong noted that human resources management is a strategic and logically consistent approach to managing the most valuable resource of an enterprise by its employees, who collectively and individually contribute to solving the enterprise's tasks [2, p. 20].

At the same time, the basis of effective human capital management is the availability of reliable and complete information support, capable of meeting the needs of management in the process of making and implementing management decisions. However, the analysis of the current state of information support of enterprise management testifies to the necessity to deepen and develop organizational and theoretical-methodological provisions, oriented on generation of information support adequate to the modern conditions, capable of satisfying the

growing information needs of account data users. Besides, the absence of a universal methodology of human capital accounting, which would be officially recognized at the international and national levels, is one of the factors that counteract the effective implementation of the value-oriented enterprise management policy. Therefore, along with the implementation of balanced economic policy, aimed at creating prerequisites for improving the efficiency of enterprises, it is necessary to develop and implement a set of measures aimed at improving the organizational and methodological provisions of human capital accounting as the basis for information support of the management process.

Literary review. Questions of formation of accounting and information maintenance of management of the human capital is object of scientific researches of many scientists-economists, in particular N. Golovaj, T. Davidyuk, M. Koroba, N. Korolyuk, S. Legenchuk, M. Medvedeva, E. Mniha, N. Pochinok, M. Pushkar, I. Sadovskaya, Y. Sokolov, E. Flamholtsa, M. Chumachenko, D. Yadransky and other academic economists. Paying tribute to the scientific refinement of predecessors in the study of accounting and economic analysis of human capital, it should be noted that some aspects, in particular, organizational and methodological provisions of the formation of accounting and analytical information in the context of meeting the needs of human capital management remain poorly studied, needing systematization and improvement.

Results. A component of the modern system of enterprise activity management is human capital management, the carriers of which are employees. Today, employees are the key strategic resource of enterprises, the source of their competitive advantages, and their management is one of the most important areas of the organization of any hierarchy level, capable of improving its efficiency many times. When substantiating the essence of the process of human capital management, scientists proceed from the position of enterprise strategy, according to which labor resources should be managed. From this it follows that the human capital management is a process, because the activity aimed at achieving the strategic goals of the enterprise is not a single-step phenomenon, but a set of long-term interconnected actions, which M.Meskon calls management functions [3, p. 48]. The French scientist-economist, founder of the classical school of management A. Fayol once noted that there are five functions of management. According to him, control means to anticipate, organize, manage, coordinate and control [4, p. 12].

As a result of a study of the scientific literature on management, it was found that virtually every work contains different lists of management functions, which, although not essential, differ from one another. Allocation of a considerable quantity of functions of management and their various combinations is explained by own vision of researchers of the essence of the administrative process and features of activity of the separate enterprise, namely, type of manufacture,

complexity of technological process, branch specificity and so forth.

Among administrative functions economists allocate primary, basic functions from which all others occur. M.Meskon, M.Albert and F.Hedouri include planning, organization, motivation and control, which are connected with each other by communication and decision making systems. However, many Russian scientists, including A. Bradul, V. Zavgorodny, Y. Meh, and V. Sopko, are extending this list to include accounting and analysis functions.

By subb jectively singling out the function of accounting, a whole cohort of scientists gives it the status of a necessary, but auxiliary function in relation to others. The scientific discussion about the importance of the accounting function is joined by J. Sopko. Mech, assuring that «... accounting is a basic management function, which provides collection of primary information, its evaluation and grouping, accumulation, comparison, interpretation, design and transfer of processed information to specific officials for decision making» [5, p. 46]. I. Sadovskaya notes that accounting plays a key role in the process of making managerial decisions [6, p. 134]. Another group of representatives of the scientific community is not so categorically in favour of the dominance of accounting. Thus, A. Bradul writes in this regard that all management functions are equally important, and the absence of any of them in practice leads to a break in the cycle of the management mechanism and a significant reduction in the efficiency of the management system [7, p. 48].

It should be noted that all management functions are complex and interrelated in their content, so their allocation in practice is a very difficult task. Proceeding from this, effective implementation of one of the management functions becomes impossible without performance of all their aggregate. At the same time, there is an inconsistency of scientists' views concerning the order of execution of managerial functions. Thus, some authors note that the following sequence is optimal: planning, organization, control and analysis. On the other hand, A. Bradul emphasizes that this sequence contradicts the new paradigm of management and violates its principles and integrity in a concrete economic system [7, p. 49]. Moreover, the scientist came to the conclusion that since accounting is the primary source of data for control, analysis and planning, it is the main function of management.

So, effective management of human capital of enterprises requires performance of the whole range of management functions, and their practical realization becomes impossible or significantly complicated without quality information support of management system. The latter should be understood as a set of scientifically processed data, through the internal information and communication channels of the organization are sent to the management link for preparation and implementation of rational management decisions. It is obvious that in the current business environment it is impossible to respond effectively to permanent changes in the market environment without reliable and timely

information, which is the basis for making managerial decisions. In M. Pushkar's opinion, the information is a necessary and obligatory substratum in order to assess the situation, to develop possible alternatives of managerial decisions and select the most expedient of them for practical use [8, p. 54]. Interrelation between the functions of management and information support of the enterprise are shown in Fig. 14.

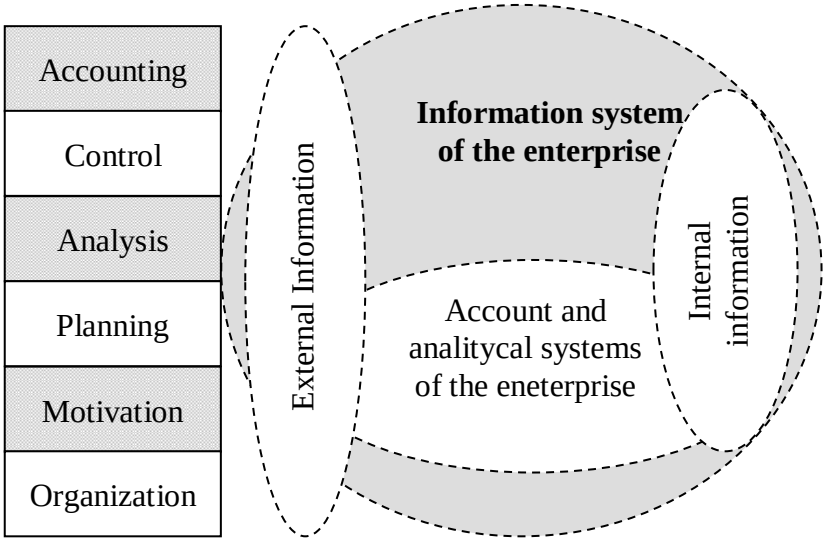

Figure 14. Connection between management functions and enterprise information system

Source: [7, p. 50]

It can be seen from Fig. 1 that the enterprise information management system is the result of synergy of two components: external and internal information sources. In spite of the fact that data of external environment do not disclose information about human capital of the enterprise and efficiency of its use, they have an indirect influence on the process of its formation and use through the system of legal acts. The state, represented by legislative and executive bodies of power, carries out regulatory and legal regulation of the whole system of social and labor relations at an enterprise, namely, determines the order and conditions of conclusion of labor collective agreements and sectoral agreements manages the distribution of labor through employment centers sets limits of working and rest hours, determines the conditions of granting and duration of vacations, and regulates issues of remuneration of labor. It is regulatory acts that make up the core of the data set that a business entity receives from the external environment. Besides, it is not necessary to underestimate other sources of external information, which include macroeconomic indicators, results of market research, labor market indicators, etc.

The information received by an enterprise from the external environment is complex in structure and cumbersome in volume. Modern scientists point to the danger of large information flows in the decision-making process: "the continuous acquisition of new data creates a paradox: information as a measure to eliminate

uncertainty today increases the sense of danger in the individual through unsuccessful attempts to turn this data into knowledge" [6, p. 45]. Therefore, when forming a database on human capital management of enterprises, in our opinion, it is necessary to adhere to the main principle of building an information system "obtaining a maximum of a derivative with a minimum of incoming information".

Without denying the significance of the external environment data, it should be noted that the substantiation and management decision-making on the use of human capital of an enterprise is based mainly on internal information support, which is based on two management functions - accounting and analysis. Scientists note that at the current stage of economic development accounting and analytical information is the most important element of the management system of economic activity, which is designed to create conditions for achieving corporate goals and objectives used at various levels of enterprise management [9, p. 306].

American Institute of Chartered Accountants back in 1970. It stated that the function of accounting is to provide information on the activity of an economic entity with the purpose of its use for management decision making [10, p. 12]. A. Fayol, investigating the role of management accounting function, noted that accounting is an enterprise's vision body, giving it an opportunity to know what results have been achieved and where it goes [4, p. 11]. M. Pushkar stresses: «accounting is a part of the general information system, which transforms primary data, fixed in documents, into a product for management» [8, p. 59].

B. Needles noted that in modern conditions accountants must satisfy information needs of both internal and external users [10, p. 12]. The researcher states that accounting is not a «goal in itself», but is a system that provides measurement, processing and transfer of information about the relevant business entity, allows users to make informed decisions when choosing alternatives for the use of limited resources in the management of the enterprise [10, p. 12-13]. In support of the above, V. Paliy and Ya. Sokolov: «the purpose of accounting - management of economic processes; its content - information about the facts of economic activity and its working function - observations, measurements, classification, synthesis and transfer of information» [11, p. 23]. In their opinion, the purpose is beyond accounting, it is given to him.

In the accounting system of enterprises various information is formed which is used in human capital management. However, through an entrenched practice of accounting, focused primarily on meeting information needs of external users, accounting data in the management process is applied in a fragmented manner. The current accounting system does not fully generate information flows necessary for management and has a destructive effect on the efficiency and effectiveness of decisions taken. In such a situation, value criteria for the initial accounting information and requirements for its content should be determined by the management unit of the enterprise. Accounting should act as a mechanism that provides feedback to the management system.

Today accounting information for human capital management of an

enterprise is formed in operational, accounting (financial and management) and statistical accounting. Dispersion of information on human resources in three types of accounting, each of which is conducted in various structural units and departments of the enterprise, creates obstacles in the timely formation of accounting and information base, which significantly complicates, and sometimes makes it impossible to make prompt managerial decisions. Thus, in the framework of operational accounting, orders are formed about taking on a robot, setting up vidpuskah, zilnennya pratsivnikov, recording the use of working time, and the same special employee cards with the necessary pre-dovidkovimy amounts of money for srakhuvannya earnings and fees, taking out additional social and other benefits for taxation, etc..

Statistical accounting of human resources at enterprises is reduced to collection and study of quantitative and qualitative processes (calculation of list number of employees by their age, sex, education level, qualification, use of working time fund; calculation of average wage level, use of wage fund). On the basis of statistical data, analytical studies are conducted to obtain the information necessary for management.

The current accounting system at domestic enterprises implies a cost approach to accounting of human capital; it is regulated by P (C) BU 8 «Intangible assets2, P (C) BU 16 «Expenses2 and P (C) BU 26 «Employee compensation». According to these Regulations, expenses on formation and use of human capital of an enterprise, namely expenses on their formation (selection, selection, hiring of personnel), use (expenses on remuneration of labour, other incentive and compensation payments, etc.) and professional development (expenses on training and retraining of personnel) are reflected in liabilities and expense accounts of accounting. In order to implement the methodology of human capital accounting at enterprises, it is necessary to review the procedure for accounting of expenses on its formation and use, which are incurred by the business entity at various stages of management. In the scientific literature, the most common in the classification of expenses on the formation and use of human capital of an enterprise are the following features: purpose, sources of financing, place of origin, stages of the process of reproduction of human capital, the carrier of expenses, the obligation to bear expenses, etc..

However, in our opinion, such approaches to cost grouping do not meet accounting requirements. In this regard, it seems reasonable to introduce a new classification feature, namely, «impact on the economic result». Under such approach, all expenses incurred by the enterprise for formation, use and reproduction of human capital can be divided into expenses related to the increase of initially expected economic benefits, and those that do not lead to the increase of initially expected economic benefits from investments in human capital. At integration of several classification features to division of expenses on formation, use and reproduction of human capital, namely «place of occurrence of expenses», «stages of the process of reproduction of human capital» and «influence on the

economic result» the approach to their accounting representation is formed. The offered initial sign is the basis for differentiation of means invested in the personnel of the enterprise, investments and expenses. On the economic contents expenses on development of the personnel of the enterprise are long-term investments into formation of the human capital. Such expenses should be a certain analogy with investments in physical capital, because they increase the productive potential of employees and are the source of potential economic benefits for the enterprise. Expenses associated with the attraction and use of human capital, including those included in the wage fund, and social costs should be accounted for according to the current methodology.

The above recommendations are a composite methodological approach to the accounting representation of human capital of an enterprise, based on the accounting interpretation of their essence. Accordingly, we consider personnel development costs (education, training, retraining of employees) as funds that the enterprise invests in the formation of human capital of its employees.

In general, the approach to understanding the economic essence of the costs incurred by the enterprise for the formation and use of human capital, further affects the order of their accounting representation, shown in Fig. 15.

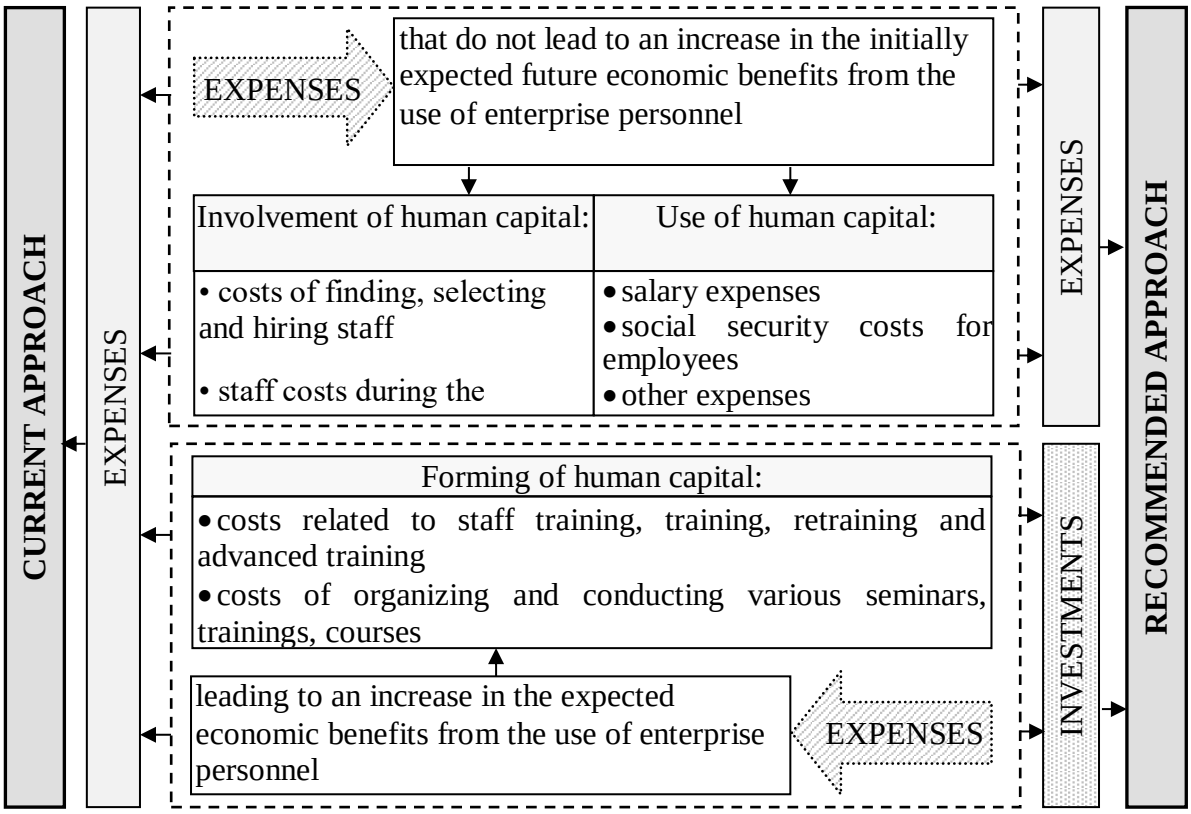

Figure 15. Approaches to determining the economic content of costs for attracting, forming and using human capital of the enterprise

Source: compiled by the authors

The appropriateness of transformation of the approach to the understanding of the economic essence of personnel development costs as an investment in the

formation of human capital and their further accounting as part of intangible assets is due to the realities of the modern economic system, the conditions under which employees, due to their qualitative characteristics, occupy a key place in the system of resource support of organizations, becoming a determining factor of their performance. Besides, implementation of the above mentioned methodical approach to reflection of human capital in the accounting system of the enterprise meets the needs of strategic management aimed at maximization of the market value of the company.

The current system of financial accounting of enterprises does not provide for accounting of human capital of employees, creates practical obstacles in systematization of accounting information necessary for management. In such a situation it becomes problematic to implement one of the main criteria of accounting information - completeness, and management decisions, taken in conditions of limited information, may not only fail to bring the desired effect, but also have a destructive impact on the labor process as a whole. According to M. Medvedev, the ignoring of such an object as human resources by accountants is connected with unsolvable accounting problems [12, p. 94]. That is why the development of conceptual bases of accounting of human capital of employees in the accounting system of an enterprise is a promising research task.

So, accounting in the system of human capital management of an enterprise can be defined as the process of receiving, processing, generalization and transfer of information about the employees of the organization, which is used by the management to develop a system of measures aimed at formation (attraction), preservation, increase and use of human capital of employees as the main prerequisite for achieving corporate goals.

Today it becomes obvious that enterprises can operate efficiently and compete without rational management of this valuable resource. In the process of implementing management functions, it is unacceptable for managers to assign exclusively their intuitive skills. Complete, adequate and reliable information on quantitative and qualitative composition of employees, their movement, expenses on formation and reproduction, labor efficiency, information on the cost of human capital and other labor indicators are the data on the basis of which strategies should be substantiated and operational decisions should be made in the sphere of human capital management of modern enterprises. The role of such a generator of information for the needs of management, besides accounting, is performed by the system of economic analysis. Carrying out of analytical researches should be focused on achievement of qualitatively substantial knowledge which use at realization of administrative decisions considerably reduces risk of uncertainty. Thus level of information maintenance has to correlate with efficiency of administrative decisions: the higher qualitative parameters of the information, the better possibility of managers to prepare optimum decisions.

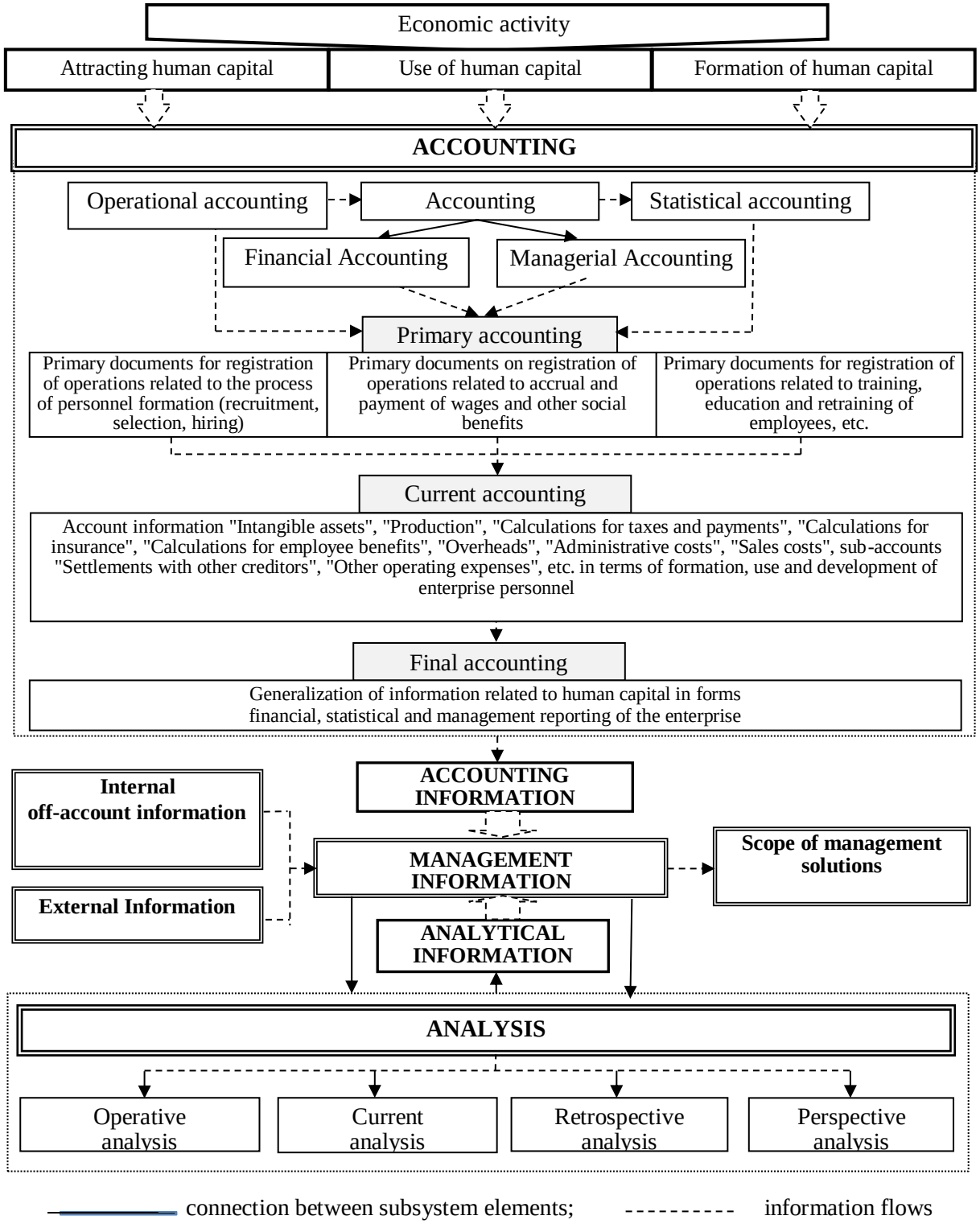

Figure 16. Mechanism of forming accounting and analytical information in the process of managing human capital of enterprises

Source: compiled by the authors

In A. Bradul's opinion, analysis is «the main information-forming element of the control system» [7, p. 64]. However, despite this current state of analytical

support, it far from fully meets the requirements of effective management. Analysis is mainly retrospective, the whole arsenal of methodical means and techniques is directed to the determination of causes and consequences of past events while the function of prediction is not sufficiently developed. Analytical research process should be aimed not only at assessing and declaring the current state and efficiency of the use of human resources of enterprises as a result of earlier decisions, but also be promising, strategically focused, aimed at developing recommendations and finding optimal solutions in a rapidly changing socio-economic situation. In addition, the introduction of human capital into the objects of economic analysis makes it necessary to conduct analytical research to establish the closeness of the relationship between their absolute size and indicators of financial and economic activity of the enterprise, the study of the structure of human capital of employees, their dynamics, conducting factor analysis and the like. Consequently, the mechanism of formation of information support of human capital management of enterprises covers accounting and analytical systems with inherent intra-system and extra-system links (Fig. 16).

Conclusions. Proceeding from the stated above it should be noted that accounting and analytical support of human capital management at enterprises should be considered as a process of uniting information flows generated by accounting and analysis systems in order to form reliable data for making managerial decisions aimed at efficient use of human capital of employees.

Provisions are formulated for the development of a theoretical and methodological approach to accounting costs of attracting and using human capital, as well as proposals for analytical work contribute to the improvement of organizational and methodological provisions for the formation of accounting and analytical support for decision-making in the implementation of a policy of value-oriented and strategic management of enterprises significantly reduce the risk of uncertainty in making managerial decisions.

REFERENCES

1. Ruus, J., Pajk, S. and Fernstryom, L. (2010). Intellektual'nyj kapital: praktika upravleniya. Sankt-Peterburg. Vyssh. shk. menedzhmenta, 436 s.
2. Amstrong, M. (2004). Praktika upravleniya chelovecheskimi resursami. Sankt-Peterburg. Piter, 831 s.
3. Meskon, M., Albert, M. and, Hedouri F. (2004). Osnovy menedzhmenta. Moskva. Delo, 493 s.
4. Fajol, A., Emerson, G., Tejlor, F. and Ford, G. (1992). Upravlenie – eto nauka i iskusstvo. Moskva. Respublika, 351 s.
5. Mekh, Ya.V. (2003). Informatsiine zabezpechennia upravlinnia vnutrishnimy rezervamy pidpryiemstva (metodolohiia i orhanizatsiia). [monohrafiia]. Ternopil. PP «Syntez-Polihraf», 340 s.
6. Sadovska, I.B. and Machulka O.V. (2010). Oblikovo-analitychne

zabezpechennia pryiniattia upravlinskykh rishen. [monohrafiia]. Lutsk. RVV Volyn. nats. un-tu im. Lesi Ukrainky, 226 s.
7. Bradul, O.M. (2009). Oblikovo-analitychne zabezpechennia menedzhmentu korporatsii. [monohrafiia]. Kyiv. KNTEU, 356 s.
8. Pushkar, M.S. (2006). Kreatyvnyi oblik (stvorennia informatsii dlia menedzheriv). [monohrafiia]. Ternopil. Kart-blansh, 334 s.
9. Resler, M.V. (2010). Znachennia obliku ta analizu yak skladovykh chastyn oblikovo-analitychnoho mekhanizmu. *Ekonomichnyi analiz: Zbirnyk naukovykh prats kafedry ekonomichnoho analizu TNEU*. Ternopil. TNEU, Vyp. 6. 306-308.
10. Nidlz, B., Anderson, H. and Kolduell, D. (2004). Principy buhgalterskogo ucheta. Moskva. Finansy i statistika, 496 s.
11. Palij, V.F. and Sokolov, YA.V. (1981). ASU i problemy teorii buhgalterskogo ucheta: [ucheb. posobie]. Moskva. Finansy i statistika, 224 s.
12. Medvedev, M.YU. (2004). Buhgalterskij uchet dlya posvyashchennyh. Moskva. FBK-PRESS, 320 s.

10. Budgetary policy and budgetary regulation of economic dynamics under the corona crisis conditions

Tetiana Paliichuk
PhD in Economics,
Analyst, All-Ukrainian Association of Local Governments
"Association of Ukrainian Cities", Kyiv, Ukraine
E-mail: tvpaliychuk@gmail.com
ORCID ID 0000-0002-6951-4371

Sergiiy Petrukha
PhD in Economics,
Associate Professor of the Department of Financial and
Economic Security, "KROK" University, Kyiv, Ukraine
E-mail: psv03051984@gmail.com
ORCID ID 0000-0002-8859-0724

Nataliia Alekseienko
postgraduate student of SESE
"The Academy of Financial Management"
E-mail: alekseienkoaa@ukr.net
ORCID ID 0000-0002-6497-6526

Introduction. On 11 March 2020, the World Health Organization (WHO) recognized an outbreak of the new SARS-CoV-2 coronavirus, which started in December 2019 in Wuhan (Hubei, PRC), as a pandemic. This was reported by Director-General of the WHO Tedros Adhanom Ghebreyesus at the press conference [1]: "*The WHO has been assessing this outbreak around the clock and we are deeply concerned both by the alarming levels of spread and severity and by the alarming levels of inaction… We have therefore made the assessment that COVID-19 can be characterized as a pandemic"*.

On 3 March 2020, it became known of the first patient in Ukraine – the Ministry of Health of Ukraine reported [2] of the confirmed case of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus – a man from Chernivtsi, who was hospitalized on 29 February.

From 12 March 2020, the Cabinet of Ministers of Ukraine has introduced the quarantine, by adopting, on 11 March 2020, the Regulation "On Prevention of Spread, in the Territory of Ukraine, of the COVID-19 Acute Respiratory Disease Caused by the SARS-CoV-2 Coronavirus" [3]. Implementing quarantine measures has a direct impact on the state's performance of its social, economic, human rights functions, certain restrictions are introduced. According to the quarantine, it was

prohibited visiting institutions of education by its seekers; holding all mass (cultural, sports, social, religious, advertising etc.) events; operation of economic entities providing reception of visitors, in particular, public catering facilities (restaurants, coffeehouses etc.), trade-entertainment centers, other entertainment activity centers, fitness centers, cultural institutions; carrying out activities on the provision of financial services, activities of financial institutions and activities on currency values collection and transportation as well as medical practices; activities on the provision of public catering services at outdoor (summer) areas etc.

From 22 May, Ukraine has moved to the adaptive quarantine – this is a period, during which most restrictions are gradually removed. Business activities are gradually resumed: economic entities of wholesale and retail sale, repair of motor vehicles, post and courier activities, insurance activities, art, sports, entertainment and recreation are allowed to work. From 1 June, Ukraine has moved to the next stage of quarantine easing: public catering facilities are allowed to receive visitors in the premises subject to compliance with anti-epidemic measures, the operation of inter-oblast passenger transportations (by bus, automobiles) etc. is resumed.

Provided that COVID-19 spreads in many countries of the world and quarantine measures are introduced that results in a rapid decline in business and economic activities, reduction in production outputs, respectively, in receipts to the state and local budgets, in an increase in the unemployment level, all this is peculiar to Ukraine as well. Implementing the quarantine by the Cabinet of Ministers of Ukraine to prevent the spread, in the territory of Ukraine, of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus has affected carrying out economic activities in Ukraine: an adverse impact resulted from the restrictions provided by the quarantine has been exposed by all economic entities that causes complicating or at all precluding from timely payments under credit obligations (loans).

A special role in stimulating the economy under the condition of overcoming the consequences of COVID-19 is cast for the state's budgetary policy, which has a direct and indirect impact on any spheres of economic activities of the society. So, improving budgetary policy under the conditions of fighting against COVID-19, accumulating financial and monetary resources, providing their weighted allocation and more efficient use becomes an important task for Ukraine as a state striving for the provision of a high level of economic welfare

Results.

1. Impact of Implementing Quarantine Measures on Ukraine's Economy

A global spread of the virus has caused overloading of the healthcare system and all-round social-economic destabilization. The International Monetary Fund forecasts declining in the global economy in 2020 by 3 % [4], analysts of the

international Fitch credit rating agency expect, in 2020, decreasing in global GDP by 1.9 %, at the same time, a deep recession is a baseline scenario. [5]. According to the information of the Ministry of Finance of Ukraine, the rates of changing in real GDP of Ukraine in 2020 are in a very wide range – from growing by 1 percent to declining by 7.5 %. According to the forecast approved by the Government, real GDP will decrease in 2020 by 4.8 % [7]. The International Monetary Fund forecasts declining in the Ukraine's economy, based on the results of 2020, by 7.7 %, but, meanwhile, expects growing in the economy in 2021 by 3.6 % [4].

The impact of quarantine restrictions on the economy of the country can be conventionally divided into a direct and indirect impact:

direct impact – a reduction of revenue and profit of economic entities due to a rapid and complete decrease in production and consumption of goods and services, which are not able to be provided online, incurrence of expenses (losses) by economic entities under current contracts incl. refund of money to consumers for undelivered services and goods; a reduction of employment and productivity of labor caused by forced downtimes and relevant placing employees on unpaid leave; a growth in prices for food and services and price volatility; a reduction of tax receipts (personal income tax, single tax, corporate profit tax, value-added tax, tourism fee etc.);

indirect impact – a decline in business activity and investments, an increase in unemployment and social payments and shadowing of the economy (shift of business into the informal sector of the economy), a reduction of business chains and a shift of business processes into a digital format (online); a reduction of revenues of employees, spending of savings; an increase in social payments (unemployment benefit); worsening of the fiscal balance and narrowing of the private sector of the economy.

For the economy, basic consequences caused by fighting against COVID-19 include: an export and import reduction; investment projects cancellation; a shift in the structure of branches of the economy; a reduction of allied business suppliers – chain reduction of value added in the sphere of services; temporary downtimes and/or personnel dismissal, private sector narrowing; demand contraction, able-bodied population's deskilling; an increase in outsourcing; a shift of service provision into a digital format (business digitalization); an increase in share of online digital products and goods consumption; a growth in a state budget deficit; an increase in state debt service expenditures; a decline in financial capacity of local budgets; a reduction of working capital of business and savings of households; transformation of business chains; an increase in a shadow share of the economy; a decline in competitiveness of economic entities; a growth in population poverty and inequality; cost inflation; a shift in business models; a decline in prices for products and services in the long-term.

2. Budget Policy Priorities under the Conditions of Prevention of COVID-19 Occurrence and Spread

There is quite a number of various components of state regulation, on which efficiency of the use, a level of welfare of the society and prospects of further economic development of the country depends. A weighty role among said components is cast to budgetary policy, because just it establishes the directions for the functioning of finance, cash flows, enables to provide the intended use of financial resources, implement main priority goals of economic development etc.

Budgetary policy is a weighty element of financial policy and one of the key tools of the implementation of economic and social policy of the state. It is just this policy embodies, to the considerable extent, the place and role of the state in regulating social and economic processes and providing macroeconomic growth. Therefore, "the successfulness of the implementation of managerial functions of the state in all spheres of its influence – social, economic, ecological etc. – finally depends on the optimality and efficiency of establishing a budget process" [8, p. 167].

Budgetary policy is closely associated with the economy. In particular, policy may impact the economy both positively and negatively. In this connection, the state, forming budgetary policy, is obliged to comply with such basic conditions: taking into account the requirements of all objective economic laws and regularities of social development; studying and taking into account the previous experience of economic, financial and budgetary development; studying and taking into account the experience of other countries; taking into account a particular state of social development, regularities of the internal and international situation; complying with the comprehensive approach to the implementation of measures of budgetary policy, policy in the field of finance, pricing, loan, wages etc. [9, p. 24].

Budgetary policy has an impact on the efficiency of economic management of enterprises and organizations using such budget tools as: state procurement, taxes and transfers, interest rates, budget control, penal sanctions, budget investments, budget loans, state guaranties, state subsidies.

Main tasks of budgetary policy are: 1) assistance in achieving stable rates of economic growth in the country, optimizing economic dynamics; 2) efficient distribution and optimal use of public expenditures; 3) enduring the responsibility of all budget process subjects for the fulfillment of assumed obligations; 4) balancing budgets at all levels; 5) clear and steady compliance with the norms of budget legislation by budget process subjects [10, p. 143].

A need to provide coordinated management of preparedness for and response to the spread of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus has conditioned a necessity to review the priorities of budgetary policy and further implementation of mechanisms of emergency management in healthcare involving relevant line ministries such as the ministry of health, foreign affairs, finance, economy, education, social protection,

development of communities and territories as well as other anti-crises management bodies.

In order to prevent the occurrence and spread of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus, there emerged a necessity of making shifts in budgetary policy priorities – it has been reviewed and adjustments have been introduced into activities of state power and management bodies in terms of formation, fulfillment and regulation of the financial plan of the state.

The Ministry of Finance of Ukraine as the main body within the system of central bodies of executive power providing the formation and implementing state budgetary policy (incl. that in the sphere of inter-budgetary relations and local budgets), subject to overall uncertainty as to times of overcoming the COVID-19 pandemic and scales of its impact on the world economy and, in particular, the economy of Ukraine, will coordinate the budget process in 2020, subject to the impact of the coronavirus in the short- and long-term period [6].

Under the conditions of volatility of the social-economic situation in Ukraine, in particular, in connection with the introduction of a number of measures to prevent the occurrence and spread of the coronavirus disease, there emerged a necessity of introducing amendments to the legislation of Ukraine in order to reduce an adverse impact of the spread of the COVID-19 coronavirus and ensure the fulfilment of the state's functions.

A business activity decline caused by the spread of the coronavirus disease has conditioned an urgent need to take measures by the state to support taxpayers.

On 17 March 2020, the Verkhovna Rada adopted Law of Ukraine No 530-IX "On Introduction of Amendments to Some Legislative Acts of Ukraine Aimed at Preventing the Occurrence and Spread of a Coronavirus Disease (COVID-19) [11]" providing a simplified procedure of procurement of goods, works and services for the purposes of fighting against COVID-19; exemption from valued-added tax to take measures aimed at preventing the occurrence and spread, localizing and liquidating COVID-19 outbreaks, epidemics and pandemics.

According to the data of the State Treasury Service of Ukraine, by 28 May 2020 inclusive, payments have been made – from the budgets of all levels – for the amount of UAH 2.62 B, of which: UAH 658 M – from the state budget and UAH 1.965 B – from local budgets. The total amount of registered budget obligations under all procurements of goods and services for fighting against COVID-19 is over UAH 3.4 B (UAH 934 M – state budget, UAH 2,484 M – local budgets).

In addition, the parliament has adopted the resolution (Laws No 533-IX and No 540-IX) [12; 13] to:

Exempt, for the period from 1 March to 31 March 2020, from imposing the land charge, tax on immovable property, further it is provided not to use penal sanctions for tax legislation violations;

Put a moratorium on conducting documentary and actual inspections;

Increase the maximum amount of revenue allowing to pay a single tax (group I – from UAH 300 K to UAH 1 M; group II – from UAH 1.5 M to UAH 5 M; group III – from UAH 5 M to UAH 7 M);

Increase a list of expenses, which may be included to get a tax abatement;

Postpone a submission of the annual asset and income declaration for 2019 (postpone deadlines for the declaration from 1 May to 1 July 2020).

The Government adopted the resolution on support of business under the quarantine conditions by improving the mechanism of the "Affordable Credits "5-7-9%" State Program, by extending its functionality and a circle of entrepreneurs, who will be able to use it. For this purpose, the Cabinet of Ministers of Ukraine adopted, on 18 March 2020, the Regulation "On Introduction of Amendments to the Procedure of Provision of State Support to Micro-Business and Small Business Entities" [14]. In preparation of said amendments, an argent need arose to supplement them with the provisions aimed at preventing the spread of the coronavirus disease in Ukraine overcoming its consequences.

In terms of granting new opportunities to entrepreneurs and improving the "Affordable Credits 5-7-9%" Program itself, it is provided to:

1) increase the maximum loan amount from UAH 1.5 M to UAH 2 M;

2) extent the investment purposes, for which loans may be granted:

Acquisition of non-residential real estate without the right to hand over such real estate for paid or free use to third parties;

Acquisition of items of the intellectual property right under commercial concession contracts (franchising) associated with the implementation of the investment project by a business entity;

Replenishment of current assets of business entities in the amount not exceeding 25% of the total value of the investment project financed from loan funds;

3) review the loan interest rate calculation;

4) increase up to 35 % the level of the maximum amount of payment under the guarantee of the Entrepreneurship Development Fund with the relevant increase of the allowable level of the portion of the troubled debt under loans granted to newly-established business entities, up to 25%.

In terms of changes designed to prevent the spread of the COVID-19 coronavirus disease and overcome its consequences, it refers, in particular, to:

1) extension of the purposes, for which financial state support is given, by anti-crises measures, and the purposes, for which loans may be granted under this Procedure:

Investment purposes associated with carrying out business activities by a business entity on the production of drugs and/or medical products and/or medical equipment;

Financing of the working capital of business entities carrying out business activities on the provision, to the population, of social-medical services and social-

domestic services (incl., care of the patients, food product delivery, etc.), to cover the business entity's expenses for payment of wages of employees, rental, utility services etc., to the extent that such financing will result in preserving or gaining jobs of this business entity;

2) fixing the deadline, until which business entities may apply for state support for anti-crisis measures, until 1 September 2020;

3) setting the maximum loan amount:

Up to UAH 3 M for business entities, which will introduce business activities on the production of drugs and/or medical products and/or medical equipment;

Up to UAH 1 M, if a loan is granted for the financing of the working capital of the business entity in certain cases;

4) reduction in expenses for payment of the base interest rate under the loans for business entities carrying out business activities on the production of drugs and/or medical products and/or medical equipment;

5) inclusion of loans, which will be granted for anti-crisis measures, into the authorized banks' loan portfolio, under which the Fund provides the guarantee in the amount of 80 % of the principal amount.

As of 09.06.2020, 605 loans were granted for the amount of UAH 381.05 M [15]. Partner banks also continue to receive applications for new program tools implemented by the Government at the time of validity of quarantine measures for countering the COVID-19 pandemic (refinancing, working, investment loans for manufacturers of medical equipment).

On 13 April 2020, by introducing an amendment to the State Budget of Ukraine for 2020 [16], the Fund for Fighting Against the COVID-19 Acute Respiratory Disease Caused by the SARS-CoV-2 Coronavirus, and Its Consequences, was established in the amount of UAH 64.7 B.

The Fund for Fighting against the COVID-19 Acute Respiratory Disease Caused by the SARS-CoV-2 Coronavirus and Its Consequences is the fund within the state budget formed to prevent adverse consequences of crisis phenomena in connection with the occurrence and spread of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus; increase the efficiency of activities of state bodies, local bodies of self-government; ensure macroeconomic stability in Ukraine [17]. The period of the functioning of the fund – during the time of validity of the quarantine and next 30 days after its cancellation.

By the resolution and under the procedure set by the Cabinet of Ministers of Ukraine, upon consultation with the Committee of the Verkhovna Rada of Ukraine on Issues of Budget, the funds of the Fund will be channeled for [16]:

measures aimed to prevent the occurrence and spread, localization and liquidation of outbreaks, epidemics and pandemics of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus, in particular, for procurement of goods, works and services required to carry out said measures

including procurement of medical services under the program of state guarantees for public health service;

additional extra pays to wages for medical and other workers directly involved in works on the liquidation of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus as well as extra pays to wages for separate categories of workers ensuring life activities of the population for the period of carrying out measures aimed at preventing the occurrence and spread, localization and liquidation of outbreaks, epidemics and pandemics of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus;

granting a monetary aid to citizens, in particular, to aged persons, in connection with adverse consequences of the spread, in the territory of Ukraine, of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus;

granting a one-time monetary aid to family members of medical and other workers of the healthcare institutions, who succumbed (died of) to the COVID-19 acute respiratory disease, caused by the SARS-CoV-2 coronavirus, that is associated with the performance of works on the liquidation of such disease, in the procedure and amounts set by the Cabinet of Ministers of Ukraine;

granting a transfer to the Pension Fund of Ukraine;

granting a financial assistance, on a returnable or non-returnable basis, to the Social Insurance Fund of Ukraine and Fund of Obligatory State Social Insurance of Ukraine in Case of Unemployment, on a returnable or non-returnable basis;

replenishment of the reserve fund of the state budget;

Resumption of expenditures of the state budget (including transfers to local budgets) and granting loans from the state budget under budget programs cut in connection with the setting of the fund.

It is provided that ministries, oblast, Kyiv City State Administrations and other bodies of state power will submit, to the Cabinet of Ministers of Ukraine, applications for allocations of funds, in which they will state the area of channeling the resources of the fund and their amount, key spending units of budget funds (KSUBF), the terms of allocation of funds, proposals for the terms and guaranties of repayment of such funds, information on an opportunity of financial security for respective measures from other sources. The application should also be attached by financial and economic calculations and feasibility of the required amount of funds. KSUBF obliges to submit, up to the 5th day of the month following the accounting month, to the Committee of the Verkhovna Rada of Ukraine on Issues of Budget, Cabinet of Ministers of Ukraine and Ministry of Finance of Ukraine, the information on the use of budgetary funds, their repayment to the state budget. The latter is assigned to be in charge of the monitoring of information on the use of budgetary funds.

According to the information of the Ministry of Finance of Ukraine [18], as of 15 June 2020, the Government has adopted the resolution (subject to protocol resolutions) on allocation of UAH 36.1 B from the Fund of Fighting against COVID-19: according to regulations of the Government, UAH 18.7 B are

allocated, an opportunity is provided by protocol resolutions to allocate additional UAH 17.4 B from the Fund, of which nearly UAH 9 B – for social protection and unemployment assistance, UAH 1.6 B – for support of children of individuals-entrepreneurs, UAH 3 B – for healthcare. As of 15 June, UAH 1.8 B of the Fund were actually used.

Further, Law No 553-IX provides that, temporarily, from the effective date of the Law until 1 January 2021, some norms of the Budget Code of Ukraine will not be applied, in particular, for the implementation of mid-term budget planning, namely, its suspension; budgetary policy on local budgets and inter-budgetary relations must include a directivity on support of financial capacity of bodies of local self-government.

Concurrently, the Ministry of Finance informed [6] of further implementation of mid-term budget planning in Ukraine, which must ensure a strategic approach to establishing priority measures and respective distribution of limited resources. The work continues now on the analysis of eventual policies and financial solvency for their implementation for the midterm. Active cooperation is conducted in this direction with the Ministry of Development of Economy, Trade and Agriculture of Ukraine, National Bank of Ukraine, Ministry of Social Policy of Ukraine and MSUBF. At the time of elaborating a draft budget for 2021, the Government plans to form the vision of the budgetary policy objectives for the midterm. On 27 May 2020, the President of Ukraine signed Law on Additional Support of Taxpayers for the Period of Implementation of Measures Aimed at Preventing the Occurrence and Spread of the Coronavirus disease (COVID-19) No 591-IX [19].

Law No 591-IX provides extension of validity of tax privileges and simplified administrative procedures by the end of the quarantine, in particular:

Extension of the period of non-application of penal sanctions for tax legislation violations from 1 September to the last calendar day of the month, in which the government will announce the end of validity of the quarantine;

Extension of the period of penalty non-imposition;

Exemption form payment of a single social contribution for entrepreneurs until 31 May 2020;

Extension of a moratorium on conducting documentary and actual inspections;

Compensation from the budget for the tax on personal incomes withheld from incomes as extra pays to wages of medical workers directly employed in the liquidation of the epidemic;

Non-inclusion, into the total monthly (annual) taxed income of the personal income tax payer, of incomes as underemployment assistance (for the quarantine period), etc.

At the Government’s meeting on 27 May, the State Program of Stimulation of Economy to Overcome Adverse Consequences Caused by COVID-19, was

presented [20]. The purpose of the Program is to implement a comprehensive system of measures for stabilization and sustainable development of the economy of Ukraine, increase the employment of the population by preserving existing and stimulating the creation of new jobs.

The Program contains three sections. Section 1 provides short-term initiatives in response to COVID-19: guaranteeing the safe functioning of the economy; support for the branches of the economy and protection of their goods, works and/or services against import alternatives supplied into the territory of Ukraine, subject to international treaties and obligations of Ukraine.

In support of the economy, measures were developed for six sectors: industry, agriculture, energy industry, transport and infrastructure, information and communication technologies, service sector (trade, hotel and restaurant business, education, creative industries, personal services). Support for braches of the economy must be accompanied by implementing general functional measures, which will enhance sectoral initiatives. Functional directions include support for small and medium business, stimulation of international trade, attraction of investments, development of innovations, labor market development, reasonable regulation of economic activities.

3. Budget Solvency to Finance Expenditures under the Conditions of Fighting against COVID-19

3.1. Budget Fulfillment Status under the Conditions of Implementation of Quarantine Measures in Connection with COVID-19

Law No553-IX [16] introduced a number of amendments to the 2020 State Budget:

1) revenues are decreased by UAH 119.7 B, or by 10.9 %, incl.: general fund revenues – by UAH 119.7 B, or by 12.5 %; special fund revenues are increased by UAH 16.3 M, or by 0.01 %;

2) budget expenditures are increased by UAH 82.4 B, or by 6.9 %, incl.: general fund expenditures – by UAH 82.4 B, or by 7.8%, special fund expenditures – by UAH 13.2 M, or by 0.01 %;

3) granting loans from the state budget is decreased by UAH 20.0 M, incl.: granting loans from the general fund is decreased by UAH 34.7 M, or by 2.0 %; granting loans from the special fund is increased by UAH 14.6 M, or by 0.1%;

4) the maximum budget deficit amount is increased by UAH 202.1 B, or three times, incl.: the maximum amount of the general fund deficit is increased by UAH 202.1 B, or four times; the maximum amount of the special fund deficit remained unchanged – at the level of UAH 23.9 B.

Minister of Finance Serhii Marchenko commented approving amendments to the 2020 State Budget by the Verkhovna Rada of Ukraine [21]:

"We have put, into this budget, the resource from international financial organizations, incl., the IMF's direct budget support. Support from our

international partners is very important because it gives us an opportunity to fully finance all required expenditures, in the first turn, wages of doctors, social protection, expenditures for infrastructure. We expect from the parliament positive voting also for the so called banking draft law, which will accelerate the receipt of the IMF's assistance".

On 9 June 2020, the Executive Board of the IMF made a decision on the approval of the 18-month Stand-by Program and allocation of the first USD 2.1 B disbursement. The Stand-by Program focused on the key task – supporting macroeconomic and financial stability – will cover, inter alia, such spheres: fiscal policy, monetary policy, financial sector policy, energy policy and anti-corruption policy. Implementing the provisions of the Memorandum will afford to receive, by the end of the program, the remaining funds from the IMF (USD 2.9 B), which must ensure macroeconomic and financial stability. The availability of such program afforded to receive the second tranche under the fourth EU macro-financial assistance program of EUR 500 M [22].

In terms of fulfilling the state budget indicators for the quarantine period, in April 2020, the general fund of the state budget received UAH 90.9 B, of which nearly UAH 43 B – from the National Bank of Ukraine [23]. State budget revenues inclusive of inter-budgetary transfers, for January – April 2020, amounted to UAH 314,847.28 M that is by UAH 7,716.84 M, or 2.39 % less than for the same period of 2019. Tax receipts for January – April 2020 were equal to UAH 239,570.27 M, that is by UAH 1,976.92 M or 2.7 %, less than for January – April 2019 *(Tbl. 10).*

Table 10

State Budget Receipts Amounts Comparison for January – April 2019 and January – April 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
State budget revenues inclusive of inter-budgetary transfers	322,564.11	314,847.28	-7,716.84	-2.39
State budget revenues exclusive of inter-budgetary transfers	319,553.37	311,200.44	-8,352.93	-2.61
Inter-budgetary transfers	3,010.75	3,646.84	636.09	21.13
Tax receipts	244,737.35	239,570.27	-5,167.07	-2.11
Non-tax receipts	73 110,51	71,133.59	-1,976.92	-2.70
Revenues from capital transactions	46.64	20.48	-26.16	-56.09

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

In April 2020, the state budget received [24]: UAH 8.5 B of personal income tax and military levy; UAH 7.7 B of value-added tax (balance, VAT refund amounted to UAH 12 B); UAH 5.9 B of excise duty on goods produced in Ukraine; UAH 19.6 B of customs payments.

For January – April 2020, the state budget received:

UAH 36.624.56 M of personal income tax and levy, that is by UAH 3,579.22 M, or 10.83 % more than for the same period of 2019;

UAH 35,451.05 M of corporate profit tax, that is by 4,792.31 M, or 15.63 % more than in 2019 *(Tbl. 11).*

Table 11

Basic State Budget Receipts Amounts Comparison for January – April 2019 and January – April 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Personal income tax and levy	33,045.34	36,624.56	3,579.22	10.83
Corporate profit tax	30,658.74	35,451.05	4,792.31	15.63
Rent on subsoil use	16,494.43	9,264.42	-7,230.01	-43.83
Excise duty on excisable goods (products) produced in Ukraine	18, 212.85	21,930.11	3,717.27	20.41
Excise duty on excisable goods (products) imported into the customs territory of Ukraine	18,649.61	14,906.23	-3,743.38	-20.07
Value-added tax	24,434.64	33,542.61	9,107.97	37.27
Taxes on international trade and external transactions (customs payments)	9,752.91	8,484.56	-1,268.34	-13.00
Environmental tax	881.98	1,020.42	138.44	15.70

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

For January – April 2020, social expenditures, expenditures on defense, servicing the debt and grants to local budgets are fully financed according to the breakdown on the basis of payment orders. So, according to the operating data of the State Treasury Service, expenditures of the general fund of the state budget amounted, for 4 months of 2020, to UAH 308.9 B, or 87.5 % of the relevant breakdown for the accounting period.

For January – April 2020, actual state borrowings to the general fund of the state budget amounted to UAH 108 B, or 84.1 % of the plan for this period. In total, for financing of the state budget it was attracted from the placement of DGBs UAH 73.8 B (97 % of the plan), incl., from the issue of DGB's in foreign currency – UAH 41.3 B (USD 1.2 B and EUR 0.3 B). From external sources, it was attracted UAH 34.2 B (66% of the plan), in particular, UAH 33.9 B by placing 10-year Eurobonds for the amount of EUR 1.25 B at 4.375 % per annum. In this case, payments form the state debt redemption amounted, for January – April 2020, nearly UAH 71.3 B (81.8 % of the plan), payments for servicing – UAH 41.1 B (94.2 % of the plan).

A decline in business activity caused by implementing quarantine measures aimed at preventing the spread, in the territory of Ukraine, of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus has adversely affected

the fulfillment of the revenue component of the state budget. A monthly breakdown of revenues in the general fund of the state budget was fulfilled at 84.3 %, based on the results of January-April 2020 – at 86.1%. Based on the results of January – April of the current year, the state budget was fulfilled with a deficit in the mount of UAH 23.5 B, incl., the general fund – with a deficit in the amount of UAH 33 B, that is in line with the budget indicators [23].

In May 2020, it has been started to mitigate the quarantine measures, aimed at preventing the occurrence and spread of the coronavirus infection, that will result in improving the economic situation in the country.

According to operating data of the State Treasury Service [24], for January – April, the state budget revenues inclusive of transfers amounted to UAH 388.3 B, that is by UAH 38.5 B, or 9.1 % less that in the same period of 2019; tax receipts were equal to UAH 306.0 B that is by UAH 16.9 B, or by 5.24 % less than in 2019 *(Tbl. 12).* Subject to non-fulfillment of the revenue breakdown, which took place in January – April 2020 (86.1 %), the revenue breakdown based on the results of January –April for the general fund of the state budget was fulfilled, in general, at 88.4%.

Table 12

State Budget Receipts Amounts Comparison for January – May 2019 and January – May 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
State budget revenues inclusive inter-budgetary transfers	426,720.56	388,260.08	-38,460.48	-9.01
State budget revenues exclusive of inter-budgetary transfers	422,919.62	383,743.68	-39,175.94	-9.26
Inter-budgetary transfers	3,800.94	4,516.40	715.46	18.82
Tax receipts	322,958.73	306,027.60	-16,931.13	-5.24
Non-tax receipts	98,143.61	77,076.25	-21,067.35	-21,47
Revenues from capital transactions	65.99	26.43	-39.56	-59.95

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

For January – May 2020, among basic budget-forming taxes and levies, positive dynamics was shown by personal income tax and levy (military levy) (+7.49 %), corporate profit tax (+6.92 %), excise duty on excisable goods produced in Ukraine (+18.43 %), value-added tax (+32.12 %). Receipts of the rent for subsoil use, for January – May 2020, as compared to the same period of 2019, reduced by 43.48 %, of excise duty on excisable goods imported into the customs territory of Ukraine – by 19.49 %, of taxes on international trade and external transactions (customs payments) – by 14.28 %, of environmental tax – by 13.42 % *(Tbl. 13).*

Table 13

Basic State Budget Receipts Amounts Comparison for January – May 2019 ND January – May 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Personal income tax and levy	41,628.81	44,745.92	3,117.11	7.49
Corporate profit tax	50,118.24	53,585.56	3,467.33	6.92
Rent for subsoil use	21,354.21	12,068.65	-9,285.56	-43.48
Excise duty on excisable goods (products) produced in Ukraine	24, 469.47	28,978.90	4,509.43	18.43
Excise duty on excisable goods (products) imported into the customs territory of Ukraine	23,466.80	18,892.11	-4,574.70	-19.49
Value-added tax	30,394.24	40,155.91	9,761.68	32.12
Taxes on international trade and external transactions (customs payments)	12,134/02	10,401.51	-1,732.51	-14.28
Environmental tax	1,938.81	1,678.66	-260.15	-13.42

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

For January – May 2020, social expenditures, expenditures on defense, debt servicing and grants to local budgets were fully financed according to the breakdown on the basis of payment orders. So, the expenditures in the general fund of the state budget for 5months of 2020 amounted to UAH 392.8 B, or 83.4 % of the breakdown for the accounting period. Based on the results of January – May of the current year, the state budget was fulfilled with a deficit in the amount of UAH 47.8 B, incl. the general fund – with a deficit in the amount of UAH 52.2 B, that is within the limits of the budget indicator planned for this period. For January – May 2020, actual state borrowings to the general fund of the state budget amounted to UAH 160.9 B, or 69.9 % of the borrowings planned for this period.

In total, for the financing of the state budget, from the placement of DGBs, it was attracted UAH 125.3 B (100% of the plan), incl., from the issue of DGBs in the foreign currency – UAH 51.1 B (USD 1.6 B and EUR 0.3 B). From external sources, it was attracted UAH 35.6 B (33.9% of the plan), in particular, UAH 33.9 B by placing 10-year Eurobonds for the amount of EUR 1.25 B at 4.375% per annum and UAH 1.350 B (USD 50.0 M) – receipt of the loan funds from the IBRD within the Social Assistance System Modernization Project in Ukraine. In this case, the payments for the state debt redemption were equal, for January – May 2020, to UAH 114.6 B (84.9 % of the plan), payments for servicing – UAH 53.8 B (90.7 % of the plan) [25].

For January - May 2020, state budget revenues amounted to UAH 519.4 B, that is by UAH 2.47 % less than in 2019. It was received UAH 360.4 B that is by

4.55 % less than in 2019. Revenues from capital transactions decreased by 62.97 % *(Tbl. 14).*

Table 14

State Budget Receipts Amounts Comparison for January – June 2019 and January – June 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
State budget revenues inclusive of inter-budgetary transfers	506,849.33	519,390.13	12,540.80	2.47
State budget revenues exclusive of inter-budgetary transfers	502,240.10	514,028.99	11,788.88	2.35
Inter-budgetary transfers	4,609.23	5,361.14	751.92	16.31
Tax receipts	377,562.81	360,383.28	-17,179.54	-4.55
Non-tax receipts	122,276.72	152,970.96	30,694.24	25.10
Revenues from capital transactions	77.80	28.81	-48.99	-62.97

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

Basic payments, from which the state budget was filled for January – June 2020, were, in particular: personal income tax and levy (military levy) (UAH 54.3 B), corporate profit tax (UAH 54.3 B), value-added tax (UAH 48.7 B) etc. *(Tbl. 15).*

Table 15

Basic State Budget Receipts Amounts Comparison for January – June 2019 and January – June 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Personal income tax and levy	51,234.28	54,265.56	3,031.28	5.92
Corporate profit tax	52,843.70	54,312.30	1,468.60	2.78
Rent for subsoil use	25,422.21	13,662.41	-11,759.80	-46.26
Excise duty on excisable goods (products) produced in Ukraine	31,129.55	35,813.41	4,683.86	15.05
Excise duty on excisable goods (products) imported into the customs territory of Ukraine	27,031.54	23,833.95	-3,197.59	-11.83
Value-added tax	35,002.16	48,705.80	13,703.64	39.15
Taxes on international trade and external transactions (customs payments)	14,327.63	12,634.58	-1,693.06	-11.82
Environmental tax	1,962.32	1,683.14	-279.18	-14.23

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

Based on the results of January – June 2020, the breakdown of revenues in the general fund of the state budget was fulfilled at the level of 92.1 %. For

January – June 2020, social expenditures, expenditures on defense, debt servicing and grants to local budgets were fully financed according to the breakdown on the basis of payment orders. So, the expenditures in the general fund of the state budget amounted, for January – June 2020, to UAH 479.6 B, or 90.4 % of the breakdown for the accounting period [26]. Based on the results of 6 months of the current year, the state budget was fulfilled with a deficit in the amount of UAH 16.7 B, incl., the general fund – with a deficit in the amount of UAH 27.9 B, when the breakdown of the general fund for the accounting period amounted to UAH 42.1 B [26].

Actual state borrowings to the general fund of the state budget for January – June 2020 amounted to UAH 259.5 B, or 99.9 % of planned borrowings for this period. In total, for financing of the state budget, from the placement of DGBs, it was attracted UAH 153.6 B (99.9 % of the plan), incl., from the issue of DGBs in the foreign currency – UAH 61.7 B (USD 1.6 B and EUR 0.3 B). In this case, the payments for the state debt redemption for January – June 2020 amounted to UAH 156.2 B (99.7% of the plan), the payments for servicing – UAH 61.4 B (89.7 % of the plan) [26].

Table 16

State Budget Monthly Receipts Dynamics during April – June 2019 and 2020, UAH M

Indicators	2019			2020		
	April	May	June	April	May	June
State budget revenues inclusive of inter-budgetary transfers	111, 940.41	104,156.44	80,128.77	103,813.42	73,412.80	131, 130.05
State budget revenues exclusive of inter-budgetary transfers	111, 123.77	103,366.25	79,320.48	102,882.98	72,543.24	130, 285.30
Inter-budgetary transfers	816.64	790.19	808.29	930.43	869.56	844.75
Tax receipts	57, 813.94	78,221.39	54,604.08	50,895.37	66,457.33	54,355.67
Non-tax receipts	53, 223.98	25,033.9	24.133.11	51,760.71	5 942,66	75,894.71
Revenues from capital transactions	10.74	19.35	11.81	4.71	5,95	2.38

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

The analysis of monthly receipts of the state budget during quarter 2, 2020, shows that revenues of the state budget inclusive of inter-budgetary transfers in

April and May 2020 were lower than in respective months of 2019, a significant decline in revenues was observed in May. The resumption of the 2019 dynamics began to be observed only in June *(Tbl. 16).*

Among basic trends, the following ones should be noted in terms of taxes and levies during quarter 2:

receipts of personal income tax and levy (military levy) in April 2020 amounted to UAH 8,503. M, or by 5.27 % less than in the previous year, in May 2020 – UAH 8,121.36 M, or by 5.38 % less than in 2019, and only in June 2020 tax receipts have almost become equal to the then indicators;

corporate profit tax receipts significantly decreased in June 2020 – by 73.34 % as compared with June 2019;

receipts of rent for subsoil also significantly reduced in June 2020 and were equal just to UAH 1,593.76 M, or by 60.82 % less than in June 2019;

environmental tax receipts in April 2020 amounted to UAH 39.30 M, or by 32.69 % less than in 2019; in April 2020, UAH 658.24 M of environmental tax were received, or by 37.72 %, less than in 2019, and in June the receipts of this tax were equal to UAH 4.48 M, or by 80.93 % less than in June 2019 *(Tbl. 17).*

Table 17

State Budget Basic Monthly Receipts Dynamics during April – June 2019 and 2020, UAH M

Indicators	2019			2020		
	April	May	June	April	May	June
Personal income tax and levy	8,976.57	8,583.47	9,605.47	8,503.93	8,121.36	9,519.64
Corporate profit tax	1,688.13	19,459.49	2,725.46	1,914.76	18,134.51	726.73
Rent for subsoil use	3,992.82	4,859.78	4,068.01	2,134.35	2,804.23	1,593.76
Excise duty on excisable goods (products) produced in Ukraine	5,390.09	6,256.62	6,660.08	6,869.74	7,048.79	6,834.51
Excise duty on excisable goods (products) imported into the customs territory of Ukraine	3,923.50	4,817.19	3,564.74	3,895.01	3,985.88	4,941.84
Value-added tax	8,633.56	5.959.60	4,607.92	7.660.53	6,613.30	8,549.88
Taxes on international trade and external transactions (customs payments)	2,158.16	2,381.11	2,193.61	1,630.87	1,916.95	2,233.07
Environmental tax	58.39	1,056.83	23.51	39.30	658.24	4.48

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

The breakdown of personal income tax and levy (military levy) is over-fulfilled by UAH 0.1 B, the indicator of the rent for subsoil use was fulfilled at 114.7 % (over-fulfillment is UAH 0,3 B), the breakdown of excise duty is over-fulfilled by UAH 1,1 B, or by 21.4 % (predominantly, from tobacco duty receipts), the breakdown of value-added tax was fulfilled at 99.8 %, shortfalls of corporate profit tax amounted to UAH 0.1 B (under-fulfillment – UAH 0.5 B, the breakdown was fulfilled at 97.2 %).

Under the fourth EU macro-financial (loan) program, Ukraine received from the European Commission the second tranche in the nominal amount of EUR 500 M. The money will arrive as a loan at 0.125 % per annum with a repayment date until 10.06.2035. Received funds will be used to finance state budget expenditures and assist to reduce the external financial pressure on Ukraine and improve the payment balance of the state. Given the need for appropriate funding of measures to overcome the adverse consequences of the spread of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus, the receipt of said funds will assist to maintain financial stability in Ukraine [27].

Ukraine has also started implementing the Accelerating Private Investment in Agriculture Program. A loan agreement within the relevant project was made on 27 August 2019 with the International Bank for Reconstruction and Development. The loan amount is USD 200 M. The implementation of the Accelerating Private Investment in Agriculture of Ukraine Program will afford Ukraine to mitigate individual restrictions on the path to growth of the participation of the private sector, in particular, small and medium businesses (SMBs) in the agricultural market for factors of production and the product market of Ukraine [28].

Ukraine will receive USD 500 M from the International Bank for Reconstruction and Development to support the First Economic Recovery Development Policy Loan Project. The World Bank's Board of Executive Directors adopted the respective decision on 26 June 2020 [29].

This is the first project of the series of loans in support of development policy for the total amount of USD 700 M that supports efforts of the Government of Ukraine to implement reforms in such main areas:

1) Enhancing de-monopolization and anti-corruption institutions, in particular, by unbundling property in gas industry, improving the legal framework for concessions and strengthening anti-corruption institutions;

2) strengthening the land market and credit market by creating a transparent agricultural land market with relevant protections guarantees, enhancing a mechanism for resolving non-performing loans and supervising over non-bank financial institutions;

3) bolstering the social support system by increasing the amount of pension payments.

3.2. Status of Local Budgets' Receipts under the Conditions of Quarantine Measures Implementation

Amendments to the budget and tax legislation introduced in quarter 1 2020 on preventing adverse consequences of crisis phenomena in connection with the occurrence and spread of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus as well as the impact of the implementation of quarantine measures have taken a heavy toll on resource availability of local self-government in quarter 2.

For January – April 2020, local budgets revenues inclusive of transfers amounted to UAH 145,555.1 M, that is by UAH 37,347,7 M, or 20.4 % less than for the same period of 2019. Local budgets' own revenues in January – April 2020 increased by UAH 791.2 M, or by 0.9 %, as compared with 2019. At the same time, non-tax receipts decreased by UAH 1,812.9 M, or by 22.9 %, and revenues from capital transactions decreased by UAH 294.1 M, or by 31.5 % *(Tbl. 18).*

Table 18

Local Budgets Revenues Amounts Comparison for January – April 2019 and January – April 2020

Indicators	January –April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Local budgets revenues inclusive of transfers	182,902.8	145,555.1	-37,347.7	-20.4
Inter-budgetary transfers	91,131.5	52,992.7	-38,138.8	-41.9
Local budgets revenues exclusive of transfers	91,771.3	92,562.4	791.2	+0.9
Tax receipts	82,715.2	85,562.0	2,846.9	+3.4
Non-tax receipts	7,913.1	6,100.1	-1,812.9	-22.9
Revenues from capital transactions	934.4	640.4	-294.1	-31.5

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

For January – April 2020, local budgets received personal income tax in the amount of UAH 53,675.3 M, that is by UAH 4,286.3 M, or by 8.7 %, more than in 2019. Positive dynamics has also arisen in excise duty on tobacco and alcohol. However, the receipts are significantly lower from other taxes and levies, namely, from corporate profit tax (-6 %), rent for subsoil use (-28.5 %), excise on fuel (-6.1 %) etc. *(Tbl. 19).*

Table 19

Local Budgets Basic Revenue Sources Receipts Comparison for January – April 2019 and January – April 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Personal income tax	49,389.0	53,675.3	+4,286.3	+8.7
Corporate profit tax	3,057.7	3,038.7	-19.0	-0.6
Rent for subsoil use	1,596.7	1,141.9	-454.8	-28.5
Excise duty on fuel	2,268.5	2,129.3	-139.2	-6.1
Excise duty on Tobacco and alcohol	1,904.5	2,258.3	+353.9	+18.6
Local taxes and levies	23,866.8	22,822.8	-1,044.0	-4.4
Other taxes and levies	631.9	495.7	-136.3	-21.6

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

Implementing quarantine measures in connection with COVID-19, slackening in business activity, legislative changes in support of economic entities have also adversely affected the receipts of local taxes and levies. For January – April 2020, as compared with January – April 2019, land charge receipts decreased by 21.2 % - from UAH 12,850.7 M to UAH 11,780.1 M; of transport tax – by 17.2 %, from UAH 98.4 M to UAH 81.5 M; receipts from transport vehicles parking places fee – by 25.1 %, from UAH 34.6 M to UAH 25.9 M *(Tbl. 20)*.

Table 20

Local Taxes and Levies Receipts to Local Budgets Comparison for January – April 2019 and January – April 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Tax on property, incl.:	12,022.0	9,900.9	-2,121.1	-17.6
Tax on immovable property other than a land plot	1,723.2	1,779.5	+56.3	+3.3
Land charge	10,200.4	8,040.0	-2,160.5	-21.2
Transport tax	98.4	81.5	-16.9	-17.2
Single tax	11,780.1	12,850.7	+1,070.7	+9.1
Transport vehicles parking places fee	34.6	25.9	-8.7	-25.1
Tourism fee	30.1	45.3	+15.2	+50.5

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

For January – May 2020, *local budgets' own revenues* amounted to UAH 116,659.1 M, that, as compared with the same period of 2019, is by UAH 1,171.3 M less (-1.0%), however, tax receipts increased by UAH 1,782.7 M (+1.7 %), from UAH 106,551.0 M to UAH 108,333.7 M *(Tbl. 21)*.

Table 21

Local Budgets Revenues Amounts Comparison for January – May 2019 and January – May 2020

Indicators	January – May 2019, UAH M	January – May 2020, UAH M	2020 to 2019	
			UAH M	%
Local budgets revenues inclusive of transfers	234,194.7	181,891.0	-52,303.7	-22.3
Inter-budgetary transfers	116,364.4	65,231.9	-51,132.5	-43.9
Local Budgets revenues exclusive of transfers	117,830.3	116,659.1	-1,171.3	-1.0
Tax receipts	106,551.0	108,333.7	1,782.7	1.7
Non-tax receipts	9,898.7	7,196.3	-2,702.5	-27.3
Revenues from capital transactions	1,118.0	840.6	-277.4	-24.8

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

The general fund of local budgets (exclusive of inter-budgetary transfers) received UAH 109,741.6 M. The gain of receipts to the general fund versus January – May of the previous year amounted to 1.6 %, or UAH 1,720.3 M.

The amount of receipts of the basic budget-forming source of local budgets receipts – personal income tax and levy (military levy) – for January – May 2020 – amounted to UAH 66,067.3 M. As compared to the same period of 2019, the gain of receipts was equal to 5.8 % (+ UAH 3,605.3 M) *(Tbl. 22)*.

Table 22

Local Budgets Basic Receipts Sources Amounts Comparison for January – May 2019 and January – May 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, USH M	Portion, %
Personal income tax	62.462.0	66,067.3	3,605.3	5.8
Corporate profit tax	4,966.2	5,171.4	205.1	4.1
Rent for subsoil use	2,428.9	1,817.5	- 611.4	- 25.2
Excise duty on fuel	2,988.2	2,811.8	- 176.4	- 5.9
Excise duty on tobacco and alcohol	2,385.4	2,741.5	356.0	14.9
Local taxes and levies	30,138.1	28,754.9	- 1,383.2	- 4.6
Other taxes and levies	1,182.1	969.2	- 212.9	- 18.0

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

Positive dynamics is observed for receipts of tax on immovable property other than a land plot (+ UAH 74.2 M, or +4.0%), single tax (+UAH 1,430.4 M, or +9.4 %), tourism fee (+UAH 14.0 M, or +27.6 %) for January – May 2020, as compared with the same indicator of 2019 *(Tbl. 23)*.

Table 23

Local Taxes and Levies Receipts to Local Budgets Comparison for January – May 2019 and January – May 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Tax on property, incl.:	14,891.3	12,071.7	- 2,819.6	- 18.9
Tax on immovable property other than a land plot	1,866.9	1,941.1	74.2	+4.0
Land change	12,908.4	10,034.7	- 2,873.7	- 22.3
Transport tax	116.0	95.9	- 20.0	- 17.3
Single tax	15,149.2	16,579.6	1,430.4	+9.4
Transport vehicles parking spaces fee	46.7	38.6	- 8.1	- 17.3
Tourism fee	50.9	65.0	14.0	+27.6

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

However, it is worth noting that under the conditions of consideration of monthly receipts, negative dynamics is also observed:

– in April 2020, tax on property was received by UAH 1,980.3 M (-57 %) less than in April 2019, and in May 2020 – by UAH 698.4 M (-24.3 %) less than in May 2019;

– in April 2020, tax on immovable property was received by UAH 172.2 M (-20.9 %) less than in April 2019, and in May 2020 – by UAH 698.4 M (-24.3%);

– in April 2020, land change receipts amounted to UAH 820.9 M, that is by UAH 1,799.4 M (-68.7%) less that in April 2019; in May 2020, land charge receipts were equal to UAH 1,994.8 M, that is by UAH 713.2 M (-26.3%) less than in May 2019.

Table 24

Local Budgets Revenues Amounts Comparison for January –June 2019 and January – June 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Local budgets revenues inclusive of transfers	283,583.0	224,886.7	-58,696.3	-20.7
Inter-budgetary transfers	143,132.6	85,096.8	-58,035.8	-40.5
Local budgets revenues exclusive of transfers	140,450.4	139,789.9	-660.5	-0.5
Tax receipts	126,885.6	129,649.1	2,763.6	2.2
Non-tax receipts	11,964.9	8,638.8	-3,326.2	-27.8
Revenues from capital transactions	1,302.5	1,135.1	-167.3	-12/8

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

Single tax receipts, despite implementing quarantine measures and, as a result, suspending business activity in the respective period, show positive dynamics, which is, however, slight, that is stipulated by objective conditions of economic management in the quarantine period. In April 2020, single tax receipts amounted to UAH 2,954.8 M, that is by UAH 15.1 M (+0,5%) more than in April 2019, and in May 2020 – UAH 3,728.9 M, or by UAH 359.8 M (+10,7%) more than in April 2019. For January – June 2020, *local budgets' own revenues* amounted to UAH 139,789.9 M, that is, compared with the same period of 2019, by UAH 660.5 M less (-0.5%), however, tax receipts increased by UAH 2,763.6 M (+2.2 %) from UAH 126,885.6 to UAH 129,649.1 M *(Tbl. 24).*

For January – June 2020, *inter-budgetary transfers* were made from the state budget to local budgets in the amount of UAH 85,096.8 M, that is by 40.5 % less than in the previous year. As of 01.07.2020, the Government made transfers to local budgets in the amount of UAH 85,086.8 M, or 95.4% of transfers provided by the appropriation breakdown for January – June 2020, in particular:

– *a base grant* in the amount of UAH 6,641.2 M, or 100.0 % of the appropriation breakdown;

– *a medical subvention* in the amount of UAH 14,582.8 M, or 100.0 % of the appropriation breakdown;

– *an educational subvention* in the amount of UAH 46,729.0 M, or 100.0 % of the breakdown.

The analysis of receipts by 2019 and 2020 months and indicator comparisons shows significant losses of local budgets:

– *local budgets revenues inclusive of transfers* in April – May 2020 by 30 % less than in 2019;

– *inter-budgetary transfers* receipts reduced by half;

– in April 2020, *own revenues* of local budgets amounted to UAH 20,259.0 M, that is by 20% less than in April 2019 and in May 2020, own revenues of local budgets amounted to UAH 24,096.6 M, that is by 7.5% less than in 2019;

– in April 2020, *tax receipts* amounted to UAH 18,997.1 M, that is by 17.9% less than in 2019 and in May 2020, they amounted to UAH 22,771.7 M, that is by 4.5% less than in the previous year;

– in April – May 2020, *non-tax receipts* is are twice as low as 2019 indicators *(Tbl. 25).*

Table 25

Local Budgets Revenues in April, May and June 2019 and 2020

Indicators	2019, UAH M			2020, UAH M		
	April	May	June	April	May	June
Local budgets revenues inclusive of transfers	45,435.7	51,291.9	49,388.3	30,947.9	36,335.9	42,995.7
Inter-budgetary transfers	20,006.6	25,232.9	26,768.2	10,688.2	12,239.3	19,864.9
Local budgets	25,429.0	26,059.0	22,620.1	20,259.7	24,096.6	23,130.9

revenues exclusive of transfers						
Tax receipts	23,135.2	23,835.9	20,334.5	18,997.1	22,771.7	21,315.4
Non-tax receipts	2,041.6	1,985.7	2,066.2	1,093.1	1,096.2	1,442.5
Revenues from capital transactions	187.8	183.5	184.5	129.6	200.2	294.5

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

In June 2020, local budgets revenues (inclusive of transfers), as compared with April and May 2020, started to grow, however, vs indicators of June 2019, they are still lower by 12.9 % (-UAH 6,392.5 M). In June 2020, own revenues of local budgets amounted to UAH 510.8 M, or by +2.3 % more than the same indicator of 2019.

The amount of receipts of the basic budget-forming source of receipts of local budgets – personal income tax and levy (military levy), for January – June 2020, was UAH 81,027.7 M. As compared with the same period of 2019, the gain of receipts was equal to 5.0% (+UAH 3,823.6 M) *(Tbl. 26)*.

Table 26

Local Budgets Basic Revenues Sources Amounts Comparison for January – June 2019 and January – June 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Personal income tax	77,204.1	81,027.7	+3,823.6	+5.0
Corporate profit tax	5,264.8	5,251.5	-13.3	-0.3
Rent for subsoil use	2,649.7	1,914.1	- 735.6	- 27.8
Excise on fuel	3,560.2	3,557.4	- 2.8	- 0.1
Excise on tobacco and alcohol	2,879.3	3,319.8	+400.5	+15.3
Local taxes and levies	34,123.5	33,557.6	- -565.9	- 1.7
Other taxes and levies	1,204.0	1,020.8	- 2,123.5	- 15.2

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

There were prevented monthly losses of personal income tax of all local budgets. Adopted on 13.05.2020, Law No 591-IX (*draft law No 3329-ð* as worded for the second reading) contains the norm allowing, through the mechanism of monetary compensation, to form the state budget, comprehensively resolve the issue of support of medical workers and preclude personal income tax losses of local budgets. In addition, Law No 51-IX grants the BLS (Bodies of Local Self-Government) the right to expeditiously make decisions on introducing amendments to adopted resolutions on setting local taxes and levies in terms of lowering rates for land charge and/or tax on immovable property other than a land plot, for non-residential real estate items owned by individuals or legal entities.

Implementing quarantine measures in connection with COVID-19, slackening in business activity, legislative changes in support of economic entities

have adversely affected the receipts of local taxes and levies. The analysis of indicators of basic sources of local budgets revenues in monthly terms shows a significant adverse impact of implementing quarantine measures on budgets indicators:

– in April 2020, personal income tax receipts were by UAH 498.3 M (-3.7 %) less than in 2019; in May 2020, the receipts were by UAH 681.0 M (-5.2%) less than in May 2019;

– in April 2020, receipts from the excise duty on fuel were equal to UAH 638.6 M that is by UAH 1,630.0 M (-71.9 %) less than in April 2019; in May 2020, they were equal to UAH 682.5 M, or by UAH 37.2 M less (-5.2 %);

– in April 2020, receipts from local taxes and levies amounted to UAH 4,457.8 M, that is by UAH 1,971.9 M (-30.7 %) less than in April 2019; yin May 2020, they were equal to UAH 5,932.1 M, that is by UAH 339.2 M (-5.4 %) less than in April 2019 *(Tbl. 27).*

Table 27

Local Budgets Basic Revenue Sources Receipts in April, May, June 2019 and 2020, UAH M

Indicators	2019			2020		
	April	May	June	April	May	June
Personal income tax	13,498.7	13,073.1	14,742.1	13, 000.4	12,392.0	14, 960.4
Corporate profit tax	199.3	1,908.5	298.5	217.9	2,132.7	80.1
Rent for subsoil use	236.1	832.2	220.8	145.1	675.6	96.6
Excise duty on fuel	2,268.5	719.7	572.0	638.6	682.5	745.6
Excise duty on tobacco and alcohol	476.1	481.0	493.9	512.9	483.1	578.4
Local taxes and levies	6,429.,7	6,271.3	3,985.5	4,457.8	5,932.1	4,802.7
Other taxes and levies	26.8	550.	22.2	24.2	473.5	51.6

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

Taxes, which showed positive dynamics, include corporate profit tax receipts, excise duty on tobacco and alcohol. In June 2020, due to the business activity revival, positive dynamics, as compared with June 2019, was shown by receipts from personal income tax (+1.5 %, or + UAH 218.3 M), excise duty on fuel (+30.3 %, or + UAH 173.6 M), excise on tobacco and alcohol (+17.1 %, or UAH 84.5 M), local taxes and levies (+20.5 %, or UAH 817.3 M), as well as other taxes and levies (+29.6 %, or UAH 29.6 M). However, corporate profit tax and rent for subsoil use receipts have not come back to 2019 indicators.

Positive dynamics is observed for receipts from tax on immovable property other than a land plot (+UAH 162.1 M, or +7.7 %), single tax (+UAH 1,555.8 M, or +9.6 %), tourism fee (+UAH 10.7 M, or +18.4 %) for January – June 2020 as compared to the same indicator of 2019. Receipts from the rent for subsoil use for

January – June 2020 were equal to UAH 13,314.0 M, that is by UAH 2,262.5 M, or -14.5 % less than for January – June 2019 *(Tbl. 28)*.

Table 28

Local Taxes and Levies Receipts to Local Budgets Comparison for January – June 2019 and January – June 2020

Indicators	January – April 2019, UAH M	January – April 2020, UAH M	2020 to 2019	
			Amount, UAH M	Portion, %
Tax on property, incl.:	17 818,8	15 695,3	- 2 123,5	- 11,9
- Tax on immovable property other than a land plot	2 108,6	2 270,7	+162,1	+7,7
- Land charge	15 576,5	13 314,0	- 2 262,5	- 14,5
- Transport tax	133,8	110,6	-23,1	- 17,3
Single tax	16 193,1	17 748,9	+1 555,8	+9,6
Transport vehicles parking spaces fee	53,8	44,8	-8,9	- 16,6
Tourism fee	57,9	68,6	+10,7	+18,4

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

Under the conditions of consideration of monthly receipts indicators, the following situation is observed:

– in April 2020, tax on property receipts were by UAH 1,980.3 M (-57 %) less than in April 2019, and in May 2020 – by UAH 698.4 M (-24.3 %) less than in May 2019;

– in April 2020, tax on immovable property receipts were by UAH 172.2 M (-20.9 %) less than in April 2019, and in May 2020 – by UAH 698.4 M (-24.3%);

– in April 2020, land charge receipts were equal to UAH 820.9 M, that is by UAH 1,799.4 M (-68.7 %) less than in April 2019; in May 2020, land charge receipts amounted to UAH 1,994.8 M, that is by UAH 713.2 M (-26.3 %) less than in May 2019;

– in June 2020, tax on immovable property receipts amounted to UAH 329.7 M, that is by UAH 87.9 M, or 36.4 % more than in June 2019, of land charge – UAH 3,279.2 M, that is by UAH 611.2 M, or 22.9 % more *(Tbl. 29)*.

Table 29

Local Taxes and Levies Receipts to Local Budgets Comparison in April, May, June 2019 and 2020, UAH M

Indicators	2019			2020		
	April	May	June	April	May	June
Tax on property, incl.:	3 474,8	2 869,2	2 927,6	1 494,5	2 170,8	3 623,6
- Tax on immovable property other than a land plot	823,6	143,7	241,7	651,5	161,6	329,7
- Land charge	2 620,3	2 708,0	2 668,0	820,9	1 994,8	3 279,2
- Transport tax	30,9	17,6	17,8	22,1	14,5	14,7
Single tax	2 939,8	3 369,1	1 043,9	2 954,8	3 728,9	1 169,3

Transport vehicles parking spaces fee	8,0	12,1	7,1	5,0	12,7	6,2
Tourism fee	7,1	20,8	7,0	3,4	19,7	3,6

Source: Calculated and constructed on the basis of the data of the State Treasury Service of Ukraine.

On 13 April 2020, in order to form the *Fund for Fighting against the COVID-19 Acute Respiratory Disease Caused by the SARS-CoV-2 Coronavirus, and Its Consequences,* a number of budget programs was cut back by *amendments introduced* to the 2020 State Budget (Law No 553-IX). As a result, local budgets suffered losses in the amount of UAH 9.65 B caused by reducing the amount of funds of the State Regional Development Fund by UAH 2.6 B, subventions for conducting elections of deputies of city councils and village, settlement and city chairpersons by UAH 1.15 B, subventions for supporting ATCs (Amalgamated Territorial Communities) by UAH 2.1 B, subventions for improving social protection of individual categories of teaching employees of general secondary education institutions by UAH 1.55 B, subventions for implementing The Able School for Best Results program by UAH 1 B etc.

A necessity to form the fund has caused cutting back a number of budget programs including those relating to ATCs. The latter have actively joint counteracting the spread of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus – in addition to introducing and implementing quarantine measures at the territorial communities level, local self-government has channeled funds for increasing wages for medical and other workers directly involved in works on liquidating the COVID-19 disease, purchasing drugs, masks, tests, equipment, organizing transportation of medics to work, delivery of products for elderly people and socially vulnerable families [30].

Therefore, in general, implementing quarantine measures in connection with COVID-19, has adversely affected local budgets receipts, so, in particular, receipts of the rent for subsoil use for January – June 2020 were by 27.8 % less than in 2019: UAH 2.649.7 M in 2019 vs UAH 1,91.1 M in 2020; excise duty receipts reduced by UAH 2.8 M – from UAH 3,560.2 M to UAH 3,577.4 M. Positive dynamics is observed only for personal income tax receipts (a gain in 2020 equaled to 5.0 %, or UAH 3,823.6 M, the dynamics is caused by an annual natural increase in wages and business activity recovery) and in excise duty on tobacco and alcohol (a gain in 2020 was 15.3 %, or UAH 400.0 M).

Conclusion. A pandemic of the COVID-19 acute respiratory disease has caused a rapid economic decline, which affected the revenues of the state and local budgets and produced an additional load on budgets, caused a necessity to review priority directions of budgetary policy.

Shifts in priorities of budgetary policy have been aimed, first of all, at ensuring financial solvency of implementing quarantine measures (for procurement of goods, works and services, extra pays to wages of medical and other workers

directly involved in works on liquidating the COVID-19 acute respiratory disease), social payments and, to a lesser extent, at the mechanisms for slackening in an economic decline, protecting business activity from bankruptcy, as well as at the tools of recovery of the economy after the end of the quarantine.

Now, efforts of the Ministry of Finance of Ukraine aim to ensure the fulfillment of the 2020 state budget, in particular, the financing of measures aimed at fighting against the coronavirus. Approved amendments to the 2020 state budget provide channeling funds for medical needs, aid to vulnerable population groups as well as for business support. All ministries continue to analyze the current situation and develop steps to minimize an adverse impact of the COVID-19 pandemic [6].

Implementing midterm budgetary planning in the budgetary process in Ukraine, which must ensure a strategic approach to identifying priority measures and relevant allocation of limited resources, remains an unchanged priority of budgetary policy. The work is in progress on the analysis of eventual policies and financial solvency for their implementation in the midterm. Stabilizing the situation with the COVID-19 pandemic will enable to develop more realistic macroeconomic forecasts.

The main tasks of budgetary policy of Ukraine under the conditions of the pandemic of the COVID-19 acute respiratory disease caused by the SARS-CoV-2 coronavirus that will help slacken in an economic decline, maintain enterprises from bankruptcy, jobs, promote to fill the state and local budgets, accelerate recovery of the economy after the end of the quarantine, promote to increase revenues of employers and employees, ensure timely payment of wages, are: stimulating investment activity, increasing in the accumulation fund's share of the national income; reducing in unproductive expenditures of the budget and state grants to particular material production industries; strengthening the revenue base of the budget by improving the taxation system and increasing in control of tax payment completeness; establishing a system of effective financial control of the efficient and intended use of state expenditures.

REFERENCES

1. Coronavirus disease (COVID-19) pandemic / World Health Organization. URL: https://www.who.int/emergencies/diseases/novel-coronavirus-2019.
2. В Україні зареєстрований випадок захворювання на COVID-19 / МОЗ України. URL: https://moz.gov.ua/article/news/v-ukraini-zareestrovanij-vipadok-zahvorjuvannja-na-covid-19-%e2%80%93-moz.
3. Про запобігання поширенню на території України гострої респіраторної хвороби COVID-19, спричиненої коронавірусом SARS-CoV-2: постанова Кабінету Міністрів України від 11.03.2020 №211. URL: https://zakon.rada.gov.ua/laws/show/211-2020-%D0%BF.

4. World Economic Outlook, April 2020: The Great Lockdown / IMF. 2020. April. URL: https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020.
5. Deep Global Recession in 2020 as Coronavirus Crisis Escalates / Fitch Rayings. 2020. April 2. URL: https://www.fitchratings.com/research/sovereigns/deep-global-recession-in-2020-as-coronavirus-crisis-escalates-02-04-2020.
6. Бюджетний процес у 2020 р. буде здійснюватись з урахуванням впливу пандемії COVID-19. *Урядовий портал*. 2020. 17 квіт. URL: https://www.kmu.gov.ua/news/minfin-byudzhetnij-proces-u-2020-roci-bude-zdijsnyuvatis-z-urahuvannyam-vplivu-pandemiyi-covid-19.
7. Про внесення змін до постанови Кабінету Міністрів України від 15 травня 2019 р. № 555 : постанова Кабінету Міністрів України від 29.03.2020 № 253. URL: https://www.kmu.gov.ua/npas/pro-vnesennya-zmin-do-postanovi-kabinm2903020etu-ministriv-ukrayini-vid-15-travnya-2019-r-555.
8. Запартіна І. В. Бюджетний механізм економічного зростання. Київ: Ін-т соц.-екон. стратегій, 2007. 528 с.
9. Дем'янишин В. Теоретичні засади бюджетної політики. *Світ фінансів*. 2007. Вип. 1 (10). 2007. С. 19–34.
10. Музика-Стефанчук О. А. Мета бюджетної діяльності у контексті бюджетної політики держави. *Право і суспільство*. 2011. № 3. С. 141–146.
11. Про внесення змін до деяких законодавчих актів України, спрямованих на запобігання виникненню і поширенню коронавірусної хвороби (COVID-19): Закон України від 17.03.2020 № 530-IX. URL: https://zakon.rada.gov.ua/laws/show/530-IX.
12. Про внесення змін до Податкового кодексу України та інших законів України щодо підтримки платників податків на період здійснення заходів, спрямованих на запобігання виникненню і поширенню коронавірусної хвороби (COVID-19): Закон України від 17.03.2020 № 533-IX URL: https://zakon.rada.gov.ua/laws/show/533-20.
13. Про внесення змін до деяких законодавчих актів України, спрямованих на забезпечення додаткових соціальних та економічних гарантій у зв'язку з поширенням коронавірусної хвороби (COVID-19): Закон України від 30.03.2020 № 540-IX. URL: https://zakon.rada.gov.ua/laws/show/540-20#Text.
14. Про внесення змін до Порядку надання державної підтримки суб'єктам мікропідприємництва та малого підприємництва: постанова Кабінету Міністрів України від 15.04.2020 № 283. URL: https://zakon.rada.gov.ua/laws/show/283-2020-%D0%BF#Text.
15. Підсумки тижня за результатами програми «Доступні кредити 5-7-9%»: 51 угода на суму 32,6 млн грн. *Урядовий портал*. 2020. 9 черв.URL:

https://www.kmu.gov.ua/news/pidsumki-tizhnya-za-rezultatami-programi-dostupni-krediti-5-7-9-51-ugoda-na-sumu-v-326-mln-grn.

16. Про внесення змін до Закону України "Про Державний бюджет України на 2020 рік: Закон України від 13.04.2020 № 553-IX. URL: https://zakon.rada.gov.ua/laws/show/553-IX.
17. Парламент врахував пропозиції АМУ щодо змін до Держбюджету-2020. URL: https://www.auc.org.ua/novyna/parlament-vrahuvav-propozyciyi-amu-shchodo-zmin-do-derzhbyudzhetu-2020.
18. Мінфін забезпечує прозорість та ефективність використання коштів Фонду для боротьби з COVID-19. Урядовий портал. 2020. 18 черв. URL: https://mof.gov.ua/uk/news/minfin_zabezpechuie_prozorist_ta_efektivnist_vikoristannia_koshtiv_fondu_dlia_borotbi_z_covid-19-2210.
19. Про внесення змін до Податкового кодексу України та інших законів України щодо додаткової підтримки платників податків на період здійснення заходів, спрямованих на запобігання виникненню і поширенню коронавірусної хвороби (COVID-19): Закон України від 13.05.2020 № 591-IX. URL: https://zakon.rada.gov.ua/laws/show/591-20#Text.
20. Уряд представив Програму стимулювання економіки для подолання наслідків COVID-19. *Урядовий портал*. 2020. 27 трав. URL: https://www.kmu.gov.ua/news/uryad-predstaviv-programu-stimulyuvannya-ekonomiki-dlya-podolannya-naslidkiv-covid-19.
21. Міністр фінансів Сергій Марченко: «Підтримка МВФ – це гарантована можливість профінансувати усі необхідні видатки, в першу чергу соціальні». *Урядовий портал*. 2020. 13 квіт. URL: https://mof.gov.ua/uk/news/ministr_finansiv_sergii_marchenko_pidtrimka_mvf_-_tse_garantovana_mozhlivist_profinansuvati_usi_neobkhidni_vidatki_v_pershu_chergu_sotsialni-2094.
22. МВФ оприлюднив текст Листа про наміри та Меморандуму про економічну і фінансову політику щодо нової 18-ти місячної Програми Stand-by для України. *Урядовий портал*. 2020. 11 черв. URL: https://mof.gov.ua/uk/news/mvf_opriliudniv_tekst_lista_pro_namiri_ta_memorandumu_pro_ekonomichnu_i_finansovu_politiku_shchodo_novoi_18-ti_misiachnoi_programi_stand-by_dlia_ukraini-2184.
23. У квітні до державного бюджету надійшло понад 90 млрд грн. *Урядовий портал*. 2020. 5 трав.URL: https://www.kmu.gov.ua/news/u-kvitni-do-derzhavnogo-byudzhetu-nadijshlo-ponad-90-mlrd-grn.
24. Державна казначейська служба України URL: https://www.treasury.gov.ua/ua.
25. У травні 2020 р. до загального фонду держбюджету надійшло 63,9 млрд грн – розпис виконано на 100 %. *Урядовий портал*. 2020. 1 черв. URL: https://mof.gov.ua/uk/news/minfin_u_travni_2020_roku_do_zagalnogo_fon

du_derzhbiudzhetu_nadiishlo_639_mlrd_grn_-_rozpis_vikonano_na_100-2167.

26. Виконання держбюджету за червень 2020: 105% перевиконання розпису податковою і 100% виконання плану митницею. *Урядовий портал*. 2020. 1 лип. URL: https://www.kmu.gov.ua/news/vikonannya-derzhbyudzhetu-za-cherven-2020-105-perevikonannya-rozpisu-podatkovoyu-i-100-vikonannya-planu-mitniceyu.
27. Україна отримала 500 млн. євро макрофінансової допомоги ЄС. *Урядовий портал*. 2020. 10 черв. URL: https://mof.gov.ua/uk/news/ukraina_otrimala_500_mln_ievro_makrofinansovoi_dopomogi_ies-2183.
28. Україна отримає від Міжнародного банку реконструкції та розвитку 200 мільйонів доларів США. *Урядовий портал*. 2020. 15 черв. URL: https://mof.gov.ua/uk/news/ukraina_otrimaie_vid_mizhnarodnogo_banku_rekonstruktsii_ta_rozvitku_200_milioniv_dolariv-2191.
29. МБРР виділить Україні 350 мільйонів доларів США на підтримку економічного відновлення та розвитку. *Урядовий портал.* 2020. 27 черв. URL: https://mof.gov.ua/uk/news/mbrr_vidilit_ukraini_350_milioniv_dolariv_ssha_na_pidtrimku_ekonomichnogo_vidnovlennia_ta_rozvitku-2224.
30. Громади протидіють пандемії COVID-19 / Асоціація міст України. 2020. 24 берез. URL: http://auc.org.ua/novyna/gromady-protydiyut-pandemiyi-covid-19-dobirka-3.

11. Assessment of economic security of enterprises formation on the basis of economic and mathematical modeling: current state and development pragmatics

Oksana Vivchar
Doctor of Economic Sciences,
Professor of the Security, Law Enforcement Practice and Financial Investigations Department
Ternopil National Economic University,
Academician of Academy of Economics Sciences of Ukraine
E-mail: o.vivchar84@gmail.com
ORCID ID 0000-0001-9246-2226

Mariia Ziailyk
PhD in Economics, Associate Professor Department of Management and Administration Department
Ternopil Ivan Puliui National Technical University
E-mail: zyachamf@gmail.com
ORCID ID 0000-0002-8435-8565

Justyna Krzywkowska
Doctor of Law, assistant professor
Department of Legal Theory and History
Faculty of Law and Administration
University of Warmia and Mazury in Olsztyn (Poland)
E-mail: justyna.krzywkowska@uwm.edu
ORCID ID 0000-0002-0667-6453

Introduction. In modern transformational conditions, one of the important requirements for the effective functioning and development of the enterprise is the analysis and ensuring its economic security. It is provided by a certain state of available resources of the enterprise, which guarantees their most effective use and prevention of the negative impact of external and internal threats (destabilizing factors). Therefore, in order to ensure and maintain a reliable state of economic security it is necessary to constantly analyze the economic situation, conduct a rigorous scientific study of financial relations and the movement of available resources in the financial and economic activities of each enterprise, i.e. conduct a comprehensive assessment of the economic condition of economic entities.

Literary review. The purpose of this research is to substantiate the essential characteristics of economic and mathematical modeling, as well as the formation of economic security assessment on the basis of economic and mathematical

modeling in modern transformational conditions using business structures as an example.

Results. Examining this scientific issue, it should be noted that the economic security of enterprises is the protection state of its resources and intellectual potential from existing and potential threats of the external and internal operation environment, characterized by high financial performance index and future economic development.

Based on the research, it is established that a threat is a development of events, action or inaction, as a result of which there is a possibility or an increased probability of normal business operation interruption of the enterprise and unattainability of its goals, causing any kind of damage to the enterprise [2, p. 58]. Most often investigated are the threats that arise at the individual level from competing firms, which include restricting market access through monopoly collusion by competing firms with other monopoly firms; appropriation of trademarks by a competitor; counterfeiting of products; economic espionage by competing firms; loss of firm status and ownership due to fraud by competing firms; theft and looting of property and money; theft and fraud by competitors in collusion with the company's own employees; computer theft; destruction of property; danger from particular individuals. It should be noted that a threat is a set of conditions and factors that create a danger to the realization of economic interests of business structures, which in turn can create economic risks.

Special attention is also drawn to the fact that according to the Content Security portal data, the world's internal and external threats are distributed as follows: disclosure (excessive chatter of employees) – 32%; unauthorized access through bribery and incitement to cooperation by competitors and criminal groups – 24%; lack of proper supervision and strict conditions for ensuring the confidentiality of information – 14%; traditional exchange of production experience – 12%; uncontrolled use of information systems – 10%; preconditions for the occurrence of conflict situations among the staff, related to the lack of high labor discipline, psychological incompatibility, random selection of staff, inefficient work of staff to unite the team – 8%. In addition, it should be noted that according to a study by Ernst & Young, the level of corporate fraud recorded in Ukraine is slightly higher than the average in developed countries (13%), though, it is lower than in developing countries (20%). Theft with the help of insiders is considered to be among the ten main trends in data protection in 2018 by the French company Kroll Ontrack: for the time being, progressive organizations are investing into strengthening security through technology, while criminals go the easy way – find accomplices among the staff. In addition to theft of information, it is also possible to face mudslinging from former subordinates, lawsuits that affect the company's reputation, the incompetence of the "casual" employee and errors in personnel documents [5].

In such operating conditions, the modern pragmatics of the economic security system of enterprises requires a well-chosen method of ensuring the security of business structures, in particular, the collection and processing of analytical information on experience and measures to strengthen security, analysis, continuous monitoring and forecasting of conditions, threats, hazards and indicators of financial security, development and implementation of necessary measures to maintain economic security at the appropriate level.

Following the line of our study, it should be noted that the systematic assessment of economic security of enterprises is characterized by a set of conditions and factors preconditioning the protection of economic interests [3, p.26]. The level of economic security of enterprises is characterized by many indicators. The assessment of the economic security state of enterprises is carried out through a system of criteria and indicators. The criterion of economic security of the enterprise is a measure of the state of the business entity in terms of compliance with the actually achieved indicators of its activities to pre-established indicators that reflect the essence of the economic security.

In this case, the general task of forming an assessment of the economic security of the system is to develop an assessment by which in the process of system operation there is a quantitative threat of destruction of the system for timely measures to prevent this. This assessment can be obtained using the parameters of the trajectory of the system in the form of a functional:

$$J_{б} = J_{б}(t, s, u, \sigma, \xi), \quad s \in S, \quad u \in U, \quad \sigma \in \Sigma, \quad \xi \in \Xi. \qquad (1)$$

The schematic diagram of the security indicator$J_{б}$formation on the basis of all information flows in the system is shown in Figure 17.

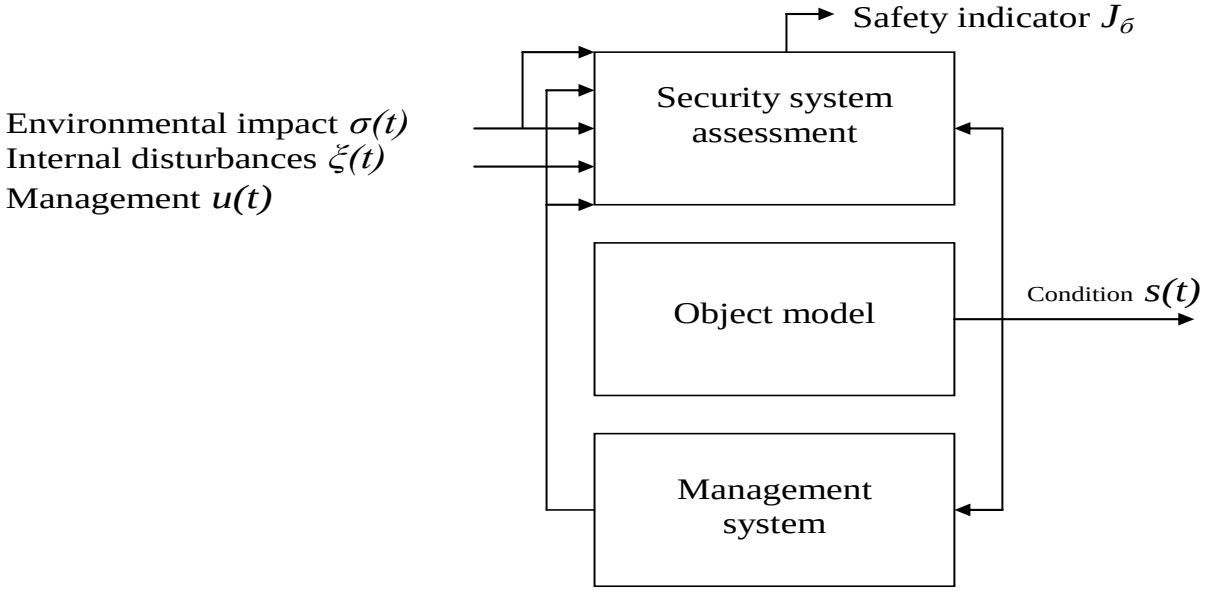

Figure 17. Typical and logical scheme of the assessment of economic security of the enterprise formation [2, p. 232]

In order toget it, it is necessary to divide the system state space into two domains that describe the complete set of all system states:

$$S = S_o \cup S_б, \tag{2}$$

Where S_0 is a set of dangerous states of the system existance; S_6 – a set of all safe states.

Then it is necessaryto build up the set S_6, which in turn means the need to find the boundary of this set $Г_б$, which contains all the information about the security of the system. In this case, the security indicator $Г_б$ is a measure of the deviation of the current state of the system S from the $Г_б$ boundary. [4, p. 202].

From a practical point of view, the following scheme was usedto make a comprehensive assessment of the state of economic security of enterprises in Ternopil region (Fig. 18).

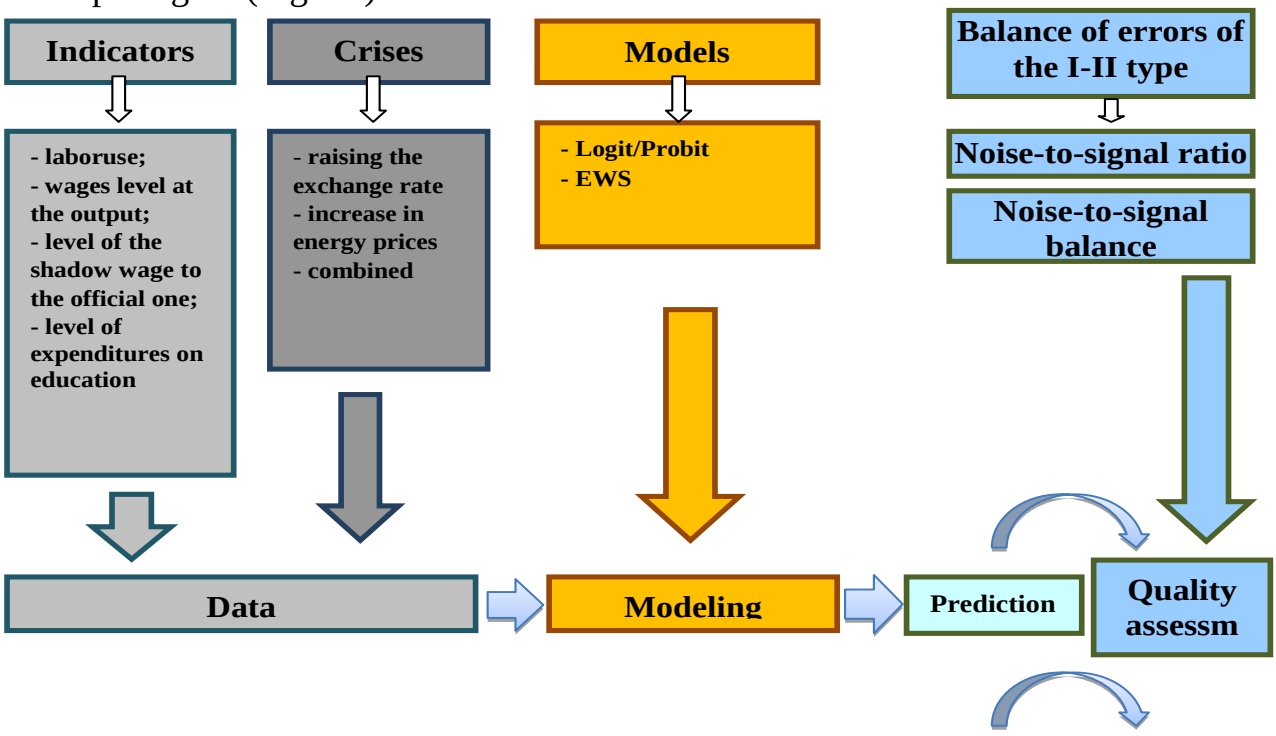

Figure 18. Structural and logical scheme of enterpriseeconomic security indicators analysis [1, p. 35]

As itcan be seen from Fig. 18. for the analysis of economic security of enterprises, the indicators were selected that characterize the economic security in various areas of enterprises activity according to the recommendations, adapting them to the enterprises of the Ternopil region. A matrix of values with enterprises and values of indicators by years was formed for each indicator. Filling out the matrix with indicators is different, since certain values of indicators could be obtainednot for all the enterprises. When assessing the factors of economic security, it is necessary to assume how a certain factor affects the economic

security of the enterprise whether leads to theincrease or decrease in the security of the enterprise. These assumptions are formed in Table 30.

A multidimensional logit model, the case of binary choice, was chosen to analyze the economic security of enterprises. The model does not take into account group effects, i.e. there is no analysis of fixed effects. Multidimensional logit model for the case of binary selection:

Table 30

Hypotheses of the impact of indicators on the economic security of enterprises [2, p. 350]

	Indicators	Impact sign		Indicators	Impact sign
	Risk of economic security of the enterprise indicators			**Development indicators**	
ICr1	labor use level	+	IV1	efficacy of financial and economic activity of enterprises	+
ICr2	wages level at the output	+	IV2	resource efficiency	+
ICr3	level of the shadow wage to the official one	–	IV3	production cost	–
ICr4	level of the shadow employment to the total employment	–	IV4	product competitiveness	+
ICr5	level of expenditures on education	+	IV5	level of investment activity	+
ICr6	level of health care expenditures	+	IV6	level of innovation activity	+
ICr7	the ratio of the subsistence minimum to the average wage	–	IV7	legislation stability in the entrepreneurship sphere	+
ICr8	the share of wages in the structure of net income of enterprises	+		**Additional indicators**	
ICr9	level of pension expenditures	–	II1	Index of the legal component	–
			II2	Fictitious variable =1, if the account balance of the enterprise is negative for more than 2 years	+
	Indicators of economic independence				
IL1	level of providing enterprises with resources	+			
IL2	resource-intensive production	+			
IL3	depreciation of the material and technical base of enterprises	–			
IL4	level of providing enterprises with scientific potential	+			
IL5	level of providing enterprises with production and technical potential	+			

$$Y_{it}^{*} = \beta' \cdot x_{it} + \varepsilon_{it} ,$$

$$Y_{it} = \begin{cases} 0, \text{ if } \ Y_{it}^{*} \le 0, \\ 1, \text{ if } \ Y_{it}^{*} > 0 , \end{cases} \quad (3)$$

where Y_{it}^{*} – binary dependent variable, which takes the value of *1*, if at the time *t* the enterprise undergoes crisis, and *0* otherwise; x_{it} – explanatory variables; ε_{it} – accidental error, $t = 1, ..., T_i$, a $i = 1 ... n$.

The function of logistic probability distribution is given in the formula (2).

$$F(\beta' x_{it}) = \Pr(Y_{it} = 1 | x_{it} , \beta) = \frac{e^{\beta' x_{it}}}{1 + e^{\beta' x_{it}}}, \quad (4)$$

The assessment of parameters by the method of maximum reliability formula (5):

$$\ln L = \sum_{t=1}^{T} \sum_{i=1}^{n} [Y_{it} \ln \{F(\beta' x_{it})\} + [1 - Y_{it}] \ln \{1 - F(\beta' x_{it})\}] \to \max . \quad (5)$$

Interpretation of coefficients:

where "+" increases the variable => increases the probability of crisis; "–" – increases the variable => decreases the probability of crisis; – the coefficient shows the effect of changes in the exogenous variable on $\ln[Y_{it} / (1 - Y_{it})]$.

In order to avoid cross-effects, when not the variable itself affects the probability of a crisis, but the state crisis begins to affect the behavior of the variable, two groups of the models are built:

– for the first group of regressions, all observations after the first year of crises are excluded from the sample;

– for the second group of regressions, it is proposed to apply the sample according to the same principle: all observations after the first year of the crisis are excluded and then all observations after the crisis are added to it, i.e. all data are used except crisis years after the first year of crisis - Table 2, respectively, according to the results of scientific research the formulas (6; 7) have been formed.

$$X_{it}'\beta = +0.037 \cdot \text{ICr1} + 0.016\text{I} \cdot \text{Cr2} - 0.034 \cdot \text{ICr3} - 0.032\text{I} \cdot \text{Cr4} + 0.006 \cdot \text{ICr5} + 0.016 \cdot \text{ICr6} - 0.254 \cdot \text{ICr7} + 1.13 \cdot \text{ICr8} - 0.126 \cdot \text{ICr9} + 0.024 \cdot \text{IL1} + 0.024 \cdot \text{IL2} - 0.021 \cdot \text{IL3} + 0.017 \cdot \text{IL4} + 0.008 \cdot \text{IL5} + 0.106 \cdot \text{IV1} + 0.027 \cdot \text{IV2} - 0.032 \cdot \text{IV3} + 0.036 \cdot \text{IV4} + 0.004 \cdot \text{IV5} + 0.003 \cdot \text{IV6} + 0.235 \cdot \text{IV7} - 0.565 \cdot \text{II1} + 0.253 \cdot \text{II2} , \quad (6)$$

$$X_{it}'\beta = +0.038 \cdot \text{ICr1} + 0.014\text{I} \cdot \text{Cr2} - 0.034 \cdot \text{ICr3} - 0.032\text{I} \cdot \text{Cr4} + 0.005 \cdot \text{ICr5} + 0.017 \cdot \text{ICr6} - 0.252 \cdot \text{ICr7} + 1.12 \cdot \text{ICr8} - 0.124 \cdot \text{ICr9} + 0.022 \cdot \text{IL1} + 0.025 \cdot \text{IL2} - 0.021 \cdot \text{IL3} + 0.017 \cdot \text{IL4} + 0.008 \cdot \text{IL5} + 0.107 \cdot \text{IV1} + 0.027 \cdot \text{IV2} - 0.032 \cdot \text{IV3} + 0.036 \cdot \text{IV4} + 0.005 \cdot \text{IV5} + 0.006 \cdot \text{IV6} + 0.234 \cdot \text{IV7} - 0.563 \cdot \text{II1} + 0.251 \cdot \text{II2} . \quad (7)$$

Table 31

The names of enterprises taken for the calculation of economic and mathematical model of the economic security of enterprises indicators system

№	C_RAJ	KOD	NAME
1	2	3	4
1	18	130725	OJSC “TERNOPILOBLENERGO”
2	1	291569	LLC “PIDVYSOTSKE PLANT OF BUILDING MATERIALS”
3	18	1268934	LLC “TERNOPILBUD”
4	18	1269000	LLC “TERNOBUDMEKHANIZATSIIA”
5	18	3353503	PJSC “TERNOPILGAS”
6	15	5421350	PJSC “BEREZOVYTSKYY KOMBINAT ”BUDINDUSTRIIA”
7	4	14040434	LLC “MRIIA TSENTR”
8	1	14049168	LLC “KHRYSTYNA”
9	16	14338122	BILLERBECK-UKRAINE FEATHER AND DOWN FACTORY
10	18	19350040	LLC “SUShP “DIANA INTERNATIONAL LTD”
11	18	21138240	LIMITED LIABILITY COMPANY FIRM “RUTA-FARM”
12	11	21150620	PJSC “KORZHIVSKYI SHDK”
13	18	22603696	PRIVATE SMALL ENTERPRISE “HORNOSTAI”
14	18	22604402	EDITORIAL OFFICE OF THE NEWSPAPER “PIDRUCHNYKY I POSIBNYKY”
15	18	24637417	“PUBLISHING HOUSE “NAVCHALNA KNYHA-BOHDAN”
16	18	25345757	LLC “DOBROBUT”
17	16	25347839	PJSC “AHRO-PRODUCT”
18	18	30047671	PE “PRODEKSPORT”
19	18	30345109	LLC “ANT”
20	18	30356917	PJSC “TERNOPILSKYI MOLOKOZAVOD”
21	18	30622532	LLC “TK “MEGAPOLIS-UKRAINE”
22	3	30811896	LIMITED LIABILITY COMPANY “BUCHATSKYI SYRZAVOD”
23	14	30828208	PRIVATE RENTAL ENTERPRISE “DARAKHIVSKYI”
24	18	30836947	LIMITED LIABILITY COMPANY “TERNOPILKHLIBPROM”
25	18	31138408	LLC “SAHKARA”
26	18	31594297	LLC “STEN”
27	18	32549732	LLC “ARS-KERAMIKA” TRADE GROUP
28	18	32578370	LLC “ARIOL”
29	18	32736671	LLC “VINISAN”
30	18	32865702	PE “ZAKHID- AGROINVEST”
31	18	32941987	LLC “LAN COMPANY”
32	2	33317158	PE “SKALA-INTER”
33	18	33357824	LLC “KUPAVA-5”
34	18	33680419	LLC “SAIUZ”
35	18	33992917	LLC “TERVIKNOPLAST”
36	15	34419383	LIMITED LIABILITY COMPANY “SEBN.UA”
37	18	34473461	PRIVATE ENTERPRISE “KOZATSKA SMAKOTA”
38	18	34473655	LLC “TERMOBUD PLUS”
39	5	34526958	PE “TIMIRTAN”

40	15	34699310	PE “AGROSPETSHOSP”
41	7	35039068	LLC “BILYY BEREH”
42	18	35219218	LLC “ZAKHIDSYR”
43	2	35368754	SE “DINTER UKRAINE SKALA”
44	4	35855770	LLC “MRIIA – LEASING”
45	4	35855828	LLC “INTERFOM-ZAKHID”
46	15	35907603	LIMITED LIABILITY COMPANY “TEMA – OPILLIA”
47	1	35969895	LLC “ZAKHID-AGRO MHP TERNOPIL”
48	15	36404316	LLC “TERNOPIL MOSTOBUD”
49	8	36650633	LLC “ELAGRI-KOZOVA”
50	2	36865601	LLC “ELAGRI – BORSHCHIV”
51	18	37306731	LLC “PH“TERPOLIMERGAS”
52	18	37306789	LLC “AVAKS PROF”
53	18	37457526	PE “ARIOL-TERNOPIL”
54	2	37498122	PE “VP-TRANS”
55	18	37556849	LLC “AGROTSENRT-HALYCHYNA”
56	15	37576802	LLC “MIASOPRODUKT MPK”
57	5	37888305	LIMITED LIABILITY COMPANY “EDEM-F”
58	14	37961273	LLC “FEROSIT”
59	15	38038313	LLC “SERVICE-AGROZAKHID”
60	18	38155346	TERNOPIL BRANCH “LATONA “LIMITED LIABILITY COMPANY “KOTOVSKYI VYNZAVOD”
61	18	38303253	LLC “PRODLUKS PLUS”
62	18	38417636	LLC “PK “TERPOLIMERGAS”
63	18	38989673	LLC “TBK “PROFESIONAL”

[systematized by the author]

Afterwards, there was a comprehensive assessment of the indicator impact on the economic security of enterprises using logit and probit functions. When checking the stationary, non-stationary were the variables: ICr1, ICr2, ICr7, IL1, IL6, IV7. The stationary nature of a variable indicates that it changes predictably over time. Non-stationary factors need to be further investigated, as economic safety direct dependence on them is not established, because it is impossible to predict their change over time with a high degree of reliability.

The linear form of the economic and mathematical model is given in Fig. 19.

Conditional fixed-effects logistic regression — Number of obs = 294
Group variable: IDCode — Number of groups = 27

Obs per group: min = 6
avg = 10.9
max = 14

LR chi2(5) = 31.58
Log likelihood = -62.693942 — Prob > chi2 = 0.0000

Y2	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
DIL1	-9.77678	5.781843	-1.69	0.091	-21.10899	1.555424
ICr10	-.1416409	.0484753	-2.92	0.003	-.2366507	-.0466311
IL7	.0065406	.0027356	2.39	0.017	.0011789	.0119023
IV1	-.7645714	.28408	-2.69	0.007	-1.321358	-.2077849
IV4	.0296845	.0110367	2.69	0.007	.0080531	.051316

Figure 19. The results of the linear form of economic and mathematical model for non-stationary factors of enterprises
[calculated by the author]

Based on a systematic assessment of economic security of enterprises in the context of indices and determination of economic security parameters, it should also be noted that in addition to economic methods, administrative and socio-psychological means of strengthening can be used. They include methods of influencing over individual employees, groups of employees or the team as a whole to form a corporate culture that will help to achieve the goals of the enterprise and reduce the impact of economic security threats on the enterprise. Such methods include: training of staff on safety measures; work with managers, whose behavior serves as a sample for the staff of the enterprise; development of the work program with new employees and its implementation; formation and adjustment of enterprise traditions; regulation of interpersonal and intergroup relations; moral encouragement; social planning; other methods.

Organizational or administrative and legal methods of managing the economic security of the enterprise are based on coercive motives and include building and improving the management structure, defining the authority of employees, development and application of administrative orders, instructions and other documents that facilitate interaction between the subject and the object of management.

Conclusions. Without claiming the exhaustiveness of a systematic assessment of economic security of enterprises, it should be concluded that the necessary conditions for the formation of an effective system are: increasing the level of protection of entrepreneurship by strengthening the responsibility of the state (legal, judicial, institutional, etc.) to business entities; efficacy of entrepreneurial activity support policy; introduction of adaptive security management systems; ensuring the internal balance of the main economic parameters of regional enterprises; strategic focus on long-term and rational development.

REFERENCES

1. Valinkevich, N.V. (2012) Pobudova optymalnoi modeli prohnozuvannia modernizatsiinykh zrushen u vyrobnytstvi produktsii pidpryiemstv [Formation of an optimal model for forecasting modernization changes in the production of enterprises]. *Visnyk Zhytomyrskoho derzhavnoho tekhnolohichnoho universytetu. Ekonomichni nauky – The Journal of Zhytomyr State Technological University. Economic sciences.* 34-39.
2. Vivchar, O. I. (2018) Upravlinnia ekonomichnoiu bezpekoiu pidpryiemstv: sotsiohumanitarni konteksty: *monohrafiia* [Management of economic security of enterprises: socio-humanitarian contexts: *monograph*]. Ternopil: Individual - entrepreneur Palyanytsya V.A. 474.
3. Vivchar, O. I. (2017) Teoretychni aspekty bezpekoznavstva v umovakh pidpryiemstv (fundamentalni zahrozy v suchasnomu sotsiohumanitarnomu prostori) [Theoretical aspects of security in the conditions of enterprises (fundamental threats in the modern socio-humanitarian space)]. *Sotsialno-ekonomichni problemy i derzhava – Socio-economic problems and the state.* Ternopil.. Issue. (1) 16. 24-31. URL: http://sepd.tntu.edu.ua/images/stories/pdf/2017/17voissp.pdf
4. Hryhoruk, P. M., Khrushch, N. A. (2017) Metodolohichni zasady modeliuvannia systemy zabezpechennia finansovo-ekonomichnoi bezpeky v umovakh nevyznachenosti i bahatomirnosti rynkovoho seredovyshcha [Methodological principles of modeling the system of financial and economic security in conditions of uncertainty and multidimensionality of the market environment]. *Naukovyi visnyk Mukachivskoho derzhavnoho universytetu – Scientific Bulletin of Mukachevo State University.* 198-204.
5. Doroshuk, A. A., Trybukha, M. V. Systema rehuliuvannia reiderstva v Ukraini [System of raiding regulation in Ukraine]. URL: http://economics.opu.ua/files/archive/2018/ No1 / 170-176.pdf.
6. Melnyk, O. O. (2011) System of threats to economic security of the enterprise [Systema zahroz ekonomichnoi bezpeky pidpryiemstva]. *Sbornyk nauchnыkh trudov "Vestnyk NTU "KhPY" – Collection of scientific works "Bulletin of NTU "KhPI"*. № 25. 97-103.
7. Oleksiuk, O. S., Mostipaka, O. V. (2017) Rivnovaha sotsialno-ekonomichnykh system v konteksti ekonomichnoi bezpeky [Equilibrium of socio-economic systems in the context of economic security]. *Innovatsiina ekonomika –Innovative economy*. № 7. 302-305.

12. Numerical atmospheric models and their application in different areas of economics

Anatoliy Doroshenko
Doctor of Sciences (Physics and Mathematics),
Head of Department of Computing Theory
Institute of Software Systems of NASU
and
Professor of Department Automation and Control in Technical Systems
National Technical University "Igor Sikorsky Kyiv Polytechnic Institute"
E-mail: doroshenkoanatoliy2@gmail.com
ORCID ID 0000-0002-8435-1451

Vitalii Shpyg
PhD (Meteorology, Climatology and Agricultural Meteorology),
Head of department of atmosphere physics
Ukrainian Hydrometeorological Institute
E-mail: vitold82@i.ua
ORCID ID 0000-0003-1055-7120

Igor Budak
MSc (Theoretical and Nuclear Physics),
Scientist of department of atmosphere physics
Ukrainian Hydrometeorological Institute
E-mail: budak_i@meta.ua
ORCID ID 0000-0002-6400-7557

Kateryna Huda
MSc (Meteorology, Climatology and Agricultural Meteorology),
Leader engineer of department of atmosphere physics
Ukrainian Hydrometeorological Institute
E-mail: cat_rin@meta.ua
ORCID ID 0000-0001-9506-5859

Introduction. Numerical Weather Prediction (NWP) is a scientific field that arose on margin of three sciences: meteorology, mathematics and cybernetics. This direction is based on the usage of the equations of dynamic meteorology, which are mathematical expressions of the basic laws of Physics: the law of variation of momentum, the law of conservation of energy and the law of conservation of mass.

Over the past decades, NWP models have established themselves as a highly effective tool in the daily operational practice of forecast centers in many countries

of the world. Their use greatly speeds up and simplifies the process of creating diverse types of information for a wide range of users, which, moreover, does not depend on the well-being of the weather forecaster. The accuracy of such models, as a rule, exceeds the accuracy of synoptic forecasts, especially when it comes to their spatial and temporal sampling.

Short review of numerical atmospheric models' types and tendency of NWP. First numerical atmospheric models were quite original, and the number of centers, in which they were created and operated, was insignificant. Over time, individual blocks of existing models were borrowed, new ones appeared, and the number of models grew rapidly. Conditionally, the models can be divided using the following criteria:

1. The spatial scale of the modelling area (the territory for which the calculations are performed) are divided on global, hemispherical, regional / mesoscale models, which may also have nested grids to reflect smaller-scale atmospheric phenomena and processes.
2. A coordinate system (horizontal and / or vertical). In the horizontal plane, models can be built based on Cartesian, spherical and geographical coordinate systems (in different map projections). The latter are the most perfect, and nowadays they are used for operational purposes. The absolute altitude, isobaric, sigma- (and its hybrid varieties) and eta-coordinates are used as the vertical coordinate.
3. Mathematical methods of realization of physical schemes.
4. Physical schemes and completeness of reflection with their help of all variety of atmospheric processes.
5. The operational qualities of the model (nomenclature of predicted values; quality of forecasts that meets the established criteria; time range of prediction within the required quality of forecasts; forecasting efficiency; the needs of computer equipment and software; the needs of the number and composition of the model service group, etc.).

The first four points are sufficiently covered in the scientific literature and do not require detailing [1-6]. The fifth one can be determined not only by the properties of the model itself, but also by capabilities of users and the needs of consumers of forecasting information.

Among the main features of modernity are the following: reducing the time that is required for forecasting; increasing the earliness of forecasts, their temporal and spatial detailing; reducing the impact of the human factor; creation of new technical means of observation and monitoring, their automation and involvement directly and indirectly in forecasting. For several decades, the leadership in the development of weather forecasting models in general and numerical weather forecasting models in particular, their implementation in operational practice belonged to highly developed countries such as the United States, the former

Soviet Union, Germany, France and Japan. However, at the end of the twentieth century, the tendency to concentrate scientific and technological capacity within individual countries, changed to the integration and joining efforts to solve a problem. The modern world tends to create a kind of research and operational forecasting consortia, a clear example of which can be ECMWF (European Centre for Medium-Range Weather Forecasts), ALADIN (original in French "Aire Limitée Adaptation dynamique Développement InterNational"), HIRLAM (High Resolution Limited Area Model) and COSMO (Consortium for Small-scale Modelling). Weather forecast models or their results created by one state can be used by others.

Among the most well-known modern global models of short- and medium-range weather forecast are the following:

- Global Forecasting System (GFS, the USA);
- Weather Research and Forecasting Model (WRF-ARW version 3.0 and higher in the global option is realized as global numerical model, the USA);
- Naval Operational Global Atmospheric Prediction System (NOGAPS is global spectral model, the USA);
- Global Environmental Multiscale (GEM is global numerical model, which runs in the Canadian Meteorological Centre);
- UKMET (United Kingdom Meteorological) global model;
- ECMWF (European Centre for Medium Range Weather Forecasts) global model;
- Global Spectral Model JMA-GSM9603 (Japan Meteorological Agency);
- ICON (Icosahedral Nonhydrostatic Model runs at the German Weather Service, DWD).

The largest number of atmospheric models of different classes, which are widely used in many countries around the world, were created in the United States. The NCAR alone has created 36 models that allow to study and predict of transport of pollutants, radiation and chemical processes in the atmosphere, biogeophysical processes, climate change for individual regions and the globe as a whole, to study the relationships between the atmosphere, ocean, underlying surface and sea ice and their mutual influence on the climate system, to consider in more detail climate change on different spatial scales, to study the influence of relief, lakes, coastline and human activity on climatic features of certain regions, etc., to create weather forecast, study atmospheric and ocean vortices, turbulence , seasonal changes in ocean surface temperature, ocean currents, El-Niño forecasting, etc., research and forecasting of the ionospheric processes. So let's focus on the experience of weather forecasting of this country. Thus, currently GFS and WRF are the most widely used in the operational practice of the United States National Weather Service and many countries on all continents.

The GFS was developed by the National Weather Service of the United States as part of the Global Data Assimilation and Forecasting System (GDAS) to improve global forecasting and forecasting of the long-wave weather systems. The GFS is a spectral, hydrostatic model that has 64 levels vertically and uses the sigma coordinate system. The horizontal step for the model version with the highest resolution is approximately 25 km, and the earliness of forecast is 384 hours.

WRF is one of the best performance and most widespread numerical mesoscale models in the world. It was conceived as a new generation model that would provide an opportunity to better understand atmospheric processes and significantly improve weather forecast, and was created by the joint efforts of many research organizations and centers in the United States: the National Center for Atmospheric Research (NCAR), the National Center for Environmental Foresight (NCEP), Forecast Systems Laboratory (FSL), the US Air Force Weather Agency, the US Naval Research Laboratory, Oklahoma State University, the US Federal Aviation Administration, and several other organizations. WRF is currently used in many of the world's leading meteorological centers. For example, in the United States, the WRF NMM (Weather Research and Forecast Nonhydrostatic Mesoscale Model) was used as the national weather forecast model. Later, a modification of the model (HWRF) was created based on the WRF-ARW, which replaced the WRF-NMM as the national weather forecast model. WRF has become an effective tool for solving problems of operational weather forecasting and research in the field of atmospheric physics in South Korea, India, Taiwan, Greece, and Ukraine, where their own forecast systems are being created on its basis. A brief history of the model development, a description of the experience of its application for solving various problems in meteorology, both in Ukraine and abroad, is presented in [7, 8].

COSMO is worth highlighting among the other European consortiums. The basic NWP model is a nonhydrostatic limited-area atmospheric prediction COSMO-Model. It has been developed at the DWD to meet high-resolution regional forecast requirements and to provide a flexible tool for various scientific applications on a broad range of spatial scales [9, 10]. The model is used successfully in Europe, Africa, Asia, Oceania, and South America.

Today in Ukraine WRF-ARW, COSMO and mesoscale atmospheric model of the Ukrainian Hydrometeorological Institute (UHMI) are operated currently restrict focusing on specific area of interest [8, 11-17]. These models depend on lateral boundary conditions provided by a global model (GFS and ICON).

Weather, natural disasters, types of meteorological information and place of the NWP models in economy. According to the Center for Research on the Epidemiology of Disasters (Belgium), in the 70s of the XX century there were about 1.5 thousand natural disasters in the world, in the 80s – up to 3.5 thousand,

and in the 90s – up to 6 thousand. The number of victims and economic losses also increased: from 1990 to 1999, the losses from natural disasters almost doubled, with the average number of victims reaching 188 million per year [18]. During the ten-year period 1992-2001, about 90% of all natural disasters had hydrological and meteorological origins [19]. All information about weather conditions that reaches consumers is the basis of meteorological provision as a permanent and mandatory process of the economy, social and military spheres in the daily functioning of most states in the world.

In Ukraine at the moment the history of the origin and formation of the market of meteorological services, the specifics of the formation of supply and demand in the market of meteorological services, the development of meteorological support in the modern economy and other relevant issues are most fully described in [20].

Meteorological information (and, first of all, weather forecasts) have a wide range of application. In this regard, there are meteorological provision for general and special purposes. General-purpose meteorological provision includes preparation of warnings about natural phenomena, about extremely high levels of air pollution, the development of weather forecasts for up to three days, as well as the dissemination of information about the actual weather. In addition, also they include forecasts of mudflows, landslides, and avalanches in mountainous areas. To meet the needs of each individual consumer, specialized meteorological forecasts are created, which have an individual approach and are designed to consider the specifics of the field of application and accuracy requirements [20].

It is obvious that the prognostic information of numerical weather prediction models cannot prevent negative manifestations of atmospheric processes. One can talk about timely and early warning of their occurrence. Thus, numerical weather prediction models are an effective tool for application in decision-making systems for various purposes and for making coupled models / systems. The NWP models products are possible to provision in following sectors of the economy of Ukraine: agriculture; aviation; heat power industry; marine transport; railway transport; road transport; energetics (including of renewable energy); water management and supply. Let us consider these experience and possibilities below in detail.

Since 2008, systems for short-term and medium-term forecasting of weather conditions for general and special purposes have been developed in the UHMI. Currently, the basic model is the WRF (this is due to a number of limitations in computing resources), but others are also used to solve specific goals. A number of so-called combined systems have been developed on the basis of the WRF, the main purpose of which is the calculation of processes and phenomena, both natural and technogenic, dependent on atmospheric conditions: hydrological, marine [21], pollution [3, 16, 22] and etc.

NWP forecasts of the main meteorological elements, some parameters and indices for the whole world and separated regions are available at the link http://accuweather.org.ua/gfsnwp/index.php. For the territory of Ukraine NWP forecasts with the expanded namelist of meteorological values are available also at the link http://accuweather.org.ua/nwp/tabpage.php. The results are presented in the form of tables, graphs and charts. Forecast data is available also for separated points on the territory of Ukraine.

NWP models productions possibility to provision to agriculture. In every country in the world, agricultural production is given priority. Nowadays in Ukraine it is the leading sector of the economy, providing the population with food, foreign exchange earnings, and hence the life of the state as a whole.

Agricultural production is diversified (it includes agriculture and animal husbandry) and requires a wide variety of meteorological information. Crops in all phases of production are constantly under the weather influence.

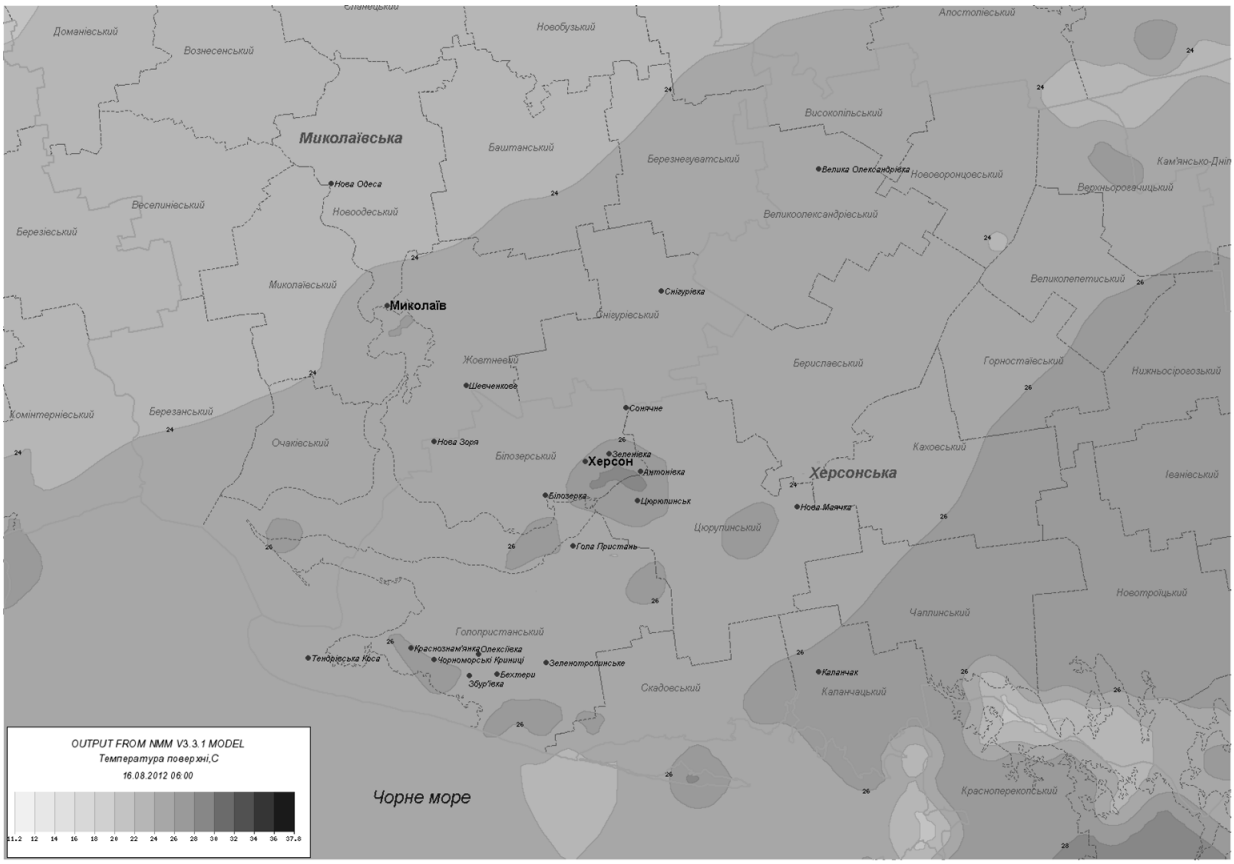

Figure 20. WRF-ARW skin temperature forecast for the area of agriculture activity of company on the south of Ukraine

In the last decade, large agricultural holdings in Ukraine have developed their own ground-based meteorological observation networks (as a rule, these are automatic stations and portable rain gauges). In the planning of agrotechnical measures, data from satellites and aerial drones are being introduced, which make

it possible to assess the state of crops. Considering the results of modeling weather conditions of different time ranges allows calculating the norms and technologies of sowing and planting agricultural crops, types, and agricultural techniques of fertilizing, protecting crops from pests, diseases and weeds. Moreover, the trend is such that gradually the task of forecasting is reduced to a specific field. The example of such forecasts is presented on Fig. 20.

NWP models productions possibility to provision to aviation. Nowadays aviation is represented by a fairly large range of aircrafts. These are passenger liners of international and regional traffic, helicopters of various classes, single-engine aviation for training and transport, agriculture, medical, sports purposes etc.

The influence of meteorological conditions on aircrafts is considered separately depending on the phase of the flight: takeoff, landing, and flight at altitudes. During take-off and landing difficult conditions are characterized by limited visibility and low cloud base, and hazardous weather phenomena such as thunderstorms, hail, squalls, heavy rainfall and vertical wind shear. In cold part of the year, heavy snowfall, ice deposits and fog can disrupt of work of airports. When flying at altitudes, the greatest danger is created by thunderstorms, turbulence and aircrafts icing.

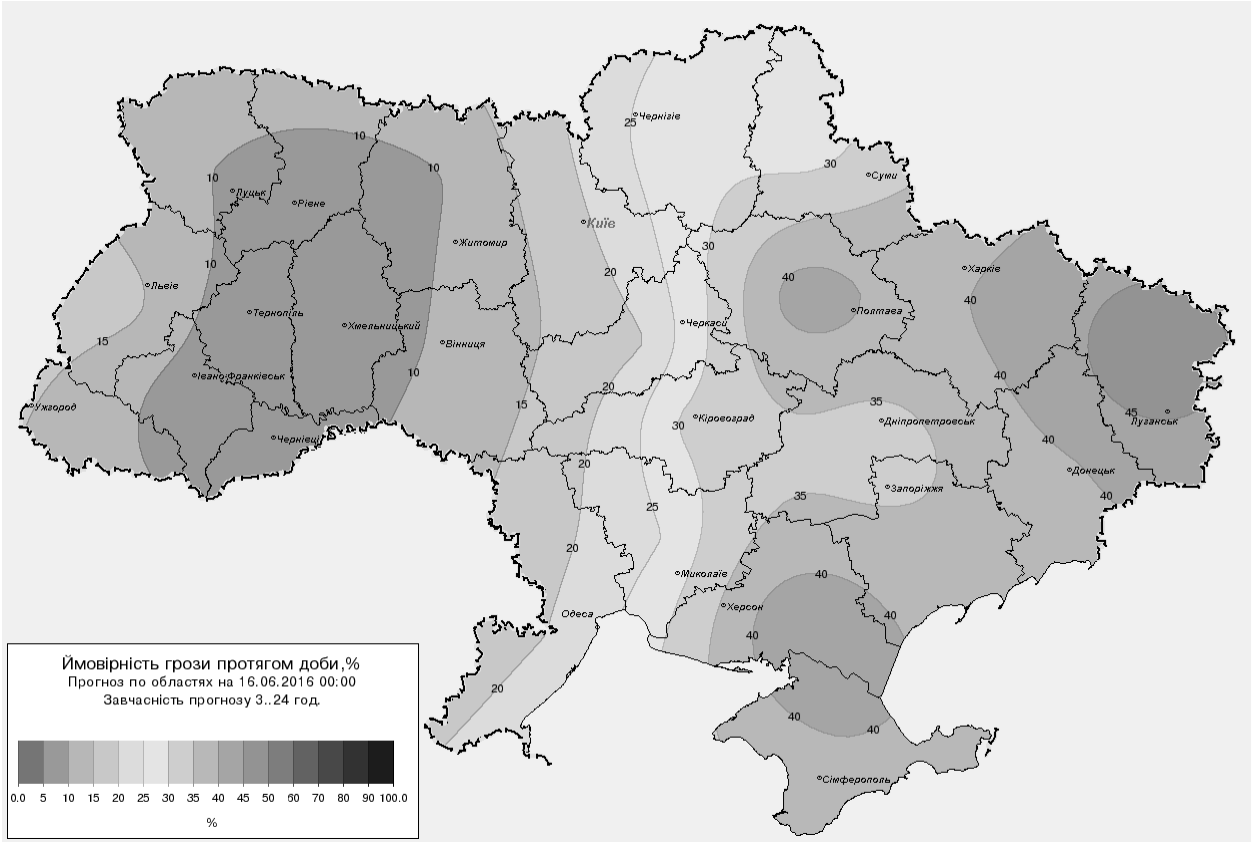

Figure 21. Predicted thunderstorm probability on the territory of Ukraine on 1st day of forecast (16 Jun 2016)

Forecasts of weather conditions at airports on the territory of Ukraine (both near the Earth surface and at altitudes) are carried out using the basic model (WRF), which was discussed above.

Forecasts of weather conditions at airports on the territory of Ukraine (both near the Earth surface and at altitudes) are carried out using the basic model (WRF), this was described above. Prediction of atmospheric phenomena is carried out at the post-processing stage or using specially developed models. Let us consider hail forecast and thunderstorm probabilistic forecast below (see Fig. 21-22).

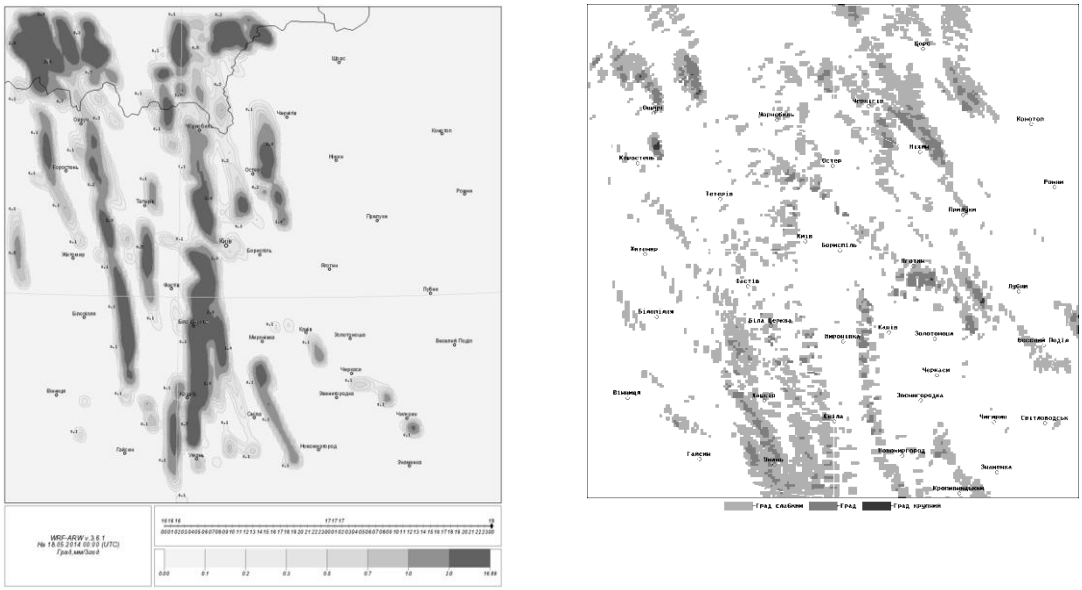

Figure 22. Predicted (left) and observed (right) accumulated hail (20140516+48-h)

The model of thunderstorm probabilistic forecast runs on the stage of post-processing twice per day as the basic NWP model and uses their results as input data. Using the archived data, the forecast skill scores were carried out. It was realized in accordance with [23]. Retrospective forecasts were calculated for each day for the period from 1-st of March to 31-th of October for 2012, 2013 and 2014 years. The duration of the series was 727 forecasts, where 483 were used as a training sample, 244 were used as a control (for the estimation) sample. The threshold was set during the training. Then, as a first approximation, it became possible to conduct estimation as for dichotomous forecasts. Probability of detection (hit rate, POD), false alarm ratio (FAR), critical success index (threat score, CSI) and probability of detection of absence / no phenomena (PON), which was calculated in individual way, were calculated for separated regions and Ukraine as a whole (see Table 32).

Table 32

Average values of thunderstorm forecast skill scores by regions of Ukraine and country as a whole

Region	POD	PON	FAR	CSI
Vinnytsia Oblast	88.9	85.6	48.4	48.5
Volyn Oblast	80.5	78.8	56.6	39.3
Dnipropetrovsk Oblast	75.0	85.2	44.6	46.8
Donetsk Oblast	83.3	85.1	46.2	48.6
Zhytomyr Oblast	89.2	78.3	57.7	40.2
Zakarpattia Oblast	85.2	79.8	41.6	53.1
Zaporizhia Oblast	87.2	81.5	52.8	44.2
Ivano-Frankivsk Oblast	82.7	80.2	46.9	47.8
Kirovohrad Oblast	84.3	86.0	38.6	55.1
Kiev Oblast	85.7	86.1	43.8	51.4
АР Крим	86.4	81.1	40.7	54.3
Luhansk Oblast	90.6	79.7	59.7	38.7
Lviv Oblast	84.4	80.0	40.0	54.0
Mykolaiv Oblast	80.5	85.2	47.6	46.5
Odessa Oblast	92.7	78.3	44.6	53.1
Poltava Oblast	94.1	84.3	50.8	47.8
Rivne Oblast	80.0	74.3	69.6	28.2
Sumy Oblast	76.5	85.2	54.4	40.0
Ternopil Oblast	88.6	78.5	59.2	38.8
Kharkiv Oblast	70.0	89.7	36.4	50.0
Kherson Oblast	84.7	86.5	33.3	59.5
Khmelnytskyi Oblast	87.5	87.3	42.6	53.0
Cherkasy Oblast	89.8	87.7	35.3	60.3
Chernivtsi Oblast	83.0	83.2	45.8	48.8
Chernihiv Oblast	84.8	84.8	43.5	51.3
Ukraine	**84.6**	**82.8**	**47.2**	**47.9**

Results of thunderstorm forecast are available at the link http://accuweather.org.ua/nwp/tstorm/tstorm.html.

Hail is a local phenomenon. Therefore, it is not always observed by the ground-based meteorological network. When modelling hail, individual cases are investigated. In Fig. 2 shows the results of a modeled and observed (with the help of meteorological radar, which is located at the Boryspil International Airport) for the case of hail fall, which had place in May of 2014 on the north of Ukraine. The results obtained indicate good agreement between simulated and observational data and are encouraging.

NWP models productions possibility to provision to heat power industry. In the energy balance of Ukraine, more and more importance is attached to heat power engineering. In large cities, most of the heating of residential premises is carried out by thermal power plants different size. Hence the importance attached

to energy saving strategies is obvious. Special place takes optimal use of weather information for planning purposes and reducing fuel and energy consumption. Nowadays this direction is at the development stage for the Kiev metropolitan area. The first results are published in [17].

NWP models productions possibility to provision to marine transport. Ukraine is sea state. Ukrainian ships carry various cargoes, catch fish and seafood. Gas is being produced in the shelf zone. Wind and roughness determine the behavior of vessels at sea throughout the entire route.

In Ukraine on the base of the functioning WRF complex, system of the sea waves forecasting was developed by means the adaptation of SWAN (Simulating WAves Nearshore) model for the Azov and Black seas (see Fig. 4). Since 2010 this system was in operational mode for the informational support of marine forecasting in the whole Azov-Black Sea basin and in the Azov Sea alone with better spatial resolution. Since the end of 2017, the system was adapted for the detailed calculation of the prognostic sea waves maps of the Kerch Strait and the North-Western shelf of the Black Sea, in particular in the area of Odessa Gulf and the Dnieper-Bug estuary. Technology of nested grids is used for this purpose [21].

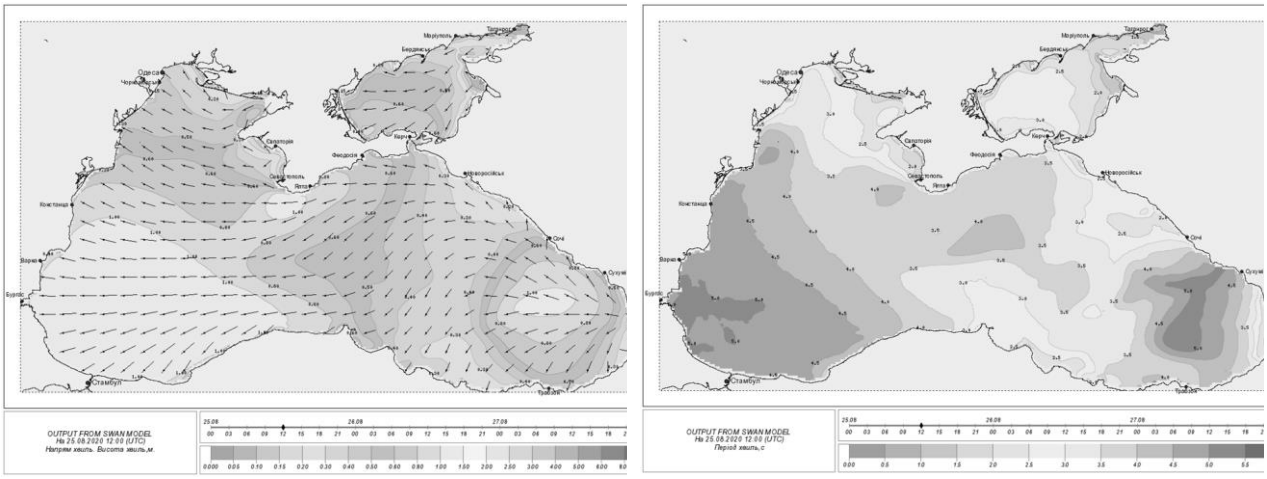

Figure 23. Waves direction and height (left) and theirs period (right) at 1200 UTC 25 Aug 2020. Shown is the 0000 UTC + 12-h WRF-SWAN complex forecast.

NWP models productions possibility to provision to railway transport. Rail transport is an extremely wide and complex sector of the economy of Ukraine that is constantly dependent on weather conditions. Despite the introduction of modern mechanisms into practice, he became even more dependent on meteorological conditions. Due to the relatively high speeds of the track and the trains during the day, they can be subject to sharp changes in the weather.

The most difficult working conditions are observed in winter. Snowfalls and blizzards on railway tracks force to reduce the speed of movement, and at large junction stations prevent the normal rhythm of the formation of trains. On

electrified sections of railway tracks, in addition to blizzard conditions, a particular danger is caused by wet snow falling with a subsequent decrease in air temperature.

The air temperature has a great influence on the operation of railways, especially on the continuous-welded track. To buy unfavorable and often dangerous weather conditions include ice and frost deposits, fogs, as well as precipitation that impairs visibility and lead to reduce train speed. Long-term precipitations and heavy rains form landslides on the slopes of the roadbed, creating the danger of its erosion.

At this time, such systems were not developed in the Ukraine.

NWP models productions possibility to provision to road transport. In the Ukrainian economy, road transport occupies an important place. It is the main link between other transport systems (railway, marine, etc.). Various types of passenger and cargo vehicles are widely used. However, the transport of goods plays a major role in the economic importance of road transport.

Meteorological conditions affect not only the process of transporting goods, but also for all road-construction work. Modern road maintenance is characterized by heavy loads on the road surface. Changes in temperature, wind speed and direction, and rainfall have a profound effect on road conditions. Ice deposits on roads are a direct threat to vehicles. Fog also makes traffic more difficult.

At present time, there is no experience with such meteorological support using numerical models. But if necessary, a system for forecasting temperature, wind speed, precipitation and a number of unfavorable atmospheric phenomena can be created within several years for roads of state and regional significance.

NWP models productions possibility to provision to energetics. Energetics is an important sector of the country's economy. It represents a complex that includes the receipt, transfer, transformation and use of various types of energy and energy resources. The power industry unites the systems of electrical and thermal supply, oil and gas supply, coal supply, green energy and nuclear power systems. The variety of activities in each system requires selective and extensive meteorological support.

Two groups of meteorological parameters can be distinguished in the entire set of specialized power supply. The first group of parameters affecting power generation. It includes incoming solar energy and wind speed. The second group of parameters affecting energy consumption. The electricity consumer's regime largely depends on the air temperature and natural illumination considered for a specific region of the country, as well as on the need for this type of energy resources of enterprises and the population.

In the cold season a forecasts of ice deposits and wind speed are required, and thunderstorm forecasts are required in summer. Ice and frost deposits on the wires, accompanied by strong winds, can lead to wire breakage and breakage of the supports. This must also be taken into account in cases of wet snow falling with following decrease of temperature. Early warning of thunderstorms is of great importance, which allows to switch to thunderstorm mode, start the protective measures provided for by it and thus significantly reduce losses. To plan the mode of electricity consumption, forecasts of the daily average values of air temperature and cloud cover and similar actual values for the past day in various regions of the country are required. These aspects are especially important given the fact that the electricity market has been launched in Ukraine.

In the world among other directions renewable energy is actively developing, including in the Ukraine. Thorough analyze of the impacts of adopting weather forecast model at different levels of the decision-making hierarchy of the power grid was carried out in [24]. Here authors shown that state-of-the-art numerical weather prediction (NWP) models can provide high-precision forecasts and uncertainty information that can significantly enhance the performance of planning, scheduling, energy management, and feedback control systems. In [24] it was obtained a few important conclusions:

- the relative operating costs decay quickly to zero as the forecast horizon is increased;
- for a purely reactive strategy (1 hr), the relative costs can go as high as 300%;
- the close-to-optimal costs can be obtained with a relatively short forecasts (1-14 days);
- the economic penalty of using a forecast of one day is just an increase of 10% in relative costs, whereas the penalty for a forecast of 12 hr goes up to 31%.

More and more NWP models are becoming as the base for power generation forecasting systems for wind and solar farms [25-27]. NWP models allow providing of sensitivity simulations of sea breeze [28].

It is really possible to realize for any regions of the Ukraine both solar and wind forecast of power generation. But this is only possible in the case of two-way cooperation since the energy production in different systems can be very different. The example of short-wave solar radiation is shown on Fig. 24.

NWP models productions possibility to provision to water management and supply. Currently the several systems have been created, but they are focused on the tasks of hydrological forecasting (flow and levels of water, floods). A system is being created that will make it possible to predict the inflow of water into the Dniester reservoir.

The most important characteristic of such systems, primarily from a practical point of view, is the ability to predict heavy precipitation and, as a consequence, the formation of dangerous floods. In order to demonstrate the fundamental capabilities of the WRF-ARW, below the results of comparison and modelling data (see Fig. 25) are presented, for 23-th of June 2010, when in the basin of the Dnister river flood was observed.

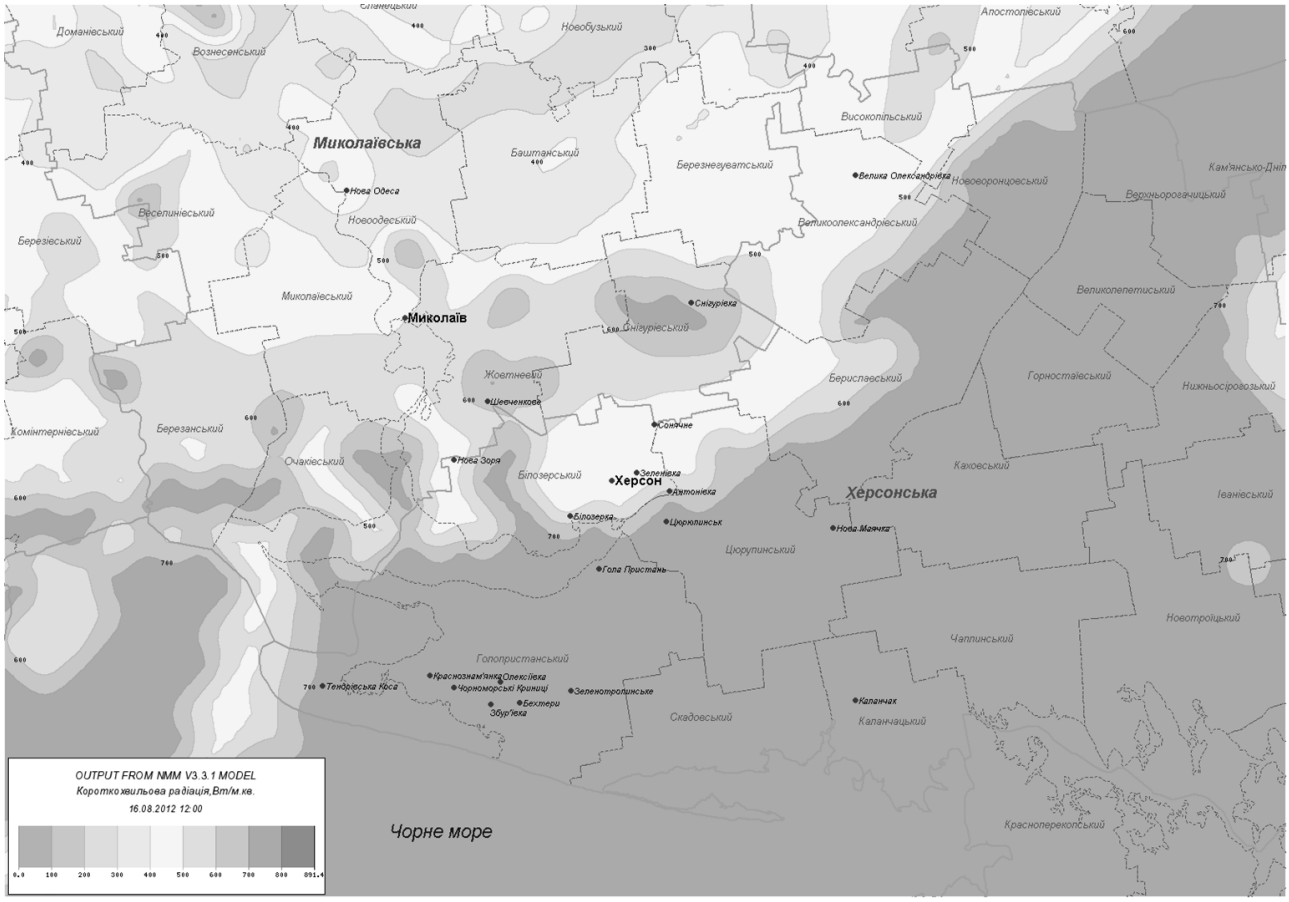

Figure 24. WRF-ARW short-wave solar radiation forecast for the area of agriculture activity of company on the south of Ukraine

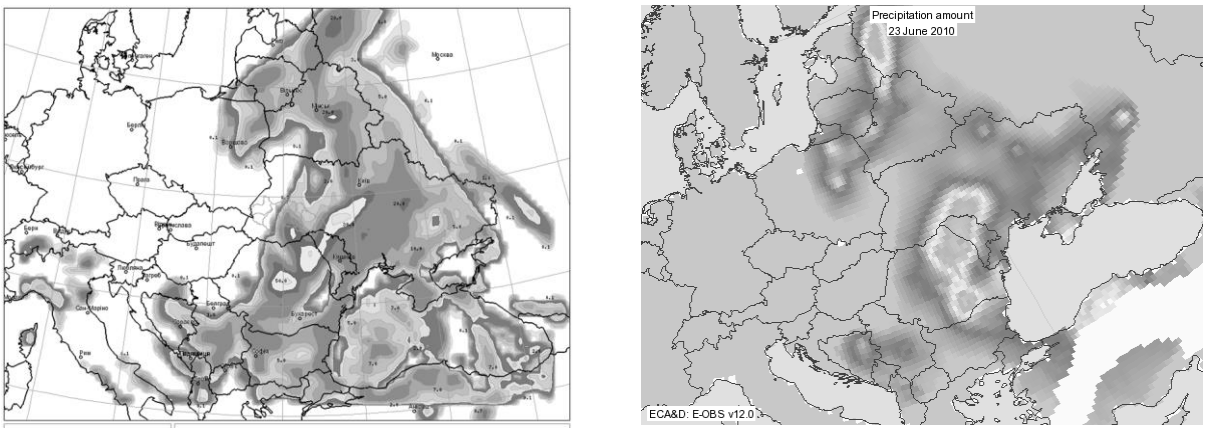

Figure 25. Predicted (left) and observed (right) precipitation (20100623+24-h)

For the comparison gridded data from the European Climate Assessment & Dataset were used. These data are used widely in many studies. The principles and methods of obtaining spatial information about temperature and precipitation are described in [29-31].

Overall, the WRF-ARW provides good agreement between the predicted and observed precipitation fields. In cases of heavy frontal precipitation, the model correctly predicts not only the general configuration of the field, but also identifies the centers of heavy precipitation.

Conclusion. NWP models are effective tool in weather forecasting tasks at different temporal and spatial scales. Their using significantly speeds up and simplifies the process of creating a variety of information for a wide range of users, which also does not depend on the well-being of the forecaster. The available experience in the Ukraine and the accuracy of the NWP models, which are used, allow meeting the requirements of consumers in many sectors of the Ukrainian economy.

REFERENCES

1. Kalnay, E. (2003). Atmospheric modelling, data assimilation and predictability. New York, USA: Cambridge University Press, 341 p. DOI: https://doi.org/10.1256/00359000360683511
2. Prusov, V.A., Doroshenko, A.Yu. (2006). Fizychni i matematychni modeli, chysel′ni metody analizu i prohnozu pryrodnykh ta tekhnohennykh protsesiv v atmosferi [Physical and mathematical models, numerical methods of analysis and forecast of natural and technogenic processes in atmosphere]: monograph. Kyiv, Ukraine: Vydavnytstvo Naukova Dumka, 542 p.
3. Prusov, V.A., Doroshenko, A.Y. (2016) Hydrodynamic Modeling of Industrial Pollutants Spreading in Atmosphere. [In: Bátkai A., Csomós P., Faragó I., Horányi A., Szépszó G. (eds) Mathematical Problems in Meteorological Modelling. Mathematics in Industry]: monograph. Springer International Publishing. DOI: https://doi.org/10.1007/978-3-319-40157-7_6
4. Prusov, V., Doroshenko, A. (2018). Computational techniques for modeling atmospheric processes. Hershey, USA: IGI Global, 460 p.
5. Prusov, V.A., Doroshenko, A.Yu. (2020). An efficient computational method for mesoscale weather forecasting. *Reports of the National Academy of Sciences of Ukraine.* 3, 10-18. DOI: https://doi.org/10.15407/dopovidi2020.03.010
6. Pirnach, G.M. (2008). Chysel′ne modelyuvannya khmar ta opadiv u systemakh atmosfernykh frontiv [Numerical modelling of clouds and precipitation in atmospheric fronts systems]. Kyiv, Ukraine: Vydavnytstvo Nika-Center, 295 p.
7. Powers, J. G., and Co-authors (2017). The Weather Research and Forecasting Model: Overview, System Efforts, and Future Directions. *Bull.*

Amer. Meteor. Soc., 98, 1717-1737. DOI: https://doi.org/10.1175/BAMS-D-15-00308.1

8. Shpyg, V.M. (2014). Tochnist′ prohnozu termodynamichnykh meteorolohichnykh velychyn i opadiv v umovakh hirs′koyi mistsevosti za hidrostatychnoyu ta nehidrostatychnoyu chysel′nymy atmosfernymy mezomasshtabnymy modelyamy [The accuracy of forecast of the thermodynamic meteorological parameters and precipitation in mountainous terrain by hydrostatic and non-hydrostatic mesoscale atmospheric numerical models]. *Physical geography and geomorphology*, 4(76), 117-136.
9. Baldauf, M., Seifert, A., Förstner, J., Majewski, D., Raschendorfer, M., and Reinhardt, T. (2011). Operational Convective-Scale Numerical Weather Prediction with the COSMO Model: Description and Sensitivities. *Mon. Wea. Rev.*, 139, 3887-3905. DOI: https://doi.org/10.1175/MWR-D-10-05013.1
10. Kücken, M., Hauffe, D., and Österle, H. (2012). A High-Resolution Simulation of the Year 2003 for Germany Using the Regional Model COSMO. *J. Appl. Meteor. Climatol.*, 51, 1889-1903. DOI: https://doi.org/10.1175/JAMC-D-11-0186.1
11. Shpyg, V., Budak, I., Pishniak, D., Poperechnyi, P. (18-19 November 2013). The Application of Regional NWP Models to Operational Weather Forecasting in Ukraine. Materials of the CAS Technical Conference (TECO) of the World Meteorological Organization [Responding to the Environmental Stressors of the 21st Century] (Turkey). Retrieved from: http://www.wmo.int/pages/prog/arep/cas/documents/Ukraine-NWPModels.pdf (Last accessed: 25.08.2020)
12. Shpyg, V., Budak, I. (24-26 June 2015). WRF reflectivity simulation and verification of thunderstorm forecast by radar and surface observation. Proceedings of the 16th International Radar Symposium (Germany), P. 610-615. DOI: 10.1109/IRS.2015.7226388
13. Katsalova, L.M., Shpyg, V.M. (2016). The choice of optimal lag for Kriging interpolation of NWP model forecast. *Meteorology, Hydrology and Water Management*, 4(2), 23-28. DOI: https://doi.org/10.26491/mhwm/64292
14. Ivus, G.P., Pishniak, D.V., Shpyg, V.M. (2010). Estimation of the restoration of the atmospheric state during the cold fronts moving in the WRF ARW model [Otsenka vosstanovlenia sostoyaniya atmosfery pri prokhozhdenii kholodnykh frontov v modeli WRF ARW]. *Bulletin of the Odessa State Environmental University*, 9, 92-102.
15. Pishniak, D.V., Ivus, G.P., Shpyg, V.M., Budak, I.V. (2010). Calculation of the available potential energy based on the data of the regional atmospheric model WRF-ARW [Raschet dostupnoy potentsial'noy energii na osnove dannykh regional'noy modeli atmosfery WRF-ARW]. *Ukrainian Hydrometeorological Journal*, 6, 130-137.

16. Osadchy, V.I., Voloshchuk, V.M., Prusov, V.A., Budak, I.V., Shpyg, V.M., Kryvobok, O.A., Skrynyk, O.Y. (2015). Operational emergency response system for accident atmospheric emissions [Systema operatyvnoho reahuvannya na avariyni vykydy shkidlyvykh domishok v atmosferu]. *Proceedings of Ukrainian Hydrometeorological Institute*, 267, 3-8.
17. Prusov, V.A., Doroshenko, A.Yu., Sologub, T.A. (2019). Atmospheric processes in elements of urban construction [Atmosfernyye protsessy v elementakh gorodskoy zastroyki]. *Cybernetics And Systems Analysis,* 55(1), 106-126.
18. The report defined affected by natural disaster as those people who for a time either lost their home, animals, their crops, their livelihoods, or their health as a result of a natural disaster // UN/ISDR. – 2003.
19. Sivakumar Mannava V.K. Natural Disasters and Extreme Events in Agriculture / [Ed. by Mannava V.K. Sivakumar., Raymond P. Motha, Haripada P. Das.] – Springer: Berlin Heidelberg – New York, 2005. – 367 p.
20. Shevchenko, O.G., Snizhko, S.I., Vitrenko, A.O. (2019). Ekonomichna meteorolohiya [Economic meteorology]: monograph. Vydavnytstvo Maister knyg, 352 p.
21. Osadchiy, V.I., Fomin, V.V., Ilyin, Y.P., Budak, I.V., Shpyg, V.M. (2019). Operatyvna systema prohnozu mors′koho khvylyuvannya u pryberezhniy smuzi Azovs′koho ta Chornoho moriv [Operational system of marine waves forecasting for the Azov and Black seas coastal zone]: in monograph "Problems of hydrology, hydrochemistry and hydro ecology". Kyiv, Ukraine: Vydavnytstvo Nika-Center, 116-121 p.
22. Skrynyk, O., Voloshchuk, V., Budak, I., Bubin, S. (2019). Regional HYSPLIT simulation of atmospheric transport and deposition of the Chernobyl 137Cs releases. *Atmospheric Pollution Research*. 10(6), 1953-1963. DOI: https://doi.org/10.1016/j.apr.2019.09.001
23. Recommendations for the verification and intercomparison of QPFs and PQPFs from Operational NWP Models (2009). *WMO TD No. 1485*, 37 p.
24. Zavala, V. M., Constantinescu, E., Anitescu, M. (2010). Economic impacts of advanced weather forecasting on energy system operations. Proceedings of the Conference Innovative Smart Grid Technologies (ISGT). DOI: 10.1109/ISGT.2010.5434772
25. Deppe, A. J., Gallus, W. A., Takle, E. S. (2013). A WRF Ensemble for Improved Wind Speed Forecasts at Turbine Height. *Wea. Forecasting*, 28, 212-228. DOI: https://doi.org/10.1175/WAF-D-11-00112.1
26. Ji-Hang, Li, Zhen-Hai, Guo, Hui-Jun, Wang. (2014). Analysis of Wind Power Assessment Based on the WRF Model. *Atmospheric and Oceanic Science Letters*, 7(2), 126-131. DOI: 10.3878/j.issn.1674-2834.13.0078
27. Mehrens, A. R., and von Bremen, L. (2016). On the correlation of spatial wind speed and solar irradiance variability above the North Sea. *Adv. Sci. Res.*, 13, 57-61. DOI: https://doi.org/10.5194/asr-13-57-2016

28. Steele, C. J., Dorling, S. R., von Glasow, R., Bacon, J. (2013). Idealized WRF model sensitivity simulations of sea breeze types and their effects on offshore windfields. *Atmos. Chem. Phys.*, 13, 443-461. DOI: https://doi.org/10.5194/acp-13-443-2013
29. Haylock, M.R., Hofstra, N., Klein Tank, A.M.G., Klok, E.J., Jones, P.D., New, M. (2008). A European daily high-resolution gridded data set of surface temperature and precipitation for 1950-2006. *J. Geophys. Res.*, 113, D20119. DOI:10.1029/2008JD010201
30. Hofstra, N., Haylock, M., New, M., Jones, P.D. (2009). Testing E-OBS European high-resolution gridded dataset of daily precipitation and surface temperature. *J. Geophys. Res.*, 114, D21101. DOI:10.1029/2009JD011799
31. van den Besselaar, E.J.M., Klein Tank, A.M.G., Buishand, T.A. (2013). Trends in European precipitation extremes over 1951-2010. *International Journal of Climatology*, 33(12), 2682-2689. DOI:10.1002/joc.3619

13. An Increase of Efficiency of IT-projects Management on the Basis of Model of Development of Professional Competence of Staff

Serhii Poida
PhD of Pedagogical Sciences,
Senior Lecturer of Department of Management and Administration
KVNZ "Vinnytsia Academy of Continuing Education",Vinnytsia, Ukraine
E-mail: serj.pojda@gmail.com
ORCID ID0000-0001-9895-0220

Tetiana Halych
PhD of Pedagogical Sciences,
Associated professor of Department of Filology and Humanitarian science
KVNZ "Vinnytsia Academy of Continuing Education",Vinnytsia, Ukraine
E-mail: galich070@gmail.com
ORCID ID 0000-0002-0471-4671

Introduction. Modern society more and more depends on software, developing by companies which are working in industry of information technologies (IT). Life quality both in Ukraine and in the whole world depends on the quality of such new software. Appearing of new software products, creation and updating, supporting of existent additions, services and resources of network the Internet is vitally necessary. Quality of development of software products, their possibility and absence of problems in use depend on the level of qualification of personnel which develops them. Accordingly, IT-companies try to enlist the best specialists. Thus, on the basis of experience, it is possible to assert that modern developers, mainly, work on one job from 9 months to year. Whereupon they get invitation on more high-paying work and abandon a company.

Invitation of graduating students of technical professions of higher education establishments for development of software products is a solution in such situation. However, their level of knowledge and abilities often is insufficient, that becomes a barrier for their employment. To estimate possibilities of such young developers (capacity, self education ability, skills and so on) large IT-companies take them with a trial period and give an opportunity to participate in development of some project under surveillance of experienced engineers-programmers. Such approach gives an opportunity to reveal deserving pretenders, provide a company in the future by loyal workers and to economize time and money on recruiting of new workers.

Thus, one of major positions of IT-company occupies from Human Resources Managers (HR-managers). Their task consists of not only to find and take away new workers but also to look after personal professional development of every developer, who works in a company, offer to him or her ways and directions

of professional increase. Every developer has to study constantly to be competition solvent, because all material and non-material welfare which an IT-company provides him or her will depend on his or her knowledge and abilities.

Another aspect that influences on the timeliness of appearance and quality of worked out programmatic providing is: how IT-companies manage a development of such software process. The companies of developers of software spare considerable attention to the management of IT-projects. The most high-paying positions in IT-companies have leaders and managers of projects. In fact exactly from their work depends as far and as qualitatively and as in time the update version of software, the internet service or resource will appear. This substantially influences on success of company that is expressed in the level of her profit.

Literature review. The results of work of IT-companies usually are software, internet-services and resources. The process of development of such additions, services and resources actually, their result, will name projects. The important aspect of project realization is its life cycle - a period of time from the beginning of its financing to closing. A life cycle is determined by three basic stages: 1) pre-investment (scientifically-project preparation) - from previous researches to the acceptance of final administrative decision about the necessity of investing; 2) investment (realization of the real investing) is planning, entering into contracts, building of objects; 3) operating is industrial and economic activity of enterprise [1, p. 15-16.].

The scientists [1, c.63-64] pointed that the «main normative document, which regulates the structure of life cycle processes, is an International Standard of ISO/IEC 12207: 1995 «Information Technology - Software Life Cycle Processing» and The State Standard of Ukraine ДСТУ 3918-99 «Information technologies» which corresponds to it. Among other important standards that determine the processes of management IT projects, it is possible to distinguish: IEEE 1540: Standard of Software Risk Management; IEEE 1517: Standard of Software Reuse Processes; ISO/IEC 15939: Standard of Software Measurement Process.

Thus an IT-project goes some phases: origin and research of idea, analysis of requirements of planning, directly coding, test and adjusting, introduction of the program in an action, exploitation and accompaniment, withdrawal from exploitation. Depending on the selected model of life cycle of IT-project, these phases can be broken on a few component parts or vice versa can be unite. The model of life cycle of IT-project describes the succession of performers' operations. Such sequence can be both linear and nonlinear, as phases can be executed consistently, or in parallel. The «models of life cycle of IT of projects determine the general stages of software development. They are concentrated on basic works and their mutual relations. Models must take into account the specific of industry of information technologies that are characterized by the high level of vagueness and emergency dynamic» [2, c.63-64].

Realization of projects in IT-industry execute by using of the specialized technologies of management projects. Researchers assert that «in a management IT-projects distinguish the cascade and iterative models of development of SOFTWARE processes. Cascade working out or Waterfall model is the model of software when development process looks like a flow of process and passes the phases of analysis of requirements, planning (analysis and design), realization (Implementation), testing, integration and support (Deployment) consistently. The problem of use of this model is that every change of requirements forces to go back to the phase of determination of requirements and repeat all processes from the beginning. In addition, this model has limited possibilities of estimation and adjustment of important attributes of project as speeds of development, quality of product (adequately estimate them adequately becomes possible only on late implementation of project phases)» [3, c. 24].

The alternative of cascade method of management of projects is the flexible method. In scientific literature it got the name of Agiles method. In scientists opinion [4, p. 35], it «is used as effective practice of organization of work of small groups (what do homogeneous creative work) in combination with a management by them by the combined (liberal and democratic) method». A management projects on the basis of flexible ideology comes true on the basis of Agile Manifesto [5] - to the Manifest of flexible methodology of software development. Its basic ideas are: people and cooperation are more important than processes and instruments; working product is more important than exhaustive documentation; collaboration with a customer is more important than concordance of terms of contract; readiness to the changes is more important than observance of initial plan. Methods which are built on the basis of Agile are characterized by large variety as for example, SCRUM, KanBan, RAD and Lean.

Beginning of planning of project in accordance with SCRUM- technology occurs with meeting of all interested parties. During such a meeting a customer formulates his vision of result of project realization and expounds the wishes. The further actions of team of developers are planning as 2-4 week's sprints during which every participant of project executes his or her tasks. After each every sprint command introduce intermediate job performance of a project, to a customer and specifies a task together with him. The process of work is represented by colored stikers with a help of SCRUM-board. SCRUM-board is usually divided into 3 parts, they are: «pre-arranged», «in the process of implementation» and «executed» [6].

Methodology of management of KanBan projects is a complex decision in relation to the uncompleted work. As noticed Lee Mean, «KanBan gives priority to the uncompleted works (WIP), limiting their volume, to effectively answer the command possibilities. As a task will be completed, a command can take the next point. Thus, the process of development has greater priority in planning, more rapid turnover, clear aims and transparency. Such companies, as Spotify and Wooga successfully use this approach during many years. However the 43% of

organizations combine Scrum from KanBan, using rather Scrumban than original methodology» [7, p. 104].

Researchers assert [7, p. 35] that methodology of management of the RAD (Rapid Application Development) projects, consists of sparing the special attention on speed and comfort of programming, on creation of technological process that assists the acceleration of realization of project. «RAD technology means the active participating of the customer on the early stages such as an inspection of organization, making of system requirements. The last of the indicated characteristics means complete implementation of customer requirements as functional, as not functional, taking into account their possible changes in the period of development of the system, and also receipt of quality documentation that provides the comfort of exploitation and accompaniment of the system» [7, p. 35].

No less important in IT-projects management is the use of method of LEAN . In Lee Mean opinion, the «Toyota» company was the first in the establishment of this approach. Industrial system, as an administrative approach is directing to «deliver the transport vehicles, booked by clients, the most rapid and the most effective way, as quickly as possible». Application of LEAN principles to software development was first entered by Mary and Tom Poppendick in their book «LEAN Software Development: Agile Toolkit». A team, which follows LEAN has no limits of use of any formal processes, such as the repeated meeting or priority of tasks. However his principles often combine with other Agile methods: 21% of teams combine SCRUM with LEAN» [7, p. 104-105].

Realization of IT-project also depends on the correct selection of personnel. That's why, work of specialists on the selection of personnel (Human Resources (HR)) is extraordinarily important. Professional activity of HR specialists begins with determination of necessities of company. Thus important is not only determination of finish good, ways of its realization and others like that, but also clear understanding a company volume of work, which must be executed, and amounts of personnel that is needed for implementation of the indicated volumes of work for set time, and management. Except it, the important is skilled politics of company, which is followed by HR specialists during the selection of personnel.

A. Grytsay notices that «personnel politics of enterprise is general personnel work of organization assignment, system of principles, methods, forms and organizational mechanism of aims determination and tasks for creation, maintenance and development of personnel potential; the valued reference-points, procedures, methods of personnel estimations, necessary for the achievement of long-term strategic aims of development of organization and realization of its mission in the modern conditions of economy development» (A.Grytsay, 2014) [8, p.149].

At the same time it is necessary to remember, that forming of personnel politics of IT-company has its own features. First of all, personnel potential is the main capital of IT companies, unlike commodity producers. Staff of IT-company

differs from other companies because of its high level of education and competitiveness. For an IT-company it is important not only personnel selection, which will execute basic work. Exceptionally important is a selection of HR-manager who will manages to select personnel correctly. O.Orlova determines such basic requirements to the specialist that will hold a position of HR-manager. HR-manager has to know the specifics of IT-market; oriented in IT-professions (ERP-programmer, HTML- imposer, administrator of data, administrator of web-site, analyst, business-analyst, web-designer, web-programmer, imposer, consultant from ERP-systems, content-manager, sale-manager, Internet-projects manager, programmer, programmer of 1C, editor of web-sites, system administrator, system analyst, specialist from informative safety, scenario writer of computer games, tester of software), to understand that department needs such a specialist; must be able to work with plenty of vacancies in parallel and to analyse plenty of information; to plan campaigns of the selection of personnel; to own the methods of search and selection (direct search, head hunting); to apply the methods of the primary controlled from distance estimation and motivation during consideration of resume; able to conduct interview with application and tests.

At the same time, Yu.Masiuk notices that «one of the mostly used indexes of efficiency of work of department of personnel is staff fluidity. The high level of it is interpreted as an unfavorable factor. In fact in companies with a large productive block, fluidity must be necessarily but if its indexes (up-diffused on working positions) are within the limits of the norm for every position» [9, p. 315]. Absence of career possibility, or insufficient level of qualification of workers, can become one of the reason of such stuff fluidity, as a result, they cannot participate in other projects of company. Researcher [9] specifies that, average term of working on one workplace for workers of IT- industry is about 9-12 months. Thus, the important aspect of HR service is understanding not only places, which one or another worker can occupy in a company but also their potential of personal, quarry and professional increase in a company. In fact the incorrect estimation of potential of worker can become a reason of the considerable financial losses, but underestimation can be a reason of the loss of worker.

Thus, researchers notice that it is possible to distinguish some basic tasks of HR-services, which is constrained from: stabilizing of skilled potential of personnel (satisfaction of requirement of stuff (placing, advancement), co-ordination of stuff behavior (discipline, fluidity, responsibility), adaptation of new workers (employment and maintenance of workplaces); studies of personnel (providing of permanent studies, (courses, seminars, training), forming of effective style of management); development of skilled potential (upgrading of evaluation of workers (leasing of personnel), forming of skilled reserve (marketing of personnel), improvement of working conditions through studies and self-training of personnel [10, p. 73].

Studying different ways of evaluation of IT-specialists K.Vodolazkina [11] determines the positions generally accepted in IT according to the levels of Junior,

Middle and Senior and determines criteria of their classification on the level of general requirements, features of work and additional requirements to work for different positions of developers of WEB-additions in IT-company. Such classification gives an opportunity to the worker to understand the necessity and sequence of steps for the achievement of next qualification level, and for HR they are criteria for determination of workers achievements their level of qualification and the way to point them the direction for self-development, which will promote to the quarry increase. Thus, if workers of Middle and Senior positions already have skills of self-education, workers of Junior position need additional guidance in this question.

As practice, knowledge and ability of graduating students of high educational establishments are not always coincide with the necessities of modern IT-companies. Thus, on Junior level they accept only with an experience of not less than 3 months on the certain work assignment. That's why during their studies in higher technical institutions, students try to get on practice to the IT-companies, where they not so much make programs, as practice in skill of self-education. They have an enormous list of literature to their services. Important for them is the knowledge of technical English, as translation of special foreign literature appears in Ukrainian and Russian languages much more later and data of even quite new book, to the moment of its printing can become antiquated. The same is with various on-line courses.

The biggest suppliers of knowledge in the Internet network are providers of swift courses of Cursera, Udemy, Udacity. These services integrate everything the best of distance educational courses of the best western universities. Mainly all such courses go through the format of MOOC. It is possible to find IT-courses adapted to the Ukrainian and Russian languages, on Prometheus (https://prometheus.org.ua/) and Stepic (https://welcome.stepik.org/ru).

Mentorness is the widespread method of teaching in large IT-companies. Another ways of teaching for the workers of IT-companies there are revision and record of own YouTube short films, communication on the specialized forums, groups in social networks. As the examples of such specialized groups in Facebook it is possible to name «C/C++ Programming Language Group For Start ups» (https://www.facebook.com/groups/2468334190047290/), «C, C++,C#, Java, SQL, VB.net, Python, MVC, Swift, Android, web of Programming» (https://www.facebook.com/groups/prog11/), C++» (https://www.facebook.com/groups/ standardcpp/) where, they examine the serious questions of programming, and also it is possible to ask question and, often, get an answer. The important aspect of personality professional increase of specialists of IT-sphere can become studies in the specialized educational organizations (academies) created by large IT-corporations - Google, Microsoft, Cisco, whose programmatic and vehicle providing workers use, or for whom software is developed. Usually, such IT-academies offer their students possibility of certification.

D.Buchynska notices that passing of certification in IT-academies gives the worker of IT-sphere follow possibilities: «55% leaders examine the presence of certificate, as a criterion for hiring; 46% leaders look at the presence of certification as criterion for advancement of employee; 63% leaders are realized, that the certificated employees are more productive for the uncertificated colleagues; 40% declared that the certification of Microsoft played a key role at the search of new work, keep of existing work or at advancement; 43% of the polled got the increases of salary as a result of certification of Microsoft; 53% of the polled seems, that a certification promotes their value at the work market; 93% declared, that became more expert in additions of Office as a result of certification; on 50% become shorter temporal charges on typical tasks in companies that have the certificated employees2 [12].

Results. Results of analysis of such large quantity of flexible technologies of management projects gave an opportunity to build the model of increase of efficiency of management IT-projects on the basis of development of skilled potential of company (pic.1). This model demonstrates the ways of introduction of different technologies of management projects in parallel with professional development of personnel, shows the basic stages of realization of project and the order of their implementation and inter communications between the elements of model.

An offered model demonstrates the process of realization of project of software development. Appearance of new project begins the realization of model. On this stage a leader and manager of project, together with a customer and author create requirement specification, elect the technology of management of project, whereupon a HR-manager elects the workers of company of necessary persons from a list. If the workers of company do not have corresponding professional competenses, a manager does recruiting, searching workers with corresponding competenses out of limits of company. In parallel with it a leader and manager of project, elect technologies of management of the projects and consult the workers of company according to the features of certain technology of project management. At the same time, the HR-manager determines the educational necessities of workers and offers to them the ways of in-plant training, and also controls their studies and certification.

Mastering certain technology of project management, workers begin realization of project, and a leader and manager of project can estimate the first stage of work on this technology. If the results of implementation of project are unsatisfactory, or technology works wrong, then there is a change of management technology, and education of workers to the features of new technology of management projects repeated. However, reason of failures also can be in the incorrect selection of personnel so it is necessary to check this parameter also. After that the realization of project can continue.

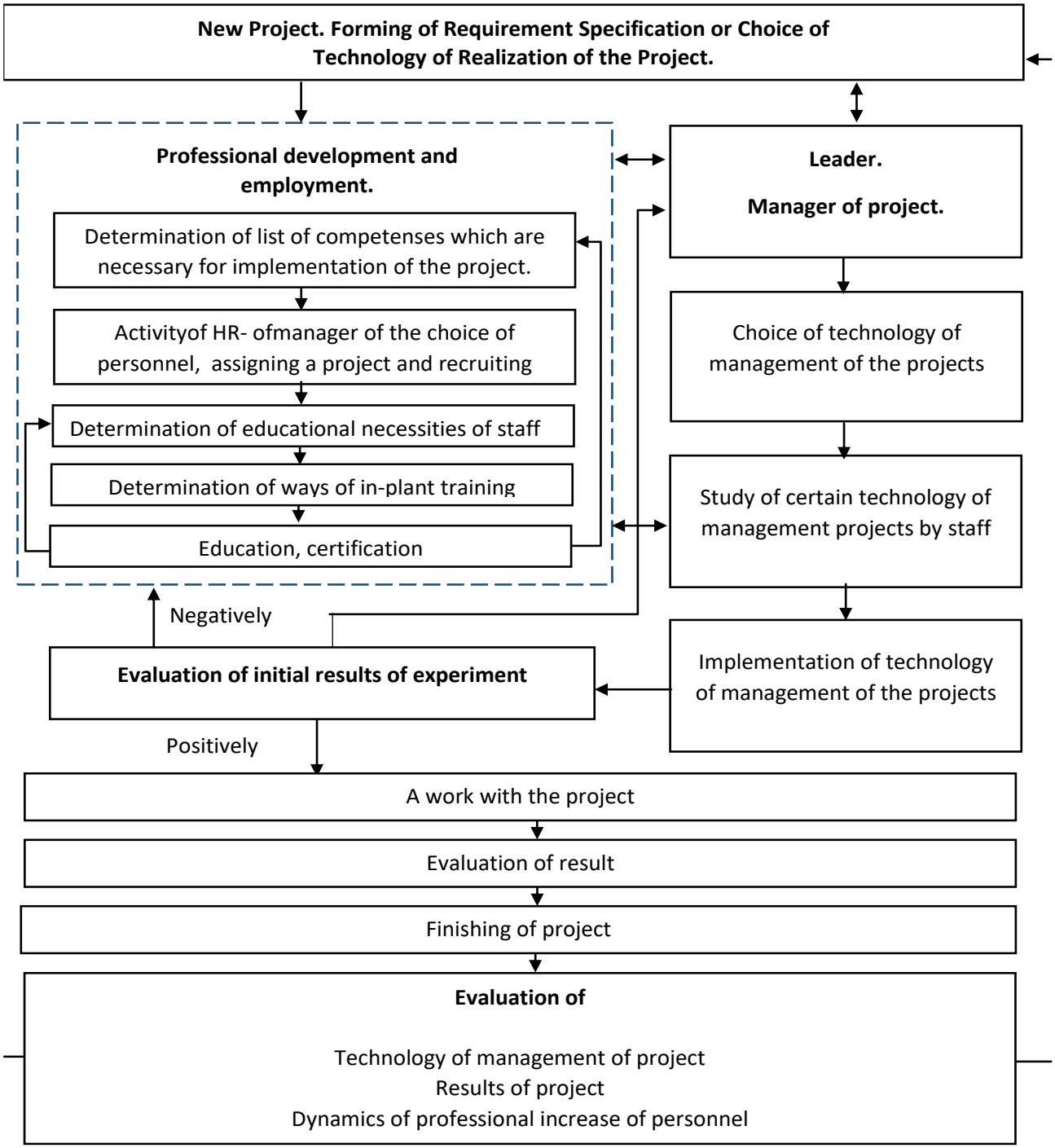

Figure 26. Model of management of IT-projects on the basis of development of skilled potential of the company

After a choice and claim of technology of project management and then there is work on a project, in accordance with select technology. In the process of work there are a permanent evaluation of results and correction until then, while a final product will not appear. On finishing of project the evaluation of technology of project management, results of project, and also dynamics of professional development of personnel is conducted. It is whereupon possible to begin a new project.

An offered model was approved at development of CRM - system for the dental clinics of MagiDent that is realized in a kind of web-addition. MagiDent (https://magi-dent.com) is CRM- system for dental clinics. It allows improve the process of record to the clinic, to organize work, and to do the process of functioning of clinic more transparent. In the system there are three access levels: leader, doctor and an administrator. Each of them has an access to different functional of the system, to provide confidentiality of those or other data, and avoid the leakage of information.

The design of CRM-system is maximally simple and clear that provides a rapid entrance threshold for work with the system. Web-addition loads quickly and processes data that is why the process of introduction of information is maximally simple and rapid. There are four programmers were taken part in development they are:

Maksym (Junior Front - end developer);
Yevhen (Junior Front - end developer);
Vitalij (Middle Front - end developer);
Yevhen (Middle Back - end developer).

For development of the project were taken these people taking into account technologies, with that they work. Soft Skills of workers were also taken into account. Front - end part of addition is realized in language of JavaScript with the use of libraries of React and Redux. All the developers that were selected for development of the project had an experience of working with these libraries and high level of possessing the language of JavaScript. Exactly these criteria were basic during a choice. Also important were abilities to communicate, to perceive criticism calmly and listen to advice of experienced developers. These qualities are owned by each of members of command. In the process of prosecution of the system each of developers was increasing his qualification. Maksym and Yevhen (Junior) studied a course of Front-end development on-line Cursera services and got corresponding certificates and level of Middle Front - end developer. Yevhen and Vitalij (Middle) promoted their qualification by studying English, passed an exam on possession of English of B2 level that gave them an opportunity to increase their levels to Senior Front - end and Back - end developer accordingly. Such increase of levels of workers assisted changes in their payment, acceleration of producing of work and upgrading of the program.

Basic steps in design of software product were:

1. Market analysis and selection of the actual functional.

2. Writing of requirement specification.
3. Choice of technology of project management.
4. Creation of design of addition.
5. Creation of the plan of development (roadmap, exposure of milestone, distribution of the functional in accordance to priority).
6. An analysis of the first results from the point of view of choice of project technology.
7. Directly development of addition:
7.1 Make-up of basic windows of addition (front - end).
7.2 Development of the functional (front - end).
7.3 Creation of architecture of project, development of basic CRUDs (back - end).
7.4 Creation of responses upon requests (back - end).
7.5 Test of project.
7.6 Fix of bugs.
7.7 Deployment of project (back - end).
7.8 Advancement of project (marketing).

Taking into account the level of qualification of workers at the beginning of prosecution of project, manager of project defined such milestones as: Make-up of basic windows of project - 88 hours (the first milestone). Development of functional part of project - 164 hours (the second milestone):

- registration of clinic;
- addition, moving away, editing of profile of employees;
- providing of different access levels;
- addition, moving away, registration of patient, editing of profile, setting of reception;
- addition, moving away, editing of reception with possibility of completion and printing of act of the executed works;
- realization of hospital patient chart with possibility of attachment of necessary file;
- creation of queries;
- creation of curriculum of work of clinic in which appointed receptions are already represented.

Development of additional possibilities of project - 160 hours (the third milestone):

- Possibility of collection of statistical data about work of clinic (analysis of present services in popularity and profitability, analysis of the work executed by doctors in profitability).
- Possibility of printing of act of the executed works on the completed reception with pointing of the rendered services, name of patient, name of doctor, sum of the rendered services, date of grant of services. Notifications about the birthdays of patients.

- Realization of notifications of reminder about a reception, and also greeting with the birthday of patient.
- Connection to API CRM of web site of clinic for fixation and processing of entrance requests from future clients.
- Testing, bug fixing and deployment of the project - 80 hours (the third milestone).

The real time of prosecution of project was 422 hours:

- Make-up of basic windows of project - 78 hours (the first milestone)
- Development of functional part of project - 144 hours (the second milestone)
- Development of additional possibilities of project - 120 hours (the third milestone)
- Test, bug fixing and deployment of the project - 80 hours (the third milestone) - remained unchanging, as independent experts which were invited, have done the test.

Thus, difference between the pre-arranged and real time of realization of project is 70 hours, 14,23% of the economized time. In addition, the economy of salary is 8,2%, comparatively with pre-arranged one. Thus, process of working with the project and its management were realized more effectively, than it was pre-arranged. As during the prosecution of project there were no other changes, except a self-education, exams and certification of personnel, then it is possible to consider that efficiency of realization and management the IT-project of Magi Dent was increased by introduction of IT-projects on the basis of development of skilled potential of the company.

Conclusions. Modern society substantially depends on quality of programmatic providing that is developed by IT-companies. Speed, quality of development, functionality and absence of errors, during exploitation depends on that as guidance of IT-company manages of realization of the projects.

The results of analysis of standards, methods and forms of management of IT-projects show that it is a difficult multidimensional process that consists of the receipt of maximal profit by minimum charges. Thus, software development and control of the process depend on plenty of factors.

In the process of management of IT-project, leaders and managers follow international, branch, local standards of methodologies. The observance of such standards and methodologies does a management of IT-projects more simple, simplifies and standardizes procedures of documenting of results, does transparent the process of making decision and others like that.

One of basic roles in the process of management of IT-projects plays HR-manager. From his or her professional preparation and "intuition" the rightness of selection and recruitment of personnel, form of positive atmosphere in a collective and so on will depend. Except the selection of personnel, which will work with an IT-project, also the search of ways of development, and watching of progress of

professional development of workers of IT-company, are included to his position requirements. From that, how HR-manager will carry out his duties speed of change of skilled composition, quality of implementation of projects and, as a result, profit that will get IT-company depends.

At the same time, a very important constituent, that promotes efficiency of realization and management there is an increase of professional competence of personnel who works on an IT-project. One of basic tasks of HR-manager of the company there are determination and orientation of personnel in relation to the choice of ways of increase of professional competence, and also fixing of dynamics of advancement of these workers in accordance to the certain criteria.

The offered model of improvement of management of IT-projects on the basis of development of skilled potential of company includes two connected aspects of management of IT-project: there are choice and use of corresponding technology of management of IT-project and development of skilled potential of workers of the company. This model demonstrates implementation of project phases and order of their implementation, and also intercommunication of results of project with possibilities which is given by development of personnel of IT-company. The model of management of IT-projects on the basis of development of skilled potential of the company is approved by development of CRM - system for the dental clinics of MagiDent. Use of an offered model in the process of development of real CRM- system showed the increase of efficiency of both development process and process of management of IT-project.

REFERENCES

1. Mihailova O. A. Essence, classification and life cycle of investment projects. *Innovative priorities in development of economy and management*: materials of International research and practice conference of students, 18 of April 2018, 133 p.
2. Datsko M., Semeniv H. Analysis of models of life cycle of projects of industry of information technologies. *Forming of market economy is in Ukraine*. 2008. Vol.18. P.63-69.
3. Vozny A. M., Koshkin K. V., Knyrick N. Imitative simulation of ИІ-projects on the bases of Petry-nets. *Acta of Charkiv Politechnical University.*2015. Vol. 1110, № 1. P. 24-28.
4. Kryzhanovsky Ye. M., Yasholt A.R. Zhukov S.O. Kozachko O.M. Design of business processes and management IT-projects. Vinnytsia National Technical University. 2018. 91 p.
5. Manifesto for Agile Software Development. URL: https://agilemanifesto.org/iso/uk/manifesto.html.
6. Poida S.A., Markovska T.V. Use of SCRUM in planning and management projects the Electronic informative resources: creation, use, access. :

Collection of materials of International research and practice of the Internet conference. To memory of A.M. Petuh. Sumy/Vinnytsia.: 2019. P. 182-187.
7. Lee Mean. Application of flexible (Agile) methodology for implementation of international general scientific projects. Management development of the difficult systems. 2019. Vol.38. P.103-110. http://nbuv.gov.ua/UJRN/Urss_2019_38_18
8. Grytsay A.N. Theory-methodological principles of forming of skilled politics of enterprise. *The Scientific announcer of the Poltava University of economy and trade*. 2014. Vol.63. № 1. P.148-155.
9. Masiuck Yu. Perfection of control system by a personnel and role of HR- of subdivision in the strategic management of enterprises of service business. *Announcer of Lviv University*. *Economics*. 2008. № 39. P. 313-317.
10. Bakalo N. V., Strutska K.O. Efficiency of management of enterprise that carries out foreign economic activity skilled politics. An economy and region. *The scientific announcer of Poltava National Technical University.* 2016. Vol.61. № 6. P. 71-75.
11. Vodolazkina K.O. Automation of analysis of quarry development and support of making decision are in relation to attestation of developers of software. *Journal of Odesa National Academy of Food Technologies.*Vol. 8, Issue 1/2016. P. 50-61. URL: https://journals.onaft.edu.ua/index.php/atbp/article/download/23/18.
12. Buchynska D.L. Microsoft IT Academy Program. URL: http://kubg.edu.ua/images/IT-Academy_for_students.pptx.

III. CHALLENGES AND OPPORTUNITIES OF DIGITALIZATION AND SERVISATION ECONOMY OF UKRAINE

14. The role of digital-technologies in the development of tourism in the carpathians

Oresta Shcherban
PhD, Associate Professor, Associate Professor of Department of accounting, analysis and audit, Institute of Business and Advanced Technologies of the Lviv Polytechnic National University
E-mail: mppjavir@ukr.net
ORCID ID 0000-0001-5422-4032;

Zenovii Kvasnii
Ph.D in Economic, associate Professor, Department of Management, Precarpathian Institute named after Mykhailo Hrushevsky, MAUP;
e-mail: zenovii_kvasnii@ukr.net
ORCID ID 0000-0001-9124-1579;

Viktoriya Paslavska
Ph.D in Economic, associate Professor, Associate Professor of Department of Management, Precarpathian Institute named after Mykhailo Hrushevsky
e-mail: vika_pasl@ukr.net,
ORCID ID 0000-0002-1083-1006

Introduction. At the present stage Carpathian region of Ukraine faces a number of problems that impede the full realization of its tourist potential. Among them, it is necessary to highlight the following: the promotion of tourism stimulates other spheres and industries related to it; the need to protect the environment of the Carpathian foothills; establishing the proper regime of crossing the state border of Ukraine for foreign tourists; the need to protect the interests of consumers of a comprehensive tourism product of the Carpathian foothills region of Ukraine; the need to raise patriotic feelings in the youth population of the Carpathian foothills region of Ukraine; development of tourist industry business entities in the Carpathian foothills region in the context of advertising and providing proper information. Based on the above, it is necessary to develop an effective mechanism of state management of enterprises of the tourist industry for the specified territory. In the conditions of digital economy tourism activity becomes more and more technological, a single information space in the sphere of

world tourism is created, innovative principles of information support and management of the sphere of tourism are formed. It is the informative support of the tourism business and the use of digital technologies is a strategic resource that provides an increase in the competitiveness of the tourism industry.

Literature review. Such scholars as M. Boruschak, L. Davydenko, E. Kozlovsky, Kozhukhivska R., Khosrow-Pour M. and othershave devoted their scientific works tothe issues of the development of effective mechanisms of public administration in the field of tourism. However, the mechanisms of state management of enterprises of the Carpathian foothills tourist industry in the present conditions still remain insufficiently researched.

Results. In recent years, the modern tourism industry has undergone very serious changes due to the development and introduction of new information systems and technologies in the field of tourism. Successful operation of any companies in the tourism business market is almost unthinkable without the use of modern information technologies. The specifics of the formation and implementation of the tourist product requires such information systems, which in the shortest possible time would provide information on the availability of vehicles, accommodation options tourists, provided for quick reservation and reservation of seats, registration of tickets, bills, security settlement and reference information, etc. In addition, information technology is a necessary attribute guarantees of quality of the services rendered to the tourist as end users make rather high requirements to information support of the received service, in particular, constant and reliable access to the Internet, availability various mobile applications for tourism, etc. This can be achieved with widespread use in tourism of modern computer technologies of information processing and transmission. Tourism is important today factor as an internal socio-economic state policy and foreign economic activity. The tourism industry is already producing about 4-6% of gross national product and 20% of Ukraine; foreign trade turnover, about 15% of the labor force in Ukraine is employed in the tourism business and related industries.

The purpose of the article is to develop an effective mechanism for state management of the tourist industry enterprises of the Carpathian foothills region of Ukraine.To achieve this goal, the following task needs to be put into practice: defining the main principles of the state policy in the field of tourist enterprises development in the Carpathian foothills region of Ukraine. These principles shall be the basis for forming the of public management mechanisms in the tourism industry for the researched territory.

According to the World Tourism Organization data, the volume of international tourism business in monetary terms will double and amount to 7.2 trillion dollars in the next 20 years [1]. In the conditions of economic change, the tourism industry faces many problems, such as the instability of the market, the

seasonal fluctuations of for services demand, the fierce competition, the is determined primarily by the balance of different development directions. At the same time, an important role belongs to the infrastructure and its components, such as communication lines, transport services, engineering structures, roads, other enterprises which provide access to tourist services, their proper use, as well as maintaining the life of the enterprises of the tourist industry. The reasons for ineffective implementation of the competitive advantages of unique resource potential of Ukraine are the following: poor quality of the national tourist product components; unavailability of many natural cultural heritage objects for tourist visits, so the overall tourist infrastructure does not meet the quality requirements; lack of integrated state policy measures; imbalance in organizational and financial security with present needs of economy and population; not developed state management in tourism; high tax burden; difficulties that foreign tourists face when crossing borders; lack of high-skilled tourism managers. [2]

The tourism sector is suffering global losses as a result implementation of measures to overcome the coronavirus pandemic and uncertainty of further development of the situation. 96% of tourist destinations in worldwide have been subject to restrictions. According to various scenarios, in 2020 it is expected decline in international tourist arrivals at 58-78% compared to last year[3]. According to experts, demand will return to 2019 levels will take at least two years, at the same time airlines will be forced to increase travel cost on average by 43-54%[4]. It accelerates the development of tourism in Ukraine a large number of negative reasons, a significant proportion of which has an outdated character. First of all, they need to attribute the lack of methodological and organizational business support in the field of tourism by state regulators, the inconsistency of the level of comfort most hotels, boarding houses and holiday homes world quality standards, small amounts of investment in development of material base tourist complex. At present, when there is quarantine due to coronavirus COVID-19, there are no effective small business development programs in Ukraine. in the field of hotel and restaurant services. The declarativeness of many program documents on local level leads to the fact that funds for the development of these industries of the tourist complex are deducted on the latter principle, and their number remains insignificant. In unsatisfactory condition is service and information infrastructure of the industry. Strongly restrains tourism development is low the quality of most roads in the Carpathian region, especially in places of perspective rural development and green tourism. However, despite negative factors in Ukraine implemented purposefully policy on the creation of new tourism clusters, work continues on the development of extreme, cultural and cognitive, hunting, fishing, underwater, religious and sports and health tourism. Among the urgent tasks of the tourism industry it should be noted the work on creating optimal regulatory framework for the development of attractive investment climate, which can

significantly increase volumes of investments in the tourist and resort-recreational complex and its infrastructure.

Digitalization of the economy leads to the emergence of new types of enterprises in the tourism industry, including virtual companies, spatially distributed network structures, etc. It is necessary not only to develop organizations of a new type, but also to provide creation of organizational ecosystems and networks. The central role of Digital tourism business organizations will play adaptability as companies compete in order replace the structural hierarchy with a network of teams with the necessary authority as soon as possible
[5, p.198].

Processing of e-commerce data according to the typology of orders via the Internet in Ukraine, allowed to state that on average 60.5% of the Ukrainian population use online services for leisure and tourism. The most used latest digital technologies that serve as the basis for digitalization of tourism indsutry are Big Data, blockchain, artificial intelligence, Internet of Things, mobile devices.

It is necessary to analyze the key features of the state policy in the field of tourism and resorts in order to develop an effective mechanism for state management of the tourist industry enterprises in the Carpathian foothills region of Ukraine.

At the present stage, the state policy of Ukraine in the field of support and development of tourism enterprises, in particular in the Carpathian foothills region, should be built on the following key principles:

- definition and development of best possible undertakings of the state policy in the field of tourism and resorts, programs of their implementation, effective control mechanisms and research results of suggested activities;
- creation of a favorable environment for the tourism industry enterprises, coordination of elements of the tourism complex with the purpose of a developed infrastructure in the Carpathian foothills region;
- government support of tourism and marketing, aimed at forming a favorable image of the country and its regions by enforcing innovations and cooperation with developed countries [6].

Based on the principles, mentioned above, the author considers appropriate to identify key priorities for improving state policy in the field of tourism enterprises. It is important to focus on the development of the tourism industry of Carpathian foothills area and consider the world development trends:

- intensification of the Carpathian foothills region cooperation with other regions of Ukraine, as well as on the cross-border and international level;
- use of transit and transport potential of the Carpathian region of Ukraine in the context of the infrastructure development intensifying on the specified territory, as well as the development of Intermodal transport logistics;
- raising the level of energy preparedness in the Carpathian foothills region, in particular, due to oil and gas production;

- use of alternative energy sources (solar and wind energy);
- creation of a favorable image of the Carpathian region of Ukraine for tourists on the basis of a meaningful historical and cultural heritage and rich natural and recreational potential;
- diversification of traditional and modern types of tourism and recreation;
- development of the agrarian industry in the Carpathian foothills region, in particular, cultivation of already present types of vegetables and fruits; introducing new species of plants; introducing the advanced irrigation technologies, etc. [7].

Thus, the strategic objectives of integrated policy in the field of tourism enterprises development in the Carpathian foothills region of Ukraine are considered the following:

- to increase the general level of competitiveness of tourist industry enterprises, taking into account the experience of the European Union countries;
- to achieve the proper territorial, social and economic integration of the tourist industry of the Carpathian foothills region of Ukraine;
- to develop effective state management mechanisms for the tourist industry enterprises in the Carpathian foothills region of Ukraine.

Each of these goals should be implemented through a determined list of actions. Thus, increasing the level of competitiveness in the tourist industry of the Carpathian region, taking into account the experience of the European Union countries, is possible through the pursuit of the following activities:

- assistance in stabilizing the development of the tourist industry enterprises in the social and economic context;
- developing of effective state management mechanisms for the tourist industry of the Carpathian foothills region, which will stimulate economic growth and create a basis for reducing the level of lagging of the Carpathian region in comparison to similar regions of the European Union countries;
- supporting free competition development among business entities in the tourism industry of the Carpathian foothills region, ensuring de-monopolization of the market as an environment for the free movement of resources, goods, services, capital, and labor force in order to intensify the economic development of aforementioned territory;
- creation of favorable conditions for foreign investment in the region, which in return will contribute to the development of the tourism industry;
- ensuring the effective functioning of a transparent system of tourist enterprises state financing in the Carpathian foothills region;
- development and implementation of measures that will allow saving energy resources of the Carpathian region by using alternative sources of energy supply;
- introducing innovations at the tourist industry enterprises in the Carpathian foothills region;
- ensuring comprehensive development of tourism infrastructure in the Carpathian region;

- promoting diversification of the economy of the Carpathian region, especially in rural areas;

- raising the labor force market in the industry by the following means: development of regional educational services, supporting an effective retraining system, professional development of tourism industry personnel [8].

The efficiency of enterprise management depends on the implementation of its functions.The management function shall be understood as the product of division and specialization of managerial work, a type of management activities which allows influencing in a certain way. Among such activities the general (key) functions are distinguished.They reveal the components of the management process, and specify functions indicating the direction of purposeful influence on one or another type of production activity [8, p. 86].

The development of effective state management mechanisms for the tourism industry enterprises is based on the implementation of the following functions:

- decentralization of the government-coordinated development strategy of the Carpathian foothills region;

- intensifying of cooperation processes of state authorities both at the horizontal and vertical levels;

- improvement of the interaction between executive branch of the government and local self-governments of the Carpathian foothills region (based on the experience of European Union countries);

- governmental reforms on both regional and at the level of local self-government in the Carpathian foothills region in accordance with the Concept of Reforming Local Self-Governments and Territorial Organization of Power in Ukraine, approved by the Cabinet of Ministers of Ukraine on April 1, 2014, No. 333-p [9];

- giving the citizens the opportunity to participate fully in the processes of building and implementing a comprehensive policy in the field of tourism and resorts of the Carpathian foothills region of Ukraine;

- encouraging the investment processes by raising the level of professional training and qualification of local authorities in the Carpathian region of Ukraine, as well as increasing the number of specialists who develop and implement measures to improve integrated tourism and resort policy in the Carpathian region.

Proper territorial and social and economic integration of the tourist industry enterprises of the Carpathian foothills region of Ukraine can be realized by:

- energizing the transport network development as the basis for the free movement of resources, goods, services, labor, etc.;

- reduction of the disproportion of social and economic development of urban and rural areas of the Carpathian foothills region;

- enhancement of the capabilities of the tourist industry of in the context of the cooperation inside the region, state, European Union, or with other countries;

- assistance in the complex solution of the infrastructure problems of the Carpathian foothills tourist industry from the social and economic, ecological point of view, etc. at the level of cities, suburban and rural areas;
- ensuring favorable conditions for the economic integration of the Carpathian foothills rural zones to a social and economic area of the region and the country as a whole on the basis of urbanization processes;
- use of the existing historical and cultural potential of the Carpathian foothills region as an effective instrument for the development of a favorable image of this territory and the country as a whole, building a ground for active tourism development in the Carpathian region of Ukraine;
- orientation towards the ecological development of the tourist industry enterprises, especially taking into account the balanced use of natural resources;
- prevention of natural catastrophes; prevention and reduction of losses that affect the environment of the region.

The above-mentioned key principles, priorities, and objectives of a comprehensive state policy in the field of tourism can serve as the basis for building the state management mechanism of tourism industry enterprises in the Carpathian foothills region of Ukraine.

The tourism industry enterprises of the Carpathian foothills region are the subject of state management in the proposed mechanism. The organizational structure of management mechanism is an important element for the tourism industry enterprises management. It (structure) is one of the most important components of the internal environment of an organization. It ensures the division of tasks between various structures of the enterprise, as well as the competence of departments and units in solving problems, and general interactions between departments and units. Organizational structure has a direct influence on the implementation of the strategy and on the way an enterprise cooperates with the external environment and fulfills the tasks [10, p. 166].

The suggested state management mechanism is a closed system with feedback. These communications suggest that further adjustments to the policy of tourism and resorts of the Carpathian region depend on the achievements due to the effectiveness of the mechanism of profitability of enterprises of the tourism industry, social and economic status and the level of competitiveness of the region at both national and international levels.

We believe that the mechanism of state management of tourist enterprises in the Carpathian region of Ukraine should be formed on the basis of key priorities of state policy of Ukraine in the field of tourism and resorts. At the present stage, the state policy of Ukraine in the field of management of tourist enterprises in the Carpathian region should be based on the following key principles:
- development of optimal starting points of the state policy in the field of tourism and resorts, programs of their realization, effective mechanisms of control and research of results of the corresponding activity;

- creation of favorable conditions for the organization of enterprises of tourist activity, coordination of their actions for the purpose of formation of the developed infrastructure of the tourist industry;
- support of tourism and marketing of the state, focused on the formation of a favorable image of Ukraine and its regions by stimulating innovation and cooperation with developed countries.

We consider the following to be strategic goals for the development of a comprehensive policy in the field of tourism and resorts in the Prykarpattia region of Ukraine:
- increasing the overall level of competitiveness of the tourism industry of the Carpathian region of Ukraine, taking into account the experience of developed countries of the European Union; - achieving proper territorial and socio-economic integration of the tourism industry of the Carpathian region of Ukraine; - development of effective mechanisms of state management of the enterprises of the tourist industry of the Precarpathian region of Ukraine. In particular, each of these goals must be realized through a certain list of functions.

Taking into consideration the impact of public administration on tourism industry enterprises it is important that the development and implementation of an effective state management mechanism will contribute to the achievement of the following results:

- Significant improvement of the complex policy in the field of tourism and resorts of the Carpathian foothills region, the formation of a comprehensive tourism product of the considered area on the basis of rational realization of state-management functions;
- Improving existing and introducing new full-fledged mechanisms of interaction between executive branches of government at both state and local level, non-governmental organizations, business entities, institutions, educational institutions in the tourism sphere in order to ensure the efficient functioning of the tourism industry in the Carpathian foothills region;
- Working out a development program for tourism area of the Carpathian foothills, in particular, programs of social and economic development of the said territory, programs for the development of international cooperation in the region of Ukraine and its cooperation processes with the European Union, health- and recreation-improving programs for the Carpathian foothills region. Creating economically grounded plans for the implementation of these programs.
- Ensuring the licensing and certification of tourist services;
- Increased share of tourism and resorts in the structure of GDP of both Carpathian foothills region and Ukraine as a whole;
- Attracting investment in the development of tourism infrastructure enterprises of the Carpathian foothills region, in particular, its engineering and transport components;

- Creation modern objects belonging to the tourism infrastructure in the Carpathian foothills region, in particular, in places with a large number of resources of historical, cultural and recreational purposes;
- Efficient use of material and financial resources by enterprises;
- Public funding and currency receipt at all levels of budgeting;
- Maintaining of existing and initiation of new jobs, creation of equal conditions for the development of small and medium-sized businesses in the tourism sector, activation of employment in the rural areas;
- Development and effective functioning of a transparent market for tourist services;
- Favorable conditions for the ecological development of the Carpathian foothills region; ensuring the conservation and protection of the natural environment of the region;
- Restoration of historical and cultural heritage and natural and recreational resources of the Carpathian foothills region;
- Ensuring the safety of tourists, protecting their rights and freedoms, as well as preserving their property.

Statistics states that the number of tourists visiting Ukraine, and Prykarpattia, in particular, is growing, the volume of services provided too, but budget revenues from tourism is growing slowly. In our opinion, this is due to the pace and quality growth does not match modern world trends and the real tourist potential of our countries. In order to realize the available potential, tourist industry of Ukraine requires significant investment funds for the development of the tourism business.

According to experts, in the near future the volume of tourist flows will increase by 10-15%, and 45% will be tourists from countries of Western Europe. Knowing the unique nature of Ukraine, its rich history and original culture, foreigners will perceive our country in a completely different way. This, in turn, will stimulate the outside investment activity and will create a positive image of our country in the world community.

Investments are important source of tourism development. Total investment in the field global tourism is $ 802.3 billion annually, with of which a third are state-owned [8]. In Ukraine, there has recently been a gradual increase in investment in tourism, but their volume remain insufficient for the efficient and full operation of the industry. To achieve world indicators, the tourism industry of Ukraine needs about 80-85 billion UAH of investment annually, that given the current state of Ukraine; economy is an unattainable dream [11].

The growth rate of capital investment in the tourism sector grew until 2012, receiving a negative value in 2015-2018. Negative value of the indicator associated with the reduction of capital investment in the development of tourism. Thus, the tourism industry Ukraine needs significant investments, especially this demonstrates the trend of capital investment [11]. The share of capital investment

in tourism is only 1.3%, although there is a positive trend in attracting investment in both tourism and in the economy as a whole [12].

It should be noted that investment funds invest in only the most promising and most profitable objects and regions, namely the cities of Kyiv, Odessa, regions of western Ukraine. Other regions are in a state of "investment hunger", are not attractive enough to investors, or potential investors are not sufficiently informed about them. Therefore, a necessary condition for attracting investors is the creation of an extensive information system support of the industry, formation of the information base of investment projects.

It is expected that the coronary crisis will cause lasting changes in consumer preferences, accelerating the introduction of online technologies, paying more attention to hygiene and a healthy lifestyle, more active use of non-cash and contactless payment methods and targeted means delivery.

From our point of view, the tendency of tourists to use illegal and semi-legal resort accommodation will depend on the readiness of the reception consumers at risk of probable infection. Consequently, sanitary and hygienic conditions and the possibility of distancing during residence and rest will be important factors of competition for the consumer in the 2020 season. The desire of providers may also hinder the involvement of consumers travel services compensate for the loss of part of the season by increasing prices, reducing the quality of service and the cost of equipping recreation facilities. However such tactics can only be successful for businesses that demonstrate high level of anti-epidemic protection. Taking into account these risks and the expected preferences of tourists has support for the development of tourism at both central and local levels should be built levels for the development of domestic tourism, which would not only allow restart this industry and reduce the negative effects of the coronary crisis, but also created basis for increasing the competitiveness of Ukraine as a tourist state.

Conclusions. Thus, the need to attract investors to the tourism development process is obvious. But there are a number of problems that prevent the attraction of investment capital in the tourism sector in order to create a competitive national tourism market in the world market product.

Thus, the definition of key principles of the state policy of Ukraine in the field of tourism and resorts allowed obtaining the basis for the formation of an effective state management mechanism for the tourism industry of Carpathian foothills region of Ukraine. Improving the overall level of competitiveness of the tourism industry of the Carpathian region of Ukraine, taking into account the experience of developed countries of the European Union, is possible through the implementation of the following functions:

- promoting the stabilization of the tourism industry of the Carpathian region from a socio-economic point of view;
- formation of effective mechanisms of state management of enterprises of the tourist industry of the Prykarpattia region of Ukraine, which will stimulate

economic growth as a basis for reducing the level of lagging behind the development of Prykarpattia from similar regions of the European Union;

- support for the development of free competition among business entities in the tourism industry of the Carpathian region of Ukraine,

- ensuring the demonopolization of the Prykarpattia market as an environment for the free movement of resources, goods and services, capital, labor in order to intensify the economic development of this territory;

- creation in the Carpathian region of Ukraine of favorable conditions for foreign investment, which, in turn, will promote the development of enterprises in the tourism industry.

The before-mentioned mechanism is a closed system, which feedback influences further proposals on improving the state policy in the field of tourism and resorts, the profitability of the tourism industry, the competitiveness of the Carpathian foothills region of Ukraine in the domestic and foreign markets, as well as the general social and economic status of the territory.

During the study was found that the tourism industry is currently developing rapidly and must meet modern challenges. Thus, under such conditions, considerable attention should be paid to the use of innovative technologies and the introduction of digitalization elements in tourism. It is noted that digitalization has been the main trend and growth factor of business for several years. Innovative and communicatory technologies have transformed both business and approaches to customers, sales of products and services, etc. The tourism industry around the world is suffering as a result of measures countering the COVID-19 pandemic. At the same time, the current situation should not be considered not only as a problem, but also as an opportunity to bring tourism in Ukraine to a qualitatively new level.

The use of information technology increases the security and quality of travel services since organization, management and control of air transportation are implemented using electronic systems that help to plan a route and the schedule, to carry out the control and the analysis of passing of flights, to manage staff.

REFERENCES

1. Wall, G. (1997). Sustainable tourism-Unsustainable development. In S. Wahab & J.J. Pigram (Eds.), Tourism, development and growth: The challenge of sustainability. London: Routledge, pp. 33-49.
2. Melnyk, N. (2013). Integration of efforts of strategic public-private tourist alliances in the process of formation of international marketing strategy of tourism development of Ukraine / N. Melnyk // Visnyk of Dnipropetrovsk University. The series is economic. Vip. 7 (3). pp. 263-269.
3. COVID-19 RESPONSE: 96 % of global destinations impose travel restrictions, World Tourism Organization (UNWTO) reports). [Electronic resource]. Access mode: https://www.unwto.org/news/covid-19-response-travel-restrictions

4. IATA COVID-19: Cost of air travel once restrictions start to lift. Brian Pearce. (5-th May 2020). [Electronic resource]. Access mode:: https://www.iata.org/en/iata-repository/publications/economic-reports/covid-19-cost-of-air-travel-once-restrictions-start-to-lift/
5. Lendiel, M. (2013). Problems and prospects of development of recreational and tourist sphere of Ukraine and its regions, Naukovyj visnyk Uzhhorods'koho universytetu. Seriia, Ekonomika, vol. 1 (38), pp.196 - 199.
1. 6.Felychyn V. (2019). Strategy of development of tourist regions: author's ref. dis. … Dr. econ. science / MAUP. Kiev, 23 p.
6. Kozlovsky, E. (2008). State regulation in the field of tourism: formation and development in Ukraine: author's ref. dis. … cand. sciences of the state : 25.00.02. K., 21p.
7. Athiyaman, A., Robertson, R.W. (1992). Time series fore casting methods: Short-term planning in tourism // International Journal of Contemporary Hospitality Management, № 4 (4), pp.8 -11.
8. The Travel & Tourism Competitiveness Report (2019). [Electronic resource]. Access mode: http: // www3.weforum.org / doc/ WEF_Travel Tourism Competitive ness_Report_2011.pdf
2. 10.Yermachenko, V. (2015). The Influence of a Country's Global Market Position on the Tourism Industry Macroeconomic Indicators , 34-46.
3. 11. Official site of the World Travel and Tourism Organization [Electronic resource]. Access mode: http: // www.wttc.org/
4. 12. Mordan E., Bilets A., Serdyuk K. (2017). Investments in the tourism sector of Ukraine: current status, problems and prospects. Global and national economic problems.Vip. 19. pp. 410-414.
5. 13. Kozhukhivska, R. (2015). Directions of application of information technologies in communication strategies of Ukrainian tourist enterprises and enterprises of the hospitality industry, Business Inform, vol.10, pp. 119-125.
6. 14. Khosrow-Pour, M. (2017). Encyclopedia of Information Science and Technology, Fourth Edition (10 Volumes), IGI Global, Hershey PA, USA.

15. Development on railway transport of ukraine in the conditions of digitalization

Kalicheva Natalia

Doctor of sciences (economics),
Associate professor of economics and management
of production and commercial business
Ukrainian state university of railway transport of Kharkiv
E-mail: kalycheva_natash@ukr.net
ORCID ID 0000-0003-3523-1071

Introduction. The development of the world economic system is under the influence of the fourth industrial revolution (Industry 4.0), which is based on the full, comprehensive and comprehensive application of Internet technologies in all economic activities. The «4th Industrial Revolution2 led to a revision of approaches to doing business through the use of cyber-physical systems (CPS) and the Internet of Things (IoT). This has enabled businesses to be more mobile and adaptable in the use of different types of resources, energy and fast in the market by changing the principles and approaches to obtaining information, data exchange through cloud computing, energy transformation and workforce automation.

The advantages of the digital transformation of the world economic system are the focus on changing the system of economic, social and institutional relations between different economic entities. All this is directly related to transport companies, which are an important infrastructural element of the national economy, providing communication between all regions of the country and are directly involved in international traffic.

Literature review. Problems of development of branches of the national economy in the conditions of the fourth industrial revolution are covered in the works of Bodnar O., Veretyuk S.M., Gudzya O.E., Karcheva G.T., Kolyadenko S.V., etc [1-5]. Their works reveal the basic principles of the impact of digitalization on the development of domestic enterprises in domestic and global markets. Research of railway transport enterprises development in the formation of digital economy is revealed in scientific works Dykan V.L., Kompaniets V.V., Ovchinnikova V.O., Obruch G.V., Omelyan V.V., Nikiforuk O.I., Tokmakova I.V., etc [6-12], which identifies the main problems of digitalization of the railway industry and outlines the main directions of further development of railway transport enterprises.

At present, railway transport enterprises are undergoing processes of reform and reorganization, which leads to the formation of new approaches to economic activity by increasing the involvement of the private sector in the transport process.

At the same time, the modern transport market is in a state of transformation, which requires a review of approaches to change the organizational and managerial activities in the industry.

Therefore, despite the large number of scientific papers on the effective development of railway transport enterprises, a number of theoretical and applied issues related to the organization of business activities in the industry in the context of digitalization of the economy need further study.

Results. Modern economic development requires increasing the operational and economic independence of railway transport as the basis of the country's transport system, which transfers the center of gravity of economic work directly to specific enterprises, namely freight stations, mechanized loading and unloading distances, stations, self-service terminals and others. Under such conditions, they are forced to independently economically justify technical solutions, develop optimal strategic and operational work plans, that is engaged in business activities, which consists not only in carrying out transportation work, but also in performing various functions of transport services, including loading, unloading, storage, provision related services, logistics services, passenger service, etc., which allows developing business activities in this area.

Entrepreneurial activity is a special type of economic activity, which is based on innovation, innovation, risk and responsibility, rational combination of resources, efficient management, creation of real values that can meet the needs of consumers in order to make a profit. You can do business in all areas of management, namely the creation, distribution, exchange, consumption, organization and management. This contributes to the entrepreneurial benefits that are the basis for the development of entrepreneurial activity. After all, effective entrepreneurship helps to solve many economic problems at the state and regional levels by stimulating production and motivating the activities of various groups, especially in times of crisis.

Entrepreneurship, especially small and medium-sized enterprises, is the most massive, flexible and dynamic form of business life in society. Due to the mobility and flexibility of small and medium-sized businesses can eliminate violations of the necessary relations in commodity markets, promote their rapid saturation with different types of products, solve the problem of introducing scientific and technical innovations into production, and so on.

In developed countries, entrepreneurial activity is the main driver of competition, provides renewal of goods and services in the market, helps in the fight against unemployment, intensifies the processes of innovative development and others. In our country, the development of entrepreneurial activity has a number of specific features compared to the world's leading economies, in particular:

- weak level of technical and technological development;
- low level of management due to lack of necessary knowledge and skills;

- lack of effective state support;
- weak legal awareness;
- low level of entrepreneurial culture;
- public distrust and lack of international partners;
- focus on a multi-product development model;
- low level of ownership of information about the market;
- high degree of adaptation to market conditions, etc.

Under such conditions, the implementation of entrepreneurial activity in our country is a rather complex process that requires the development and implementation of entrepreneurial development strategies. Currently, there are business strategies aimed at technical modernization, innovation, use of various achievements of scientific and technological progress, namely the strategy of minimizing production costs, the strategy of increasing market share, the strategy of innovative programming of research. Another type of business strategy is to maximize short-term profits through financial speculation and overpricing, shifting production costs to the consumer, manipulating the investment portfolio, simulating research and innovation, and so on.

In market conditions, all these business strategies interact with each other, so when forming a development strategy, the company should focus on their relationship in management and their impact on ensuring its competitiveness. The choice of the type of business strategy is determined by the enterprise itself, based on its economic activity. The success of business strategy depends on its validity, motivation, adequacy, impartiality, stability, dynamism, longevity. It is necessary to take into account the experience of past strategies, time factor, market conditions, etc.

Thus, entrepreneurial activity contributes to overcoming crisis challenges in the economy through gradual economic growth, creating a socially necessary product, increasing employment and solving national, regional and local problems of society, so it is necessary to develop business strategies to focus on the optimal combination of factors, determine, and the resulting efficiency of the enterprise through the use of various innovations or the use of favorable opportunities provided by the external environment.

The current conditions of entrepreneurial activity require the choice of effective methods of management and development of business entities. Given that it is important to predict the structure of the transport services market and with significant fierce competition from all economic entities due to global factors, flexibility in geopolitical tensions and other factors, railway transport companies need to change their management approaches. After all, the speed and adequacy of response to market changes, revision of management tools and methods allows transport companies to become more efficient by finding areas of development that will provide opportunities to achieve economic stability and stability.

For railway transport enterprises currently the main areas of business are:

- separation of subsidiaries from complex transport enterprises that specialize in certain activities within the framework of ensuring the transportation process;

- increase in the number of international and intermodal transportations with the participation of other modes of transport;

- transition to business process management of transport services;

- constant improvement of business processes of transport service and optimization of their components;

- use of information technologies.

According to the medium-term development strategy of JSC Ukrainian Railways, ensuring the effective development of railway transport enterprises in market conditions should be based on market mechanisms, namely mutual settlements between the main activities, distribution of actual costs by activities, tariff liberalization, public-private partnership. The main measures to be implemented to implement the strategy are to meet all logistical demands of consumers by introducing their comprehensive services, tariff deregulation, improving customer focus, streamlining railway networks and production units, and others. [13], which cannot be realized without digitalization of railway transport and substantiation of basic spheres of digital transformation of enterprises of the branch.

Currently, the digital transformation is the mechanism that will allow railway companies to ensure the development of technical policy by moving to a new level of productivity and reliability of business processes in accordance with international requirements and standards by expanding the horizons of scientific research, active involvement of various sources of new ideas, promising developments in other areas, activation of the regulatory framework to accelerate the introduction of innovations, motivation of innovation activity, introduction of a system of segmentation of innovation processes, commercialization of promising projects, formation of a single information platform to control the innovation life cycle, organization of innovation platforms, etc.

The main transformational changes in the context of digitalization in the market of transport and logistics services are:

- rapid change of development guidelines;

- increasing the complexity of supply chains;

- enlarging consumer expectations from logistics operators and carriers;

- the need to address the problems of sustainable development in conditions of limited resources;

- rapid development of new directions of the digital economy, which stimulates the increasing influence of the circular economy.

Digitalization in railway transport enterprises opens opportunities for the implementation of various business processes, including fundamentally new techniques and technologies. In particular, digitalization is a tool to ensure the effective development of railway transport enterprises, which will attract additional

investment to address innovative, balanced development and productive use of a single information base of logistics and transport infrastructure. After all, digital transformations allow companies to obtain an information and communication effect by transferring most of the tasks of processing an array of information from staff to electronic systems, adapting all production processes to the demands of the digital economy, changing business process management and more.

Entrepreneurial activity in digital transformation is becoming a new mechanism for accelerated development of railway transport enterprises, which is based on effective information links, optimized, value flows of large databases (Big Data) needed to solve operational and strategic tasks of the transport and logistics sector of the national economy. In particular, the advantages of digitalization in transport services are expressed in the IT support of production, trade and economic processes of movement of goods and material flows through:

- reduction of time, labor and financial costs for information retrieval in the formation of optimal partnership schemes for the creation of horizontal, industrial, economic and commercial links between different entities;
- use of intelligent transport systems to create innovative integrated transport services in accordance with consumer demands.

The transformation of the market and logistics systems is forcing railway transport companies to reconsider their approaches to doing business. After all, digitalization, due to the large-scale introduction of robotics, artificial intelligence and unified information management systems, leads to violations of trade secrets and security, which is especially relevant for railway transport companies. Therefore, the main factors that have an impact on inhibiting the development of digitalization in rail transport include:

- inconsistency of actions of management institutes;
- lack of effective state support;
- absence of effective scientific programs for the development of digital logistics;
- backwardness of technical support of regional transport centers;
- absence of an effective single information platform with shared access for all participants in the logistics system;
- lack of staff, especially in remote regions, able to use the software product in service delivery, electronic financial, insurance, dispatching and other operations;
- weak involvement in innovative technologies of small and medium enterprises, which does not allow to expand the range of services and attract a significant number of consumers due to lack of access to large databases;
- distrust of cargo owners to logistics information platforms due to possible loss of commercial information, but necessary - to ensure quality information and logistics services.

Digitalization has changed the business model, the strategic guidelines of which are currently aimed at optimizing innovation potential to ensure effective

development [14]. Under such conditions, railway transport companies need to develop mechanisms for adaptation to new economic and production conditions, taking into account changes in the field of logistics and transport under the influence of digital technologies. After all, the solution of technical and technological innovative tasks of development of the sphere will ensure the implementation of intersectoral innovative solutions and promote business opportunities through:

- strengthening the influence of digitalization and integration of intersectoral research and production links;
- ensuring digital transformation of the sphere;
- creation of innovative platforms for technological development;
- maintaining reliable communications between participants in the innovation process;
- introduction of investments in technological development of railway transport enterprises;
- increase of intellectual capital of enterprises of branch, etc.

Thus, the implementation of technical and technological modernization of production processes for the manufacture of quality products and the provision of appropriate services with a significant level of service should be based on close cooperation of all participants in the transportation process. This, in terms of digitalization, is a factor in raising the efficiency and competitiveness of the railway industry in today's economic environment by:

- creation of high-tech products and services;
- ensuring technological modernization of railway transport enterprises;
- management of digital transformation projects on railway transport;
- formation of channels of effective digital development;
- intellectual potential management;
- ensuring the infrastructural development of the regions, etc.

It should also be noted that the digitalization of transport services creates significant difficulties for domestic transport companies, most of which cannot quickly transform their activities in accordance with the requirements of the digital services market. This leads to the need to involve third-party companies and organizations. After all, competition in the market can withstand only the company that has the tools to interact with electronic resellers. Therefore, railway transport enterprises to ensure the development of entrepreneurship in the industry need to fully implement the cooperation of functional units or to structure horizontal links in the organization of the transportation process. That is, to create business processes, the main purpose of which is to provide services in accordance with consumer demands.

It is entrepreneurial activity in the conditions of digitalization that provides railway transport enterprises with the necessary flexibility and diversification. After all, railway transport is one of the important basic sectors of the economy of Ukraine and, in accordance with the law, provides its internal and external transport and economic

relations and the needs of the population in transportation [15]. All this leads to the fact that entrepreneurial activity in the industry may be limited due to the need to ensure the social and economic development of the country, strengthening its defense capabilities, supporting international cooperation, and so on. However, according to the current legislation, railway transport companies have the following rights [16]:

- interact with the relevant authorities of other countries and the possibility of concluding agreements with them within their competences;
- to create investment funds for the development of the industry;
- receive information from local and central authorities to perform tasks in the functions defined by laws and regulations;
- enter into agreements on economic activity.

Another important factor influencing the functioning of railway transport enterprises is the high level of discipline, the need for strict compliance with rules, orders, instructions and other regulations, as their violation can lead to threats to the environment and human safety.

Therefore, all participants in the transportation process must provide:

- safe for human health and life transportation process;
- security of cargo and luggage transportation;
- traffic safety and rolling stock operation;
- environmental safety.

Under such conditions, a key factor in solving the problems of business development in railway transport enterprises is the process of forming clear legal norms aimed at regulating relations between enterprises in the field, representatives of business structures and customers. At the state level and JSC Ukrainian Railways should be developed and implemented a set of measures for regulation in this area by simplifying the system of contracts and tax burden, the introduction of strict standards of security and reliability, ensuring access to information databases. After all, the activities of railway transport enterprises should be regulated to maintain a balance between the public benefits of the state and the private interests of transport organizations, as well as between the benefits of transport enterprises and the burials of consumers. That is, to ensure the effective development of business activities in the field of rail transport should be developed a set of measures aimed at streamlining economic relations in the implementation of transport work. Legislation should be aimed at creating an effective legal framework, in accordance with international requirements, for the implementation of business activities in the provision of rail transport services to develop competition and eliminate the gaps between the freedom of business in the field and its restrictions.

The optimal implementation of business activities in the railway industry in the context of digitalization contributes to the development of both macroeconomic indicators of the national economy and directly to the formation of independence of entrepreneurs in railway transport, which remains a very conservative sector of the domestic transport system.

In order to improve the information support of business entities in railway transport, it is necessary to provide:

constant modernization, replenishment, expansion and technical support of existing databases;

monitoring and analysis of business results in the field of transport services;

organization and holding of meetings and conferences with representatives of business and public organizations;

– participation of business representatives in the development of regulatory and legal documentation for the development of entrepreneurial activity in railway transport enterprises.

The implementation of these measures will not only create an integrated environment for high-tech innovation, technologically enabling the digital development of railway enterprises, but will increase their competitiveness in the global transport market and provide socioeconomic effect for the national economy.

At present, digitalization is the management tool that can solve the issue of balanced development of railway transport enterprises through the effective use of the information base of logistics and transport infrastructures [17]. In particular, the management of the operational work of the entire railway network allows to solve a range of management tasks:

– to forecast train flows during the day and during the season in all main directions, to control the condition of stations;

– manage a single fleet of traction resources in areas based on active control of the location of rolling stock;

– to carry out dispatching management of work of trains on the basis of locomotive-train position in all directions, etc.

The creation of an intelligent proving ground allows planning energy saving modes, to organize logistical interaction of different types of transport, to manage cargo flows, to monitor infrastructure and rolling stock, to introduce sparsely populated and uninhabited technologies of traffic process management, etc.

Given the opportunities for business development in railway transport enterprises, digitization makes it possible to:

– reduce the role of traditional forms of organization of the transportation process and reduce the influence of mediation and "nepotism";

– reduce entry barriers to access global transport markets;

– expand the range of services and improve their quality;

– to organize complex projects of economic and technological development;

– improve the quality of information exchange;

– create conditions for quality feedback;

– take into account all the interests and demands of consumers, etc.

Thus, the formation and development of entrepreneurship in railway transport is a rather complex process, the implementation of which requires

significant organizational and systemic changes from enterprises in the industry. Railway undertakings need to move from a management system based on mountain management to a system based on self-organization. Therefore, given that digitalization is a factor that creates favorable conditions for the development of independence, railway enterprises have the opportunity to achieve effective development by changing the strategic guidelines of development.

Conclusion. The market dictates its conditions and poses challenges, and the railway industry is not always able to respond to them quickly, so certain activities of railway transport companies can and should be given to the private sector. In particular, the consumer is interested in providing services for loading and unloading, temporary storage of goods, documentation, information support, etc. Creating conditions for the development of business in railway transport will contribute to the dynamic and mobile development of the sphere, plays a significant role in shaping the competitive environment, solve the problem of employment, especially in the regions, promote infrastructure, and more.

At the same time, in the conditions of digitalization, entrepreneurial activity will provide a synergistic effect of railway transport enterprises through the introduction of creative approaches to solving painful problems of transport services, outlining promising areas of development, minimizing risks and losses. In particular, in the development of management information system, quality management, budgeting of innovative projects, evaluation of staff, their motivation and incentives, etc. The integration of digitalization into the activities of railway transport enterprises makes it possible to form a new system of economic activity in the industry, which is quite important for the effective development of the entire transport system of the country.

REFERENCES

1. Bodnar O. (2018) Digitalization and business competitiveness - key drivers of the Ukrainian economy. URL: https://business.ua/litsa/item/2452-tsifrovizatsiya-ta-konkurentospromozhnist-biznesu-klyuchovidrajveri-rozvitku-ukrajinskoji-ekonomiki. (appeal date: 17.06.2020)
2. Veretyuk C.M., Pilinsky V.V. (2016) Defining priority areas for the development of the digital economy in Ukraine. *Scientific Notes of the Ukrainian Research Institute of Communications*, 2, 51-58
3. Hudz O.E. (2018) Digital economy: changing values and guidelines for enterprise management. *"Economy. Management. Business"*, 2 (24), 4-12.
4. Karcheva G.T., Ogorodnya D.V., Openko V.A. (2017). Digital economy and its impact on the development of national and international economy. *Financial Space*, 3 (27), 13-21
5. Koliadenko S. V. (2016). Digital economy: preconditions and stages of

formation in Ukraine and in the world. *Economics. Finance. Menedzhment: aktualni pytannia nauky i praktyky*, 6, 105-112.

6. Dykan V.L., Korin M.V. (2015) yu. evelopment of high-speed traffic in Ukraine on the basis of the formation of production and logistics clusters. *Collection of scientific works of UkrDUZT*, 154, 98–103. 2.
7. Kompaniets V.V. (2018). Conceptual analysis of the prospects for digitalization of the economy and railway transport. B*ulletin of Economics of Transport and Industry*, 62, 197–200.
8. Ovchynnikova V.O., Toropova V.I. (2019). Development of railway transport enterprises in Ukraine in the conditions of digitalization. *Bulletin of Economics of Transport and Industry*, 68,175–181.
9. Obruch AV (2019). Development of railway transport services based on the development of digital platforms. *Entrepreneurship and Innovation*, 10, 69- 73. DOI: https: //doi10.37320/2415-3583/10.10
10. Omelyan V.V. (2019). The development of digital infrastructure is an important step in modernizing the transport industry. Ministry of Infrastructure of Ukraine. URL: https: // mtu .gov .ua / news / 30054. html (application date: 14.07.2020)
11. Nikiforuk O. I., & Fediai, N. Oh. (2019). Modern innovations in the transport sector. *VII Ukrainian scientific and practical conference* (May 2–3, 2019), Odessa [in Ukrainian], 23–25.
12. Tokmakova I.V., Cherednychenko O.U., Voytov I.M., Palamarchuk Ya. S. (2019). Digital transformation of railway transport as a factor of its innovative development. *Bulletin of Economics of Transport and Industry*, 68, 125–134.
13. Strategy of JSC "Ukrzaliznytsia" for 2019-2023 URL: https://www.uz.gov.ua/files/file/about/documents/%D0%A1%D1%82%D1%80% D0% B0% D1% 82% D0% B5% D0% B3% D1% 96% D1% 8F-5-Typography% 20 (% D1% 83% D0% BA% D1% 80) .pdf (access date: 06.05.2020).
14. Kalycheva N. E. (2019). Strategic terms of development of railway transport enterprises on an innovative framework. *Eastern Europe: economy, business and management*, 1 (18), 122-126. URL: http://www.easterneurope-ebm.in.ua/18-2019-ukr (access date: 11.05.2020).
15. On railway transport: the law of Ukraine. URL: https: //zakon.rada.gov.ua/laws/show/273/96-%D0%B2%D1%80 04.05.2020 (access date: 10.05.2020).
16. Transport Law of Ukraine (2019): textbook. way. / Yu. V. Korneev. Kyiv: Center for Educational Literature, 168.
17. Kalycheva N.E., Maslova V.O. (2014). Logistic approaches as a basis for rational organization of production process at the enterprise. B*ulletin of Economics of Transport and Industry*, 47, 83 - 86.

16. The role of tax instruments in the formation of innovative economy and digitalization of business in Ukraine

Nazar Demchishak
Doctor of Economic Sciences,
Professor of Finance, Money Circulation and Credit
Ivan Franko National University of Lviv
E-mail: nazar_dem@ukr.net
ORCID ID 0000-0001-6852-7405

Katerina Semenchuk
Master's student, majoring in «Finance, Banking and Insurance» Ivan Franko National University of Lviv
E-mail: semenchuk.kate1@gmail.com
ORCID ID 0000-0001-9186-643X

Introduction. The formation of an innovative economy in Ukraine is impossible without a holistic conceptual vision of the priorities for the use of incentives, especially tax instruments, for the implementation of innovative projects and support for startups. Today, these levers of influence are integral components of the world tax systems and are especially effective in the initial stages of development of innovative entrepreneurship. At the same time, the use of tax instruments is important in view of the digitalization of business in Ukraine and the actualization of adaptation problems to the relevant European standards.

Literary review. Such domestic scientists as V. Bodrov, D. Vankovych, Z. Varnaliy, M. Dyba, I. Dumanska, M. Krupka, I. Lunina, T. Mayorova, T. Medinska, S. Onyshko, N. Tsenkler, O. Yurkevich and others have paid attention to the study of theoretical and practical aspects of the application of tax instruments for building an innovative economy.

Results. Due to the fact that the domestic economic system contains certain elements of the innovative economy, it can be argued only to assess the role of tax instruments in the formation or construction, rather than the functioning of the innovative economy. The activity of innovators is one of the main factors in achieving high economic growth and structural modernization.

One of the main features of the innovative economy is the high share of innovative enterprises. According to the Law of Ukraine «On Innovation activity», the concept of «innovation enterprise» (innovation center, technology park, technopolis, innovation business incubator, etc.) is defined as an enterprise (association of enterprises) that develops, manufactures and sells innovative

products and (or) products or services, the volume of which in monetary terms exceeds 70 percent of its total output and (or) services [1]. In fig. 27 presents the main indicators of innovation activity of domestic enterprises. If we analyze the data in Fig. 1, the instability of innovation activity of industrial enterprises is obvious. Its level was the highest in 2016 and amounted to 18.9%. In the following years, there was a slight decline in this indicator, and as of the end of 2019 its value was 15.8%. The dynamics of the share of the number of industrial enterprises that implemented innovations (products and / or technological processes) in the total number of industrial enterprises is essentially similar.

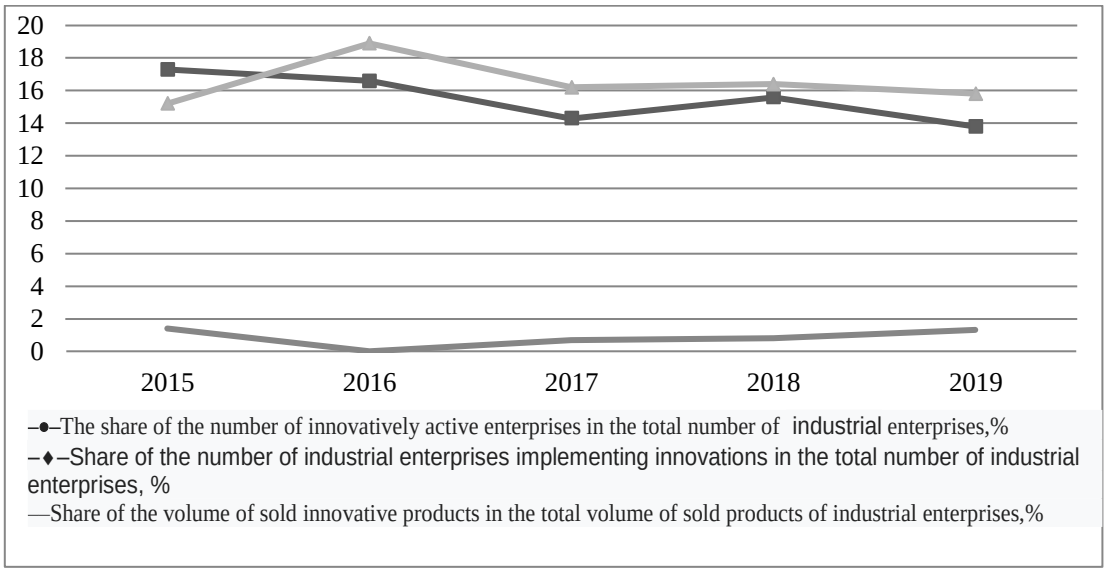

Fig.27. Indicators of innovation activity of Ukrainian enterprises during 2015-2019
Source: compiled by the authors according to the data [2]

Finally, the share of sold innovative products amount in the total sold products of industrial enterprises has increased in recent years and amounted to 1.3% at the end of 2019, but this share remains quite low compared to the same indicator of developed countries. At the same time, the latter indicator is especially important given the prospects for the formation of an innovative economy, because innovation activity does not mean that the innovation process will be completed, ie a new product or service will appear on the market. In fact, this is the case in Ukraine when, despite the existing innovation activity, the level of commercialization and the start of production of innovative products is unacceptably low. Of course, the potential of innovation is determined by sources of funding. Thus, the financing of innovation in Ukraine will be analyzed on the basis of table 33.

Table 33

Sources of funding for innovation in Ukraine, 2015-2019

Years / Indicator	2015	2016	2017	2018	2019
Expenditures on innovations, UAH mln	13813,7	23229,5	9117,5	12180,1	14220,9
including at the expense of (in% to the total cost of innovation):					
own funds of enterprises	97,2	94,9	84,5	88,2	87,7
state budget funds	0,4	0,8	2,5	5,2	3,9
funds of non-resident investors	0,4	0,1	1,2	0,9	0,3
funds from other sources	2	4,3	11,8	5,7	8,1

Source: compiled by the authors according to the data: [2]

That is, self-financing by enterprises of innovative projects prevails, when the costs of innovative activities are carried out mainly at their own expense (Fig. 27). After 2016, the share of financing innovations from own funds of enterprises decreased significantly due to the growing role of bank loans, budget funds, foreign and other sources. At the same time, the share of public funding remained consistently low (2.5-3.9%). Although state budget funds played an insignificant role in financing the innovative activities of Ukrainian enterprises, their role should not be underestimated. We believe that in modern conditions, the state should simply refocus on funding innovations in priority sectors and sectors of the economy without "spraying" resources, including robotics, electronics, renewable energy, IT industry etc.

At the same time, it is important to form an effective system of financial regulation of innovation activity in Ukraine. In fact, its subsystems are budget regulation and tax regulation. Tax instruments and incentives, the role of which we specify, are a particularly effective tool in the conditions of formation of innovative economy. According to the form of influence on innovation activity, tax incentives belong to indirect instruments, and its essence is to give up the part of tax revenues in order to increase the production of innovative products, taking into account certain priorities and doctrine of innovation policy. As a result, the growth of production of such products should subsequently multiply tax revenues, as happened in the leading countries of the world [3, p. 1151].

Thus, the tools of tax incentives are:

- application of tax benefits;
- reduction of tax rates;
- change in the tax base;
- write-off of tax arrears,
- installments and deferrals of tax liability;
- temporary exemption from property taxes without requirements for the areas of spending the released funds;

- tax holidays;
- tax credit;
- free economic zones, etc. [4, p.835].

The main normative legal act that determines the procedure for granting and applying tax benefits is the Tax Code of Ukraine. and a smaller fee if there are grounds specified in the code. The grounds for granting tax benefits are features that characterize a certain group of taxpayers, their type of activity, the object of taxation or the nature and social significance of their costs [5].

Tax benefit under the Tax Code is provided by:

a) tax deduction (discount), which reduces the tax base before tax and collection;
b) reduction of tax liability after tax and collection (ie tax credit);
c) setting a reduced rate of tax and fee;
d) exemption from tax and duty [5].

For example, the tools for exemption from paying local taxes and fees were tested by local communities in March-April 2020 in the conditions of the coronavirus pandemic, although it mainly concerned only private individuals. However, in the long run, it can be used by the United Territorial Communities (UTGs) to stimulate the digitalisation of business services and innovation on the ground. However, these issues need further study and changes in current legislation. The fig. 28 presents the criteria for classification of tax instruments to stimulate innovation activity.

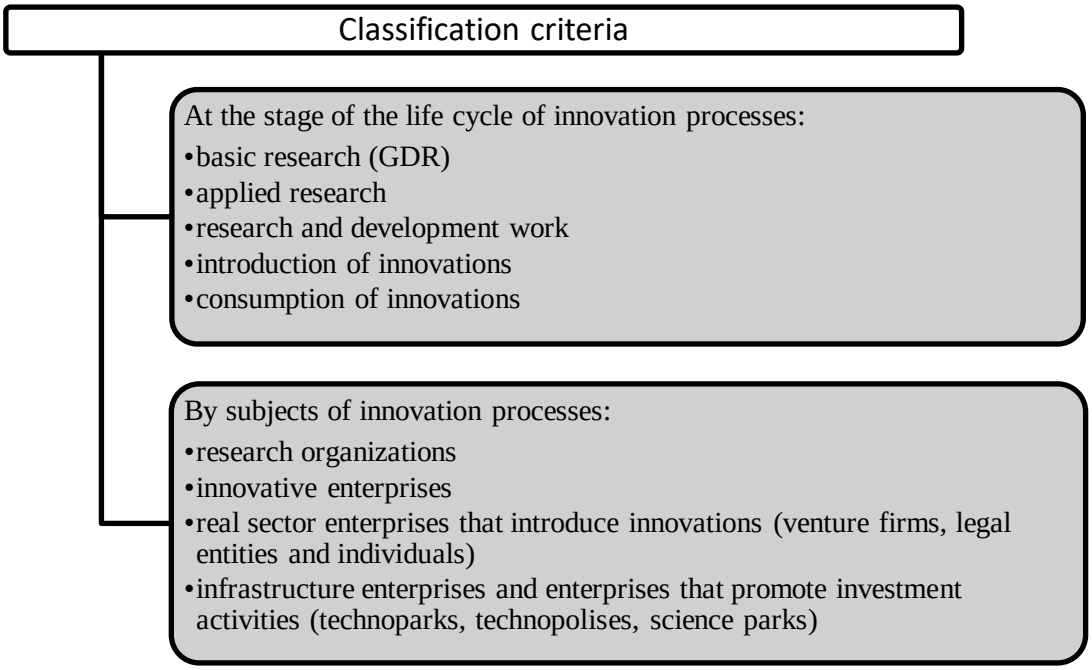

Fig. 28. Classification of tax benefits to stimulate innovation
Source: based on: [4]

Tax incentives for innovation also include benefits from value added tax, income tax, duties and personal income tax. In particular, the Tax Code of Ukraine provides for exemption from value added tax transactions with:

- payment of the basic research cost, research and development work by a person who directly receives such funds from the account of the body that provides treasury services to budget funds;
- free transfer of devices, equipment, materials, except for excisable, scientific institutions and scientific organizations, institutions of higher education, entered in the State Register of scientific organizations, which are supported by the state;
- providing scientific advice for people who improve their skills on their own;
- conducting lectures on science and technology [5].

Also exempt from taxation are transactions of importation into the customs territory of Ukraine:

- equipment operating on renewable energy sources, energy-saving equipment and materials, means of measuring, controlling and managing the consumption of fuel and energy resources, equipment and materials for the production of alternative fuels or for the production of energy from renewable energy sources;
- materials, equipment, components used for the production of equipment running on renewable energy sources;
- materials, raw materials, equipment and components that will be used in the production of alternative fuels or energy production from renewable energy sources;
- energy-saving equipment and materials, products, the operation of which provides savings and rational use of fuel and energy resources;
- means of measuring, controlling and managing the cost of fuel and energy resources [5].

Transactions on importation of these goods into the customs territory of Ukraine are exempt from taxation if these goods are used by the taxpayer for own production and if identical goods with similar quality are not produced in Ukraine. Also, temporarily, until January 1, 2023, it was exempt from taxation value added tax transactions for: supply of software products, as well as transactions with software products, the payment for which is not considered royalties, import into the customs territory of Ukraine under the customs regime of import of goods, goods in the production of space technology [5].

Another tax instrument used in Ukraine is the use of a tax bill for the amount of tax liability for value added tax. The home enterprises of shipbuilding industry which realize investment projects, approved in accordance with the Law of Ukraine «On stimulation of investment activity in main industries of economy for the purpose of new workplaces creation», at import in the customs regime of import to the customs territory of Ukraine of the equipment, the equipment and accessories which are not made in Ukraine, for use in economic activities, subject to the customs declaration, may, at their discretion, issue a tax bill to the supervisory authority in the amount of the value added tax liability specified in the customs declaration [5].

If we analyze the various tax benefits in terms of payment of duties, aimed at stimulating the formation of an innovative economy and digitalization of business,

it is necessary to highlight several important aspects. Thus, scientific, laboratory and research equipment, as well as components and materials provided by the project of the science park, registered in accordance with the Law of Ukraine «On Science Parks», are imported into the customs territory of Ukraine by the science park and its partners. are exempt from import duty.

Exemption from import duties is granted for the entire period of the science park project, but not more than for two years for equipment and not more than for one year for components and materials from the date of approval of the list and volumes of goods. In turn, equipment, facilities and components, as well as materials that are not produced in Ukraine and imported into the customs territory of Ukraine by technology parks, their participants and joint ventures implementing technology park projects, to implement such projects in accordance with the Law of Ukraine «On Special regime of innovative activity of technology parks», are taxed by import duty on general grounds. The accrued amounts of import duty are not transferred to the budget, but are credited to special accounts of technology parks, their participants and joint ventures [6].

Concerning the incentives for industrial parks, it should be noted that when imported into the customs territory of Ukraine, the following are exempt from customs duties:

- equipment, equipment and accessories to them, materials that are not produced in Ukraine, which are not excisable goods and are imported by the initiators of creation - business entities, management companies of industrial parks for the arrangement of industrial parks;
- equipment, equipment and accessories to them, which are not produced in Ukraine and are not excisable goods, which are imported by participants of industrial parks for economic activity within industrial parks. The released funds are used by relevant entities for:

1) arrangement of industrial parks, including with the use of the latest, energy-saving technologies;

2) introduction of the newest technologies connected with economic activity within industrial parks;

3) increase production and reduce costs by type of economic activity provided by the relevant law, within industrial parks;

4) implementation of research activities within industrial parks;

5) repayment of loans and payment of other borrowings used for the arrangement of industrial parks and the implementation of economic activities within them, to pay interest on such loans and borrowings [6].

Codes and the mentioned laws contain a number of provisions aimed at stimulating the development of science, technology and industrial parks in Ukraine, which are important elements of innovation infrastructure that can contribute, including digitalization of business. With regard to income tax, we agree with experts that the benefits of the innovation direction in 2010-2014 were

essentially limited to exemption from advance payments of economic entities that implement investment projects in priority sectors of the economy (approved in accordance with the Law of Ukraine «On Investment Incentives» in priority sectors of the economy in order to create new jobs»), as well as subjects in the software industry. Until 2010, Ukraine applied income tax and import duty exemptions for operations on import of equipment for the needs of technology parks.

Until 2015, there was also an exemption from the income tax of aircraft industry enterprises, received from the main activity, as well as from such enterprises research and development work performed for the needs of the aircraft industry [7, p. 43]. The Tax Code also provided that temporarily, until January 1, 2025, exempt from taxation profits of enterprises – aircraft subjects, which were determined in accordance with the Law of Ukraine «On the development of the aircraft industry». The released funds (amounts of tax that are not paid to the budget and remain at the disposal of the taxpayer) could be used for research and development work on aircraft construction, creation or re-equipment of material and technical base, increase production, introduction of new technologies.

At the same time, personal income tax benefits include exemption from tax on the amount of targeted charitable assistance provided to a taxpayer conducting research or development to reimburse the cost of equipment, materials, other expenses (except for wages payments, additional benefits, other personal expenses) provided that the results of such research or development are made public [5]. In turn, according to the Law of Ukraine «On Scientific and Scientific-Technical Activity», the state uses financial, credit and tax instruments to create economically favorable conditions for effective scientific and technical activities, respectively, ensuring by 2025 to increase funding for science through all sources up to 3% of GDP – an indicator defined by the Lisbon Strategy of the European Union.

State scientific institutions and institutions of higher education (HEIs) are exempt from import duties and value added tax on scientific instruments, equipment, spare parts and consumables, reagents, samples, scientific literature in paper and electronic form imported into Ukraine. to ensure their own scientific and scientific and technical activities (except for excisable goods) [8]. We believe that the growth of the level of autonomy of the Free Economic Zone of Ukraine, as well as the corresponding incentives are extremely necessary for the preservation of domestic science, increasing the quality of educational services and innovative progress.

It is extremely important that the Verkhovna Rada registered a bill № 2615, which proposes to create a fifth group of single tax for sole proprietors with a nine-month preferential flat tax rate of 0% (mainly for startups). In the explanatory note authors describe the startup as «a newly established company that builds its business and has a limited number of resources (both human and financial) and plans to enter the market». After the end of the grace period (nine months), the business entity is classified as groups of the single tax «startups», within a month

must be determined and move to one of the other existing forms of taxation. Otherwise, such entity is automatically transferred to the general taxation system. The use of the fifth group of the single tax «startups» two or more times by the same individual - an entrepreneur is prohibited [9].

The aim of the initiative is to create such conditions in which the state will not hinder startups from developing, because today there is no significant state support for entrepreneurs-innovators in terms of providing tax benefits. Therefore, to support the initiatives and activities of young entrepreneurs, it is proposed to encourage them to create innovative projects by providing a grace period of taxation – 9 months. discussing various aspects of preventing discrimination and distorting the competitive principles of business development.

From the standpoint of the innovative economy formation in Ukraine, the problem of venture investment development deserves special attention. The basis of legal regulation of venture funds is the Law of Ukraine «On Mutual Investment Institutions» [10] and bylaws of the National Commission on Securities and Stock Market, which has already been liquidated. The essence of venture investment is to invest in promising business ideas. Venture capital, as defined by the Ukrainian Investment Business Association, is capital invested in a high-risk project, in a start-up, or in the expansion of an existing company's business in exchange for its shares. In the world, the venture capital is represented by two sectors - formal (venture funds) and informal (private investors). Venture financing remains one of the sources of capital for companies whose rapid growth and development constantly requires additional foreign investment (usually small and medium enterprises) [11, p. 91]. Figure 2 shows information on the largest venture funds operating in Ukraine, the capital of which is mainly domestic and which finance projects of mainly Ukrainian companies (Table 34).

These funds finance domestic projects both at the stage of their origin and in the process of development and activity. Financial investments range from 100 thousand dollars to several million. These funds are developing at a slow pace due to the fact that the list includes not very successful startup projects that do not have the opportunity to compete with foreign counterparts. It should be noted that the basis of the funds is the IT industry, and they fund domestic developments in the field of Internet projects:

- e-commerce;
- software development;
- mobile applications;
- gaming industry;
- cloud services [12, p. 312].

Table 34

The largest Ukrainian venture funds

Name of the fund	AVenture Capital	Chernovetskyi InvestmentGroup	Dekarta Capital	TAVenture	VostokVentures
Founders	Eugene Sysoev, Andrey Kolodyuk	Leonid Chernovetsky	Mikhail Nikolaev, Denis Kim, Alexander Liadov	Victoria Tigipko	Not is revealed
Fund opening date	2012	2012	2008	2010	2012
Stages	A, B	Seed, A, B	A, B	Seed, A	Seed, A
The amount of capital	$30 million	$750 million	$100 million	$50 million	Not is revealed
The amount of investment per project	$0,3-3 million	From $ 100 thousand	Early:$1-3 million	Sowing: up to $ 300 thousand	Sowing: $ 20-300 thousand
			Growth: $2-15 million	Early: to $1 million	Early: from $ 300 thousand
Portfolio of Ukrainian projects	Divan.tv, AR23D	Not is revealed	ExpoPromoter	TOPMALL, HotelScan,Tripscan	SmartDoc, VostokGames, Room8studio, BumperApps

Source: compiled on the basis of [12].

That is, the funds are actually directed to the digitalization of various industries, which is especially important for the economy of Ukraine. The Tax Code of Ukraine stipulates that any income from the activities of a collective investment institution (CII) is exempt from income tax. Only the distribution of CII profits, ie payment of dividends, is subject to taxation. Another way to optimize the tax burden is to purchase CII real estate, machinery, equipment, transport and lease it. The use of CII is a transparent and legal method of tax optimization, and tax preferences for individuals-investors offset all the costs of creating and managing the fund [13]. Therefore, the role of CII in the part of venture funds is clearly underestimated, so it would be appropriate to use this mechanism much more actively.

The role of tax benefits for innovative enterprises, which were to be applied in the form of tax holidays, accelerated depreciation, investment tax rebates, and exemptions from taxes and fees, is clearly inappropriate in Ukraine. At the same time, most of them are prescribed in the current legislation, although it is necessary to develop new mechanisms. For startups, the use of tax holidays, especially in the early stages, is an effective way to save working capital that can be used for other purposes. Accelerated depreciation, as well as tax holidays, is a temporary lever, but can also be useful in the early stages of a startup, given the possibility of reducing the object of taxation and, consequently, income tax liabilities. Accelerated depreciation is a mechanism for applying appropriate depreciation

methods that affect the investment activity of the enterprise. Increasing the depreciation rate and shortening the depreciation period of non-current assets allow you to increase in each tax period the use of such fixed assets of the accrued amount of depreciation, which reduces the object of taxation.

The investment discount is one of the most widespread tax benefits for innovative enterprises and can be used by startup companies in the case of purchasing equipment for the production of innovative products. The essence of the investment discount is that the base of income tax for the company is reduced by the amount of investment costs of an innovative nature [14, p. 72]. At the same time in different countries of the world the research tax discount is successfully applied, ie it is a question of possibility to deduct from a tax base expenses for scientific researches and developments that, in our opinion, it would be important to implement in Ukraine for the development of educational and scientific sphere and integration within the triad «education-science-business». Ensuring the cooperation of educational and research institutions with the business sector is a necessity given that the driver of innovation, competitiveness and growth in today's world is the digital economy. Digital technologies have become the basis for creating new products and, consequently, the basis for gaining competitive advantage in the markets.

The digital economy implies the type of economy where the key factors (means) of production are digital data. Their use as a resource allows to significantly increase the efficiency, productivity, value of services and goods, to build a digital society. Digitalization gives small companies and project teams the opportunity to create new products and quickly bring them to market along with large companies present there. Digital transformation leads to the emergence of new unique systems and processes that make up their new value essence (for example, Uber, Airbnb, digital banking, etc.) [15].

For the successful functioning of the digital economy requires the presence of at least four components [16, p. 31]:

- infrastructure (Internet access, software and staffing, telecommunications);
- e-business (doing business through computer networks);
- e-commerce (distribution of goods via the Internet);
- e-government.

Of course, there are industries that are more amenable to digital transformation and those that are smaller. The first group includes the sphere of services, in particular administrative services, where there is no material product, ie the banking and financial sectors, insurance and e-commerce, advertising services, media business, etc.

Among the hallmarks of a digital company are the following:

- high level of automation;
- electronic internal document management;
- automated accounting and management accounting systems;
- electronic data warehouses, use of CRM;

- the presence of corporate social networks [16, p. 31].

Thus, the digital economy is already a priori innovative in nature, it can be considered as a new type of economic system, although it is debatable. The development of the digital economy depends largely on the regulatory policy of the state and the creation of favorable conditions for all major stakeholders - innovators, investors, businesses, in particular through the tax regulation of e-commerce and more. In addition, it is a question of providing legal protection and direct financing. The main tasks of the state are: institutional regulation (unification and standardization, etc.), staff training, as well as providing access to capital, Internet networks. However, restraining factors of both economic and institutional nature do not contribute to the interest of innovators to patent their own inventions and develop digital business in Ukraine similar to the best European practice.

The digital infrastructure creates conditions and forms a system that develops digital innovations, and we mean the development of innovative clusters. In addition, classic personalities contain the most important ecological ecosystems - R&D, laboratories, incubators, accessories, higher education institutions, venture funds, innovation teams, technology business, and the business sector. One of the well-known clusters is cross-sectoral alliances, such as the European Automobile and Telecommunication Alliance, which include maintenance operators, car manufacturers, research centers, innovative companies that may decide on unmanned vehicles, autonomous driving [15].

The state can stimulate the creation of innovation clusters and other objects of innovation infrastructure through tax benefits, simplification of the administration of taxes and fees, harmonization with world standards in this area. The forecast of the effect of digitalization for the Ukrainian economy and budget is given in table. 35.

As it can be seen from table. 35, the share of the digital economy in Ukraine's GDP is expected to grow quite rapidly. In our opinion, this is quite possible given the development of the IT industry, the digitalization of public services for the rapid development of e-commerce in Ukraine. However, there are certain risks that need to be considered in general and in the application of tax instruments. Thus, the possibility of uncontrolled money laundering opens up, there is a complicated process of identification of participants in economic relations in the digital business space and in the provision of services by the state, and so on. As a rule, for transactions with virtual assets it is enough to register an account via an Internet mailbox, payment for digital goods is made via I-bohabo or via an Internet card, and this makes it impossible to personalize the payer. In this case, the income is not taxed, so economic relations with the participation of virtual organizations can go into the «shadow».

Table 35

Effects of digitalization for the economy of Ukraine and the budget

Indicator	2021	2025	2030	Total y 2021–2030
Investment in digital infrastructure	$0,7 billions	$3 billions	$6 billions	$16 billions
Investments in digitalization of industries, business, industry	$1,5 billions	$5 billions	$14 billions	$70 billions
Increase in productivity due to digitalization	+1,1%	+13%	+13%	
Additionally created GDP due to digitalization (only the effect of investment and productivity)	$17 billions	$93 billions	$280 billions	$1 260 billions
- additional GDP in%	+11%	+44%	+95%	
Additional budget revenues	$3,2 billions	$17 billions	$50 billions	$240 billions
Number of jobs created (excluding the export IT industry), persons	150 000	300 000	700 000	
Share of digital economy in Ukraine (in GDP)	3%	15%	65%	

Source: compiled on the basis of [15]

There is a growing risk of Internet fraud cases, which in the context of the movement of digital goods may take the form of not providing the relevant digital product or providing limited access to the use of goods, substitution of goods by others and so on. After all, the buyer is not always able to identify the virtual product, assess its quality, completeness or distinguish other characteristics as when buying a real one. Potential solutions to these problems are modern biometric technologies that are currently used in the field of control of physical access and access to information. Biometrics is widespread in the system of access to a computer network, biometric documents, in the fields of e-commerce, banks, retail. The use of such technologies on the platforms will prevent the uncontrolled circulation of digital goods, including in order to avoid taxation and money laundering [17, p.4]. Therefore, these and other risks must be considered and studied in depth.

The Ministry of Digital Transformation of Ukraine together with the profile committee of the Verkhovna Rada are working on the preparation of tax reform for the IT industry, which provides for the establishment of a single tax at 4-7% of company turnover. more than 10 employees; the share of exports in profits and the

share of the salary fund in the cost - more than 75%; average salary - not less than 5 minimum wages.

According to the Ministry of Finance, this will create legal working conditions for the industry, make it more attractive for investment, creating a transparent and understandable corporate structure, create a level playing field, as well as conditions for the export of other services. At the same time, the model preserves the mechanism of providing social guarantees for employees and does not increase the tax burden and does not complicate administration. After all, on the one hand, a tax and reporting is introduced for IT companies, and on the other hand, a number of taxes for employees are abolished (in government plans). Thus, in the first half of 2019, 158,000 IT-FOPs operated in Ukraine with an income of UAH 52.3 billion. At the same time, there were about 60 thousand officially employed employees of IT companies, whose salary fund amounted to only 6.5 billion UAH [18]. We believe that the potential use of such tax mechanisms and tax regulation tools in the IT industry would help transform private individuals into full-fledged transparent businesses and increase budget revenues.

Therefore, it is clearly necessary to minimize the impact of restraining factors development of the innovative economy and digitalization of business in Ukraine, among which:

- low level of state funding of innovative projects;
- underdeveloped innovation infrastructure, in particular the network of science, industrial, technology parks, innovation clusters;
- venture capital deficit;
- slow pace of digitization and bureaucratization;
- inadequate financial culture.

The opportunities created by digitalization of business and developed innovative economy for Ukraine include:

- emergence of new areas of activity;
- the competitiveness of the national economy increasing;
- digitalization of services;
- optimization of jobs number;
- innovative reorientation of entrepreneurship;
- approximation to EU standards in terms of digitalization of certain sectors and sectors of the economy, including priority and export-oriented.

Conclusions. For the development of innovative business in Ukraine, the state needs to use tax instruments and directly participates in the financing of innovative activities. It is in the complexity of budget and tax incentives that the key to successful results.

One of the tools to stimulate indirectly investments in innovation and digitalization of the economy should be tax benefits. In particular, in our opinion, preferential taxation of innovative entrepreneurship should include the following measures: application of tax holidays for startups, which provides for tax exemptions for a certain period, application of preferential rates at the stage of

implementation of innovative projects or startups, VAT exemption, VAT transactions related to the import of equipment necessary for innovators, research institutions, institutions of higher education; introduction of a research tax rebate and investment tax credit for businesses in priority areas; reduction of tax rates, the establishment of benefits from land tax, other local taxes and the collection of incentives for the development of innovation in the formation of united territorial communities in Ukraine.

Therefore, tax incentives, as well as the use of budgetary resources to support innovation, will play a significant role in the formation of an innovative economy and digitalization of business. The main task of the state in this context should be to provide a favorable environment for the implementation of innovative projects and the progress of startups to form an innovative image of the country and social progress.

REFERENCES

1. Law of Ukraine «On Innovation» of July 4, 2002 № 40-IV [Electronic resource]. Access mode: https://zakon.rada.gov.ua/laws/show/40-15
2. State Statistics Service of Ukraine [Electronic resource]. Access mode: http://www.ukrstat.gov.ua
3. Medinska T.V., Cherevata R.Yu. (2017). Tax incentives for innovation in Ukraine and Poland in terms of European choice. *Economy and Society*. Vol. 17. P.149-156.
4. Petyk M.I., Sharak S.T. (2018). Tools of fiscal stimulation of economic development of Ukraine. Global and national economic problems. Electronic professional publication. Vol. 22. P. 834-840.
5. Tax Code of Ukraine: Law of Ukraine of 02.12.2010 № 2755 [Electronic resource]. Access mode: https://zakon.rada.gov.ua/laws/show/2755-17.
6. Customs Code of Ukraine of March 13, 2012. № 4495-VI [Electronic resource]. Access mode: https://zakon.rada.gov.ua/laws/main/4495-17
7. Lunina I.O., Bilousova O.S., Bulana O.O. (2016). Budget and tax incentives for innovation in Ukraine. Economics and Forecasting. Vol.1. P. 41-56. DOI: 10.15407 / eip2016.01.041
8. On scientific and scientific-technical activity: Law of Ukraine of November 26, 2015 № 848-VIII. [Electronic resource]. Access mode: https://zakon.rada.gov.ua/laws/show/848-19
9. Draft Law on Amendments to the Tax Code of Ukraine on the Establishment of a Special Tax Regime // Official Web Portal of the Verkhovna Rada of Ukraine [Electronic resource]. Access mode: http://w1.c1.rada.gov.ua/pls/ zweb2/webproc4_1?pf3511=67671
10. Law of Ukraine «On Joint Investment Institutions» [Electronic resource]. Access mode: https://zakon.rada.gov.ua/laws/show/5080-17

11. Veremienko A.S. (2017). The place and essence of venture investment funds among CII in Ukraine. *Economy and State*. Vol. 6. P. 90–93.
12. Tarumov V.O., Lobodzinskaya T.P (2017). Prospects and opportunities for the development of venture entrepreneurship in Ukraine. *Economy and Society*. Vol. 13. P. 309-313.
13. Optimization of the tax burden through the use of investment funds [Electronic resource]. Access mode: http://www.moris.com.ua/ optimizatsiya-podatkovogo-navantazhennya-cherez-vikoristannya-investitsijnih-fondiv/
14. Tsenkler N.I. (2019). Tax incentives for innovation: accounting dimension. Problems of theory and methodology of accounting, control and analysis. Vol. (44). P. 70-74.
15. Ukraine - 2030 a country with a developed digital economy. Ukrainian Institute of the Future [Electronic resource]. Access mode: https://strategy.uifuture.org/kraina-z-rozvinutoyu-cifrovoyu-ekonomikoyu.html
16. Bodrov V.G. (2018). Tax regulation in the formation of the digital economy in Ukraine. *Economic Bulletin. Series: finance, accounting, taxation*. Vol. 2. P. 30-37. DOI: 10.33244 / 2617-5932.2.2018.30-37
17. Arzyantseva D.A., Zakharkevich N.P. (September 19-20, 2019). Problematic aspects of the use of digital assets in the activities of virtual organizations // Building an information society: resources and technologies: materials of the XVIII International scientific-practical conference, Kyiv, P. 68-71.
18. The Ministry proposes to establish a single tax for legal entities in IT [Electronic resource]. Access mode: https://ua.interfax.com.ua/news/ telecom/634555.html

17. Challenges and opportunities of digitalization of the agricultural sector of Ukraine

Lesya Ovcharenko
PhD (Economics),
Associate professor of department
of financial law and fiscal administration
National Academy of Internal Affairs (Kyiv)
E-mail: ovch_lesya@ukr.net
ORCID ID 0000-0001-9492-114X

Tatyana Ozhelevskaya
PhD (Economics),
Associate professor of department
of economics and competition policy
Kyiv National University of Trade and Economics
E-mail:ozhelevskaya@ukr.net
ORCID ID 0000-0002-8985-5149

Introduction. The development of STP and the aggravation of social and environmental problems of mankind have created the preconditions for the emergence of the fourth industrial revolution in the early XXI century, which as a result of the combination of the material and virtual worlds led to the creation of new cyber-physical systems, which are integrated into a single digital ecosystem. According to the Global Information Technology Report, «full effects of new technologies such as the Internet of Things, artificial intelligence, 3-D Printing, energy storage, and quantum computing unfold… The future of countries, businesses, and individuals will depend more than ever on whether they embrace digital technologies » [1]. The rapid development of digitalization of the economy is already a priority for most economically developed countries - Japan, USA, UK, Germany and others.

The agriculture industry is facing several challenges: an elevated increase in demographics will boost demand for food; current uses of natural resources are highly stressed; climate change is reducing productivity in agriculture; food waste is a massive market inefficiency and an environmental threat [2]. All these threats can lead to poverty and hunger. According to experts, by 2050 the planet will need 70% more food, with 25% of all farmland is already rated as highly degraded, while another 44% is moderately or slightly degraded [2, p. 6]. Agriculture is

required to produce more food, but using less energy, fertilizer, and pesticide while lowering levels of GHGs and coping with climate change [2, p.11].

This requires revolutionary transformation processes in the agricultural sector. Scientists see solutions to these problems through digitalization in agriculture, which now takes the following forms: big data, internet of things, augmented reality, robotics, sensors, 3D printing, system integration, ubiquitous connectivity, artificial intelligence, digital twins, and block-chain among others [3].

Unfortunately, despite the rapid changes in the technology of agricultural production and the transformation of its infrastructure under the influence of digitalization, agricultural economic science has not yet given a sound assessment of these processes and their consequences. As aptly stated by S. Roth, HF Dahms, F. Welz, and S. Cattacin, today's scientists «belong to the illiterate farmers of the information age today… our profession of bookworms and elaborate natural language processors itself grew dependent on trust in and reliant on spiritual guidance from a community of cybermonks who shape and administer the increasingly omnipresent knowledge architects of the future» [4].

Literature review. The problem of digitalization in agriculture is quite new and insufficiently covered by foreign and Ukrainian scientists of agricultural area. At the same time, the categorical apparatus of this problem is not clearly defined and understood by both scientists and representatives of high-tech business structures. In particular, N. Demchyshak, O. Radykh and V. Hryb do not see the difference between the categories «information economy» and «digital economy» [5, p. 10]. M. Rudenko practically identifies the concept of «digital economy» and «digitalization» [6, p. 30], separates the categories of «innovations» and «digitalization» as independent, unrelated to each other [7, p. 70], and B. Hinings, T. Gegenhuber and R. Greenwood, M. Ayre, V. Mc Collum, W. Waters, P. Samson, A. Curro, R. Nettle, J.-A. Paschen, B. King and N. Reichelt, on the contrary, use the category of «digital innovation» in their research [8, 9].

Farmers expect scientists to clearly calculate the benefits they will receive from the introduction of digitalization. Society is also interested in the specific positive and negative consequences of digitalization in agriculture, as well as sound recommendations for public policy measures to eliminate (or mitigate) the negative consequences. But scientists are still limited to descriptive articles and the statements without any reasonable calculations of the axiom of increasing the efficiency of agricultural production, reducing labor intensity, cost and transaction costs, increasing competitiveness, etc. Most social theorists know of computers and programming languages as little as illiterate medieval farmers knew of the Bible [4, p. 5].

In general, scientific research digitalization in agriculture is still fragmentary. L. Klerkx, E. Jakku, P. Labarthewhich could be quite successfully systematized on digital agriculture, smart farming and agriculture 4.0 from the point of view of social science [3]. They singled out «five thematic clusters of extant social science literature on digitalization in agriculture can be identified: 1) Adoption, uses and adaptation of digital technologies on farm; 2) Effects of digitalization on farmer identity, farmer skills, and farm work; 3) Power, ownership, privacy and ethics in digitalizing agricultural production systems and value chains; 4) Digitalization and agricultural knowledge and innovation systems (AKIS); and 5) Economics and management of digitalized agricultural production systems and value chains, and also identified four topics that are still insufficiently studied: «1) Digital agriculture socio-cyber-physical-ecological systems conceptualizations; 2) Digital agriculture policy processes; 3) Digitally enabled agricultural transition pathways; and 4) Global geography of digital agriculture development» [3].

Of particular note are the studies of K. Bronson, who raised the very important issue of social responsibility in the implementation of digitalization in agriculture and the uneven distribution of scientific developments and innovations in the field of digitalization in agriculture among all participants in agricultural production. «Social actors shaping innovation hold a narrow set of values about good farming and good technology and their data selection choices privilege large-scale and commodity crop farmers by focusing on agronomic crop data and data mapping unusable to organic growers» [10, c. 1]. At the same time, in our opinion, we should not count on the rise of social responsibility in the implementation of digitalization in agriculture. At present, the consciousness of mankind, its moral and spiritual values, especially those of business, are not ready at this historical stage of civilization for the introduction of an informal social responsibility of business institution, so the creation of a formal social responsibility of business institution is, in our view, the only way to form an effective social responsibility of business system [11, p. 100].

A significant role in the study of digitalization in agriculture plays the problem of consequences of digitalization for the activity of agricultural advisory services. M. Ayre, V. Mc Collum, W. Waters, P. Samson, A. Curro, R. Nettle, J.-A. Paschen, B. King and N. Reichelt outlined the new challenges facing agricultural advisory services and propose a solution to this problem through co-design process and symbolic (or representational) practices [9]. C. Eastwood, M. Ayre, R. Nettle and B. Dela Rue argue that without the help of agricultural advisory services smart technologies, which presents an opportunity for farmers to better understand their farm systems, and thereby improve outcomes for productivity, sustainability, and animal care, can lead to negative consequences [12]. The article by Ukrainian scientists Yu. O. Bakun and S.P. Saiapin is quite contradictory in its content on this topic. They are trying to substantiate the

expediency of creating a binary system of advisory, which is represented by the structure of classical advisement, leading agricultural institutions of higher education, scientific institutions using the technological web platform of electronic advisement [13]. On one hand, the authors provide statistics that in Ukraine in 2019 from the state budget to finance agricultural advisory services for farmers and agricultural cooperatives 0.15 million euro was allocated, and as of November 2019 only 0.015 million euro was actually used [13, p. 84-85].This shows that farmers underestimate the quality of these services and refuse them even on a gratuitous basis. The authors recognize the inefficient system of agricultural advisory services in Ukraine [13, c. 82] and that the declared advisory services were offered mostly formally [13, c. 90]. And at the same time, on the other hand, the authors of this study insist on «the undeniable need for consulting services for agricultural producers, regardless of their size and specialization» [13, p. 85]. We question the reliability of the results of a poll conducted by the interested public organization «National Association of Agricultural Advisory Services of Ukraine», which states that 68% of respondents indicated the need for advisory services [13, p. 85].

Voloshchuk Yu. O. researched basic information and communication technologies for agricultural production, which are able to ensure the transition to e-agriculture, such as computers, websites servers, telephones, satellites and communications; various mobile devices; cloud storage technologies and analytics; sensor networks; telecommunications; Internet and broadband. The author outlined the main directions of the national concept of e-agriculture [14]. An important issue of agro-digital convergence cooperation platform in the regions of the country was raised in the study by L. V. Zaburanna and Yu. O. Yarmolenko, which on one hand enables to expand export' markets for domestic agricultural products, and on the other hand to compete successfully on the domestic market with importing companies [15]. V. Ye. Dankevych and Ye. M. Dankevych justified that digital technologies have made it possible to aggregate a large amount of data in a single system. For the first time possibilities of introduction of modern space technologies and remote sensing of the Earth for agricultural lands monitoring were analyzed. It was proved that the use of space monitoring technologies allows estimate an area of crops with high accuracy, to monitor conditions of plants at all phases of growth, to predict harvest in the early stages, to control agro-operations, etc. [16].

The most fundamental research of digitalization in agriculture in Ukraine was carried out by M. V. Rudenko, who investigated the versatility and multifaceted content of the category «digitization» and provided an author's interpretation of the concept; outlined the basic principles of digitalization (laws, regulations and driving forces for the promotion of information and communication technologies in everyday life of the state, enterprises and society); analyzed the possibilities of obtaining a positive effect from digitalization for the

Ukrainian economy from the standpoint of three main actors - the state, enterprises and society; stated the need for institutional intervention of the authorities in the process of forming the necessary regulatory framework to achieve a positive effect of digitalization [17]. M.V. Rudenko classified digital technologies according to the degree of impact on the development of agricultural enterprises, singled out groups of technologies with high (innovative solutions that have already had devastating consequences in the sector and may have even greater impact in the future), medium (were not included in the agri-food value chain to cause disturbances) and low (intermediate technologies) impact on the configuration of the value chain in agricultural production [6]; studied modern technologies inherent in the process of digital transformation of agricultural enterprises: space technology, sensors, information and communication technologies, artificial intelligence and Internet technologies [18], carried out econometric analysis of the impact of digitalization on economic development [7].

The latter study, in our opinion, is the least successful. It is well known if econometric data is simplified and has errors, then you cannot trust the results. In our opinion, the final results taken by M.V. Rudenko, such as indexation of the agricultural production, in comparison with the dynamics of GDP and part of the export of agricultural sector in Ukraine's merchandise exports, and also indicator of grain crop capacity [7, c. 68] (after all, there are still livestock and other crops in production) can not indicate the impact of digitalization of the economy on the development of agricultural production. Taking into account only the indicator of grain yield and studying the export, the researcher contradicts himself, noting that the largest exporters - agricultural holdings - also grow industrial crops [7, p. 71-72], which is not clearly taken into account in the model.

In our opinion it is doubtful to divide two independent categories of digitalization and innovation [7, c. 70], which also negatively affects the reliability of the result of econometric analysis. In general, in the absence of indicators of digitalization in agriculture, it is impractical to conduct econometric analysis using macroeconomic indicators. Thus, the results of one of the few studies of digitalization in agriculture, which has a specific calculating nature, can’t be considered reliable.

Results. A review of the publications showed that because economic scientists do not have profound technological knowledge about digitalization, they trust the slogans of digitalization experts about its incredible positive effects on society, industries and individual companies (increased production efficiency, productivity, competitiveness, cost reduction etc.). In turn, experts in digitalization do not know how to perform economic calculations of effects and make predictions about the economic, social, psychological and environmental consequences of digitalization. The methodology of economic theory, which is used by agricultural scientists to analyze the development of digitalization in

agriculture, is unable to give reliable results because it is based on orthodox economics, which has already exhausted itself.

The analysis requires a multidisciplinary approach offered by institutional economic theory. It should be noted that currently the economic practice of agricultural development is far ahead of science. While scientists are adapting their research to today's realities, Fourth Industrial Revolution has already influenced the development of agriculture by radically changing its technologies, which are now building on an array of digital technologies: Artificial Intelligence, Big Data, Internet of Things and of digital practices (Table 36).

Table 36

Current trends in digitalization and agriculture, which were formed under the influence of the Fourth Industrial Revolution

Current trends in agriculture	New technologies	
	Today available	Future perspectives
Produce differently using new techniques	➢ Hydroponics ➢ Algaefeedstock ➢ Bioplastics	➢ Desert agriculture ➢ Seawater farming
Use new technologies to bring food production to consumers increasing efficiencies in the food chain	Vertical/Urbanfarming	➢ Genetic modification ➢ Cultured meats ➢ 3D Printing
Incorporate cross – industry technologies and applications	➢ Drone technology ➢ Internet of things ➢ Data analytics ➢ Precisionagriculture	➢ Nanotechnology ➢ Artificial intelligence ➢ Food sharing and crowdfarming ➢ Blockchain

Source: Developed by the authors based on Clercq M., Vats A., Biel A. (2018).

The publication on the European Commission's behalf [19] declares the following positive effects of digitalization in agriculture:

- increase of efficiency of agricultural production through, for example, sensors tight monitoring and control over crop treatments;
- increase of labor productivity due to automation of production;
- ability to collect more data and measurement about the production: soil quality, irrigation levels, weather, presence of insects and pests;
- improving the quality and environmental friendliness of products;
- environmental protection. For example, in precision farming, nitrogen fertilizers get exactly where they are needed and in the amount that this plant needs. Thus, fertilizers are saved and the soil is not contaminated;
- transparency of productions to facilitate and automate legal and tax declarations, to increase food traceability through the publication of detailed information on goods, quality and origins due to the use of the Internet of

Things to collect and publish information on the production processes and the farm;

- increase in added value;
- emergence of new types of services and new jobs. A first notable example of service development is preventive maintenance services. But connected objects are also enabling other types of services such as advice on production practices and timing, or forecasting and scheduling services

It should be noted that the European Commission refuses to take responsibility for any views expressed in this publication [19, c. 6], thus, noting the inability of existing scientific methods to obtain reliable data on the consequences of digitalization and agriculture. And some scientists claim that the benefits of digitalization are fully tangible only for a fairly small number of companies [20, p. 50].

The European Commission publication identifies the main challenges to adapting: technological standards to ensure the compatibility of equipment; low level of digital skills of the workforce and the ability of farmers to invest and to modernize their production practices through very limited investment ability, as well as low level of development of communication infrastructures in rural areas [19].

Since, except for the proclamations about the effectiveness of digital technologies, scientists have not been able to prove it in specific calculations, half of farmers, according to a sociological study of Ukrainian scientists, are not ready to use digital technologies [13, c. 88] and the main reason for this is the manufacturers disbelief of in their efficiency (Figure 29).

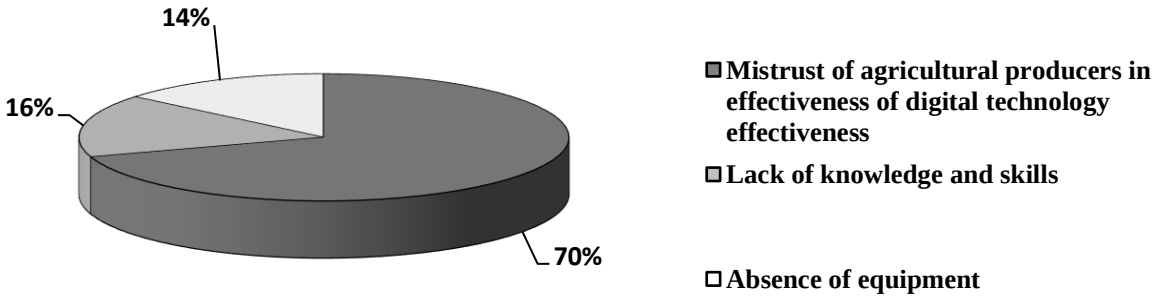

Figure 29. Reasons for unwillingness of agricultural producers to use digital technologies in Ukraine

Source: Developed by the authors based on Bakun Yu. O. & Saiapin, S. P. (2020).

When there was no Internet for the spread of modern agricultural knowledge among farmers, for their training and informational support agricultural advisory services were established in many countries. With the development of

digitalization in agriculture, the need for these structures is gradually disappearing, with which employees of these structures do not want to agree.

Agricultural advisory (extension) services in Ukraine were created from the initiative and financial support of the state in order to equip agricultural producers with the latest knowledge and technologies to increase competitiveness and profitability, as well as assistance in spreading the idea of cooperation and farming development. The result of agricultural advisory services is unsatisfactory: the share of farms in the overall structure of Gross Agricultural Output of Ukraine - from 6% to 8% per year (for comparison in the US - 90%) [19, p. 944]. Despite the fact that Ukraine has the largest arrays of agricultural land in Europe, more than 60% of which are the most fertile chernozems, it has the lowest productivity in agriculture in Europe.

The need for free agricultural advisory services for farmers in Ukraine (financed from the State Budget of Ukraine) for 2007-2019 is eloquently evidenced by the indicators in Table 37. Thus, we would call agricultural advisory services in Ukraine a «carcinogenic tumor» that diverts a nutritious financial flow from the state budget.

Table 37

Amount of financing used for advisory activities from the State Budget of Ukraine for the period 2007-2019

Sources of funding and the state of funds usage	By years									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2019
Planned by state target programs, million euros	1,54	1,41	1,08	0,98	1,21	1,25	1,19	1,16	0,68	0,15
Planned by the state budget and the stabilization fund, million euros	1,54	1,4	0,52	0,35	0	0,16	0	0	0	0,15
Used for the reporting period, million euros	0,08	0,47	0,19	0,15	0	0,16	0	0	0	0,015
Used to planned,%	4,8	32,9	17	14,6	0	12,6	0	0	0	10
Used to the budget and stabilization fund,%	4,8	33,2	30,9	41,5	0	80	0	0	0	10

Source: Developed by the authors based on Yu. O. Bakuпra S. P. Saiapin (2020)

The development of digitalization in agriculture and the expansion of access to the necessary up-to-date information has raised the question of the feasibility of agricultural advisory (extension) services. Employees of these services began to look for arguments that would prove the usefulness of agricultural advisory services for agribusiness in the context of digitalization in agriculture, conducting

various opinion polls of agribusiness representatives [13, c. 85-86], offering a co-design process with farm advisers supported them to effectively do digital innovation [9]. And this is a natural process, because they are not interested in being in the labor exchange, so they are not interested in the objective results of their research, but in concrete results in favor of further public funding of their institutions.

In our opinion, these institutions as independent legal structures have exhausted themselves. Any farmer can get the latest information he needs on the Internet. Developers and sellers of digital products are interested in making them easy to use, so they shoot a video where they explain in detail the mechanism of the product, because after buying a washing machine, the buyer does not go to the consulting center to learn how to use it. If necessary, the farmers' cooperative can hire a specialist to service and control the digital products of the members of cooperative. Neither a scientist who does not specialize in digital technology, nor an expert in agricultural advisory services, who has no practice of working with digital technology, will be able to give quality advice better than a manufacturer or specialist in digital technology. The function of accumulating and spreading the latest technologies and knowledge has now shifted from agricultural advisory services to the Internet and other means of the virtual world and agricultural advisory services have lost their relevance, so employees of these structures must have the courage to admit it. Their need remains only in those regions where there is no Internet. Unfortunately, there are still such areas in Ukraine.

At the same time, the issue of raising the educational level of farmers throughout their lives does not disappear, because they, and not advisors, make decisions on which the efficiency and competitiveness of the agricultural sector depends. This function should be assigned to higher education institutions specialized in agriculture, where the whole array of skills and knowledge should be aimed not only on agricultural, economic, legal, environmental issues, but also on digitalization in agriculture.

Despite all the positive effects of digitalization, it does carry significant risks. In addition to the rising threat of cyberattacks that expand into the physical world, privacy issues, and the polarizing effects of technologies on labor markets, which are identified in the Global Information Technology Report [1], national development characteristics of the world can diversify these risks. For example, farming is practically not developed in Ukraine, which is the dominant form of agriculture in most developed countries and is the key to rural development, more responsible management of natural resources and preservation of the rural ecosystem, solving rural unemployment, etc. [21, p. 942], preservation of ecological and food security of the country. Unfortunately, as in other countries [10, p. 5], Ukraine is one of 8 countries in the world, to which Bayer developers offer implementation ofa comprehensive platform Harvio™ for digital farming

[22], which focuses on developing a long-term business model based on digital tools, but focuses on big companies where there are very large cost related items connected to asset management. Harvio™ can support decision-making by improving the financial and agro-economic situation of agricultural companies, but does not take into account the environmental impact of agricultural holdings. Thus, this direction of digitalization in agriculture leads to increased competitiveness of agricultural holdings, whose activities in Ukraine have led to the destruction of agrobiocenosis, soil degradation, rapid decline in the welfare of the rural population, decline of rural areas, disappearance of almost 700 villages on the map of Ukraine [21, p. 942].

The situation is complicated by the fact that only big business or the state can be the customer and consumer of scientific developments in the field of digitalization in agriculture. In conditions of a constant state budget deficit, as a rule, only agricultural holdings remain customers and investors, which dictate the requirements for developers in the field of digitalization in agriculture in accordance with the conditions of their management. At the same time, there are already a lot of worldwide examples of companies with traditional technology giving way to innovators in the field of digital technologies and going bankrupt as a result [23, p. 1]. It is not difficult to predict the fate of small and medium agribusiness without state intervention.

The open online platform farmOS, which was developed by a community of farmers, developers, researchers, and organizations, can be an example of solving the problem of uneven involvement of all subjects of agricultural production [10, p. 1], Such an open online platform can only be created by large farmers' associations (for example, the country's agricultural cooperatives and the country's farmers' union) and with the organizational and financial participation of the state. One cannot ignore the warnings of a number of scientists who have used an institutional approach in their research about digital disruption, which requires the formation of fundamental organizational changes in management, new behavior of economic actors, new values etc [24].

Thus, studies of the negative consequences of digitalization in agriculture have shown that the statements of BCG (The Boston Consulting Group) experts that the introduction of digitalization technologies allow the state, business and society to function more efficiently [17, p. 61], in our opinion, is not so unambiguous. If the government does not interfere in this process or the wrong public policy, which can be caused by fierce lobbying of the interests of large agribusiness, is implemented digitalization can lead to irreparable negative consequences as aptly stated.

Conclusion.

The study gives grounds to claim:

1. Society expects from scientists clear calculations and predictions about the socio-economic and environmental effects and consequences of digitalization and agriculture. In these conditions, in our opinion, achieving reliable research results is possible only if each topic will be studied by a multidisciplinary team of scientists consisting of specialists in digitalization in agriculture, economic, social, psychological and legal sciences. At the same time, economists should change the research methodology from orthodox to institutional, which uses a multidisciplinary approach to analysis. The failure of orthodox economic theory is recognized by the world's leading economists, who continue to use outdated tools in their research, unwilling to study innovations in the development of economics.

2. Since the research of the consequences of digitalization in agriculture requires a multidisciplinary approach and should take into account the results of experimental research in agriculture, we propose to study its effects on pilot projects which to be implemented in leading agricultural universities with their own production base and multidisciplinary scientists, before the widespread introduction of digital technology and the results through a distance learning platform to be spread among farmers.

3. Digitalization in agriculture is an objective reality and, despite the resistance of those business people who are afraid of radical change, it is the future of the industry. But in addition to the positive ones, it has a number of negative consequences that require careful study and a set of measures, both by the state and business structures, that would prevent, eliminate or mitigate their effects. Without a controlling role of the state and the creation of a rigid institutional framework to prevent unfair competition among farmers through cybercriminals, the liberalization of digitalization and agriculture could threaten the country’s food security.

4. Digitalization in agriculture has significantly affected the infrastructure of agriculture. In particular, due to the increasing availability of information about the latest technologies and the spread of smart farming, agricultural advisory (extension) services have lost their functions. Because the farmer, not the agricultural advisor, decides on the successful operation of the agribusiness, he must constantly improve his educational level throughout life. Higher education institutions specialized in agriculture accumulate the latest knowledge in all fields of science, including digitalization in agriculture, and have the opportunity to test the quality of these innovations in practice on the lands and livestock that belong to them. That is why they should provide training for farmers and provide, if necessary, socially oriented agricultural advisory (extension) services.

REFERENCES

1. World Economic Forum. (2016). The Global Information Technology Report 2016. Innovating in the Digital Economy. URL: http://www3.weforum.org/docs/GITR2016/WEF_GITR_Full_Report.pdf
2. Clercq, M. & Vats, A. & Biel, A. (2018). Agriculture 4.0: the future of farming technology. *World Government Summit*. URL: https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2018/February/Oliver-Wyman-Agriculture-4.0.pdf
3. Klerkx, L. & Jakku, E. & Labarthe, P. (2019). A review of social science on digital agriculture, smart farming and agriculture 4.0: New contributions and a future research agenda. *NJAS - Wageningen Journal of Life Sciences*, 90–91, 100315. DOI: 10.1016/j.njas.2019.100315
4. Roth, S. & Dahms, H. F. & Welz, F. & Cattacin, S. (2019). Print theories of computer societies. Introduction to the digital transformation of social theory. *Technological Forecasting and Social Change*, October, 149. DOI: 10.1016/j.techfore.2019.119778
5. Demchyshak, N. &Radykh, O. &Hryb, V. (2020). Digitalization of the agricultural sector in the conditions of opening the land market in Ukraine. *Agrosvit*, 12, 10-18. DOI: 10.32702/2306-6792.2020.12.10
6. Rudenko, M.V. (2019). Vplyv tsyfrovykh tekhnolohii na ahrarne vyrobnytstvo: metodychnyi aspekt. *Vchenizapysky TNU imeni V. I. Vernadskoho. Seriia: Ekonomika i upravlinnia*, 30 (69), 6, 30-37. DOI: 10.32838/2523-4803/69-6-28
7. Rudenko, M. V. (2020). Ekonometrychnyi analiz vplyvu tsyfrovizatsii ekonomiky na rozvytok ahrarnoho vyrobnytstva. *Ekonomika APK*, 4, 66-79. DOI: 10.32317/2221-1055.202004066
8. Hinings, B. & Gegenhuber, T. & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, 28, 1, March, 52-61. DOI: 10.1016/j.infoandorg.2018.02.004
9. Ayre, M. & Mc Collum, V. & Waters, W. & Samson, P. & Curro, A. & Nettle, R. & Paschen, J.-A. & King, B. & Reichelt, N. (2019). Supporting and practising digital innovation with advisers in smart farming. *NJAS - Wageningen Journal of Life Sciences*, 90-91, 100302-100302. DOI: 10.1016/j.njas.2019.05.001
10. Bronson, K. (2019). Looking through a responsible innovation lens at uneven engagements with digital farming. *NJAS - Wageningen Journal of Life Sciences*. DOI: 10.1016/j.njas.2019.03.001
11. Novikova, N. & Ovcharenko, L. & Ozhelevskaya T. (2020). Social responsibility of business: institutional approach. *Ekonomika APK*, 2, 93-103. DOI: 10.32317/2221-1055.202002093
12. Eastwood, C. & Ayre, M. & Nettle, R. & Dela Rue, B. (2019). Making sense in the cloud: farm advisory services in a smart farming future. *NJAS* -

Wageningen Journal of Life Sciences, 90-91. DOI: 10.1016/j.njas.2019.04.004

13. Bakun, Yu. O. & Saiapin, S. P. (2020). Shliakhy tsyfrovoi transformatsii silskohospodarskoho doradnytstva v Ukrainy. *Ekonomika APK*, 4, 80-93. DOI: 10.32317/2221-1055.202004080
14. Voloshchuk, Yu.O. (2018). Napriamky tsyfrovizatsii ahrarnykh pidpryiemstv. *Efektyvna ekonomika*, 2. URL: http://www.economy.nayka.com.ua/?op=1&z=7284. DOI: 10.32702/2307-2105-2019.2.66
15. Zaburanna, L. V. & Yarmolenko Yu. O. (2019). Potentsial provadzhennia platformy ahrotsyfrovoi kooperatsii dlia konverhentsii rehioniv u protsesi staloho rozvytku. *Ekonomika APK*, 3, 87-96. DOI: 10.32317/2221-1055.201903087
16. Dankevych, V. Ye. & Dankevych Ye. M. (2019). Monitorynh silskohospodarskykh uhid iz zastosuvanniam system dystantsiinoho zonduvannia zemel. *Ekonomika APK*, 8, 27-36. DOI: 10.32317/2221-1055.201908027
17. Rudenko, M. V. (2018). Tsyfrovizatsiia ekonomiky: novi mozhlyvosti ta perspektyvy. *Ekonomika ta derzhava*, 11, 61-65. DOI: 10.32702/2306-6806.2018.11.61
18. Rudenko, M. (2019). Digital transformation technologies in agricultural enterprises. *Agrosvit*, 23, 8–18. DOI: 10.32702/2306-6792.2019.23.8
19. Bonneau, V. & Copigneaux, B. & Probst, L. & Pedersen, B. (2017). Industry 4.0 in Agriculture: Focus on IoT aspects. Digital Transformation Monitor. European Commission. URL: https://ec.europa.eu/growth/tools-databases/dem/monitor/sites/default/files/DTM_Agriculture%204.0%20IoT%20v1.pdf
20. Dyba, M. I. & Herneho Yu. O. (2020). Vyklyky Industrii 4.0 u konteksti yii stanovlennia na hlobalnomu i natsionalnomu rivniakh. *Ekonomika Ukrainy*, 6, 43–59. DOI: 0000-0002-4929-0411
21. Ozhelevska, T. S. & Poplavskyi, V. Y. (2018). Fermerstvo v Ukraini: perspektyvy rozvytku. *Molodyi vchenyi*, 1(2), 942-948. URL: http://nbuv.gov.ua/UJRN/molv_2018_1(2)__90.
22. BASF. *Latifundist.com.* URL: https://latifundist.com/kompanii/712-basf
23. Verhoef, P. C. & Broekhuizen, T. & Bart,Ya. & Bhattacharya, A. & Dong, J. Q. & Fabian, N. & Haenlein M. (2019). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*. DOI: 10.1016/j.jbusres.2019.09.022
24. Skog, D.A. & Wimelius H. & Sandberg J. (2018). Digital Disruption. *Business & Information Systems Engineering*, 60, 431–437. DOI: 10.1007/s12599-018-0550-4

18. Tourist industry of Ukraine in the context of world modernization processes

Tetyana Chernihovets
Candidate of Pedagogical Sciences (Ph.D.),
Associate professor of department of documentary communications
Rivne State University for the Humanities
E-mail: tchernigovets@ukr.net
ORCID ID 0000-0002-0757-8863

Olha Nedzvetska
Senior Lecturer Departments of Tourism
Lviv Polytechnic National University
E-mail: nedzvetska.olga@gmail.com
ORCID ID 0000-0001-6449-7341

In recent years, tourism has become one of the most perspective and leading industries in the world economy. The promotion of business in the field of tourism can guarantee a large contribution to tourism and the country's economy in providing new jobs, filling the state budget through taxes. The tourism industry is one of the most promising areas of economic restructuring, has a stimulating effect on the development of related industries, such as transport, construction, communications, agriculture, production of consumer goods.

The modern tourism industry allows hotel chains, transportation companies, and travel corporations around the world to flexibly intersect in business. Tourism as a tool of economic development attracts visitors who are motivated by interest in learning about the monuments of history, architecture, art; natural and ethnic features; modern life of the people. Tourist activity plays an important role in understanding one's own identity, in reviving local traditions. Awareness of the historical and cultural significance of the achievements of one's own country and pride in it is especially important for young people.

The main condition for the development of tourism is the historical and cultural potential of the country, the level of access to it. The objects of cultural tourism include both historical and cultural heritage (historical territories, architectural structures and complexes, archeological sites, museums, folk crafts, rituals, performances of folk groups) and modern culture (exhibitions, festivals, celebrations, features people's lives: kitchen, costumes, forms of leisure).

The Constitution of Ukraine states that “All human beings are free and equal in their rights, …”, “Everyone has the right to the free development of his or her personality, …” [4, p. 21-23]. In tourist activity as a certain form of extracurricular (including extracurricular) time, a person is formed as a person, his worldview and consciousness expand, creative potential.

The American philosopher J.D “Yui, considering the problem of education and the formation of a «progressive society», by which he meant a society that is progressively developing and improving, it is advisable to pay considerable attention to the use of previously acquired experience in human life to build a new stage of better development. man. The facts and ideas obtained in this way become the basis for further knowledge that will raise new questions. This process is continuous. The indispensable connection between the present and the past must be applied and the results of human formation must be expected [2, p. 69, 73].

During recent years, more and more scientists are studying tourism as a kind of phenomenon that is a powerful factor in the economy, one of the social institutions, as well as a holistic sphere of culture. The development of international and national trismus was studied by well-known domestic scientists O. Beidyk, T. Bozhuk, O. Lyubitseva, M. Klyap, M. Malskaya, D. Stechenko, V. Fedorchenko, L. Cherchik. In order to increase the representativeness of the country's image and popularize national traditions, the introduction of promising areas of tourism development must take into account those components of tourism potential that have the necessary properties to develop, create and successfully use a competitive tourism product. Ukraine has a high rate of resource potential for tourism development, sightseeing and recreation. In addition to natural and historical and cultural tourist resources, traditional culture of the people, Ukraine also has a large number of different holidays, festivals and objects of scientific, educational, industrial, religious, sports purposes.

The Ukrainian people have a rich authentic culture that is acquisition of numerous generations. They were able to feel nature, ladle a health, force and beauty from her bosom; all creative forces of man were sent to strengthening of family, the family and transmission of traditions to the rising generation. It is brightly confirmed by expressions of the known ethnographer O. Voropaya: «Every nation, every people have his traditions, customs and ceremonies that was produced during many centuries and sanctified by centuries. Family is our rich on traditions, holidays and ceremonies, wonderful spirituality, as from the oldest times our пращури took away the most valuable acquisitions, enriching them and thriftily passed that glass wisdom and health of nation from a generation to the generation» [1, p.25].

Ukrainian state is successfully fighting for the fourth revival of its statehood. The deep and ancient history of our people, wisdom and majestic colorful culture have consolidated the Ukrainian people for centuries, strengthened their spirit and

helped them withstand the difficult trials of fate. The tourism industry in Ukraine contributes to the revival of Ukrainian culture, ancient traditions, customs, celebrations, which allows Ukrainians to identify with their culture and little-known, and often distorted history. For foreign guests, the history and culture of the Ukrainian people, the attractiveness of the celebrations remains a wonderful form of recreation and knowledge of the ancient transformed interactive culture. From time immemorial we have received the wisdom of life and guidelines for lifestyle, attitude to man and nature. They are embedded in Ukrainian customs, holidays, folk rites, folklore. This is the worldasseption and worldperseption of many generations of our people. Ukrainian traditions tell and teach us the relationship between people, carry a great spiritual value of each individual and the people in general.

Our ancestors were pagans by faith. Unlike us, they believed in the gods of the elements and various forces of nature. They had many gods. Each of the gods, according to the ancestors, had its own territory of influence and responsibility, performed a specific task. The oldest gods who were worshiped by our ancient ancestors and with whom we tried to live in harmony and communication were Lada, Div, Svarog, Dana, Dazhbog, Veles. With them the constrained and calendar holidays are the oldest rite that arrives at primitive, heathen beliefs a root and combines in itself rational experience and religiously-magic beliefs of our ancestors. Calendar holidays are the most ancient ritual, which has its roots in primitive, pagan beliefs and combines rational experience and religious and magical beliefs of our ancestors. The annual agrarian circle included winter, spring, summer and autumn holidays, rites and customs. Among all the rites and holidays, where the best preserved pagan character in the celebrations, is the holiday of Ivan Kupala.

Pre-Christian customs were harmoniously intertwined with religious ones, and formed the dualistic rites we have today. Earlier, Christmas fell on the holiday of the winter turn of the sun, the herald of harvest and happiness, which is sung in carols. They intertwine motifs of farming, military, fairy-tale, wedding and biblical-religious. Rituals cover the entire life path of a person from birth to death (childbirth, invitations of the midwife, visits to the newborn and the mother, baptisms, virgins, engagements, weddings, funerals); all spheres of human activity and agriculture (call of spring, spring flowers, the first furrow, harvest, Saviour). Ukrainian folk traditions are revealed in the works of O. Voropay, L. Orel, V. Balushok, V. Zhayvoronok, N. Yakovenko. Peculiarities of hospitality in the tourist sphere are revealed by scientists: L. Agafonova, G. Garbar, G. Krul, M. Malska, J. Walker.

The main regularity of Ukrainian celebrations is that traditions in Ukraine are closely connected with everyday, calendar and religious life. But this is quite natural. After all, many Ukrainian traditions and events, as in many nations, were

associated with the agricultural calendar. Harvest songs, winter carols or joyful spring songs have long accompanied seasonal work. It was impossible to imagine hard work without economic magical rituals, and rest without disguises, entertainment or ritual congratulations and detours. Natural hospitality and cheerfulness were passed down from generation to generation through these everyday Ukrainian customs [10].

In general, calendar rituals were divided into four main cycles: winter, spring, summer and autumn. Each cycle of rituals was timed, on the one hand, to natural phenomena, and on the other – to the corresponding types of agricultural activities.

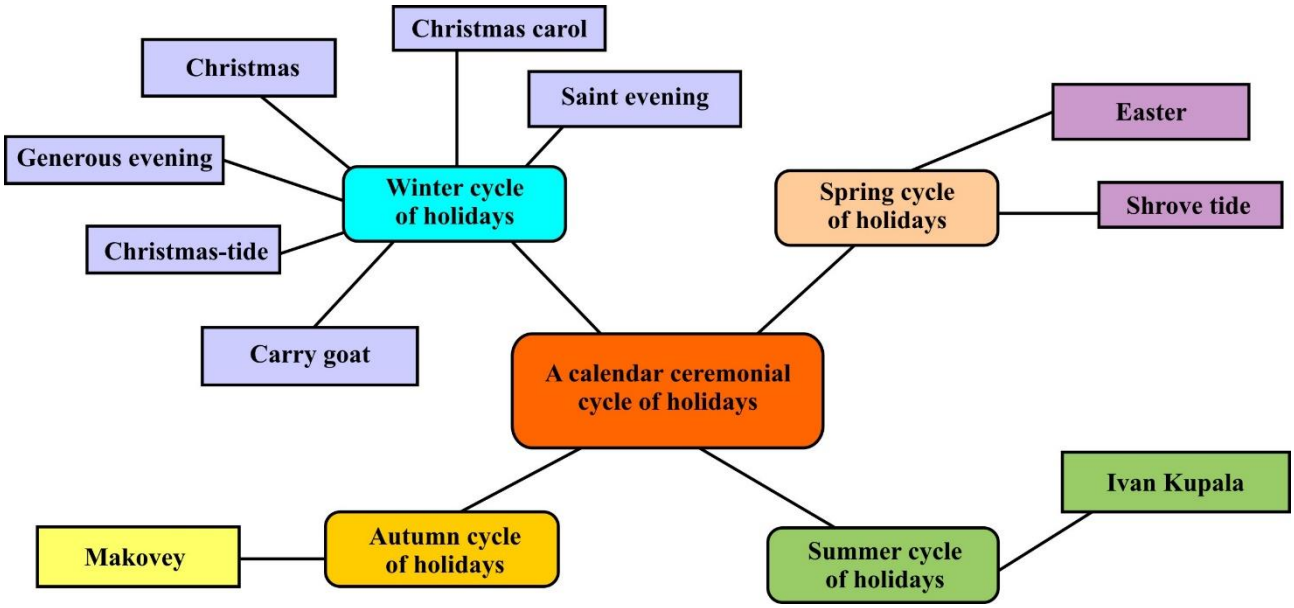

Figure 30. Calendar ceremonial cycle of holidays *

* developed by the authors

Next to a traditional festive culture the handicraft was historically formed in Ukraine, society, municipal and others like that. The modern system of festive traditions in Ukraine is folded: state (Day of Constitution, independence Day, Day of Collegiality, Victory Day), historical and cultural (holidays of cossack glory, holiday of cities, villages, streets),literary-art (timed to the notable events and figures of literature and art : the Shevchenko holidays), labour (professional, corporate: day of medical and pedagogical worker, builder and others like that), domestically-domestic (holidays are families wedding, housewarmings, domestic anniversaries), religious, holidays of folk work (handicrafts, song, dance, embroidery art, humour, fairs and others like that). The adopted types of holidays are the important cultural events of state, regional or local value and interesting tourist.

Various forms of celebrations in tourism are attributed by type to event tourism. This is a trend in the tourism industry that impresses tourists with the

brightness of emotions, leaves unforgettable impressions, expands the worldview and sometimes deepens a person's knowledge of the traditions of certain events. The main motivation of the tourist when choosing such a tour is to attend a certain event. It is the need or necessity to see or hear something new that motivates a person to travel long distances, bringing pleasure to himself and profits to tourism businesses. Event tourism includes a cognitive component, immersion of tourists in the culture and customs of the people in the host country. This type of tourism remains relevant at any time of the year and its resources are inexhaustible.

The main tasks of this type of tourism include:

1. Carrying out of mass actions which already have the history;
2. Development of existing measures that have high potential but do not yet exist

perfect in conducting;

3. Development and formation of new measures.

The time spent on this type of tourism varies from a few days to a week. But, as practice shows, many events are of a longer nature. Event tourism occupies a significant place in the world. Every year its share increases by 1.5%. Carrying out large-scale events plays an important role in the revival of cities, increasing the tourist attractiveness of the territory, and even the creation of a branding company.

Event tourism includes a cognitive component, immersion of tourists in the local culture and customs of the host country. Event tourism was studied by Ukrainian scientists A. Babkin, O. Beidyk, N. Kornilova, L. Ustymenko. The big advantage of this type of tourism is that it remains relevant at any time of the year and its resources are inexhaustible. Every year it is replenished with more and more new tours. Smal I. also notes that: «We can only talk about the extent of the impact of event resources on the creation of tourist infrastructure, the formation of tourist flows, which in today's world, first of all, depends on the advertising of events which is used in tourism, largely depends on public preferences, fashion and imagination about the prestige of the event. Of great importance is the consistency and frequency of events» [8, p. 62].

Favorite events bring recognition to cities, increase interest in the whole country. A striking example is the festival in Rio de Janeiro, which is firmly in the top of the most visited events in the world. Another example is one of the most popular Oktoberfest festivities. The reputation of the «holiday city» was given to Venice, where the Venice Carnival is held annually. Masquerades, parades, traditional ceremonies and a festive atmosphere take place here for 10 days. Every year this festival is visited by more than 500 thousand tourists.

In Ukraine, for example, it is advisable to consider the western region where samples of traditional Ukrainian culture are best preserved. Lviv region is the heart of Western Ukraine, where the most preserved folk traditions of traditional celebrations and hospitality, so it is here that tourists can feel the comfort of

Ukrainian flavor. Galicia has long been famous for its celebrations, themed events, gathering people for fun, celebrating memorable days and creating a holiday to continue and maintain its cultural identity and nationality.

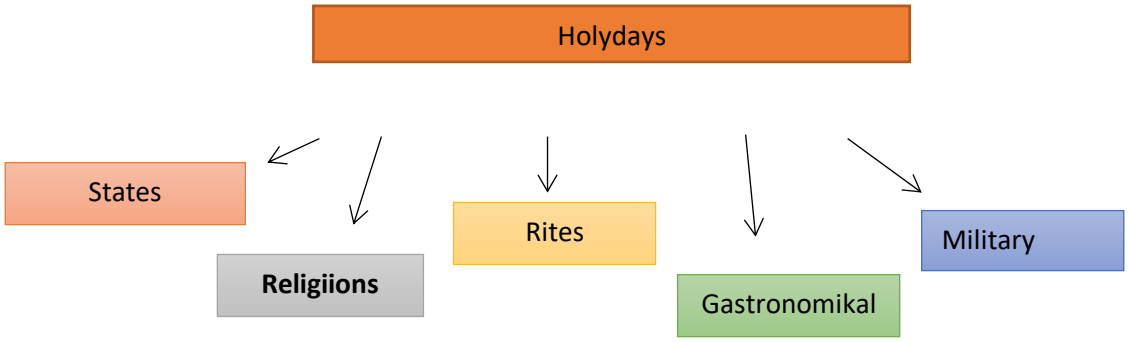

Figure 31**.** Thematic celebrations in Galychina

** developed by the authors*

More than 100 festivals a year are held in Lviv region. The most popular of them are the music festival «West», the historical festival «Tu stan!», The ecological festival «Verkhobuzh», the ethno-festival «Pidkamin», the theater festival «Golden Lion».

Having considered the festivals of the Lviv region, tourism researchers Kadnichansky DA and Gritsyuk IM distinguish the following features:

- growth in number and mass character;
- focus on young tourists;
- appeal to cultural traditions, folk crafts, reference to the ethnographic heritage of the region;
- Ukrainian, patriotic orientation;
- development of gastronomic festivals;
- timing of festivals to festive events;
- variety of activities offered;
- the emergence of specialized festivals;
- stimulating the development of adjacent infrastructure [3, p. 177]

Lviv boldly can be called a «majestic holiday city». According to the Department of Tourism [11], tourists traveling in Lviv like:

72.5% - drink coffee, eat something tasty in the cozy atmosphere of the city;
66.9% - walk through the historic center of the city;
57.7% - to visit cultural institutions and events.

The index of tourist attractiveness of the city is 4.8 out of 5, and the index of satisfaction with tourist services is 4.4 out of 5, which largely indicates the hospitable receptions of vacationers.

There are 9 big city celebrations in Lviv every year, in particular: «Easter in Lviv» (Pysanok Festival), Batyar Holiday, Art Festival «Summer on the Market», Folklore Festival «Ethnovyr», Coffee Festival «Coffee to Lviv», «Holiday

Chocolate», Lviv City Beer Festival, Cheese and Wine Festival, «Pampuha Festival».

City celebrations are popular not only among tourists but also among locals. These include one of the «sweetest» events in the country – Lviv National Chocolate Festival, which is colorful and interesting with a special hospitality of this holiday for different categories of tourists and locals. The history of this holiday began in the Middle Ages, when the people of Lviv discovered chocolate and fell in love with it. With the beginning of the twentieth century. There were confectioneries in almost every house on present-day Svobody and Shevchenko avenues. Now it has become a traditional holiday in Lviv, during which presentations of chocolate products, master classes, creation of chocolate sculptures, a fair, shows of chocolate dresses «ShokoFashion» are held. The organizer of the event is the company for organizing events №1 in Lviv «Dick-Art».

The first chocolate festival was held on May 2, 2008, when a 10-meter chocolate cake was baked in honor of this holiday. This holiday annually attracts more than 20 thousand connoisseurs, and about 50 confectionery companies [10]. In 2019, striking Chocolate Festival was held at the Potocki Palace in February.

The holiday program included:

- Traditional chocolate fair
- master classes from professional chocolatiers,
- art chocolate installations,
- competitions, games for children.

In total, during the 5 days of the National Chocolate Festival, the organizers spent 6 tons of chocolate to create 20 sculptures, the main festival sculpture "Chess Horse", chocolate railway, decor and treat guests. Among the surprises prepared for the festival guests by the organizers is the interactive Chocolate Museum, where each guest was greeted by little bears - guardians of chocolate secrets. At the Museum, visitors immersed themselves in the history of chocolate, got acquainted with its recipes. Young visitors to the chocolate festival traveled through the «Children's Chocolate Country», in which all the houses and monuments and even the railway were made of chocolate. In addition, each little guest could take part in making their favorite sweets, including their own chocolate trailer, which could be «loaded» with nuts, raisins, cookies and other delicacies.

The festival included several «chocolate» photo zones – art installations: a 5-meter chocolate mill with a bear, a huge 9-meter chocolate box of candies, a frame decorated with chocolate flowers, and a huge bar of secular chocolate "Tiramisu", where you could take pictures together. with famous chocolatiers. And the visitors shared their impressions of the holiday with their relatives and friends with the help of the holiday mail «From Lviv with love».

The program of the event was so well provided with interesting events, excursions and master classes that it did not need additions. Tour operators often

include such festivities in their tours because they vary in the type of event. But more and more often such events act as an independent tourist product.

Lviv also hosts the largest football fans' festival-tournament in Eastern Europe, Eurofan. International swimming competitions «Lviv Open», motocross and speedway competitions are popular.

The «pluses» of any holiday event in the city of Lviv are:

1) Venue in the city center, which will allow the event to visit a large number of tourists;

2) Hospitable meeting of tourists of all ages and genders;

3) The festive event reveals the traditions of hospitality of the Ukrainian people, which have existed since ancient times;

4) Updating the program of the event, which has already been held many times in order to be interesting to tourists who have visited the festival before.

Festivals and celebrations in Lviv are no less interesting than European ones, but at the moment they do not have enough digitalization of events and advertising to attract more tourists and bring them to the world level.

Having corrected minor shortcomings, Lviv can position itself as a European city and count on a score of 5 out of 5.

By choosing event tourism in Ukraine, the traveler can be sure that he will spend his time usefully. After all, it is during such a trip that the tourist learns more about the customs and traditions of Ukrainians, can take part in interesting workshops, try national cuisine, enjoy folk music and immerse themselves in the ancient history of our country.

Accelerated development of the tourism industry, along with the positive consequences for the economy and society has some negative effects. The appearance in recreational areas, at attractions of a large number of organized and self-organized tourists carries certain threats in the organization of leisure time of tourists. Namely:

- the emergence of a large number of hotels, tourist bases, parking lots, sanatoriums, restaurants, which do not always meet the high level of tourist service;
- Lack of ecological certification of tourist facilities, which will allow to assess the impact of emissions and pollution from tourist stay and service;
- the formation of a large number of cultural practices in the form of mass and group leisure activities that do not carry a deep information content and serve a certain unification of the tourist's leisure time in the process of recreation;
- Lack of effective state control over the use of tourist resources, in particular, the use of natural medical and restorative facilities.

The phenomenon of tourism is that it is based on meeting the physiological needs of man and his desire to learn about the world around him. This form of

high-quality human recovery, saturation with information and filling with new impressions cannot be stopped.

Today, there are more than 500 event companies operating in the Ukrainian market, and each of them holds up to 30 events a year. The total fund of the Ukrainian market working in the field of event tourism is about 30 million dollars. In recent years, the growth of competition from companies operating in this industry has increased, which has led to their growth and a certain positioning in the market. The role of the Internet, Internet blogs, forums, media channels and social networks has significantly increased. Every company strives to show something special and unique. Ukrainian customs and traditions are increasingly becoming the basis of events, because this is what tourists from abroad follow and what Ukrainian tourists are interested in. All this suggests that today the organization of special events is an integral part of shaping the image of Ukraine as a whole and each region.

It is the image of the region that reflects its current state, level of economic development, peculiarities of mentality and culture of people. Each region has its own specific features, but common general trends of modernization and development of the tourism industry. It

- attractiveness (natural and recreational value), cultural and aesthetic value that attracts tourists;
- accessibility, i.e high level of development and availability of efficient transport connections;
- level of development of tourist infrastructure, comfortable placement of tourist infrastructure, high level of service;
- maximum orientation to all target markets.

Modern information technologies allow a coordinated interaction of tourism and socio-cultural services, which makes the service sector and the tourism industry more interesting, accessible to consumers and competitive in the market of tourist services. Information systems significantly simplify the procedure of forming a tourist product using computer networks, international reservation systems, electronic databases of regulations in tourism, acquaintance with the variability of the future tourist product, automated system of mutual account. The works of such scientists as: O. Vinogradova, Y. Zabaldina, S. Melnichenko, M. Skopen, M. Shakhovalov are devoted to the issue of using information support and digitalization in tourism.

Today, in any tourist region of Ukraine, there is an urgent need for digitalization and information support when opening a certain direction of travel, creating a new tourist product or making changes to an existing tourist product. In this context, information serves as a decision-making tool, for example, when assessing the capabilities of the territory and the available resource base. The concept of «information support» is widely discussed in the professional literature. So the researcher MM Perepelytsia characterizes information support «... as a

process of providing information, and as a set of forms of documents, regulations and decisions implemented on the volume, location and forms of existence of information used in the information system in the process of its operation».

Information support of the tour is necessary for the greatest awareness of the tourist and his confidence in the right choice of vacation. To display meaningful information and intensify the activities of the tourist information package must be formed taking into account the characteristics of the tour. In preparation for the trip, the tourist needs the most complete information about the destination: a detailed description of attractions, schemes and maps of the area, norms, rules and customs of a particular area and country, highways, transport schedules and museums. Also, tourist information should be of an advertising nature to attract an additional flow of tourists to a particular region. It is safe to say that all regions of Ukraine have the right to succeed in the development of tourism under the following conditions: first, the preservation of unique tourist sites and ancient traditions inherent in the regions; secondly, the availability of good infrastructure and high service in it; thirdly, support of information systems, digitalization of historical objects and cultural events, digitalization of the tourist process.

World practice shows the exceptional role of event tourism, created on the basis of the use of elements of cultural and historical life of peoples. Trends in the revival of interest in original folk customs must be taken as a basis for the development of new event tourism products and the formation of a special image of Ukraine. The rapid globalization processes taking place in the world in recent decades have stimulated to pay more attention to people, their rights and interests, to develop relationships with business partners from other countries and regions of the world. Unification of the service, ratification of international programs and agreements, mutual respect between peoples stimulates the activities of the tourism sector, remains a guarantee of peaceful relations and mutual understanding between people.

REFERENCES:

1. Voropay O. (1958). Customs of our people. *Ethnographic Essay*. Vol. 1, Munich, «Ukrainian Publishing House», 442p.
2. D ”yui J. (2003). Experience and Education / Trans. from English M. Vasylechko. Lviv: Calvary, 84 p.
3. Kadnichansky D.A., Gritsuk I.M. (2012). The state and prospects of development of eventful tourism are in the Lviv area. *Geography and tourism*. Part. 20. P. 174-184.
4. The Constitution of Ukraine (1996). Information of the Verkhovna Rada (VVR), No.30, Art. 141.
5. Perepelytsa M.M. (2003). Some theoretical aspects of the informative providing. *Announcer of University of internal affair*, P. 37-45.

6. Ponamorjov A.N. (1992). Ukrainians: folk beliefs, popular beliefs, demoniacal. K.: Lebed, 640 p.
7. Rusavska V.A. (2016). Hospitality in the Ukrainian traditional culture: textbook. Kyiv: «Lira-K Publishing House», 280 p.
8. Smal I.V. (2010). The Tourist resources of the world. Nizhyn : the Nezhin state university of the name of M. Gogol, 336 p.
9. Official site of the State Statistics Service of Ukraine [Electronic resource]. Access mode: http: // www. http://www.ukrstat.gov.ua/
10. Official site of the Chocolate Festival - Electronic resource - [Access mode]: http://www.shokolad.lviv.ua/uk/2019/
11. Official site of the Department of Tourism - Lviv City Council. Electronic resource: https://city-adm.lviv.ua/news/tourism

19. Socjologiczna analiza mobilności zawodowej ukraińskiej młodzieży

Natalia Warga
Doktor Zakładu Socjologii i Pracy Socjalnej
Uniwersytet Narodowy w Użhorodzie, Ukraina
e-mail: ignatola23@gmail.com
ORCID ID: 0000-0002-6607-2969

Bohdanna Gwozdecka
Doktor Zakładu Prawa, Socjologii i Politologii
Państwowy Pedagogiczny Uniwersytet imienia Iwana Franki w Drohobyczu, Ukraina
e-mail: bogdankauafm@gmail.com
ORCID ID: 0000-0003-2240-3508

Natalia Nikon
Doktor Zakładu Psychologii i Pracy Socjalnej
Narodowy Politechniczny Uniwersytet w Odessie, Ukraina
e-mail: nikonnataliy@ukr.net
ORCID ID: 0000-0002-0827-0895

Wiktoria Ruhl
Doktor Zakładu Socjologii i Pracy Socjalnej
Uniwersytet Narodowy w Użhorodzie, Ukraina
e-mail: vikarul@gmail.com
ORCID ID: 0000-0002-7961-1933

Beata Szluz
Doktor habilitowany, profesor Uniwersytetu Rzeszowskiego
Zakład Socjologii Rodziny i Problemów Społecznych
Uniwersytet Rzeszowski, Polska
e-mail: bszluz@ur.edu.pl
ORCID ID: 0000-0003-2441-9175

Wprowadzenie

Podstawową wartością dla współczesnego świata jest wolność kapitału i swoboda przemieszczania się ludzi. Obecnie jesteśmy uczestnikami nasilonych ruchów migracyjnych, intensywnych procesów wymiany kapitału ludzkiego, nie tylko na poziomie krajowym, ale i globalnym. Staje się to problematyczne,

ponieważ wraz z pozytywnymi konsekwencjami (redystrybucja pracy pomiędzy różnymi regionami, asymilacja kulturowa), dostrzegane są również negatywne skutki, np. migracja jednostronna – migracja z krajów słabiej rozwiniętych do krajów o wysokim poziomie rozwoju.

Zdaniem L. Sokuriańskiej: «Wśród głównych składowych tego procesu «wymiany» (choć wymiana ta jest na tyle jednostronna, że powinniśmy raczej mówić o «odpływie», «odpływie» kapitału ludzkiego, analogicznie do «drenażu mózgów») można wskazać migracje zarobkowe, wyjazd za granicę na studia, staż itp.» [1, 298]. Warto zwrócić uwagę na młodzież, która jest społecznością najbardziej mobilną i w większości przypadków migrację młodzieży można określić jako «drenaż mózgów».

Społeczeństwo ukraińskie jest aktywnie zaangażowane w procesy migracyjne na dużą skalę. Ukraina uznawana jest za piąty kraj na świecie pod względem liczby osób, które wyemigrowały z niej w różnych latach, przechodzi zatem przez jeden z największych na świecie korytarzy migracyjnych [2]. Coraz więcej Ukraińców wyjeżdżało do Unii Europejskiej (UE) w poszukiwaniu pracy. Jeśli jednak w latach 2014–2016 migranci zarobkowi z zachodnich ziem ukraińskich udawali się do krajów UE, to w latach 2017–2018 liczba migrantów ze wschodnich regionów Ukrainy stała się zauważalna [3, 105].

W porównaniu do 2017 r. w 2018 r. liczba osób, które chciałyby zmienić miejsce zamieszkania i migrować do innego kraju wzrosła z 30 do 35%. Większość osób, które chciałyby zmienić miejsce zamieszkania, to mieszkańcy zachodniej części kraju (41%). W pozostałych częściach kraju odsetek jest niższy i wynosi: na południu – 34%, w centrum – 33%, na wschodzie – 23%. Wśród młodych ludzi (18–35 lat) liczba tych, którzy chcą przenieść się i zamieszkać na stałe za granicą wynosi 54% (tylko 19% starszego pokolenia). Wśród wyrażających chęć emigracji dominują osoby z wyższym wykształceniem i zamożniejsze. Najczęstszym, wśród powodów motywujących respondentów do myślenia o emigracji, była nadzieja na zapewnienie lepszych warunków życia (64%). Chęć zapewnienia lepszej przyszłości dzieciom, jako powód do przeprowadzki do innego kraju, wskazało 34%, brak godnej pracy na Ukrainie – 23%, chęć uzyskania dobrej edukacji – 12%. Uzyskanie odpowiednich warunków życia, jako powód ewentualnej emigracji, było często wymieniane we wschodniej części kraju, chęć zapewnienia przyszłości dzieciom – na południu, brak godnej pracy – na zachodzie. Młodzi ludzie, częściej niż inni, wymieniają wśród przyczyn chęci emigracji: brak pracy i możliwości samorealizacji, natomiast najstarsi – poczucie zagrożenia i niską jakość medycyny [4].

Zdaniem ekspertów osobliwość polega na tym, że międzynarodowe wyjazdy zagraniczne stały się "młodsze", a młodzi ludzie z wyższym wykształceniem i znajomością języka obcego są bardziej skłonni do wyjeżdżania w poszukiwaniu pracy. Niedawne badanie przeprowadzone przez „Research&BrandingGroup” wykazało, że sentyment emigracyjny jest najsilniejszy wśród młodych ludzi: 55%

Ukraińców w wieku poniżej 30 lat jest gotowych wyjechać z kraju, a 47% wśród trzydziestolatków jest gotowych do emigrowania z kraju [5].

Przegląd literatury

Podstawą teoretyczną i metodologiczną przeprowadzonych badań zespołowych były przede wszystkim prace: T. Schultza, G. Beckera, F. Makhlupa, J. Kendrika, D. Begga, L. Turou i innych. Mobilność jest bowiem badana przez przedstawicieli wielu nauk społecznych, przede wszystkim ekonomistów i socjologów, ze względu na jej duże znaczenie społeczno-ekonomiczne. W badaniach nad mobilnością można zidentyfikować także prace: I. Petrowej, N. Kowalisko, S. Roszczina. Różne aspekty ukraińskiej migracji zarobkowej (mobilność terytorialna) poruszane są w pracach krajowych naukowców, takich jak: O. Malinowska, I. Prybytkowa, O. Pozniak, S. Pyrożkow, T. Petrowa, M. Romaniuk, O. Chomra i inni. Celem przerowadzonego badania jest analiza postaw mobilności zawodowej młodzieży ukraińskiej, na przykładzie badania ankietowego studentów.

Mobilność jako zasób kapitału ludzkiego na poziomie osobistym charakteryzuje się zdolnością jednostki do poprawy i szybkiego przystosowania się do nowych warunków życia, umiejętnością celowej zmiany statusu społecznego, przynależności zawodowej, zatrudnienia, rodzaju pracy, miejsca pracy, miejsca zamieszkania innych osób. Zgodnie z teorią kapitału ludzkiego mobilność pracowników przejawia się w następujących głównych formach: po pierwsze, jako zdolność jednostki do celowych zmian jakościowych w jej życiu, po drugie jako ruch (międzyzawodowy, interkwalifikacja, z jednego przedsiębiorstwa do drugiego, międzysektorowy, w ramach terytorium kraju zamieszkania i za granicą) [6]. Na tej podstawie zidentyfikowano i scharakteryzowano następujące rodzaje mobilności, które w ogólnym sensie są cennymi cechami człowieka, determinującymi rozwój i efektywność indywidualnego kapitału ludzkiego:

- zawodowa (umiejętność uczenia się nowych zawodów i opanowania wewnętrznej specyfiki działalności);
- edukacyjna (umiejętność uczenia się nowej, przywracania i ulepszania istniejącej wiedzy);
- informatywna (umiejętność świadomego śledzenia przepływu informacji);
- intelektualna (umiejętność analizowania, oceniania i produktywnego wykorzystywania rosnących przepływów informacji, wykorzystywania swojej wiedzy i doświadczenia do rozwiązywania problemów produkcyjnych i społecznych, tworzenia nowych pomysłów);
- kwalifikacyjna (umiejętność jakościowego rozwoju zawodowego);
- mobilność pracy (zdolność do zmiany pracy na inną);
- komunikatywna (umiejętność nawiązywania kontaktu z różnymi ludźmi w różnych sytuacjach życiowych);
- adaptacyjna (zdolność do szybkiego i ekologicznego przyjmowania nowych warunków życia);

- adaptacyjna (zdolność do produktywnej pracy i życia w warunkach, które nie są postrzegane przez osobę, jako dość komfortowe);
- sytuacyjna (umiejętność adekwatnego, obiektywnego reagowania na zmiany w otoczeniu, podejmowania szybkich decyzji, spełniających wymogi nowej rzeczywistości);
- społeczna (umiejętność akceptacji innego statusu społecznego: stan cywilny, rola w zespole lub społeczeństwie itp.);
- terytorialna (geograficzna) (zdolność do zmiany warunków środowiska, związanych z przeprowadzką do innego obszaru) [7].

W nowoczesnych warunkach mobilność jest ważnym atutem, ponieważ wpływa na tworzenie, akumulację i wykorzystanie zasobów kapitału ludzkiego. Generalnie w dzisiejszych dynamicznych warunkach życia społecznego, kluczem do sukcesu człowieka jest poziom mobilności. W ramach przeprowadzonych badań zidentyfikowano i scharakteryzowano czynniki wewnętrzne i zewnętrzne wpływające na aktywizację mobilności młodzieży. Zwrócono uwagę na fakt, że mobilność jest niezbędnym warunkiem wstępnym kształtowania gotowości jednostki do migracji zarobkowej.

Wśród głównych przyczyn migracji młodzieży należy wymienić: ekonomiczne, finansowe, społeczno-kulturowe itd. I tak, 72% respondentów stwierdziło, że nie widzi na Ukrainie dobrej przyszłości dla siebie i swoich rodzin, 44% jako główny powód wskazało niskie wynagrodzenie na Ukrainie, 41% – brak możliwości pełnego zrealizowania się jako profesjonalista, 34% – wymieniło niestabilną sytuację polityczną, 33% stwierdziło, że za granicą można "normalnie zarobić", nawet mając mniej prestiżową pracę [8]. Badani znacznie rzadziej wskazywali na przyczyny polityczne i narodowe.

Warto zwrócić uwagę na taki czynnik, jak znajomość języka obcego. O ile przed nieznajomością języka obcego, ograniczone informacje stanowiły istotną barierę przy wyjeździe młodych ludzi za granicę, to obecnie wszystko się zmieniło. Młodzi ludzie biegle władają językami obcymi i korzystają z Internetu, aby uzyskać potrzebne im informacje. Należy zaakcentować, że wiele krajów dotkniętych kryzysami demograficznymi, jest zainteresowanych zatrzymaniem utalentowanych i obiecujących młodych ludzi na swoim terytorium.

Znacznemu wzrostowi liczby pracowników migrujących w ostatnich latach sprzyjało rozszerzenie UE kosztem krajów Europy Środkowo-Wschodniej, otwarcie granic między nimi, ruch bezwizowy między Ukrainą a Unią Europejską – status umożliwiający obywatelom Ukrainy przekraczanie granic. Ponadto gwałtowny spadek wskaźnika urodzeń i starzenie się ludności w krajach UE na tle rosnącej produkcji, również stymuluje migrację młodzieży. Należy zauważyć, że z socjologicznego punktu widzenia sentyment emigracyjny należy rozpatrywać jako połączenie chęci wyjazdu ze stopniem gotowości do jej realizacji. W niniejszym opracowaniu poddano analizie postawy emigracyjne młodzieży ukraińskiej w kontekście ewentualnej emigracji.

Wyniki

Od stycznia do maja 2019 r. prowadzono badanie socjologiczne studentów II roku z wykorzystaniem ankiety, która objęła uczelnie w Drohobyczu, Odessie i Użgorodzie, miasta te reprezentowały zachodnią granicę Ukrainy (Zakarpacie i Lwów) oraz południe (Odessa). Badanie zostało przeprowadzone w ramach międzynarodowego badania „Wypadanie z uczelni". Do analizy nastrojów emigracyjnych młodzieży ukraińskiej wybrano 319 respondentów (dobór celowy).

Studenci posiadają doświadczenie związane z pobytem za granicą np. zdobyte w ramach programu wymiany studentów. Odpowiadając na pytanie: „Czy uczestniczyłeś w programie wymiany studentów?", ankietowani wskazali na brak takiego doświadczenia – 92,3% studentów odpowiedziało „nie", a tylko 7,7% ankietowanych wskazało, że ma takie doświadczenie. W odniesieniu do miast zauważono, że studenci uczestniczący w wymienie są najbardziej obecni wśród badanych z Użhorodu 15,5% i Odessy 8,0% respondentów (por. tabela 38).

Tabela 38

Rozpowszechnianie odpowiedzi na pytanie «Czy uczestniczyłeś w programie wymiany studentów?», (%)

Odpowiedź	Użhorod	Drohobycz	Odessa
TAK	15,5	1,0	8,0
NIE	84,5	99,0	92,0

Źródło: opracowanie własne

Próbowano dowiedzieć się, co stanowi przeszkodę w studiowaniu za granicą dla ukraińskich studentów. Przecież, jak wynika z badania, zagranicznej mobilności edukacyjnej nie ma wśród studentów z badanych miast. Wśród czynników, które są głównymi przeszkodami, wymieniono: „Niezadowalający poziom znajomości języka obcego" – 29,3%, „Obawa przed nieznaną sytuacją" – 24,6%, „Przebywanie z dala od bliskich" – 22,4% respondentów. Innym ważnym czynnikiem, który ma wpływ, są „dodatkowe obciążenia finansowe" – raczej „tak" – 44,0% i zdecydowanie „tak" – 21,5% (zob. Tabela 39). Tym samym czynniki te tworzą istotną barierę dla mobilności edukacyjnej studentów w tych miastach.

Tabela 39

Odpowiedzi studentów na pytanie «Co według Ciebie utrudnia studiowanie w wolnych strefach ekonomicznych za granicą?», (%)

Odpowiedź	Zdecydowanie «nie»	Raczej «nie»	Raczej «tak»	Zdecydowanie «tak»	Nie wiem
Niezadowalający poziom znajomości języka obcego	14,8	14,1	41,0	29,3	0,7
Brak informacji z własnej wolnej strefy ekonomicznej	18,5	29,5	29,8	17,2	5,0
Oddalenie od swoich bliskich	22,1	19,2	33,4	22,4	2,9
Dodatkowe obciążenia finansowe	11,4	20,8	44,0	21,5	2,3
Strach przed nieznaną sytuacją	17,8	15,8	40,1	24,6	1,7
Brak motywacji	24,8	23,8	33,3	15,5	2,6
Studiowanie za granicą nie jest	39,5	30,4	15,2	10,8	4,1

przydatne w domu					
Studia za granicą są trudne do zintegrowania z rodzimym programem ekonomicznym	19,5	34,6	26,2	11,4	8,4
Problem uznawania kursów międzynarodowych w ich wolnych strefach ekonomicznych	22,1	39,1	25,4	6,4	7,0
Trudności administracyjne (wiza itp.)	33,9	32,9	21,1	10,1	2,0
Niezadowalający poziom wiedzy	27,5	29,5	29,2	9,2	4,7
Nieoptymalny dostęp do programów mobilności studentów	23,3	33,3	25,3	10,4	7,6

Źródło: opracowanie własne

Spoglądając z perspektywy kategorii badanych miast można zauważyć, że dla studentów w Drohobyczu (35,9%) i Użgorodzie (22,5%) główną przeszkodą jest «Niezadowalający poziom znajomości języka obcego», a dla studentów w Odessie «Dodatkowe obciążenia finansowe» oraz «Strach przed nieznaną sytuacją» (32,0%). Jednak dla studentów z Drohobycza (45,3%) i Użhorodu (37,3%) istotnym czynnikiem jest również taka przeszkoda jak «Dodatkowe obciążenia finansowe». «Strach przed nieznaną sytuacją» przeszkadza badanym w Odessie (42,0%) i Użgorodzie (39,2%). Co ciekawe, studentom brakuje motywacji – stwierdzili tak badani studenci Użhorodu (zdecydowanie «tak» – 20,6%) i studenci z Drohobycza (raczej «tak» – 39,3%) (por. Tabela 40).

Tabela 40

Odpowiedzi studentów na pytanie „Co według Ciebie komplikuje studiowanie w wolnych strefach ekonomicznych za granicą?", (%)

Odpowiedź	Użhorod					Drohobycz					Odessa				
	Zdecydowanie «nie»	Raczej «nie»	Raczej «tak»	Zdecydowanie «tak»	Nie wiem	Zdecydowanie «nie»	Raczej «nie»	Raczej «tak»	Zdecydowanie «tak»	Nie wiem	Zdecydowanie «nie»	Raczej «nie»	Raczej «tak»	Zdecydowanie «tak»	Nie wiem
Niezadowalający poziom znajomości języka obcego	10,8	22,5	38,2	22,5	0,0	5,1	14,5	42,7	35,9	1,7	28,0	12,0	36,0	24,0	0,0
Brak informacji z twojej własnej uczelni	15,7	27,5	33,3	13,7	0,0	12,0	33,3	25,6	13,7	12,8	26,0	26,0	26,0	22,0	0,0
Oddalenie od swoich bliskich	12,7	30,4	34,3	22,5	0,0	28,2	16,2	34,2	13,7	7,7	22,0	20,0	28,0	30,0	0,0
Dodatkowe obciążenia finansowe	8,8	34,3	37,3	19,6	0,0	11,1	25,6	45,3	10,3	6,0	12,0	16,0	40,0	32,0	0,0
Strach przed nieznaną sytuacją	12,7	27,5	39,2	15,7	0,0	20,5	19,7	31,6	21,4	4,3	16,0	10,0	42,0	32,0	0,0
Brak motywacji	17,6	22,5	26,5	20,6	0,0	23,1	14,5	39,3	12,0	6,8	30,0	30,0	28,0	12,0	0,0
Studiowanie za granicą nie jest przydatne w domu	27,5	27,5	12,7	9,8	0,0	43,6	24,8	13,7	3,4	10,3	38,0	28,0	16,0	18,0	0,0
Studia za granicą są trudne do zintegrowania z programem nauczania w kraju	15,7	30,4	27,5	17,6	0,0	18,8	27,4	25,6	3,4	21,4	20,0	48,0	20,0	12,0	0,0
Problem uznawania kursów międzynarodowych na uczelni	19,6	34,3	28,4	9,8	0,0	22,2	38,5	14,5	2,6	17,9	20,0	44,0	30,0	6,0	0,0

Trudności administracyjne (wiza itp.)	24,5	27,5	11,8	15,7	0,0	25,6	33,3	25,6	6,8	5,1	46,0	28,0	20,0	6,0	0,0
Niezadowalający poziom wiedzy	11,8	22,5	25,5	9,8	0,0	23,1	20,5	29,1	11,1	12,0	42,0	28,0	26,0	4,0	0,0
Nieoptymalny dostęp do programów mobilności studentów	17,6	27,5	20,6	8,8	0,0	16,2	23,9	27,4	9,4	18,8	30,0	40,0	20,0	10,0	0,0
	102 studenci - 100%					117 studentów - 100%					100 studentów - 100%				

Źródło: opracowanie własne

Można więc stwierdzić, że głównymi przeszkodami w studiowaniu za granicą dla studentów badanych miast jest niedostateczna znajomość języka obcego, obawa przed nieznaną sytuacją. Kolejną, zdaniem studentów, istotną przeszkodą są „dodatkowe obciążenia finansowe" i brak motywacji.

Według wyników badania blisko 71,7% respondentów nie planuje pracy za granicą, ale takie zamiary ma jedna trzecia badanych studentów – 28,3%, w większości studenci studiujący w Użgorodzie (34,7%) i Drohobyczu (32,1%) (Tabela 41). Takie praktyki są powszechne w tych regionach, ponieważ wielu studentów wyjeżdża na wakacje za granicę do pracy sezonowej, aby poprawić swoją sytuację finansową.

Tabela 41

Odpowiedzi studentów według miast na pytanie «Czy podczas studiów w wolnej strefie ekonomicznej planujesz pracować za granicą?», (%)

Stanowisko	Użhorod	Drohobycz	Odessa
TAK	34,7	32,1	18,0
NIE	65,3	67,9	82,0

Źródło: opracowanie własne

Niestety migracja zarobkowa młodzieży ukraińskiej charakteryzuje się nieodwracalnością. Zwłaszcza, że znalezienie pracy w kraju i uzyskanie zarobków, które otrzymali w Europie Zachodniej jest prawie niemożliwe. Problem migracji zarobkowej młodych ludzi na Ukrainie zajmuje ważne miejsce, ponieważ oprócz procesów migracyjnych występuje w tym kraju niż demograficzny. Należy zaakcentować, że migracja młodzieży może być zjawiskiem zarówno pozytywnym, jak i negatywnym. Dobrze jest, gdy młodzi ludzie wracają z zagranicy z dobrym europejskim wykształceniem, doświadczeniem życiowym i zawodowym. Negatywne jest to, że młodzi ludzie nie chcą i nie wracają z zagranicy, kraj traci zatem wykształconą, mobilną i aktywną ludność. Wyniki badania wykazały, że ponad połowa badanych chciałaby pracować za granicą, a odsetek osób gotowych do podjęcia pracy poza specjalnością jest niezwykle wysoki (31,0%) (por. Tabela 42).

Tabela 42

Odpowiedzi studentów na pytanie „Czy planujesz w przyszłości pracować za granicą?”, (%)

Chęć podjęcia pracy za granicą	%
Tak, z zawodu	27,8
Tak, ale nie z zawodu	31,0
Nie	36,2

Źródło: opracowanie własne

Miasto Użhorod wyróżnia się najbardziej ukierunkowanymi na migrację nastrojami wśród studentów. Ponad 70% z nich chce pracować za granicą, 31,6% z nich chce pracować zawodowo, a 42,1% respondentów jest gotowych do pracy nawet poza swoim zawodem. Wśród studentów Drohobycza jest też wielu chętnych do pracy za granicą, zgodnie z zawodem 29,3%, niezgodnie z zawodem 37,9%. Odsetek studentów z Odessy jest nieco niższy, odpowiednio, 22,4% i 24,5% (patrz Tabela 43).

Tabela 43

Odpowiedzi studentów na pytanie „Czy planujesz w przyszłości pracować za granicą?”, (%)

Chęć podjęcia pracy za granicą	Miasto		
	Użhorod	**Drohobycz**	**Odessa**
Tak, zgodnie z zawodem	31,6	29,3	22,4
Tak, ale niezgodnie z zawodem	42,1	37,9	24,5
Nie	26,3	32,8	53,0

Źródło: opracowanie własne

Starano się poznać stopień przejawiania się postaw emigracyjnych młodzieży. W tym celu narzędzia socjologiczne zawierały pytanie: «Czy po studiach planujesz pracować za granicą?». Skala odpowiedzi obejmowała kafeterię: «tak, chcę się przeprowadzić», co w naszej ocenie świadczy o pełnej gotowości wyjazdu za granicę i pozostania tam; «Tak, długo, ale nie chcę tam mieszkać» – wskazuje na chęć wyjazdu na dłuższy czas, ale z możliwością powrotu do domu; «Tak, na krótki czas» – wykazuje silne przywiązanie do miejsca zamieszkania i niechęć do jego opuszczania; «Nie wiem» – poświadcza niepewność; «Zdecydowanie nie chcę» wskazuje na całkowitą niechęć do opuszczenia kraju.

Wyniki badania pokazują, że 23,1% badanych studentów jest gotowych wyjechać za granicę i zostać tam na zawsze. 12,2% młodych ludzi wyraziło chęć wyjazdu na dłuższy czas, ale z możliwością powrotu do domu. 14,1% respondentów jest gotowych na krótki czas opuścić swoją ojczyznę, 39,4% młodych ludzi nie potrafiło się zdecydować na odpowiedź. Odsetek osób, które w żadnym wypadku nie chcą i nie są gotowe do opuszczenia obecnego miejsca zamieszkania, wyniósł 11,2% (zob. Tabela 44).

Tabela 44

Odpowiedzi studentów na pytanie «Czy po ukończeniu studiów planujesz pracować za granicą?», (%)

Chęć podjęcia pracy za granicą	%
Tak, chcę się przeprowadzić	23,1
Tak, na długi czas, ale nie chcę tam mieszkać na stałe	12,2
Tak, na krótki czas	14,1
Nie wiem	39,4
Zdecydowanie nie chcę	11,2

Źródło: opracowanie własne

Około połowa młodych ludzi ma nastrój ukierunkowany na emigrację, chce wyjechać za granicę, a połowa jest gotowa tam zostać. Ci, którzy zdecydowanie nie chcą nigdzie jechać, stanowią zaledwie jedną dziesiątą badanych. Znaczny odsetek młodych ludzi jeszcze się nie zdecydował.

W zależności od regionu zamieszkania istnieją pewne różnice w postawach emigracyjnych młodzieży przygranicznej. Młodzież Użhorodu (36,8%) ma najwyższy poziom nastrojów emigracyjnych, skłonności do wyjazdu za granicę i pozostania tam, a także największą liczbę młodych ludzi (21,1%) w porównaniu z innymi badanymi miastami, które chcą wyjechać na dłuższy czas. Należy zwrócić uwagę, że jedną z przyczyn wysokiego poziomu migracji mieszkańców zachodniej Ukrainy jest obecność granicy z UE, czyli bliskość krajów europejskich. Mały ruch graniczny działa na obszarach przygranicznych między Ukrainą, Polską, Słowacją i Węgrami.

Ten specjalny system przekraczania granicy daje ich mieszkańcom prawo do wielokrotnych bezwizowych wizyt w strefie przygranicznej sąsiedniego państwa (30 km od granicy z Polską, 30–50 km – ze Słowacją, 50–65 km – z Węgrami). Większość mieszkańców terenów przygranicznych posiada zezwolenia na przekraczanie granicy w ramach małego ruchu granicznego, natomiast w Drohobyczu jest najwięcej respondentów, którzy chcą opuścić kraj na krótki czas (18,8%). Co ciekawe, w Użhorodzie większość młodych ludzi (27,4%) nigdzie się nie wybiera. Ponad połowa młodzieży z Drohobycza (55,5%) i Odessy (56,0%) wybrała odpowiedź „nie wiem", co wskazuje na niepewność lub na to, że jeszcze nie przemyślała tej kwestii (por. Tabela 45).

Tabela 45

Odpowiedzi studentów na pytanie „Czy po ukończeniu studiów planujesz pracować za granicą?" pod względem badanych obszarów, (%)

Chęć podjęcia pracy za granicą	Region, %		
	Zakarpacie	Obwód Lwowski	Region Odessy
Tak, chcę się przeprowadzić	36,8	12,8	22,0
Tak, na długi czas, ale nie chcę tam mieszkać na stałe	21,1	10,3	6,0
Tak, na krótki czas	12,6	18,8	10,0
Nie wiem	2,1	55,5	56,0
Zdecydowanie nie chcę	27,4	2,6	6,0

Źródło: opracowanie własne

Ponad połowa młodych ludzi ma w pewnym stopniu słabe przywiązanie do miejsca zamieszkania, stąd też młodzi ludzie przejawiają pewne sentymenty emigracyjne, a około 50% jest gotowych je realizować. Znaczący odsetek (39,4%) respondentów jeszcze się nie zdecydował. Tylko jedna dziesiąta nie zamierza opuszczać ojczyzny. Spośród badanych miast najbardziej kontrastowy jest Użhorod, z największą liczbą młodych ludzi chcących wyjechać z kraju (60%), a także największym odsetkiem osób (27,4%) wśród miast, z których badani wyraźnie nie chcą się nigdzie przeprowadzać. W Drohobyczu większość osób jest chętnych do wyjazdu na krótki czas 18,8% i tylko 2,6% tych, którzy w najbliższym czasie nigdzie się nie wybierają. Duży sentyment emigracyjny jest widoczny wśród młodzieży Odessy – 22,0% młodych ludzi jest gotowych do wyjazdu na zawsze.

Wniosek

Nastroje emigracyjne młodzieży ukraińskiej wynikają przede wszystkim z braku sprzyjających warunków do wykorzystania zdobytej wiedzy zawodowej oraz braku wysokiego standardu życia. Wyzwaniem dla młodych ludzi są dotkliwe problemy społeczno-gospodarcze, które obecnie istnieją w kraju.

Ujawnienie złożonego, wieloaspektowego charakteru mobilności, która przejawia się w gotowości jednostki do jakościowych zmian w życiu, dowodzi, że mobilność jako zasób kapitału ludzkiego na poziomie osobistym charakteryzuje się zdolnością jednostki do poprawy i szybkiego przystosowania się do nowych warunków życia (status społeczny, przynależność zawodowa, dziedzina zatrudnienia, rodzaj zatrudnienia, miejsce pracy, terytorium zamieszkania innych osób). Sytuacja ta wymaga dokładnej analizy naukowców i odpowiednich działań ze strony władzy ustawodawczej i wykonawczej. Młodych ludzi należy zatem zatrzymać w kraju, zapewniając im możliwości rozwoju.

BIBLOGRAFIA:

1. Sokuryanska L., Deineko O. (2012). Emigracyjne nastroje studentów postsowieckich megamiast: doświadczenie porównawczej inteligencji socjologicznej. Polityka młodzieżowa: problemy i perspektywy: zbiór prac naukowych; Nauka. wyd. S. Shchudlo. Drogobich: RVV DDPU, S. 298–302.
2. Migration and Remittances Factbook 2011 / by Dilip Ratha - 2nd Edition. 265 p.
3. Nikolaets K. (2018). Migracja zarobkowa do Unii Europejskiej: czynniki i konsekwencje. URL: http://zt.knteu.kiev.ua/files/2018/05(100)/ 09.pdf)
4. Dynamika nastrojów migracyjnych Ukraińców. URL: http://ratinggroup.ua/research/ukraine/dinamika_migracionnyh_nastroeniy_ukraincev.html.

5. Obiecujący Ukraińcy coraz częściej wyjeżdżają za granicę: statystyki (2017). URL: http://svitua.com.ua/news/201701/2236-perspektyvni-ukrayinci-dedali-chastishe-vyyizhdzhayut.
6. Bilyk OM (2005). Mobilność siły roboczej w systemie zasobów kapitału ludzkiego. Tworzenie gospodarki rynkowej: Coll. Nauka. myć się. K .: KNEU, tom 1. S.44–51
7. Bilyk OM (2005). Kształtowanie się mobilności i mobilności migracyjnej nośników kapitału ludzkiego. Biuletyn Chmielnickiego Uniwersytetu Narodowego nr 3 (66). T. 1. S. 246–250
8. Brenzovich KS Analiza przepływów migracyjnych młodzieży na Ukrainie. Biuletyn naukowy Użhorod National University https://dspace.uzhnu.edu.ua/jspui/bitstream/lib/21055/1/8.pdf

20. Projective methodology «fairy tale» as a tool of research of symbolic perception of online microcrediting service

Oleksandra Budanova
Candidate of Sociological Sciences, Associate Professor of Applied Sociology and Social Communications
Kharkiv National University named after VN Karazina
E-mail: alexandrabudanova2017@gmail.com
ORCID ID 0000-0002-9877-1756

Svitlana Vakulenko
Candidate of Sociological Sciences, Associate Professor of Applied Sociology and Social Communications
Kharkiv National University named after VN Karazina
E-mail: svakulenko28@gmail.com
ORCID ID 0000-0003-3293-1670

Introduction. Modern man, as noted by many researchers, don't live in the world of things, but in the world of symbols [1, 2]. The everyday reality of the individual is created by its coding, when objects, facts and events are assigned a meaning determined by existing cultural codes. On the basis of one cultural code a large number of symbols is created, which, being synonymous, convey to the consumer the same meaning. This leads to the semantic oversaturation of the everyday communicative space of the individual, which is constantly condensed. In a consumer society, people are almost constantly exposed to the growing and skillfully structured supply of goods and ways to promote them by sellers through advertising and promoted brands. According to researchers, today the average person receives about 3 thousand advertising messages daily [3].

Consumers' decisions to purchase certain goods and services are inevitably mediated by their subjective perceptions, assessments and expectations and are less and less dependent on the influence of objective reasons, which are the level of personal income and prices in the consumer market. Consumption is transforming into the living world of a modern man, so the study of consumer behavior can be seen as an important way to learn about the social reality.

Literature review. In the second half of the twentieth century, a number of theories emerged in which the concept of a "consumer society" was developed (R. Aron, J. K. Galbraith, W. Rostow, and J. Furastier). Consumption is interpreted as a constitutive principle that distinguishes the modern social order, as its essential expression. The nature of consumption in postmodern societies is analyzed in the works J. Baudrillard, P. Bourdieu, D. Lyon, S. Miles, M. Featherstone, J. Ritzer and others.

Most authors note that in the post-modern society the symbolic function of consumption is increasing, and things can act not only as utilitarian objects, but also as symbols of social differences, signs of prestige, and the process of consumption itself is considered as a constant symbolic practice. The postmodern stage is characterized by the transition from mass standardized to mass individualized consumption. This process is due, on the one hand, to changes in production itself, which is based on the diversity, the creation of a large number of modifications of the same product, and on the other - changes in the social structure, increasing fragmentation and diversification of human needs. Problems of consumer society formation, specifics and models of consumption in Soviet and post-Soviet societies were studied by O. Gurova, O. Yechevska, D. Ivanov, V. Ilyin, A. Ovsyannikov, V. Radaev, J. Roshchina and others. Among Ukrainian researchers we should mention V. Tarasenko, Yu. Pachkovsky, I. Nabrusko, M. Mastynets, G. Sorokin and others.

Results. The symbolic nature of modern production lies in the production of values, which can not only meet the non-market needs of consumers, but also form new needs. Non-market needs (the need for love, communication, belonging, self-esteem) differ from the main ones in that they usually cannot be met by normal market values. Non-market needs, however, are related to goods through semiotic communication.

Although goods are by definition incapable of meeting an individual's non-market needs, consumers begin to associate a particular non-market need with a particular product through a system of signs and symbols, meaning that individuals consume not just goods and services but certain symbols that encode information. For example, the need for communication and leisure – with certain brands of beer, the need for romance and mystery – with certain brands of perfume.

Studies of symbols representing cultural codes of consumption of a particular society as a whole and individual consumers' segments in particular provide an opportunity to obtain information about value orientations, motivation of consumers' behavior, as the process of consumption of goods and services in the digital society becomes a process of consumption [1, p. 134]. That is, the process of consumption in the information society is transformed into a system that provides the order of signs and interpretation of the group, while acting as a system of values and a system of communication.

Digitization of «classic» banking services leads not only to the emergence of new formats, but also entire segments. Thus, thanks to digitalization, there has been not only a radical transformation of credit services, but also the formation of a new direction - online crediting of macrofinancial organizations (MFIs).

Today, the choice of even relatively inexpensive everyday items is associated with the need for at least minimal market research, getting knowledge of the useful properties of various things that exist in almost countless variations and the differences between which are becoming less perceptible.

In a situation of the fierce concurrence between MFIs, it is increasingly difficult to get a potential consumer of services to appreciate the uniqueness, significance for him of the services of a particular MFI. The perception of MFIs takes place in the space of cultural codes, which give symbolic meaning to the subjects of the microcredit services market. It is the cultural codes that influence the consumer's choice of a particular MFI from the whole set of agents of the microcredit services market. This choice is made on the basis of the formation of an emotionally colored image of the MFI and its value significance for the consumer.

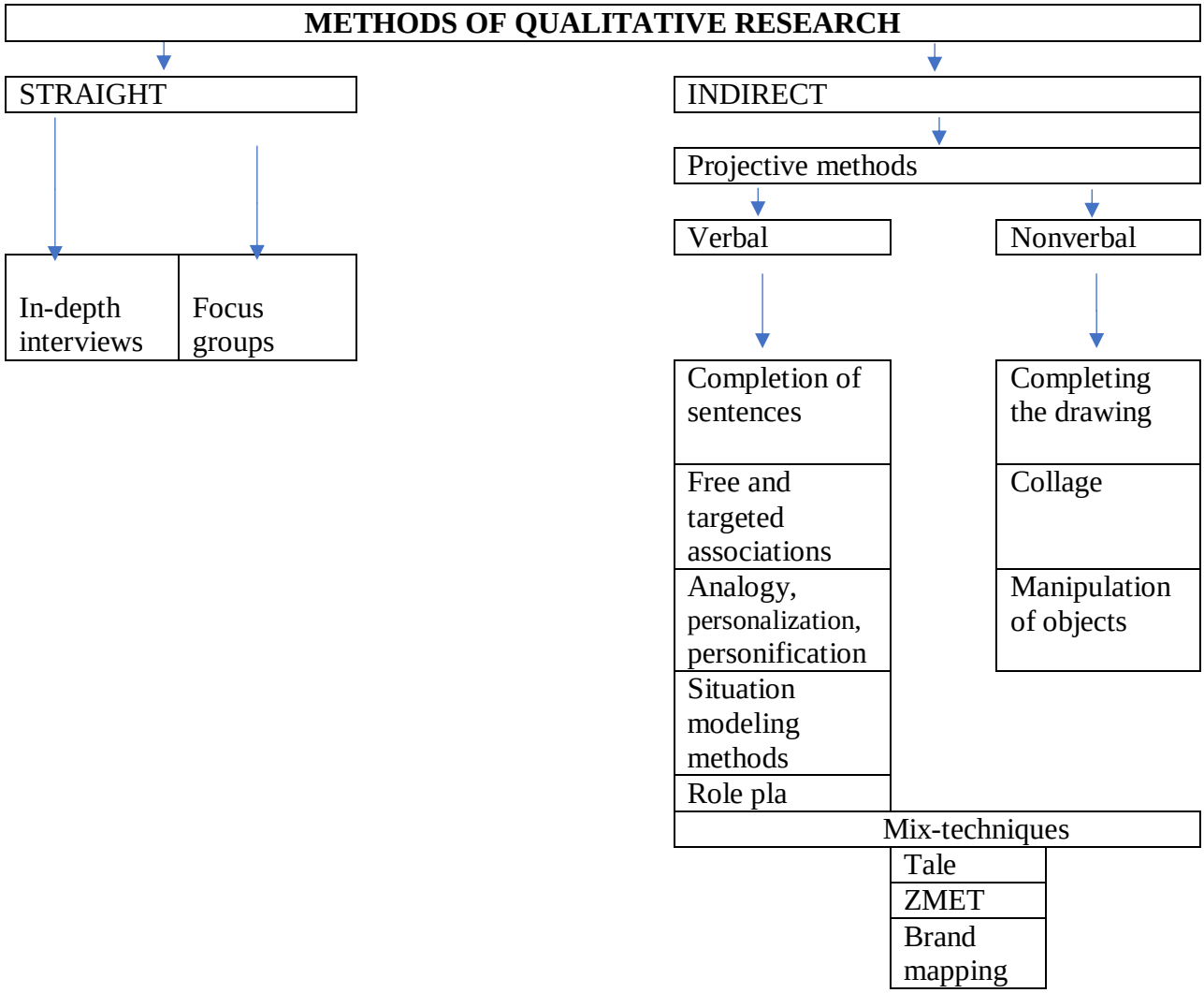

Figure 32. Classification of qualitative research methods

In our opinion, one of the most promising areas of studying the motivation of consumers' behavior in the microcredit market is the use of projective techniques to avoid rationalization of consumers' opinions, reveal their hidden motives, beliefs, feelings, explore the evaluation and perception of images of the surrounding world, personal meanings. invested by people in objects. The fundamental principle on which projective techniques are based is the principle of

psychological projection, which is interpreted differently in scientific sources, namely:
- as an attribution to the second object of their own feelings, experiences, motives, wishes [4, p. 12];
- as a symbolic transfer of the content of the inner individual's world to the objects of the surrounding world [5, p. 44].

There are a number of classifications of projective methods in the literature. Most often they are divided into two classes: verbal and nonverbal. Verbal work with verbal information, and non-verbal information is collected in the form of drawings, collages. There are a number of mixed techniques that use different channels of perception: brand mapping, ZMET, Fairy Tale.

The projective method «Fairy Tale» is aimed at removing different levels of metaphors and cultural codes that are activated in the situation of choice and play a crucial role in it. The «Fairy Tale» method requires the respondent to compose a story - a «fairy tale» - on a given topic and provide illustrations that represent the story in visual images.

The technology of application of the Fairy Tale technique is as follows. Respondents in the focus group or in individual interviews are given 1-2 sheets of paper and pens with a request to write a story about the subject of the study.

Thus the fairy tale can be written in any genre, except realistic, and in it there should be: 1) the name; 2) the author himself (in any fairy-tale form); 3) the object of study; 4) good forces; 5) evil forces; 6) other important elements for the researcher (for example, competitors, other participants in the event, events that affect the situation) [5, p. 45].

The fundamental difference between the projective method "Fairy Tale" and other projective methods that use fairy tales subjects is that it removes as much as possible the limitations of the respondent's self-expression, focused on the disclosure of his personality through the creative process. This technique assumes that the respondent does not choose a suitable fairy tale from the proposed options and does not compose a fairy tale based on the proposed images, and creates text and pictures independently, based only on a given topic and a list of mandatory elements.

The analysis of texts and drawings of the projective methodology «Fairy Tale» is aimed at identifying of typical metaphors that reveal the basic values and perceptions of respondents about the scenario in which events should develop in the proposed situation, as well as their role in this scenario. These ideas, the foundations of which are formed in childhood, determine the very logic itself in which all the life situations are considered, including those proposed in the study. Therefore, it is important for the researcher to eliminate possible obstacles for the respondent to show the patterns of their behavior, which are presented in the metaphorical language of images and attitudes.

The projective method «Fairy Tale» was used by the authors during the

implementation of a research project dedicated to the study of customers' experience of consumers' MFI services. Emphasis was placed on studying the perception of online microcredit services, MFI services, motivation, strategies, preferences in the consumption of their services. The task, which was solved by means of a fairy tale, was to identify the cultural codes of perception of the microcredit service and specific MFIs with which the respondents had experience of cooperation.

The study was conducted on September 2019, in Kyiv. During its implementation, 30 in-depth interviews were conducted with men and women aged 18-50 with experience in using microcredit services, with different user activity (from two to several dozen loans). Respondents wrote a fairy tale on the topic: «Online microcredit». Below are some examples of fairy tales and illustrations to them, composed by respondents (the language and style of the original are followed).

Male, 39 years old: «*Once upon a time there was a family, dad worked as a farmer, mom arranged life at home, took care of children - daughter and son, and helped dad. The New Year was approaching - the most important holiday, which the children were really looking forward to, since Santa Claus brought gifts under the New Year tree, but this year the family had financial difficulties. Dad did not succeed, because of the drought, there was a crop failure, he also had to repair the old car that he had, which incurred additional costs. New Year was approaching, and in the evening, when the children went to bed, sitting at home near the home fireplace, Mom and Dad started a conversation. Dad sat in confusion, as there was no longer money for gifts, and dad also wanted to give mom gold earrings, which mom had long dreamed of*».

Mom came up to dad and asked: «Are we all right?» Dad raised his head, looked at her: «Yes, but not quite», «Any problems?» Mom asked. «Yes» - dad squeezed out of himself and told mom about the financial situation in the family. Mom began to reassure dad: «Everything is fine, you just need to get through this time. The black stripe is always followed by the white one». «That's how it is, but something doesn't come», the dad replied, not looking up from his laptop, sitting on the Internet, looking through offers for additional earnings. Well, what can you say? Tomorrow is New Year's Eve, the kids are waiting for gifts, and the gold earrings that Dad had been looking after in the jewelry store for two months would suit mom.

And then dad came across an online loan offer, especially without interest and with a minimum package of documents - no need to collect certificates and so on, and so on. Dad played in his head how he could manage this money and, most importantly, how he could get the money back. His acquaintances had told him for a long time that he had a car on the move - he could engage in a private driver in his free time. Mom went to bed, and dad at that time took a credit card that he had left from his old job, checked its validity - it had not expired yet, and there were

some other small funds on it. I started filling in the form. He received the loan within 15 minutes.

«The morning of the evening is wiser» - thought dad and went to bed. In the morning, waking up, having drunk hot coffee, which my mother prepared very tasty, having kissed the children, I went to the city. In the evening, returning from the city, dad, hiding gifts for the children and purchased mom's earrings, began to help mom prepare for the New Year's celebration. The kids were waiting for 12 o'clock to strike and gifts would appear under the tree. A festive atmosphere reigned in the house - dad and mom were preparing a festive dinner in the kitchen.

A performance began on the street: night fell, the first stars lit up in the sky, neighbors arranged fireworks, and dad and his family went out into the street to watch the light performance, unnoticed by everyone for a short time. Returning to the chimes, the family sat down at the table and began to wish each other a Happy New Year. Everyone was so carried away that they did not notice how a plush Santa Claus appeared under the tree, in whose hands there was a huge bag. And then the children, turning around, shouted enthusiastically: «Santa Claus has come». Everyone got up from the table and went to the tree. The kids opened the bag - there was what they were waiting for.

The son was presented with sneakers, which he dreamed of all year, the daughter - a play kitchen set. Dad also asked Mom to look in the bag too. Mom carefully put her hand into the bag and, feeling for the small box, she took her hand out of the bag. Opening the box, my mother was speechless. «Happy New Year» - said Dad and kissed Mom. The evening was a success - the kids and their parents fell asleep by the family fireplace. The next day, dad got into the car, drove to the city in a good mood - a white streak came. For a week, dad earned so much that he was enough to pay off the loan and even a little more. So dad understood that you should not despair when something goes wrong - you need to look for a way out of any situation. In the future, dad more than once applied to online loans, but only in order to give gifts to his family, especially since this pushed him to extraordinary thoughts about making money.

Woman, 45 years old: «*There was a sorceress in a very beautiful city. And her name was Anna. She always knew how to surprise and delight people. But one day an evil wizard decided to drive her out of town and take her house. To stay, she had to pay a large sum of money, and most importantly - here and now. Anna was confused, but good always comes back. Help has come. Good people suggested SOK (online lending system). Anna was able to quickly resolve the issue and stay in the city and in her home. Help came in the most wonderful way*».

The analysis of the results of the fairy tales presented above in the context of key structural elements is as follows:

Table 46

Example of analysis of the results of the application of the method «Fairy Tale»

	Male, 39 years old	Female, 45 years old
The name of a fairy tal	–	«Boomerang»
Online lending	Profitability. Simplicity / convenience: the minimum package of documents for a valid card. Efficiency: money received in 15 minutes. Online lending services - assistants in the realization of dreams / desires «here and now» and stimulators of finding new financial opportunities. Emphasis on positive experience of cooperation. Re-access to the service: partnership	The online lending system is a lifesaver in emergency situations. Efficiency
«Evil Forces»	Objective circumstances that led to a dramatic deterioration in financial condition	An evil wizard is a life-threatening circumstance
«Good forces»	The Internet as a source of information about microcredit. Woman - support in decisions / undertakings from the immediate social environment	The hero himself in the image of a good sorceress. Good people as a source of information about microcredit
Miracle	Fulfilling a dream with the involvement of microcredit services as the start of a «white stripe» in life / drastic positive changes: «… do not despair when something goes wrong - you need to find a way out of any situation»	A way to get real and prompt help not from loved ones. Getting help that I didn't really count on. Crisis solution

Based on the analysis of the respondent's fairy tales, the key semantics of the perception of the online lending service were revealed: 1) «Wand» - connecting link = "point of improvement of the situation / life", which divides it into «before the online loan" (problems / troubles) and «after the online loan» «improvement of the situation» and they have all the good»: «This assistance helped to pay for the child's education on time and to avoid expulsion from the university. Time has passed and thanks to this help, the family today has a sufficient income for subsistence. The educated child created his own family and provides for it, but he never forgets about the assistance provided and knows that in a difficult situation, if it happens, he can count on an online loan». (Female, 48 years old, manager of an insurance company).

- way to return to the original "pre-problem" state: fulfillment of obligations, overcoming force majeure: «The wolf returned home with a full bosom of mushrooms and continued to live in his favorite forest». (Man, 26 years old, IT specialist).
- online service as the most reliable partner / friend.

2) Development of dreams / desires

- a way to achieve the goal, realize dreams and fulfill desires (not only their own, but also the immediate social environment): the client of services can be a source of joy / magic:
3) Negative lending experience / service recommendations - in conditions of constant instability from the means of solving financial problems is transformed from a «lifesaver» to a way to increase / accumulate financial liabilities: «Time passed, but nothing changed for the better. I had to contact *****. Money appeared just as quickly and instead of one microloan, two were formed. The work appeared and disappeared. One loan covered the interest for the use of another» (Man, 51 years old, locksmith).
- recommendations of the microcredit service to a person that the recommendations of the microcredit service to a person in a difficult situation ended in problems for the recommender.
- unsuccessful experience of lending / borrowing money: «He was so persistent in his efforts that he spent all the money on a dream, and when there was not enough money, he borrowed. And so he did it that he had to sell his part of the apartment. Evil collectors blacklisted him» (Man, 30 years old, web marketer).

Semantic analysis of the names of fairy tales reveals a positive connotation:
- in the context of the result: «Wonderful salvation», «Rescued», «Bad story with a good ending», «A fairy tale with a happy ending».
- in the context of the process: «In search of treasures or a well of desires».
- in the usual fairy-tale semantics «Three piglets», «Golden Fleece», «Cinderella on the contrary».
- in the identity / attributes of a specific microcredit service. In the names there is often an emphasis on external, superpersonal, supernatural forces: «Magic lamp of desires», «Field of Miracles». Fairy tale analysis allows you to identify the key instrumental and emotional values of online lending services.
1. Instrumental values: an alternative to seeking help from the immediate social environment / the ability to «save face / hide financial difficulties»; efficiency and ease of use of the service; opportunity to receive funds for use: how much is needed, how much is needed; «Transparency» of terms of cooperation; getting new profitable opportunities: “After that, they began to receive interesting offers that they use and enjoy life” (Female, 40 years old, warehouse employee). “I took money from ***** at 0% in crypt and in the first month I earned + 300%” (Man, 34 years old, IT specialist). Emotional values: an unexpected decision (help that was not expected); getting out of a difficult situation / getting the desired «here-and-now» (peace, joy, happiness); independence from the immediate social environment; joy of the «white stripe in life» / new impressions thanks to MFIs: «I could / I did / I overcame»; feeling like a «favorite customer»; reputation restoration (self-esteem).

Conclusion. Thus, we can say that the use of the projective method «Fairy Tale» allowed to identify universal cultural codes of perception of online

microcredit services, due to its innovative digital form: efficiency, simplicity, availability 24/7, confidentiality. On the basis of the listed instrumental cultural codes non-instrumental cultural codes are formed: «independence from circumstances», «partnership2, «victory over circumstances», «achievement of the desired».

REFERENCES

1. Baudrillard J. (1999). The system of things / trans. with fr. and accompaniment. Art. S. Zenkina. M .: Rudomino Publishing House. 222 p.
2. Bourdieu Pierre (2001). Practical meaning / trans. with fr.. Aleteyya. M .: Institute of Experimental Sociology. 562 p. («Gallicinium»).
3. Digital children. What advertising attracts young people. URL : https://www.forbes.ru/karera-i-svoy-biznes/365411-cifrovye-deti-kakaya-reklama-privlekaet-molodezh
4. Shlyapnikova I.A.(2005). Projective methods of psychodiagnostics. Chelyabinsk: SUSU. 69 p.
5. Marchenko A.V. (2018). Projective methods of ZMET and Fairy tale and their use in marketing and sociological research / Accounting, finance, economics and banking: a collection of scientific papers on the materials of the International scientific-practical conference January 31, 2018. St. Petersburg: Professional Science. 102 p.