

Volume 5



ECONOMIC SECURITY AT RISK:

FINDINGS FROM DIGITALIZATION OF THE NATIONAL ECONOMY

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Collective monograph

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ECONOMIC SECURITY AT RISK: FINDINGS FROM DIGITALIZATION OF THE NATIONAL ECONOMY

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INTRODUCTION

Digital technologies provide unique opportunities to develop the national economy, to improve the quality of life of citizens and ensure national economic security. Today, in the context of alterglobalization, digitalization of the state must be accompanied by increased confidence and security, including information security, cyber security, protection of the confidentiality of personal information, privacy, and it becomes a prerequisite for the simultaneous development and security of digitalization. Digitalization should become the object of focus and integrated public administration in the development of national "digital" strategies. We are sure that public administration should focus on removing barriers on the way to "digitalization" of the country, development of "digital" infrastructure and "digital" economy in order to achieve national priorities. We are convinced that digitalization of Ukraine should be guided by international, European and regional cooperation so that Ukraine will integrate into the EU and enter the European and world markets. It is digitalization that should help Ukraine to integrate with European and global systems, and digital transformation should become the basis for the life of Ukrainian society, business and state institutions on the way to prosperity and well-being of Ukraine.

We share a belief that technologies change the world and the existence of people. Ukraine should use this, be part of this process, and become a world leader in "digital" transformations. That is why, Ukrainian politicians, central and local authorities, public organizations, business and scientists have to take on the historical responsibility for the support and active promotion of the country's development in this direction. We are convinced that, in the monograph unlike in other scientific papers on similar subjects, interested readers will be able to find the priorities of the restoration of the national economy in the global security environment and to accept European priorities of Ukraine in the conditions of digitalization.

The monograph consists of four sections. The sequence of presentation of the content and research results, ideas, actions and initiatives concerning

"digitalization" are fully integrated into the sections of the monographic research. The key objective of the monograph is to reach a single scientific conclusion on the identification and systematization of the risks to the state's economic security in the conditions of "digital" transformation of the national economy.

The first chapter explores the evolution of economic risks in the global information environment and describes the transformation vector of the "Network society" development in the alterglobal space. The results of the study have revealed methodological contradictions in understanding the essence, structure and logic of modern globalization processes in the vector of the "Network society" development – from negation to absolutization. The authors are convinced that the economic growth of the national and world economies needs new impulses that are acceptable to most of the participating countries in the face of global competition. At the same time, the development of an information economy is defined as a top priority in Ukraine. In addition, the research into transformation of economic threats has led to the conclusion that the shadow economy is one of the most important constituents of economic problems. Ukraine needs to ensure sustainable development of its regions as a guarantee of transition from instability to a model of national economic security. An in-depth analysis of the use of modern information technologies in the agro-sphere allowed us to find the main clusters of information technologies in the agricultural sector, namely, in agricultural production.

The second section looks into the opportunities and threats of a digital economy, presents the authors' predictions concerning e-commerce development and threats to consumer safety. It has been found that the main priorities of the state in ensuring economic security are to overcome the risks of mistrust of buyers to e-commerce, protect consumers' interests, reduce the risks of online business activity and rapidly update the institutional framework in implementing the existing EU directives on modernizing the technical base of electronic equipment. The authors have proved that digital marketing is an effective tool for achieving these goals. Within the framework of practical

implementation, one suggests using simulators of information protection and the attraction of cloud technologies for making managerial decisions in the field of economic security.

The scientific achievements of the monograph are the authors' contributions to the formation and development of an innovative economy in an era of globalization of business, based on the implementation of the concepts of industry 4.0 and logistics 4.0. Thus, they have constructed a schematic model of transformation of logistics into the most important component of the modern knowledge economy on the basis of the interaction of the concepts Industry 4.0, Internet of Things and Logistics 4.0. New challenges that require changes in the scope of logistics, that is, its functional load and information reflection, have been identified.

In the third section of the monograph, the team of authors focus attention on the search for areas for managing the economic risks of digital security. The scientists have managed to build a model of the effectiveness of companies' advertising in the digital economy. The authors convincingly argue that the function of the current effect of enterprises' advertising messages is periodic and provides the ability to simulate the reaction sales of advertising messages of enterprises in the form of a continuous function.

The third section of the monograph raises some problems and develops strategic priorities for ensuring budgetary security of Ukraine in the conditions of the digital economy development. Those priorities were used by the Budget Committee of the Verkhovna Rada of Ukraine and implemented in the form of recommendations to legislative documents in the area of the budget process. At the same time, a comparison of Ukrainian and Canadian fiscal policies over the last five years has helped the authors to reach the conclusions that the Verkhovna Rada of Ukraine needs to legislatively and normatively consolidate the decisions on the effective meeting of budget targets. After the adoption of the Budget Code, it is necessary to increase the role of fiscal policy in the economic life of society and the state in the face of the challenges of the digital economy.

Finally, the fourth section of the monograph research contains scientific

provisions regarding forecasting and assessing the effects of digitalization of the domestic economy. According to the researchers, the digital age changes the approach to doing business, as well as the requirements for information technology that are being used. It has been established that the introduction of the digital economy in Ukraine should take place simultaneously in technological, industrial, institutional, and economic directions, and the automation of services should remain the most important result of digitalization in modern conditions. The scientists are convinced that the rapid dissemination of digital technologies makes digital competence of citizens the key to other skills, and digitalization and cross-platformity are now the main trends in the general labour market. Therefore, the result of the research is the substantiation of the inevitability of transition from human resource management to management of a team and processes, which causes a shift in the focus of management from automation to productivity in the processes of personnel management.

The authors of the monograph believe that the digital economy development will require titanic organizational and legislative efforts on the part of the state to overcome the challenges and threats to economic security as a result of digitalization of our society. At the same time, success can be achieved in case of preservation of peace, territorial integrity of the state and restoration of the innovative and creative potential of our business and national economy. In fact, the digital economy is a key engine of competitiveness, productivity, innovation, economic security and, overall, Ukraine's economic growth in the global digital and economic environment.

PART 1

**THE EVOLUTION OF ECONOMIC INSECURITY
IN THE GLOBAL INFORMATION ENVIROMENT**

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**THE ALTERGLOBAL VECTOR OF «A NETWORK SOCIETY»
DEVELOPMENT**

Abstract. The research discovers the formation of transformational vector of development of «a network society» in the alterglobal space. Analysis shows vector of development of «a network society» in a synchronous, instable and unipolar world. The research finds the collision between national priorities and the global scale of economy and public life in general. The results define a certain methodological contradiction in understanding the essence, structure and logic of modern globalization processes in the vector of development of «a network society» – from negation to absolutisation. It is defined that process of alterglobalization is gradually replacing the process of globalization and these changes are irreversible – the modern vector of development of «a network society» should be transformed. It is developed that altoglobalization is the process of global alternative economic, political and cultural integration, aimed at diffusion of global transnational influence, ecological-local stability and human-centeredness. It is argued that economic globalization causes delocalisation and disability of local communities and economies but alterglobalization involves the benefits from uniqueness, diversity and comprehensiveness of its participants. It is concluded that economic growth of the national and global economies needs new momentum that is acceptable to most of the participating countries in the face of global competition.

Jel Classification System: D85, F63

Keywords: alterglobalization, «black swans», efficiency of labour, global challenges, network society, new technologies, tectonic shift.

Introduction. Globalization creates to the country's threats and new opportunities, and the balance of positive and negative effects is constantly changing. The reality is that globalization is an objective and absolutely inevitable phenomenon of the present that can be slowed down by means of economic policy (which happens in some cases), but cannot be stopped or canceled because it is an imperative requirement of scientific and technical progress and modern society. Countries must respond to globalization processes adequately, adapting to the new conditions and take advantage of internationalization of the world economy. There are difficulties in adapting to the challenges of globalization for developing countries and for transition economies due to the lack of funds and the imperfection of national legal, economic, administrative systems and mechanisms. This forces the countries in transition and the developing countries to adopt the rules of the game offered by the stronger players in the world economy. The crisis contributes to rethinking the modern model of globalization and encourages the development of new strategic decisions and new model of economic and world development. The crisis of changing the world order revealed the shortcomings of the current economic system and the urgency of developing alternatives to world development.

G. Pleyers claims that alterglobalization provides a comprehensive account of critical global forces and he attempts to solve one of the major challenges of our time – building of a fairer, sustainable and more democratic co-existence of human beings in a global world¹. D. Held focuses on elucidating leading theoretical approaches to understanding and explaining globalization, in both its current form and potential future shapes². D. Held and U. Beck examine competing explanatory theories of globalization in its contemporary

¹Pleyers G. (2013). *Alter-Globalization: Becoming Actors in a Global Age*. London: John Wiley & Sons. 336 p.

²Held D. (2007). *Globalization theory: approaches and controversies*. Cambridge, Polity Press.

form, and look at competing prescriptions for the future of globalization³. An argument in favor of F. Fukuyama's thesis is the democratic peace theory, which argues that mature democracies rarely or never go to war with one another. This theory has faced criticism, with arguments largely resting on conflicting definitions of "war" and "mature democracy"⁴. K. Schwab, X. Sala-i-Martin research how to build a more prosperous and inclusive world for all; as a flagship effort of the economic growth and social inclusion, they research the global competitiveness as a tool for public-private collaboration on long-term competitiveness agendas⁵.

1. The potential tectonic shift of the alterglobal paradigm.

The processes of globalization increase the dependence of the global economy on institutional transformations, changing the role of the state as an institution for the organization of the vital functions of society. The advocates of globalization see it as further progress in the context of development of the information and technological revolution. The critics warn about the dangers for national cultural traditions and the deepening of social inequality. Alterglobalization as an opposition is based on the attitude to globalism on the principle «us/them» while both of these systems have become the answer to the crisis of the ideologies prior to them. By studying objective alternatives to global dominance of capital, it is possible to intensify positive substitution processes without going beyond the boundaries that transform the subjective factor of progress into subjectivism (provoking regression). The process of economic correction and regulation takes place vertically (from bottom – to top) and quite dynamically, and the modern economy requires a new system

³Maddison, A. (2001). The world economy: a millennial perspective [OECD]. Available at <http://theunbrokenwindow.com/Development/MADDISON%20The%20World%20Economy--A%20Millennial.pdf>.

⁴Fukuyama, F. (1992). The end of history and the last man. Available at <http://www.democraziapura.altervista.org/wp-content/uploads/2015/01/1992-Fukuyama.pdf>.

⁵Schwab, K., & Sala-i-Martin, X. (2016). The Global Competitiveness Report 2016–2017 (pp. 42-48, Rep.). Geneva: World Economic Forum. Available at http://www3.weforum.org/docs/GCR20162017/05FullReport/TheGlobalCompetitivenessReport2016-2017_FINAL.pdf.

and new ideas (some of them are being put in practice). It is important to pay attention to conceptual and practical alternatives, such as: new principles that create the basis for a viable system that works not for corporate profits but for people and the environment; the idea of reclamation of human goods, which were previously used by all nations, and now to a large extent, they are privatized; the concept of a considerable shift of power (from global to local); direct management, in which the global economy dramatically affects the local ones: energy, oil, transport, production, agriculture, media, etc.

The principles of organization that should be understood to be the basis for the movement, which have been described as «anti-corporate globalization» or «proglobal justice», single out some similarity among different groups, thousands of individual leaders, and hundreds of different important issues that can be defined as «the movement for justice»⁶. These principles contrast sharply with the argument of economic globalization, which in the narrow sense serves a small amount of entities with the help of the environment and a large number of people. Economic growth is the main objective of the IMF, the World Bank and the WTO, and the expansion of international trade and investment flows are their ultimate goal.

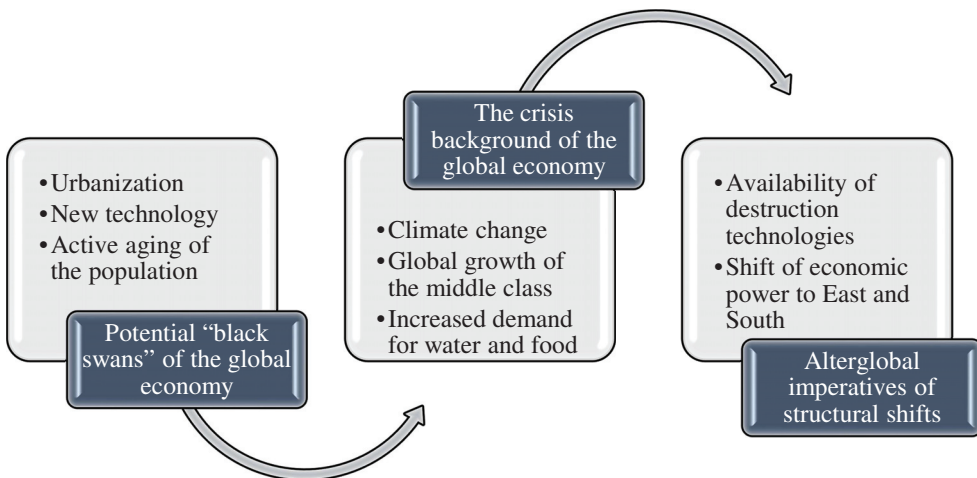
The global ideology of the last half century has defined free trade and investment as a factor of prosperity and a guarantee of democracy. Corporate and government leaders have convinced others that in order to be competitive in the global economy, governments should weaken government regulation and create a favourable climate for foreign investment (mainly thuman resources management ough workers' rights and environmental integrity). Today, it is time to create healthy, sustainable communities that work for everyone. Healthy, sustainable communities can be the salvation of power in institutions that measure their productivity thuman resources management ough their contribution to the long-term well-being of people, community and nature and the redistribution of energy on an equitable basis among all stakeholders in society. Such communities measure the essential qualities,

⁶Pleyers G. (2013). *Alter-Globalization: Becoming Actors in a Global Age*. London: John Wiley & Sons. 336 p.

above all, the welfare of all people. Every sustainable community, like a nation, seeks to achieve a decent level of self-sufficiency in meeting basic needs, including food, housing, clean water, energy, education, health, participation in political life and culture. Self-sufficiency of the community in meeting basic needs is important for providing livelihoods, civil liberties, as well as a sense of identity of each of its members.

Global growth of the ratio of middle-class representatives in developing countries to the ratio of the population both in absolute terms and in percentage terms can be considered the potential tectonic shift of the alterglobal paradigm. Moreover, in the long run, a growing tendency is observed. Military and technical products are becoming more affordable, especially weapons for surgical strikes, cyberattacks and bioterrorism, which creates opportunities for individuals or groups to commit large-scale acts of aggression that used to be exclusively controlled by the state⁷.

Figure 1. The tectonic shift of the alterglobal development



Source: compiled by the authors on the basis of research

⁷Albrecht E. Z. (2017). Alter-globalization in Southern Europe: Anatomy of a Social Movement. Cham: Springer. 166 p.

It is likely that the share of the US, Japan and Europe in the production of the total global product will decrease from 56% to 50% in 2030. In 2008, the PRC outpaced the US and became a global leader in the volume of gold and foreign exchange reserves, and in the next five years, the share of financial assets of developing countries can double. In 2012, the age of the population of Japan and Germany exceeded the median age (45 years). It is assumed that the population of most European countries, as well as the Republic of Korea, Taiwan, will also exceed this limit in ten years⁸. As a result, labour migration will become global, because, both developed and developing countries are suffering from a shortage of manpower.

Currently, cities have about 50% of the world's population; by 2030, this figure will be 60% (4.9 billion people). Countries in Africa will gradually outpace Asian countries in terms of urbanization and urban centres will be the source of economic growth at the level +80%⁹. Modern technologies and physical infrastructure of the optimized exploitation of exhaustive resources will become more accessible. By 2030, demand for food will increase by at least 35%, for drinking water – by 40%. Almost half of the world's population will live in regions with a severe shortage of fresh water. Africa and the Middle East are predicted to be at the greatest risk of an increase in drinking water and food shortages; the People's Republic of China and India will be sufficiently vulnerable too.

Potential «black swans» of the global economy's development include hard-to-predict events and rare ones that have major implications. The main reason for their unpredictability is the certainty that an event cannot occur. N. Taleb emphasizes that humankind is not able to successfully predict their future, and confidence in their knowledge outstrips the knowledge itself

⁸Milanovic, Lindert and Williamson. (2011). Ancient Inequality. The Economic Journal. Vol. 121, is. 551. p. 255-272. URL: <http://piketty.pse.ens.fr/files/MilanovicLindertWilliamson2011.pdf>.

⁹McLuhan M. and W. Gordon (2011). Understanding media: The extensions of man. Seoul: Communication Books. 460 p.

and causes the phenomenon of «excessive confidence»¹⁰. Although such a metaphor has been known in philosophy for a long time, it is N. Taleb who uses it to refer to rare and unexpected events with serious consequences. At the same time, as J. Calls noted, «black swans» can be both negative events and unpredictable «successes»¹¹. N. Taleb described several types of errors, which lead to excessive confidence in the ability to analyse the future: narrative (a delayed search for the cause of an event during its description), game (use of game analogies in modelling); retrospective (belief in the successful prediction of future events based on an analysis of past events). In the context of the object of our study, there are also certain potential events that pose a major threat to the current global economic order and that can be encountered when implementing the paradigm of alterglobal development. Such events include pandemics, climate change, economic crises, wars, large-scale man-made disasters and geopolitical changes.

It is difficult to predict the place and type of a pathogen that can spread. A new respiratory disease agent that easily spreads, kills or deprives more than one percent of its victims of the mental and physical capacity, is one of the most likely devastating events. Such a pandemic outbreak may, over a period of six months, lead to the suffering and death of millions of people in the world. Dramatic and unpredictable climate changes are happening at a faster pace than expected, so it is almost impossible to predict them. Rapid rainfall changes, the monsoons in India and Asia, can dramatically reduce the level of food supply for the population.

The Great Britain's exit from the European Union and the uncontrolled exit of Greece or another country from the Eurozone may cause great damage and trigger an even greater crisis in the European Union. In addition, the desire and signing of an association agreement with the EU by countries such as Ukraine, Georgia, Moldova, Kosovo, Bosnia and Herzegovina, the presence of

¹⁰Taleb N. N. (2010). *The Black Swan: Second Edition: The Impact of the Highly Improbable: With a new section: «On Robustness and Fragility»*. New York City: Random House Trade Paperbacks. 444 p.

¹¹Castles F. G. (2010). Black swans and elephants on the move: the impact of emergencies on the welfare state. *Journal of European Social Policy*. № 20(2). P. 91–101.

such official candidates as Albania and Macedonia, as well as negotiations with Serbia, Turkey and Montenegro create additional threats to the stability of the European Union. In turn, the threat of a crisis or the diminishing US influence can also lead to a long period of global anarchy, if there is no such country as the United States to guarantee the international order.

The limit of income per one person in the amount of 15 thousand US dollars at purchasing power parity is an important barrier to the democratization of society. In the PRC, after overcoming this limit, a new period of growth may begin, along with democratic change. On the one hand, democratic China can become more nationalistic, and on the other hand, the economic crisis will trigger political tension and crisis processes in the global economy. The suspension of international sanctions and the completion of Iran's isolation will create the preconditions for a more liberal regime. Iran, which will abandon nuclear ambitions and focus on economic modernization, can maintain stability in the Middle East. A similar scenario could take place in the DPRK, Russia and other countries on which sanctions have been imposed, and it may cause some imbalances in the global economy development. Russia or Pakistan, as well as the candidate countries for membership in the nuclear club (Iran and the DPRK), regard nuclear weapons as a guarantee of national security, thus increasing the risk of its use. In addition, there is a growing threat from non-state actors that might carry out a cyberattack or use weapons of mass destruction. Solar geomagnetic flashes can deactivate satellites, power grids, electronic gadgets and devices that threaten the energy, financial and economic security of states. Severe geomagnetic storms have occurred more and more frequently in the last century and they are becoming a significant threat, provided that the global economy dependence on energy resources increases¹².

The crisis background of the global economy reflects the threat that global instability and economic contradictions can lead to the destruction of the existing economic order. Metasystem characteristics of the global

¹²Zvarych R. Y. (2018). Financial and credit imperatives of alterglobalization the emerging markets. Financial and credit activity: problems of theory and practice. T. 1, №24. P. 360–367.

economy do not mean that there is no dependence on megaregional and national economies with different rates of development. Such disproportions are especially noticeable after the global financial and economic crisis in 2008. The disharmony in the rates of development of the economies of the megaregional entities exacerbates global imbalances and creates significant barriers to governments and international organizations. The main dilemma is that whether such imbalances will lead to global destruction and collapse, or new «centres» for the growth of developing countries will ensure the sustainability of the global economy development. It should be noted that the lack of a powerful economic centre could also provoke the instability of the global economy.

The most acute problem is whether new technologies will increase the efficiency of labour for preventing a long-term slowdown in economic growth. The prospects for global development will largely depend on the development of the countries in the East and the South. Developing countries account for more than 50% of the total world economic growth and 40% of the volumes of investment; the contribution of these countries to the world growth exceeds 70%. The economies of developing countries require the formation and development of infrastructure, housing, consumer goods, as well as new factories and equipment, which, accordingly, can increase the volume of global investment up to a level that has not been observed over the past forty years. At the same time, volumes of global savings may not be consistent with this level, which makes the burden on long-term interest rates rise.

Gradually, people make technological breakthroughs that improve economic efficiency and find solutions to the problems of a rise in the population of the world, rapid urbanization and climate change. Available technology for transferring and processing data, the power of processors and large volumes of information storage simplify the global spread of cyber services and social media. Accordingly, there is a need not only for expanding the markets of information, but also for increasing the security of global networks, solving problems for the state and civil society. Such types of applied production, as 3D printing, human resources management thee-

dimensional modelling and robotics, show great potential to modify labour patterns in developing and developed countries. However, such technologies may have a reverse effect: low- and medium-skilled workers will not be employed in developed economies, which exacerbates social inequality. Technologies of safety of vital resources are necessary to meet the needs of the world's population for food, drinking water and energy. Today, developing countries are facing some difficulties in the production and supply of basic food products, and global climate change can intensify them. New health technologies should be actively functioning for maintaining physical and mental health, improving the quality of life. The highest figures in increasing the life expectancy of the population are observed in the countries where the economy is growing together with the number of middle-class representatives.

Geopolitical aspects are among the top priorities when considering global risks. Global risks have long been a significant factor in social development due to their impact on economic dynamics, including financial crises. This implies high structural unemployment and underemployment, and it is accompanied by deep social instability. Global risks potentially affect society and require the protection of the socio-economic sphere in the long run.

2. Alterglobal imperatives of «network society» development.

Alterglobal imperatives are classified according to the following features: the nature of origin (genetically predetermined, formed by the environment, artificial); the environment of development (natural, biological, technical, economic, social, managerial); reality (real objective and subjective problems, virtual, pseudo-problems); expectations (expected and unexpected); threats (safe, dangerous and catastrophic); the possibility to be solved (solvable and insolvable); the term of availability or influence (temporary, current, short-term, medium-term, long-term, strategic, permanent); the time of onset or development (slow, fast and sudden); the term of origin (original, past, present, future); usefulness for the subject (useful, neutral and harmful); consequences or results (positive, without results (or ineffective) and negative); the sphere of activity (food, raw materials, energy).

First of all, it is necessary to attribute to existing alterglobal imperatives the following: the limited knowledge about the universe, the origins of civilization, the purpose and role of man; the absence of effective mechanisms for progressive development of mankind; the impossibility to prevent imbalances in demographic, economic, social and managerial processes that lead to conflicts and wars; a negative technogenic influence on the environment of the system of human life; lack of resources; the need to master and use new technologies¹³.

The global problem of social development generates global challenges – strategic targets, which, on the one hand, people are compelled to achieve and receive, and on the other – they want to do it voluntarily. These are the demands, signals, calls and motives for taking certain measures in the sphere of production, distribution, exchange and consumption on a global scale, which are responsible for transformational changes. The challenges are mainly conditioned by two reasons. First, this is the unresolved, aggravating and increasing number of current problems and threats in society, which complicate the quality of human life. Second, it is the desire of people to improve their own lives, continue their race and provide a decent future to next generations. That is, people, on the one hand, are compelled to determine the strategic targets that they want to achieve and benefits they can get and, on the other hand, they can do everything voluntarily.

The essential imperative of global processes is the systematic changes in the nature, role and methods of communication processes. An avalanche-like rise in the amount of scientific knowledge and information and a qualitative change in its structure lead to an increase in the speed of information exchange, transforming both the quality and structure of information and society and these phenomena form an information society with the main resource of development – information. The speed of information influences society, causing a chain reaction of interconnections between the elements of the metasystem: «man-society-nature». At the same time, informatization is

¹³Wallerstein I. (2000). Globalization or the Age of Transition. *International Sociology*. T. 15 (2), № 6. P. 249–265.

peculiar to both developed societies and developing countries. The latest information and communication technologies transform new social structures¹⁴.

Some researchers use a special term «network society» with distinctive features of decentralization and virtual social communication. An essential feature of a new society is the removal or weakening of social control and compulsion, since interaction in virtual reality complicates or even disables social control, which is particularly inappropriate to traditional Eastern societies, where public opinion is of crucial importance as a means of control. In this situation, the established values, moral and ethical norms and traditions, the foundations of a family collapse. The modern globalized society, on the one hand, is the result of an increase in the speed of information transmission, on the other hand, it independently changes not only the role of information, the ways of its dissemination, but also its content, quality, structure. Information is transformed into communication and, accordingly, into a commodity.

If it is impossible to avoid economic globalization then the strategy of national development has to put emphasis on the paradigm of alterglobalization, as an additional component to globalization, which takes into account the interests of all participating countries. At the same time, alterglobalization should not be spontaneous and chaotic, but it must be under the influence and control of a global international organization. The purposeful activity of such an organization necessitates creating integrative institutions similar to the EEC, the European Union, the Union of Asian countries, the Eurasian Union, etc. The imperatives of alterglobal development are of great importance in regulating the global economy. These imperatives are objectively predetermined by the principles of behaviour of the subjects of the global system, directions, forms and methods of management, mechanisms, tools and means of their implementation that are like patterns and are used

¹⁴Williams G. (2012). Struggles for an Alternative Globalization: An Ethnography of Counterpower in Southern France. UK: Ashgate Publishing, Ltd. 194 c.

within the institutional framework, which corresponds to general civilization interests.

Alterglobalization interprets the emergence of a «network society» («society of knowledge») from several points of view. Firstly, the phenomenon of knowledge points out the emergence of a resource, which is unlimited in its content. If we put aside the market form of knowledge and private ownership of knowledge (and alterglobalism requires this «abstraction» from the practical point of view), then it becomes a «product» that grows simultaneously with its «consumption». Thus, the dissemination of knowledge and cultural phenomena leads to an increase in this knowledge and the progress of culture: when «consuming» knowledge, scientists increase it.

Secondly, in contrast to a hierarchy, a network is flexible, mobile, open and accessible to the public (as the sea or airspace is open to all people, if it is not controlled by the military or pirates). The market, commercialization and private property are social forms that are badly compatible with network technologies and the world of knowledge.

Thirdly, the knowledge and networking organization are democratic in nature: in this world, there is a place for everyone, and all people need this world. In this case, the world is necessary and useful for everyone in different ways. This is the world of universal accessibility of unique and individualized «products» (any knowledge is unique; any work of art is individualized). The unemployed and professionals, peasants and intellectuals can enter it and in practice, they do enter this world. At the same time, everyone enters this world in different ways, although they often solve mutual problems.

Fourthly, the new principles of organization of activities and communications extend to the social sphere, even to the places, where there are no new technologies. Therefore, the productive activity of landless peasants in Latin America, based on traditional industrial and agricultural technologies, seeks to develop in the form of a network both socially and economically.

Consequently, we can assume that the «society of knowledge» («network society») by its nature involves (when putting aside the market and

private property) the implementation of new principles of social organization, such as:

- unlimited resources and at the same time their uniqueness;
- accessibility, openness, flexibility of networks and their social forms;
- democracy and inter-organizational systems (not depending whether they are professional, regional or social structures).

Generally, they are in fundamental contradiction to the principles of the modern socio-economic, and political and ideological system, which is called the global hegemony of corporate capital.

It is important to emphasize that alterglobalism does not oppose globalization in general, but it offers other, more humane projects of globalization. The protest of the alterglobalists is against corporations and states (not peoples) that are interconnected. The principal features of the movement are:

- non-hierarchical principles of interaction with each other;
- the denial of an ideological monopoly, freedom of discussion, anti-orthodoxy;
- orientation to extra-parliamentary methods of struggle, reliance on alternative state structures of society (social forums, autonomous cultural centres, mutual aid networks, association of fellow-countrymen, squatters, etc.);
- the emphasis on the development of «another culture» and new, humane, non-competitive relationships between one person and another person, people and a group, people and nature.

In fact, we must admit that the growth of global social inequality destroys the social base of political stability at national and world levels. It is the source of the spread of terrorism, organized crime, corruption, the merging of criminal structures with government and business, the spread of social diseases such as drug addiction, AIDS, alcoholism, prostitution, etc.

Let us consider the bipolar scenario of the world development, namely, the emergence of the bipolar system of the East-West in the late 1940's, which was accompanied by a double revolution in the military sphere. As a result, the

spatial characteristics lost their value, turning the Earth into a single battlefield. Most politicians and economists recognize globalization as a real process that is rapidly evolving in all spheres of public life, although now this concept is treated differently from the way it was defined 30-40 years ago. First of all, this is due to the collapse of the bipolar system.

Today, we can cumulatively identify two potential options for improving the institutional architecture of the world. In the first case, the initiative is seized by one of the participants in the system, in the second case, a new supranational global regulation institute is created, i.e. a certain global centre for making strategic decisions. If we classify the institutional arrangement according to the number of poles of power that coordinate world economic processes, it will be possible to single out thuman resources management ee systems: a) a unipolar system; b) a bipolar or a tripolar system; c) a polypolar system.

The bipolar system presupposes the presence of two management poles, which, thuman resources management ough consensus, make agreed decisions, the compliance with these decisions is mandatory for the rest of the participants in international relations. On the one hand, this system includes the intensification of international cooperation of the most developed countries of the world, which are ready to compromise in order to protect common interests. On the other hand, it presupposes the priority of the decisions taken by the ruling elite for other participants in international relations. The theory of the bipolar world covers the following main directions of institutional provision of global transformations: coalitions of states, coalitions of regional integration associations (Appendix A)

To date, there is no clear core around which the consolidation process could begin. The most likely variants are:

- “five» permanent members of the UN Security Council (it is possible to expand the composition);
- “the Group of seven» (it is possible to expand the composition);
- a compromise: the United States, the EU, Japan, BRICS countries will form the «centre».

The main instrument of pressure on the «periphery» can be the conditions of economic, technological and information partnership with the «centre», which may be more or less favourable. The main task of the union is not subordination, but the civilization of «peripheral» territories. The coalition of regional integration associations lays the foundation for the future world order, which consists in the following:

- the formation of groups based on economic factors (a response to global transformations);
- the dominance of economic factors, which reduces the probability of the emergence of hierarchical institutional structures that make decisions, which are binding for member countries;
- the focus is primarily on the creation of peculiar «... islands of a more liberal economic regime», and not on the construction of regional protectionist enclaves;
- deepening the level of regional coordination of economic policy.

Thus, we can conclude that, in spite of the absence of a single centre for global decision-making, there is danger that the future political regime of governance may be authoritarian rather than democratic. This may be due to the fact that decisions on global problems will be taken by a limited number of subjects of international relations, and the internal structure of many of them is based not on democratic principles, but on strict discipline.

3. Supranational structures that change the vector of development of «a network society».

The most important feature of modern globalization is the growing role of developing countries (emerging markets, emerging economies), which are powerful players in the global competitive market ¹⁵. Companies from developing countries have competitive advantages both in the markets of developed countries and in their own markets. They are able to adapt their products to the needs of poor markets, where there is an increase in the level of competition and the growth of solvent and wealthy consumers. Companies

¹⁵Waters M. (2013). Globalization. London : Routledge. 268 p. (2-nd edition. : extended).

from developing countries are not only recipients of capital from developed countries. On the contrary, they frequently take over well-known companies, that is, globalization is becoming a two-direction movement: a) from developed countries to developing countries; b) from developing countries to developed countries; c) between developing countries.

Today in the USA, 16% of GDP is created at enterprises controlled by foreign investors and almost 10.9% of the active labour force is employed there; in the EU these indicators are much higher: 22.4 and 14.7% (although, in the absence of borders and customs and the presence of a single currency, the notion «foreign» in the EU is gradually neutralized). The value and significance of modern globalization processes consist primarily in the fact that they open up a new degree of freedom to people in achieving their goals and force governments to be mature. The criterion for the effectiveness of power is the protection of citizens, rather than the achievement of doubtful «national interests», as it was defined in the era of geopolitical doctrines of the XIX century.

Information, financial and other processes associated with globalization curtail possibilities of national governments for controlling the internal political situation and managing it. Individual states, under the influence of the situation in the world market, lose national economic sovereignty and control over information flows. Multinational corporations, civil society institutions undertake many of the functions previously performed by governments. National and international non-governmental organizations have a growing influence on public opinion, policy-making, and the development of laws. They fulfil social protection functions and even participate in the work of the UN committees and commissions. Governments partially lose the monopoly on exercising their power and authority.

Traditional power and authority of the state is delegated to supranational and internal structures in the sphere of both international relations and domestic policy. The main types of supranational structures that restrict the powers and real possibilities of the state today are:

- various bodies of international governance and regulation established at the interstate level (e.g. NATO, the UN, the IMF and the World Bank);
- transnational corporations;
- international community, religious and criminal organizations (they are united by a non-state and mostly non-economic character of association and purpose determination);
- global media.

Global media are the only supranational structures that limit the state and that are dependent participants in global competition. They restrict the influence of any state on the life of society, as they are a direct tool for the formation of global, international public opinion and «moral standards» imposed on states (in particular, the weaker ones). Globalization limits the role of states not only «from above», but also «from below», by strengthening and giving individual elements of society a direct access to the international arena. As a rule, these are the same structures (except interstate ones), but at an earlier stage of development (they are not completely international and have not lost national identity), which limit the state «from above»¹⁶.

In addition to corporations that are turning into transnational ones, a significant role is played by regions, with the growing influence of both the most and the least economically developed territories. More developed territories get certain autonomy in exchange for political loyalty and consent to redistribute their funds in favour of the less developed. Less developed territories gain some autonomy in international contacts as an additional tool for self-development in exchange for a reduction of direct state support. The elements of society that attract external forces for interaction with the state start to promote their interests. This is a completely natural and spontaneous process, some kind of payment for support. The elements of some society give this support to the external forces on which they rely in dialogue (or confrontation) with state structures.

¹⁶Stiglitz J. (2015). *Globalization and Its Discontents*. UK: Penguin. 320 p.

However, this natural process presents a potential threat. Since the modern world cannot be considered idealistic, external forces provide support for certain social elements in conducting dialogue with the state only in exchange for advancing their own interests. In most cases, these interests do not coincide with the interests of communities. As a result, public structures that rely on external forces become the «fifth column» and defend the interests of competitors of their own society.

Thus, developed countries use global and national networks of various non-governmental organizations (including those that form the so-called «civil society») to impose their standards on less developed societies. These standards, which have been developed under other conditions, are beyond the strength of the mentioned societies and quite often do not correspond to their principles and undermine the cultural and material foundations of their competitiveness and life. Hence, diminishing the role of the state in the course of globalization limits the influence of society on the implementation of policies and its own development as well as promotes the imposition of external, foreign, and sometimes hostile interests, motivations and practical actions.

The global power of capital implies, firstly, a total market, which penetrates into all spheres of human life. And this is not a market for freely competing atomized enterprises, but a total market as space of struggle for giant networks, the centres of which are TNCs. All humanity – workers, consumers, residents, being “McDonald's clients” or “generations of Pepsi”, become the slaves of networks that are competing with each other. Secondly, today the hegemony of capital is mainly the power of virtual fictitious financial capital that «exists» in computer networks. In the world, a virtual «black box», consisting of gigantic (hundreds of trillions of dollars) financial «bubbles» started to exist. Those “bubbles” are inflated by both speculation in the «first» world, and the debts of the «second» and «third» worlds. Thirdly, the global hegemony of capital today includes not just the exploitation of wage workers through human resources management through the purchase and sale of workforce but also the holistic subordination of a worker. A modern corporation in the «first»

world takes credit for creative potential, talent, education and the life of a professional. Moreover, semi-humane methods of exploitation that isolate workers in ethnically remote regions are increasingly spread not only in the «third», but also in the «second» world. Fourthly, there is a well-known system of methods that the “first” world uses to monopolize the main development resources – know-how, high-quality labour force, etc., when absorbing the vast majority of natural resources and exporting dirty technologies, social “dirt” into the “third” and “second” worlds. Fifthly, it is global political and ideological manipulation, information and cultural pressure.

Conclusions. Consequently, the economic growth of the national and global economies needs new momentum that is acceptable to most of the participating countries in the face of global competition. Taking into account the systemic challenges of the neoliberal model of a development strategy, one should include an alterglobal component and take into consideration: (1) synchronization of economic cycles and crises; (2) the gradual introduction of the post-industrial mode of production with the characteristic set and ratio of devices; (3) a clear distinction between market and non-market sectors of the economy; (4) a change in the ratio of the real and the “virtual” economy, reflecting the declared proportions of the reproduction of financial and credit values in reality that are formed under the influence of their own imperatives; (5) the level of cultural integration and socio-global polarization.

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**ECONOMIC INSECURITY TRANSFORMATION IN CONDITIONS OF
STRUCTURAL MODERNIZATION OF THE UKRAINIAN ECONOMY**

Abstract. The article is devoted to the analysis of economic insecurity transformation in the economy. The essence and characteristics of economic insecurity at state and regional levels are considered. The difference and interrelations of terms “danger” and “threats” for economic security are analysed. Internal and external economic insecurity threats are classified; the level of their influence on the state economic security is noted. The stages of economic security, their aims as well as elements of economic insecurity are discussed. The legislative base, which describes Ukrainian economic insecurity is studied. The methods of accessing economic insecurity, their advantages and disadvantages are considered. Methodological recommendations for determining the level of economic security of Ukraine as one of the main components of the national security of the state, based on a complex analysis of indicators of economic security and counting the integral indicator of economic security level are given. Shadow economy as one of the essential components of Ukrainian economic insecurity is determined. Economic insecurity of the regions is characterized. The role of sustainable development of regions as a guarantee of transformation from insecurity to a national economic security model is studied.

Jel Classification System: A 10, F52, O 10, P 41, Q 01, R 10, R 58

Key words: economic insecurity, factors of insecurity, national security, analysis, shadow economy, sustainable development of regions, national economy.

Introduction. In the changing conditions of a modern economy, the ability to ensure the country's security from the impact of internal and external threats determines its level of competitiveness and the socio-economic development dynamics. Therefore, today, economic security is considered mainly from the standpoint of the national economy, while the regional component is not studied sufficiently. If we consider from the point of view of economic security any problem in Ukraine, such as employment, de-industrialization or the distribution of the budget, we also see clearly defined regional features of their manifestation. Trends in the development of the economic situation in Ukraine are the following – regional and sectoral economic risks can be increased.

On the other hand, quite a lot of work devoted to the studying of economic security without paying due attention to its opposition to economic danger. The confirmation of this idea is also found in the work of Ukrainian economists, which state that over recent years considerable attention has been paid to such conceptual categories as stability, balance and security. These categories reflect the level of efficiency of economic development as a single system and provide a comprehensive assessment, are criteria for assessing the socio-economic development of the region. Economic security should be regarded as the most important characteristic of the economic system, as the constructive building of the sustainable economy. It determines the sustainability of economic actors, the possibility of realizing national-state interests, decent living conditions of the population, elimination of threats that arise in the process of their achievement.

Ensuring economic security is one of the most important functions of the state. It is a derivative of economic growth goals at every stage of social development. At the region level, economic security determines the degree of development of the regional economy; its integration with the country's economy shows the regional independence level. Like most scholars, the author considers economic security in relation to threats. Stetsenko S. notes, for example, that the essence of the economic security of the region lies in the ability and capacity of its economy to improve step by step the quality of life of

the population at the level of generally accepted standards, provide socio-economic and socio-political stability of the region ¹⁷.

As to the researches on the content of concepts "threat" and "danger", the analysis of scientific literature leads to the conclusion that there is no clear definition of these terms. "Danger" and "Threat" are identified by some scientists, some of them define danger as a form of threat, and by "threat" others mean the stage or form of danger. A number of researchers emphasize the consequences of threat and danger, defining them as the effect of factors, phenomena, events that cause an unwanted state of the enterprise, loss, damage, etc ¹⁸.

The Academic Explanatory Dictionary of the Ukrainian Language gives an interpretation according to which the concepts under investigation are synonymous ¹⁹:

- threat - the possibility or inevitability of occurrence of something dangerous, pitiful, difficult for someone, something; something that can cause any evil, some kind of trouble;
- danger - the possibility of any disaster, misfortune, any kind of disaster, damage, etc.; a state where someone threatens something for some reason.

In scientific work of Ukrainian economists, other comparisons of these terms are also proposed. For example, Semenyutina T. considering the relationship of risk, danger, and threat, indicates that danger and threat should be considered risk factors and should not be identified with it in any case ²⁰.

¹⁷Stetsenko S. (2016): Theoretical aspects of the study of economic security of the regions on the basis of socio-economic monitoring. Investments: Practice and experience.

¹⁸Sukhanova N. (2011): Risks, threats and dangers in the management of enterprises in crisis conditions: common and differences. Effective economy. Available at: <http://www.economy.nayka.com.ua/?op=1&z=2544>

¹⁹Academic Explanatory Dictionary of the Ukrainian Language. Electronic resource. – Available at: <http://sum.in.ua>

²⁰Semenyutina T. (2012): Economic risks, hazards, threats: the essence and interconnection. Economic space.

According to Sukhanova N., threat is the causes, phenomena, events, conditions that can prevent the achievable goals and objectives of economic entities. Danger is a concrete form of manifestation of threat, whose destructive influence is completely understood and uncontroversial²¹.

Rach V. distinguishes danger/risk/ crisis as the basic triad²². Just as a triad is a minimal construction, which is a minimal model of the display of the whole. According to his ideas, the risk is rational, the danger is intuitional, and the crisis is emotional. This model represents a description of an uncomfortable situation. The only personality is able to determine the degree of non-comfort. At the same time, it acts as the integration of such qualities as rationality/emotionality/ intuition. Why is there such a match of the categories for personality traits? Let us consider the "danger" category. As shown in the works, this category should be viewed as an integral part of the archetype definition of danger/uncertainty/ security, as the meaningful subjective perception of insufficiency/sufficiency of methods and means of own continuous activity in organized artificial or natural integrity²³. That is, we experience a dangerous situation at the level of perception, that is, intuitively. It gives an opportunity to feel the crisis situation emotionally. And only then, with logical analysis, that is, rationally, we calculate the risk indicators, which, in comparison with the corresponding scales, give us a confirmation or not of a perceived situation as a dangerous appropriate level of crisis.

There is no consensus on the comparability of threats, risks, and dangers, and there is no unity of scientific interpretation of danger.

²¹Sukhanova N. (2011): Risks, threats and dangers in the management of enterprises in crisis conditions: common features and differences. *Effective economy*. Available at: <http://www.economy.nayka.com.ua/?op=1&z=2544>

²²Rach V. (2013): "Danger / risk / crisis" as the triad essence of development processes in the modern economy. *Project management and production development*. Available at: <http://www.pmdp.org.ua/images/Journal/45/22.pdf>

²³Rossoshanskaya O. (2011): Safety and security as characteristics of a comfortable state of the whole [Text]. *Bulletin of Volodymyr Dahl East-Ukrainian National University*. - Lugansk: View of the SNU; Rossoshanskaya O. (2012): Continuity of activity as the main criterion for assessing economic security [Text]. *Economic security of the state and scientific and technological aspects of its provision: Proceedings of the IV international scientific and practical seminar*.

Yermoshenko M. considers danger as an objectively existing possibility of negative influence on a certain phenomenon, system, mechanism, social organism, as a result of which it can be caused by harm, which will lead to decline, crisis state, etc²⁴.

Oleynikov E. notes that danger is a well-understood, but not a fatal probability of causing harm, due to the presence of objective or subjective factors.

Manilov V. describes danger as causing damage to important national interests and national security on a limited (local) scale²⁵.

Pogosova M. views danger as an existing or potential possibility of a threat, the impact of which may cause damage to any subject or object²⁶.

In the textbook on national security of Ukraine, the national danger is discussed as the practical actions of one state or their groups, legal persons in terms of harming the national interests of another country, that is, the process of direct practical harm to the national interests of the state²⁷.

In economic literature there are a lot of classifications of economic insecurity factors. In our opinion, it makes sense to analyse them from an internal and external point of view. We agree with scientists who understand internal threats as those which are usually caused by the inability of the economy to self-preservation and self-development, the weakness of innovation in the development, ineffectiveness of the state regulation of the economy, and external economic insecurity threats reflect the current state of the world economy, and their source is the conflict of national economic interests of different countries in connection with the implementation own scientific and technical and financial and economic potential.

Internal economic insecurity threats are:

²⁴Yermoshenko M. (2001): *Financial Security of the State: National Interests, Real Threats, Security Strategy*.

²⁵Manilov V. (1995): *Research on national security problems: questions of methodology. Military thought*.

²⁶Pogosova M. (2008): *Structural-logical analysis of the concept "Financial safety of the enterprise"*. *Science and economics*.

²⁷Nizhnik N. (2000): *National Security of Ukraine (methodological aspects, state and development trends): curriculum. Manual. Belous. - Irpen*.

- the low technological level of most industries, high production costs, low quality of products and, consequently, low competitiveness of the national economy;
- loss of a significant part of scientific and technical potential, positions on important areas of scientific and technological progress;
- deformed production structure;
- destruction of the reproduction system of production potential;
- energy crisis;
- the inefficiency of public administration in socio-economic processes;
- the imperfection of national legislation;
- the growth of the shadow economy;
- high level of monopolization of the economy, strengthening of raw material orientation;
- low investment activity and investment of capital mainly in an intermediary and financial activity at the expense of production;
- reduction of production sphere;
- low solvent consumer demand of the population;
- strengthening the property stratification of the population;
- criminalization of the economy, the growth of corruption and organized crime, its penetration into the basic branches of the Ukrainian economy as a result of weakening the system of state control;
- the weakness of the institutions of power, which in combination with the imperfect legislative framework leads to low legal, financial, contractual discipline, mass concealment of income and tax evasion;
- lack of adequate legislation and judicial system, delay and lag in the creation of the most important institutions of a market economy.

At the same time, external economic insecurity threats are represented

by:

- import dependence of Ukraine on many types of products, including
- strategic goods, energy carriers, component parts for mechanical engineering, foodstuffs;
- irrational structure of export;

- problems of the financial, organizational and information infrastructure supporting the competitiveness of Ukrainian exports;
- uncontrolled departure abroad of intellectual and labour resources;
- insufficient export and currency control and imperfection of customs policy;
- poor development of the transport infrastructure of foreign economic relations, etc.

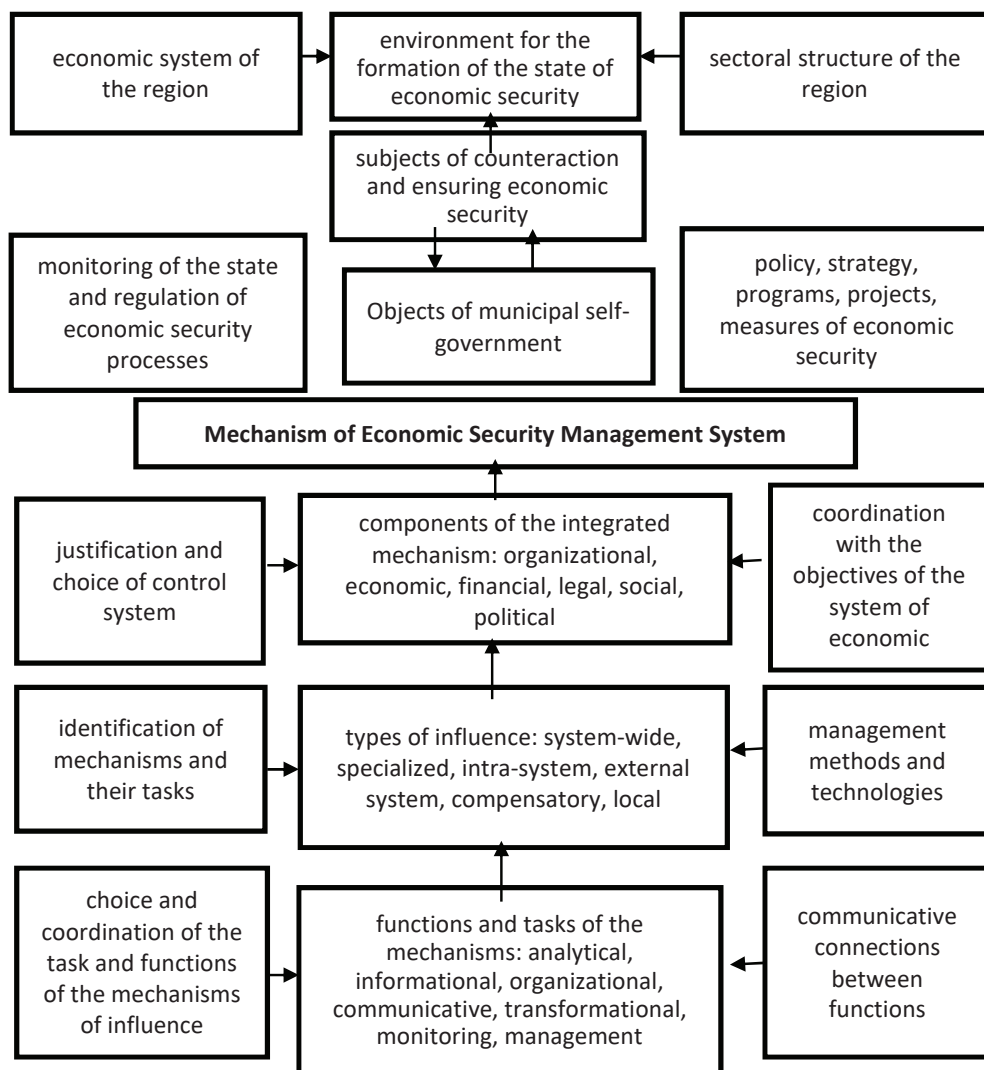
The influence level of internal and external threats on the state economic security is constantly changing because of the dynamic conditions of the functioning of society, the national economy and the world economic system as a whole.

For preventing economic insecurity, starting from the beginning of the XX century several solutions were introduced that would contribute to economic security. Therefore, it is important to consider the main stages of the country and world economic security:

- first, we need to remind the Law of Ukraine "On National Security" and the creation of the Federal Committee on Economic Security with the aim to preserve the economic independence of the country and raise the quality of life of the population by ensuring the economic security of citizens and the state as a whole;
- next stage - the creation of international associations for providing the international economic security of the developed countries of the world.
- The aim is strengthening the security of the global economy and individual states by preventing the energy crisis;
- acceptance of the Strategies of the economic method of national security by the countries of Western Europe. The aim is development of a set of measures to ensure sustainable development of the economy by creating a mechanism for countering the security of internal and external threats to European countries;
- declaration of Principles of International Economic Security of the United Nations because of the need to ensure an integrated approach to solving a lot of interconnected international problems;
- changing in the course of the former Soviet Union countries in the formation of a market economy system for the democratization of

society, overcoming social tension, ensuring political changes, the emergence of a market economy, improving the living standards of the population;

Figure 1. Mechanism of economic security management of the region



Source: compiled by the authors on the basis of the research

- acceptance by the countries of the former Soviet Union of state normative- legal acts on ensuring the national economic security questions for the formation of a mechanism for ensuring the vital interests of the individual, society and the state from internal and external threats;
- developing the market economy system by former Soviet Union countries for the democratization of society, overcoming social tension, ensuring political changes, the emergence of a market economy, improving the living standards of the population.

Moreover, Ukrainian economic insecurity is described in the Law of Ukraine "On the Fundamentals of National Security of Ukraine" and its characteristic features are²⁸:

- Significant reduction of GDP, the decrease of investment and innovation activity and scientific and technical and technological potential, reduction of research in strategically important directions of innovation development.
- The weakening of the system of state regulation and control in the sphere of economy.
- Instability in the legal regulation of relations in the sphere of economy, including the financial policy of the state; lack of an effective program to prevent financial crises; growth of credit risks.
- The critical condition of the main productive assets in the leading industries, agro-industrial complex, life support systems; the aggravation of the problem of maintaining the proper technical condition of nuclear facilities on the territory of Ukraine.
- The insufficient rate of reproductive processes and overcoming structural deformation in the economy.
- The critical dependence of the national economy on the situation of foreign markets, low rates of expansion of the domestic market.
- An irrational export structure with predominantly raw material nature and a low proportion of high value-added products.

²⁸Law of Ukraine "On the Fundamentals of National Security of Ukraine" (2003). Available at: <http://zakon4.rada.gov.ua/laws/show/964-15>.

- Great debt dependence of the state, critical volumes of state external and internal debts.
- The growth of the share of foreign capital in strategic sectors of the economy is dangerous for Ukraine's economic independence.
- The ineffectiveness of antimonopoly policies and mechanisms of state regulation of natural monopolies, which complicates the creation of a competitive environment in the economy.
- The critical state with food provision of the population.
- The inefficiency of fuel and energy resources usage, insufficient rates of its supply and lack of active energy conservation policies that threaten the energy security of the state.
- A large share of the shadow economy.
- The prevalence of the personal, corporate, and regional interests over the national ones in the management structures.

At the same time in the National Security Strategy of Ukraine the following threats to the national security of Ukraine in the economic sphere are registered, which need to be discussed ²⁹:

- the dependence of the domestic market on the foreign economic situation, insufficient efficiency of work on its protection against unfair competition from Ukrainian monopolists and importers;
- low efficiency of the material resources usage, the prevalence in the structure of industry sectors with a small share of value added, low technological level of the domestic economy;
- existing currency risks, inefficient State and local budgets funds usage;
- the imperfection of legislation to increase the development of the national economy on an innovative basis, the relatively high level of economic shadowing, the lack of sufficient incentives to legalize incomes and reduce shadow employment;

²⁹The Strategy of National Security of Ukraine "Ukraine in a Changing World". (2007): Decree of the President of Ukraine dated February 12, No. 105. Available at: <http://zakon4.rada.gov.ua/laws/show/389/2012/paran18#n18>.

- an excessive influence of foreign capital on the development of certain strategically important sectors of the national economy, a growth of the share of foreign capital in such industries is dangerous for Ukraine's economic independence.

The analysis of scientific work of Ukrainian and foreign scientists showed that there is no single common interpretation of insecurity, danger, and threat, it should be emphasized that these terms, first of all, are used in relation to the economy. For further description of the material, let us note that we understand that danger as a real manifestation of threats that arise while exceeding the critical level of threats, is accompanied by certain losses and has devastating consequences. Here the following problem field is outlined. Which level is a critical one? Talking about existing assessing methods, a SWOT analysis is the most widespread. The first time, when the analysis was represented visually in the form of a SWOT matrix, was at the Harvard conference. Initially, a SWOT analysis was based on structured knowledge about the current situation and trends, later – in the broader sense – for constructing strategies. Today a SWOT analysis is used at all levels of macro, meso, and microeconomics. In addition, this method is considered not only a basis for the development of strategies but also a method of crisis management. A SWOT analysis is the process of establishing links between the most characteristic features, threats, strengths (advantages), weaknesses, the results of which can later be used to formulate and select strategies. This is a kind of tool: it does not contain final information for making managerial decisions, but it allows you to streamline the process of considering all available information using your own opinions and ratings. It enables us to formulate a general list of strategies considering their features - adaptation to the environment or influence on it. The widespread application and development of a SWOT analysis are due to the fact that strategic management involves large volumes of information that needs to be collected,

processed, analysed, used, and hence there is a need to search, develop and apply methods for organizing such work³⁰.

The SWOT analysis algorithm consists of the following main steps: formation of expert groups, filling the matrix SWOT, expert evaluation, summarizing the results, analysis of the results. The successful application of the methodology helps to structure existing information, take a fresh look at the current situation and not only evaluate opportunities, reveal threats, but also try to take into account the information received in the future development strategies of the territories.

The main advantages of a SWOT analysis include the following:

- systematization of knowledge about internal and external factors
- influencing the process of strategic management,
- definition of competitive advantages and formation of strategic priorities,
- periodic diagnostics of the market sector and resources of the territories, diagnosing both the whole territory and its separate regions.

The most important disadvantages of this method of strategic analysis can be summarized as follows:

- subjectivity in establishing the nomenclature of strategic factors of the internal and external environments, as well as in determining their significance for the territories,
- constant lagging of the information on the analysed environment from the present time,
- the unresolved issue of ensuring the establishment of a single correct management decision and orientation only to establish a general direction of development,
- lack of consideration of the risks that each territory meets every day.

A SWOT analysis is one of the most common types of analysis in strategic management. Its versatility makes it possible to use it for various objects of

³⁰Guido Vonk G., Geertman S., Schot P. A SWOT Analysis of Planning Support Systems. (2007). Available at: <https://journals.sagepub.com/doi/abs/10.1068/a38262>

study: analysis of products, enterprises, competitors, cities, regions, etc. Currently, this method is actively used at the state and regional level for strategy development, as a result, a management decision is made as a social act, in which, in a logical form, the influence of managerial units on the social system that is necessary to achieve the goals, interests, and satisfaction of the relevant management needs. And the most problematic is that the level of threats is not evaluated in the mathematical calculation, that is, the quadrant of the weaknesses – threat, may contain indicators of the pre-crisis level and the crisis level, that is, the state of danger. All components of this quadrant are provided by experts and approved by politicians at the state and regional levels, the territory is deprived of an adequate assessment of its condition, which may lead to unexpected danger; for example, it occurred in certain Donbas areas.

It is believed that if a SWOT analysis is already used at the meso-macro level, then its application should be preceded by PEST and PRESTCOM analyses commonly used in developed countries. The resulting market information is used to find out the chances and threats to the enterprise in the region. A PEST analysis (political, economic, social, technological factors) is to identify and evaluate political, economic, socio-cultural, technological factors.

A PRESTCOM method (regulatory, competition, organizational market factors) covers the analysis of regulatory, competitive, organizational, market factors. It allows you to see the general factors (both in the country and in the international market) that affect the activities of the company, identifies the main trends that need to be addressed when designing the strategy and in the current activity.

Similarly, these methods may be extended to the meso- and macro-levels of the economy. That will allow receiving more relevant SWOT analysis results. As we see, a SWOT analysis, despite its prevalence in the application for strategies developing at the state and regional levels, does not answer the questions about the quantitative measurement of threats and assessment of the danger level. On the other hand, application of the program-target method for the programs and plans development is recommended, within which the

quantity and measure indicators of the program should be established. Nowadays, this method is implemented in the process of budgeting and is not yet common for economic or socio-economic programs development. In our opinion, the program-target method can be used for any territory in order to avoid falling into the danger zone.

At present, the most formalized is the calculation of the level of economic security of Ukraine. Appropriate methodological recommendations were approved by the order of the Ministry of Economic Development and Trade of Ukraine ³¹.

These methodological recommendations are designed to determine the level of economic security of Ukraine as one of the main components of the national security of the state and determine the list of key indicators of the state of economic security of Ukraine, their thresholds, as well as the algorithm for calculating the integral index of economic security.

The methodological recommendations are based on a comprehensive analysis of indicators of economic security with the identification of potentially possible threats to economic security in Ukraine and are applied by the Ministry of Economic Development for an integrated assessment of the level of economic security of Ukraine in general in the economy and in certain spheres of activity ³². The integral index of economic security consists of 9 weighted average sub-indices (components of economic security):

- 1) industrial safety;
- 2) demographic security;
- 3) energy security;
- 4) foreign economic security;
- 5) investment-innovation safety;
- 6) macroeconomic security;
- 7) food security;
- 8) social security;

³¹On Approval of Methodological Recommendations for Calculating the Level of Economic Security of Ukraine. (2013). Available at: <https://zakon.rada.gov.ua/rada/show/v1277731-13>

³² The same.

9) financial security.

The calculation of integral indices in the context of these components of economic security is based on the assessment of more than 130 individual indicators. For each indicator of the components of the state of economic security of Ukraine, the characteristic values that determine the level of economic security are developed. The range of characteristic values of each indicator is measured from 0 to 1 (or from 0 to 100 percent) and is divided into five intervals. They include an indicator which is characterized as a minimum or absolutely dangerous level of economic security and the level of economic security is equal to 0; the indicator value, which is characterized as a critical level of economic security and the level of economic security is equal to 0.2 or 20% of the optimal value; the value of the indicator, which is characterized as a dangerous level of economic security, and the level of economic security is equal to 0.4 or 40% of the optimal value; the value of the indicator, which is characterized as unsatisfactory level of economic security and the level of economic security is equal to 0.6, or 60% of optimal value; the value of the indicator, which is characterized as a satisfactory level of economic security and the level of economic security is equal to 0.8, or 80% of the optimal value; the value of the indicator, which is characterized as the optimum level of economic security, and the level of economic security is equal to 1, that is equal to the optimal value. Unfortunately, although it is stated that the results should be published on the website of the Ministry, it is impossible to find them. Thanks to the response to the official request, we can analyse the indicators of the integral index of economic security of Ukraine as a whole and 9 weighted average components of economic security starting from 2010 (Table 1).

Table 1. The integral indicator of economic security level and by separate components, %

Indicator components	2010	2011	2012	2013	2014	2015	2016
Industrial	50	55	49	48	50	47	56
Demographic	47	56	45	46	45	43	46
Energy	35	32	34	39	47	45	58
Foreign Economic	41	36	29	35	35	37	40

Investment and innovation	35	36	37	35	30	35	30
Macroeconomic	38	48	38	39	33	31	36
Food	90	92	93	86	94	92	92
Social	57	59	64	62	57	55	56
Financial	44	47	46	50	36	35	38
An integral indicator of economic security level	47	50	47	48	45	44	48

Source: compiled by the authors on the basis of ³³

As you can see, the integral indicator of the level of economic security is within the third interval, where insecurity is the value of an indicator characterized as a dangerous level of economic security, and the level of economic security equals 0.4 or 40% of the optimal value; the value of an indicator that is characterized as unsatisfactory level of economic security and the level of economic security is equal to 0.6, or 60% of optimal value. All integral indicators are closer to the dangerous level than to the unsatisfactory level of economic security. Similarly, in the third interval, there are production, demographic and social indicators. The energy indicator from 2010 to 2013 was in a dangerous zone, and from 2014 to 2016 it was unsatisfactory, and the financial indicator on the contrary from the unsatisfactory zone went down to the dangerous one. The worst situation is due to investment-innovation and macroeconomic indicators because they do not go beyond the limits of the level of economic security. The highest level of economic security for the food indicator is the only indicator that has reached almost the optimal level of economic security.

As the analysis shows, by most indicators, we are at a dangerous level of economic security, so it is more appropriate in this case to use the term economic danger, which more adequately characterizes the existing state of affairs. Therefore, we again emphasize the need for a legislative term for economic danger.

³³On Approval of Methodological Recommendations for Calculating the Level of Economic Security of Ukraine. (2013). Available at: <https://zakon.rada.gov.ua/rada/show/v1277731-13>

However, one of the most important components of Ukrainian economic insecurity is the shadow economy, which hinders the development of both regions and the state as a whole. Enterprises operating under the law lose competitive advantage over those players who derive their income in the shadow. The state supports these conditions in its interests: murky taxes, complex rules of the game, closed deals, political and financial groups. All this increases the risks for all types of business and prevents regions from developing and investors are afraid to invest in enterprises and regions.

Along with all the illnesses of the economy, in recent years Ukraine has encountered problems caused by the conflict in the east of the country. The "hybrid" war, on the one hand, broke up established economic and trade ties with neighboring countries, on the other, it has led huge territories and entire branches of the national economy into shadow. All this has led to an increase in the economic insecurity, even in regions and enterprises that are not directly connected with the war. Inflation, the increase of utility payments, the lack of investment, the outflow of labor, first of all, highly skilled one lead to a decrease in the competitiveness of domestic enterprises.

Ukraine's economy quickly integrated into the system of shadow financial flows, using standard instruments of manipulation of export and import prices, as well as financial instruments. According to the cumulative outflow of shadow capital, today Ukraine is among the twenty "Leader countries". Globalization of the world economy negatively affects the effectiveness of the national economy management levers, destabilizing global economic relations. The spread of shadow employment and the shadowing of financial flows, which are recognized as determinants of the shadowing of world economic relations, increase inequality within and between countries. The scale of the shadowy financial flows from Ukraine suggests the availability of untapped investment resources for the national economy, which is almost twice the amount of foreign direct investment in Ukraine³⁴.

³⁴The Global Risks Report 2019. (2019). Available at: <https://www.weforum.org/reports/the-global-risks-report-2019>

Despite the threatening scale of the problem, there is still no coordinated country-wide plan of action to overcome the shadow economy. Existing program documents or relating to them individual manifestations fight against economic crime, etc., or are aimed at counteracting shadow economic activity on the scale of national economies.

As the problem of shadowing goes beyond the boundaries of one country, the scale of the shadow economy of the global economy and the threats associated with its existence and spread require the development of a coordinated strategy to counteract such a phenomenon.

The main ways of counteracting the shadow economy of the global economy are ³⁵:

- conducting national audits of the economies of countries in order to assess the magnitude of the types of shadow economic activity and their impact on the formal economy;
- assessment of national regulatory systems for taxation, labor licensing, environment, health and safety, consumer protection, intellectual and industrial property rights in order to identify opportunities for their simplification and reduce compliance costs;
- researches of the impact of migrant labor on national well-being and compliance with corporate standards of work;
- introduction of special assistance for integration for vulnerable groups (in particular, minorities, refugees, forced migrants, etc.);
- increased electronic monitoring and supervision of cash flows of banks and other financial institutions;
- introducing more rigid rules for cash transactions and increasing fines for unregistered and unclaimed cash accounts;

³⁵Pleskachevskiy V. The underground economy: a threat to democracy, development and the rule of law. Available at: [http:// assembly.coe.int/ASP/Doc/DocListing DetailsEasp?DocID=13532](http://assembly.coe.int/ASP/Doc/DocListingDetailsEasp?DocID=13532)

- improved interaction, information exchange, exchange of best practices of monitoring among regional, national and international law enforcement agencies;
- increased control over transactions involving offshore jurisdictions;
- improving the rules and regulations governing financial markets, ensuring transparency of financial instruments;
- improvement of normative acts on the lobbying and activity of professional associations, the management of state property, strengthening control over counterfeits, etc.

A consistent, comprehensive and balanced program of legalization of the uncontrolled sphere of the economy in combination with tax policy and protection of the interests of entrepreneurship will resolve a number of problems related to the intensification of investment activity, economic growth, expansion of employment, increase of the level and quality of its life, strengthening the position of the country on the world level.

In addition, we consider it necessary to assess the level of economic security not only in the context of certain spheres of activity but also in terms of regions, as there is a significant difference at the regional level even in those areas of activity that are assessed at the macro level.

At the regional level, we have a very interesting situation, because on the one hand, the state does not propose any method of assessing the level of economic security or danger, and on the other hand for the regional level, on the part of the state, different methods of integrated assessment of the economic development of the regions are proposed.

According to the statements of the Law of Ukraine "On National Security of Ukraine" (Article 3)³⁶, the security of regions, administrative-territorial unit, and territorial communities is not an object of national security of Ukraine, and territorial interests are not part of the system of national interests.

However, the text uses the term "society", which is not a subject of law and is not defined in normative legal acts. Other entities (except state and

³⁶On National Security: Law of Ukraine. (2018): Available at: <https://zakon.rada.gov.ua/laws/show/2469-19>

citizens) are not assigned to subjects of ensuring national security whether economic entities and participants in economic relations whose interests are not part of the system of national interests (according to Article 1)³⁷.

However, the main functions of the subjects of ensuring the national security of Ukraine are not defined in any way by the functions of local governments to ensure the economic security of the region. In contrast, the Law of Ukraine "On Local Self-Government in Ukraine"³⁸ clearly defines the powers, principles, and functions of local governments, their role in ensuring the interests of the territorial community.

As we see the basic law imposes the opposition of the interests of the state at national and regional levels to the interests of administrative-territorial entities and territorial communities, other economic agents, which directly provide the conditions for life support of a person. The provisions of the Law "On Local Self-Government in Ukraine" show the predominance of personal, corporate and regional interests over the national ones, which is recognized as a threat to national security in the economy.

One of the biggest problems in ensuring economic security in Ukraine is the presence of regional aspects and manifestations. In fact, regions, territories, administrative-territorial entities are not the objects of national security, and therefore, they are not regulated by the subjects of ensuring economic security.

The traditional economic regionalization of development during the economic downturn in 2007-2010 has become a direct "economic danger" for the future of certain regions of Ukraine. In the National Security Strategy, the deepening of regional differentiation is recognized as a threat factor in terms of economic security. Therefore, it was necessary, along with evolution the strategic planning of regional development, actively and urgently turn to the issues of regional economic security.

³⁷On National Security: Law of Ukraine. (2018): Available at: <https://zakon.rada.gov.ua/laws/show/2469-19>

³⁸On Local Self-Government in Ukraine: Law of Ukraine. (1997): No. 280/97-VR of 21.05.1997. Available at: <http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?reg=280%2F97-%E2%F0>

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The most important element of the organization of the country's economy, which provides sustainable spatial relationships and the integrity of socio-economic development, is the territorial structure. It is the result of the development and placement of productive forces and an important prerequisite for the further development of both the economy as a whole and raising the standard of living of the population, ensuring the national security of the country, as well as an instrument for preserving and improving the environment of human life.

According to Derkach T., at the transformation stage of economic relations in Ukraine, the prevention of the achievement of a "high danger" zone becomes the basis of the state policy in the sphere of economic security³⁹. From the standpoint of regional management, the states of "high danger" are following:

- reduction of positive prospects for the economy of regions and territories on the way out of the economic crisis;
- reduction of resource potential and loss of opportunities for adaptation of the economic system to reduction of raw materials and energy resources;
- qualitative degradation and structural crisis of the industrial system as a result of the critical fall of the industrial, technological, scientific and technical, export, payment potential of the state;
- growth of production costs and deployment of inflation processes;

³⁹Derkach T. (2016): Formation of the model of socioeconomic security in the process of integration of the transformation of the economy of the regions. Global and national problems of the economy.

- financial system disruption and mutual non-payment crisis.

The emergence and growing problem of economic security due to both objective and subjective reasons related to market transformation of the economy of Ukraine. The crisis of the reproductive structure of the regions is complex, because it covers all aspects of the functioning of the country's economy: material production, finance, social sphere, problems of regional economic asymmetry and regionalism, foreign economy sphere.

The actuality of the assessment of the economic security of the territories is due to the fact that at present we have significant scientific advances concerning the state and development of the regional economy, within the framework of which a lot of studies are devoted to classification of regions. Although there is some misunderstanding in the scientific community concerning classification, nonetheless, there is a certain consequence in the regions' classification.

The most common is the division into regions – leaders, highly developed, developed and problematic. Problems are distinguished by underdeveloped and depressed ones. At the same time, at the state level, the Law of Ukraine "On the Promotion of the Development of Regions" was legislatively regulated only by the definition of depressed regions and the indicators by which the territory could obtain this status⁴⁰. According to Article 9, a depressive region is a region in which, over the last five years, the average gross regional product per capita is the lowest. Also, we need to emphasize that concerning industrial or rural areas, the thresholds for deviations from the average indicators of development of the respective territories are foreseen. Regarding regions there are no deviations. In this case, only of the most recent one will be depressed from all regions.

We also consider it necessary to introduce extreme deviations from the average indicators in Ukraine, and all regions that are outside the marginal deviations will be considered depressed. We think, it is inappropriate to use only one indicator to determine the status of depression. In our opinion, it is

⁴⁰On stimulation of the development of regions: Law of Ukraine. (2012): № 2850-IV. – Available at: <https://zakon.rada.gov.ua/laws/show/2850-15>

vital to adapt the indicators of assessing the level of economic security of Ukraine to the regional level. This is since each region has a certain specialization and, accordingly, under certain components, the region will be in a safe area, and some will fall into the danger zone of economic security. Accordingly, regional development agreements should focus on reducing the level of economic danger in some particular area of activity that has fallen into a dangerous zone in the region.

We will generalize the reasons for significant differences in the regions defining the tasks of regional policy:

- differences in natural and economic conditions;
- the scale, quality of the natural resources defines the "productivity" of the regions;
- economic and geographical location of the region;
- old production structure, which leads to a delay with the introduction of innovations;
- the stage of technological development, which affects certain types of goods production (raw materials, intermediate products, goods of final consumption, etc.);
- political conditions, forms of general and regional policy, degree of regional autonomy;
- physical factors of accommodation (presence or absence of ports, airports, transport systems);
- socio-cultural factors (degree of urbanization, education of the population, etc.).

Unfortunately, generalization of scientific works shows that most regions fall into the problem category, so we consider it incorrect to give the status of depression to the "worst case" region. It is the assessment of the level of economic security at the regional level that will identify the regions where the situation is worst in all spheres – and then a comprehensive solution is needed, and regions where targeted assistance is needed in a certain area so that this sphere does not become a driver for the transition of the economic

situation of the region to the zone of economic danger. Preventive measures are always better than solving existing problems.

According to the Law of Ukraine "On Stimulating the Development of Regions", the promotion of the development of the regions is carried out with the aim of ensuring their sustainable development in the interests of the whole Ukraine, raising the standard of living of the population, overcoming poverty and unemployment, forming the middle class.

The main principles of state incentives for the development of depressed territories include (Article 8):

- objectivity and openness in determining the territories for the state stimulation of their development;
- simultaneous concentration of efforts and funds in a relatively small number of territories in order to achieve maximum socio-economic development;
- inadmissibility of the use of targeted state support to finance the current needs of the territories;
- maximum use of opportunities of the territories themselves in the development and implementation of a system of measures to overcome depression.

According to the legislation for the depressed region, an appropriate program for overcoming the state of depression of the territory is being developed. It is interrelated with the content, timing, possibilities and performers of a set of measures of legal, organizational, economic, financial, social orientation, aimed at overcoming the depression of a particular territory, the provision of which involves the financial and other resources of the state and the region. And for all other regions - a strategy for regional development. We believe that all these documents have lost one of the main terms, which significantly affects the content of documents - this is the sustainability of development.

Thus, the law states that one of the goals of stimulating regional development is to ensure sustainable development, but this term does not occur more within the limits of the law. And this is admissible.

Since the strategies of sustainable development of the region should ensure the sustainability of development, the name of the strategy of sustainable regional development is more correct. Especially, if the strategy is developed for a depressed territory. Indeed, from the wording of the program to overcome the depression of the territory, no mention of sustainability, and this is the main driver exit region of the zone of economic danger. The state can provide all possible support to the depressed region and withdraw it from the zone of economic danger, but if the stability of processes is not ensured, the region will again be in the economic danger zone.

Assessing the potential impact of each region on the sustainability of its economy and the country as a whole is of particular importance today. The degree of influence on the sustainability of economic development is realized through a system of quantitative indicators.

Indicators of sustainable development of the region are not unchanged, once and for all established. They will change with the stabilization of the Ukrainian economy, reducing the level of economic danger and conditioned by shifts in the economic situation of society, the priorities of its development. Today these indicators should help the state and regional authorities to influence maximally on the social production processes in order to ensure sustainable economic development. In 2015, the strategy for sustainable development "Ukraine - 2020" was approved, which envisages the implementation of 62 reforms and state development programs within the framework of four movement vectors⁴¹. The first is the implementation of the national security reform and defense system, however the economic security was not mentioned there as a component of national security, and the fact is that Ukraine actually is in a dangerous area of economic security in this indicator since 2010. The implementation of the Strategy involves the achievement of 25 key indicators that assess the implementation of reforms and programs that are either macro indicators or indicators of Ukraine positioning in international rankings. Unfortunately, most indicators are not

⁴¹About the Strategy of Sustainable Development "Ukraine-2020". (2015): Decree of the President of Ukraine. Available at: <https://zakon.rada.gov.ua/laws/show/5/2015>

adapted to the regional level. The Cabinet of Ministers of Ukraine has developed a plan of measures to implement the Strategy of Sustainable Development "Ukraine 2020" in 2015, and this is the only document developed in 4 years.⁴² Unfortunately, the plan of measures is very declarative without specific quantitative indicators. As well as all the programs and action plans that were developed earlier, this document has no reporting component: which indicators have been achieved during the implementation of the action plan, or at least which measures are implemented, and which are not. According to the approved strategy, nowadays there is a period of major reforms for Ukraine, the economy is beginning to stabilize, but the processes that are occurring still pose a threat to the safe functioning of the state, its separate regions and society as a whole.

Under these conditions, it is necessary to develop and implement such mechanisms of management that would take into account and coordinate the interests of the state with the interests, goals and objectives of economic sustainable development of the regions. Problems, which are being solved in each region have to be consistent with national tasks, but it is essential to take into account local characteristics. In particular:

- regional economic development mechanism formation;
- reconstruction of a regional industrial system considering the economic capacity of local ecosystems;
- development of complex interregional schemes that cover the territories of some Ukrainian regions.

Program and forecast documents of the national level should be guidelines for the development of regional programs of sustainable economic development and, together with legal acts, determine the safe economic conditions for their implementation. The assessment of the sustainability of the region's economic development is the basis for determining the priority

⁴²Action Plan for the implementation of the Program of Action of the Cabinet of Ministers of Ukraine and the Strategy for Sustainable Development "Ukraine-2020" in 2015. (2015): Resolution of the Cabinet of Ministers of Ukraine. Available at: <https://zakon.rada.gov.ua/laws/show/2469-19>

directions of development and taking managerial decisions. It allows discovering the conformity as well as inconsistency of the territory development with the national criteria, identifying the specific features of the regional level, assessing the degree of the national security threat.

The transition to sustainable development of the state as a whole is possible only when sustainable development of all its regions is ensured. This implies the formation of an effective spatial structure of the country's economy while respecting the balance of interests of all regions.

To sum up, we would like to note that there is an urgent need for a comprehensive integrated approach that considers all components of economic insecurity and the development of a long-term regional economic security strategy based on sustainability, aimed at overcoming the long-term crisis and creating preconditions for the country development.

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AGRICULTURAL PRODUCTION AND ITS ROLE IN THE DEVELOPMENT OF THE NATIONAL AND INFORMATIONAL ECONOMY

Abstract. The article analyzes the essence of agricultural production and its branches. A general description of the conceptual apparatus between the branches, subdivisions on which the agricultural production is divided, is carried out. The connection of agricultural production with many other branches of economy is noted. The main natural factors of placing and specialization of agriculture are investigated. The role of agricultural production as a catalyst for the development of a market economy is highlighted. The essence of the information economy is presented and its sectors are considered. The role of agricultural production in the development of the national and informational economy is revealed. The role of using modern information technologies in the agro-sphere has been highlighted. The research of main clusters of information technologies in the agrarian sector, namely, in agricultural production, was conducted.

Jel Classification System: Q100, A100

Keywords: agricultural production, plant growing, animal husbandry, national economy, information economy, market economy, agrarian sector of Ukraine, information technologies.

Introduction. There are all the prerequisites and conditions for providing the population of the country and the whole world with high quality and affordable food in Ukraine. Nearly the best in the world fertile land, favorable climate, rich historical experience and working capacity form a powerful potential of the agrarian sector. The priority of the development of the agrarian sector in the national economy of Ukraine is due to the exceptional importance and irreplaceability of agricultural products in the life of people

and society. The formation of a sturdy, well-developed structure of the agrarian sector continued in Ukraine for centuries. During the country's development throughout history, it was agro-industrial enterprises that took the leading place in its economy. Moreover, even in the second half of the twentieth century, with massive structural diversification of agricultural production, it remained one of the leading intersectoral production complexes in Ukraine.

In each state, in any society, agriculture is a vital branch of the national economy, since it affects the interests of every person, because the production of food is the first condition of life of the population. Agricultural production is fundamentally different from all other spheres and is a special field of the economy, a central component of the agrarian sector of the country, and it forms the basis of the food industry and some branches of light industry (textile, leather, fur). The closest human contact with the environment occurs precisely in the field of human activity, such as agriculture. The earth was, is, and, apparently, for very long, and maybe always it will be the main means of production in agriculture. While all other means of production gradually become obsolete physically and morally, replaced by others, the land not only does not lose its basic and most valuable quality – fertility, but can even increase it even with rational use. Ukrainian soils, especially black soil, are characterized by high natural and economic fertility. One third of the world's black soil fund is concentrated in Ukraine, which covers more than half of the soil of its territory. At the same time, land is both a means of production and a subject of labor. Plants and animals also act as a means of production. Land is not directly involved in the creation of a product in other branches (in industry, transport). It actually is only the space on which one or another production is placed. An important feature of agricultural production is seasonality, which is due to changes in weather and climatic conditions throughout the year. It causes unevenness in the use of manpower, production, consumption and use of material and financial resources during the year.

In comparison to other branches of the economic complex, the agricultural production is most affected by the natural conditions of the

territory - climate, soil and water. In the majority of cases, they determine the level of development and features of the industry.

The agrarian sector is one of the main budget-forming sectors of the Ukrainian economy; it has reserved for expanding the country's export potential, the development of other sectors that supply means of production or consume agricultural products as raw materials and implement entrepreneurial initiatives of peasants.

In the conditions of modernization of the economy of Ukraine, it is important to form and implement a state agricultural policy aimed at effective management in the field of agricultural production and land use, support for agricultural production, stimulation of integration processes in the agro-industrial complex, formation of preconditions for the preservation and integrated development of rural areas and support of entrepreneurial initiatives in the countryside.

The structure of the agrarian sector includes three interrelated areas:

- agriculture, which forms the raw material base of the agrarian sector;
- branches that produce means of production and service of the agrarian sector;
- branches in the storage, processing and marketing of agricultural products.

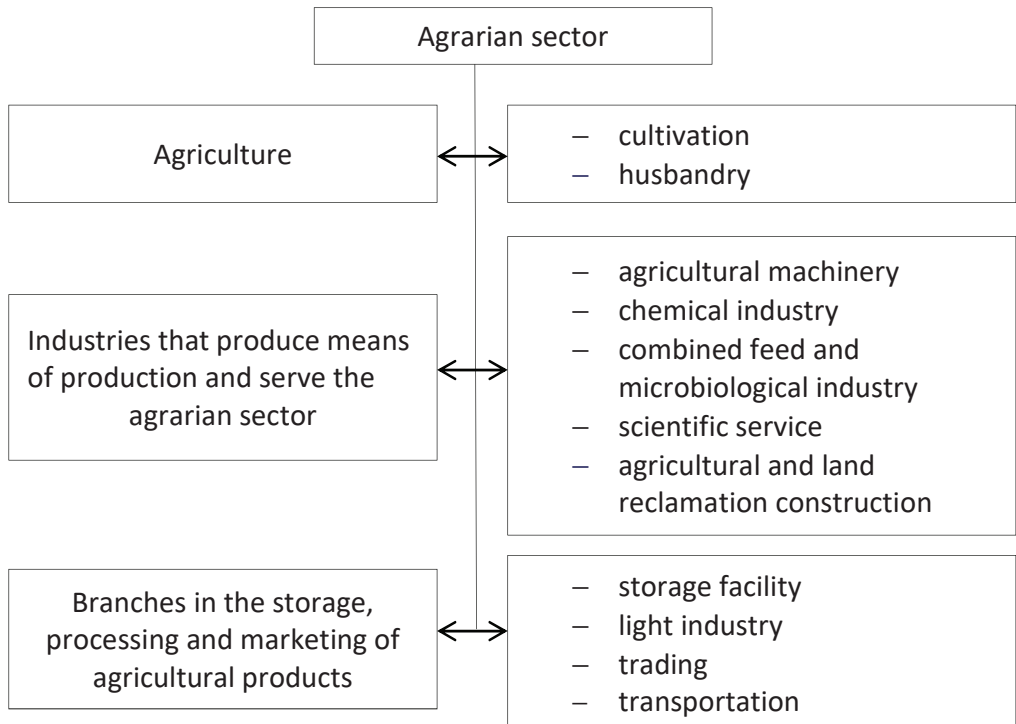
Large disproportions characterize branch structure of the agrarian sector. They are especially noticeable in the ratio of agricultural and industrial-processing units, which directly affects the unsafe market of food products by domestic products. It negatively affects the efficiency of the functioning of the agrarian sector and lagging behind the production of agricultural machinery, fertilizers, herbicides, fodder and others. Agriculture takes a leading place in the sectorial structure of the agrarian sector of Ukraine.

The main link of the agrarian sector is agriculture, which covers crop and livestock production and creates a raw material base for the processing industry.

Agriculture is considered as a complex of technological and organizational related industries, which in their totality forms a balanced,

integrated and structurally completed system, whose functional-component structure is subordinated to a stable increase in agricultural and husbandry production.

Figure 1. Structure of agrarian sector



Source: compiled by the authors on the basis of ⁴³

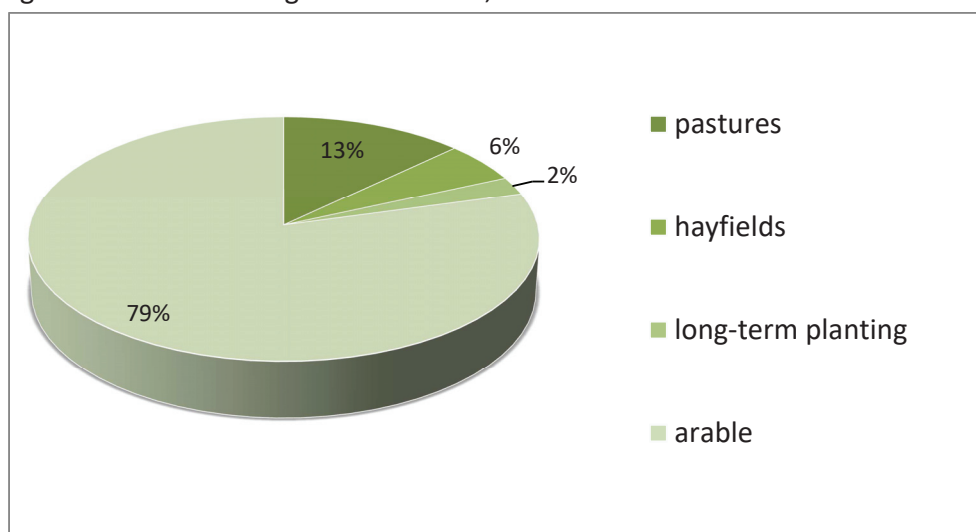
The economic process of reproduction in agriculture is closely related to the natural process. The monotony of the principles (laws) governing the economic development of industry and agriculture does not exclude the specifics of their actions in various sectors of production, especially in such industries as agriculture, where economic resources are limited and even rare, and the needs of consumers in connection with the increased population and

⁴³Grinev, L. S. (2008). National Economy: textbook. Available at: <https://www.twirpx.com/file/343743/>

insufficient consumption of food in many countries at this time are growing faster than the possibilities of their production. This, in its turn, determines the characteristic features and differences of socio-economic relations and the whole structure of rural life.

The land fund of Ukraine is 60.4 million hectares, about 70% are agricultural lands, which include arable land, pastures, hayfields and perennial plantations (Figure 2).

Figure 2. Structure of agricultural lands, %



Source: compiled by the authors on the basis of ⁴⁴

Consequently, agricultural land is part of the land fund of a country used in agriculture.

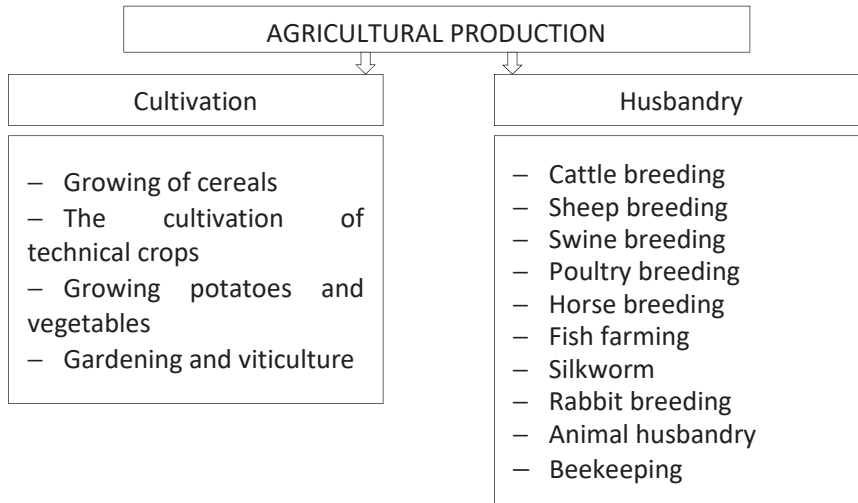
Each branch of agricultural production is a set of enterprises that produce certain types of homogeneous products or provides services that satisfy certain needs of the population in food products, and industry - in raw materials. Agriculture is associated with many other sectors of the economy. Such as mechanical engineering, engaged in the production of agricultural

⁴⁴Grinev, L. S. (2008). National Economy: textbook. Available at: <https://www.twirpx.com/file/343743/>

machinery and equipment, the chemical industry, which produces mineral fertilizers, pesticides and plant protection products, and the light and food industry, which process raw materials⁴⁵.

Agriculture (agricultural production) - a branch of material production that deals with the cultivation of agricultural crops and the cultivation of farm animals to provide food to the population, and the industry - raw materials. It includes two interconnected large industries - crop production (also called agriculture) and animal husbandry, which are divided into smaller industries, sub-sectors, production (Figure 3).

Figure. 3. Branches of agricultural production



Source: compiled by the authors on the basis of⁴⁶

Plant growing - is an agricultural sector that grows cultivated plants and produces 60% of gross agricultural output. Plant growing production is divided into arable farming (cultivating plants on arable land), growing fruit (growing

⁴⁵Giletskij, I. R. (2017). Geography: textbook for a 9 class of general educational establishments. Available at: <https://ru.osvita.ua/school/textbook/9klas/56954/>

⁴⁶Grinev, L. S. (2008). National Economy: textbook. Available at: <https://www.twirpx.com/file/343743/>

perennial plantations - gardens, vineyards, patch of berries) and mowing (using and improving natural grass, creating artificial grasslands and pastures).

The cultivation is engaged in growing various agricultural plants, which by convention combine into the following groups: cereals, technical, barley, vegetable melons and fodder. In recent years, crop areas have been reduced. This is the result of the fact that a portion of the arable land is not cultivated; part of it is transferred to other agricultural lands (pasture and hayfields).

Or part of the arable land is removed from agricultural use for housing construction, for the needs of industry, transport, etc. A serious problem is the transformation of fertile land into non-agricultural land, while the change in the structure of agricultural land in the direction of reducing the share of arable land is a necessary and progressive phenomenon.

The main branch of agriculture is the grain economy - the cultivation of food grain (wheat, rye), cereals (buckwheat, rice, millet), fodder (barley, oats, corn), legumes (peas, beans) cultivated plants. The key place belongs to the plants, which are called "three breads of mankind": wheat (giving over 40% grain), rice (almost 28%) and corn (almost 25%). However, bearing in mind the important food value, rice and corn are conventionally called "bread".

Wheat is the most important grain crop, which occupies 2/3 of the area of grain crops. Winter wheat is usually grown mainly in the forest-steppe and steppe zones. In the east of these zones, where winter is mostly a small snow cover, crops of spring wheat prevail. The leaders in gross collections of wheat in Ukraine are Kharkiv, Dnipropetrovsk, Zaporizhia, Odesa, Kherson, Vinnytsia regions.

Rye is mostly grown in woodland and in the Carpathian region, where humidity is excessive, the soils are not very fertile. Rye gives lower harvests than other grains, but it is a valuable food crop.

Barley, corn and oats are used as fodder crops, but they also have important food value. Barley is grown most in the southern regions. The leading producers of barley are Odessa, Mykolayiv, Dnipropetrovsk, Kherson regions. Corn is a heat-loving culture. The largest areas of corn crops are concentrated in the northern and central parts of the Steppe, in the south of

the forest-steppe, where the highest yields are produced. The country's leaders in its gross collections are Poltava, Chernihiv, Sumy, Cherkasy and Kirovograd regions. An important fodder crop is oats, its crops are mostly distributed in the woodland, because the plant is moist and is unpretentious to the soil. Areas of spring berry barley and oats increase if in spring they are cropped over winter plants, destroyed during harsh winters (severe frost, lack of snow cover).

Millet grows in the steppe due to drought tolerance. Buckwheat, by contrast, due to the concern of genera, is common in the forest-steppe and woodland, on wet sandy soils. Due to demanded humidity of buckwheat they occur in the forest-steppe and woodland, and the crops under it are quite significant. Rice is a typical plant for monsoon climate, which requires a lot of moisture and heat, as well as fertile soils. It is released by artificial watering, most often with constant flooding of the field.

Peas (chickpeas, peas, forage lupines) are grown in the forest steppe and in woodland.

Technical cultivated plants are raw materials for industry: they are divided into fibrous fruits - flax, cotton, hemp; oil - sunflower, flax, rape, soybean; eyelashes - cumin, mint, rose; sugar cane - sugar beet.

The main fiber culture in Ukraine is long-stalk flax. Long-stalk flax is cold resistant and well developed on acid soils, therefore it is considered unpretentious to the conditions of growth and is the main fibrous culture of non-black earth strip of Europe. The main crops of long-stalk flax are concentrated in woodland and in the Carpathian region (Chernihiv, Zhytomyr, Rivne, Volyn, Lviv regions), where the summer is chill and humid. In recent years, cotton growth has been restored in the southern regions of Ukraine, whose crops occupied significant areas at the beginning of the last century.

The largest areas among technical crops cultivated plants in Ukraine take sunflower and sugar beet. The largest gross collections of sunflower seeds are produced in Kharkiv, Kirovograd, Dnipropetrovsk, Zaporizhia, Mykolayiv and Odessa regions. Two other crop areas of export oilseeds - rape and soya - have significantly increased in Ukraine. Rape is grown in the west of the country, in woodland and in the forest-steppe. More than 50% of oil is contained in its

seeds, which is used in paintwork, soap and margarine industries. Makukh (squash) is fed to cattle. Ukraine is in top three of the world's leading exporters of rape. The main crop area of soy is concentrated in Poltava, Kirovograd, Vinnitsa, Khmelnytsky, Kiev regions, as soy needs sufficient heat and moisture. Ukraine has become the top ten world leaders in its production. More than 2/3 of the crop grown finds consumers on the foreign market, and the rest produce feed and oil in Ukraine⁴⁷.

Sugar beets demand heat, light and moisture, require fertile soils, and therefore the main regions of their cultivation are the forest-steppe and the north of the steppe zone.

Regarding technical cultivated plants, hops are also produced in Ukraine (in woodland - in Zhytomyr, Rivne and Khmelnytsky regions), which are primarily used in brewing industry, and tobacco (the south of the forest-steppe and steppe), which is a raw material for the production of cigarettes. The small crop area of tobacco is in Chernivtsi, Vinnytsia and Transcarpathian regions.

In Ukraine, many medicinal and essential oil plants are grown and harvested (about 100). One cultivates valerian medicines, cumin, horseradish, sage medication, lavender, peppermint, fennel, belladonna, and others. Ethereal crops (rose, mint, coriander, etc.) are grown in the south of the steppe zone.

Potato growing and vegetable growing play an important role in plant growing. The potato is a food, feed and technical culture, it produces starch and alcohol. Potatoes are grown throughout Ukraine, and its highest yields are in woodland and in the forest-steppe. For the gross collection, Vinnitsa, Lviv, Chernihiv, Kiev, Rivne regions take the championship. Vegetable cultivation is developed everywhere, most crops - in farms of forest-steppe and steppe zones. Vegetable crops like cabbage, carrots, table beets and cucumbers, in the south - tomatoes, peppers, eggplants, and onions predominate in the north and in the central regions of the country. Large areas of Ukraine are

⁴⁷Stefan von Kramon-Taubadell, Sergiy Demyanenko, Arnim Kuhn (2004). Agriculture of Ukraine: crisis and renewal. Available at: <http://www.ier.com.ua/ua/publications/books?pid=1524>

found in melon crops: pumpkins, watermelons, melons, zucchini, palisons, which are valuable food. The main area of their cultivation is the steppe (Kherson, Mykolayiv, Zaporizhia regions). Among them, the highest proportion of annual and perennial grasses, corn, and also grow fodder root crops.

Ukraine has vast gardens thanks to its mild climate and the presence of fertile soils. Grain breeds of trees (apples, pears) are best fetched in the forest steppe and in woodland, and stone (cherry, plum, apricot etc.) are mostly in the steppe. Across Ukraine, berries are spreading, in which the currant, roes, raspberries, gooseberries and others grow. Vinnitsa, Poltava, Ternopil, Zaporizhia and Transcarpathia have the largest areas of gardens and berries.

Vinery growing is developed in the southern and central parts of the steppe, in the foothills of Crimea and in Transcarpathia. Grapes are heat-loving and labor-intensive culture. In Transcarpathian, Odessa, Mykolayiv and Kherson regions, the largest areas under vineyards are concentrated.

Feed crops occupy more than a third of the country's sown areas. Fodder crops (annual and perennial grasses, fodder beets, maize on green mass, etc.) are grown in many regions of the country, but mostly - in the forest-steppe.

Ukraine is one of the world leaders in the production of walnuts (6th place). In 2017, volumes of walnuts accounted for 3% of the total world production.

Husbandry is another important agricultural sector. Husbandry is a branch of agriculture, which deals with breeding of cattle, pigs, sheep breeding, poultry farming, etc. In the structure of gross agricultural production, it is 46%. In general, the livestock task consists in the production of high-calorie foods (meat, milk, butter, cheese, eggs, fish, honey) and valuable raw materials for the food and light industry (meat, leather, wool, fur raw materials, raw silk, wax, fluff, etc.).

The development of husbandry depends on crop production, primarily on fodder production. Modern fodder production consists of field, meadow-grazing and industrial production of forages. Forage fodder production involves the cultivation of forage crops, as well as the use of waste and by-products of grain, technical and other crops (straw, beetles, etc.). Meadow-grazing feed production is associated with the use of natural forage land -

grassland and pastures. The industrial production of combined feed is used in the mixed feed industry. Combined feed is a mixture balanced by the content of nutrients and minerals, vitamins. On feed mills, grain and products of its processing are used as raw materials, as well as oil, sugar, meat, fish industry waste.

As a feed for animals, waste is used by the enterprises of the food industry (pulp, molasses, whey), public catering, and also food waste of the population without additional processing. In each region feed resources have their own characteristics and it is important to use them more rationally.

The most important industries include cattle breeding (breeding of cattle). A cattle breeding is a leading livestock sector and is widespread in all regions of Ukraine, most notably in Polissya and Lisostep. It gives the largest volume of livestock products - milk and meat. According to the ratio of produced products, there are several areas of specialization of cattle breeding: milk, meat, meat and milk, milk and meat.

Farms in woodland, western and forest-steppe regions produce the most milk, where there is a forage base or around big cities where there is a significant consumer of fresh milk.

Dairy and meat cattle breeding prevails in areas of intensive farming with a high proportion of crop areas of forage crops, as well as hayfields and pastures.

The meat and dairy specialization of animal husbandry has been preserved in those regions where feed calories are dominated by high-calorie feeds. These are the farms of the south-eastern parts of the arid regions (Mykolayiv, Kherson).

Meat breeds of cattle are grown in all-natural areas around large centers of the food industry, the waste of which is a feed for cattle. Compared to Western European countries with similar natural and climatic conditions, the productivity of husbandry is low.

Swine breeding is in the second place after cattle breeding. The share of pork in the production of meat exceeds 40%, as well as fat, skins, bristles. It covers areas of production of sugar beet and sunflower, highly developed

grains and potatoes, and in the areas of processing agricultural products and food industries, where waste of the corresponding production is used to feed pigs. In Polissya and Forest-Steppe, especially in Rivne, Cherkassy, Kyiv, Khmelnytsky, Vinnytsia regions, there are the largest concentration of pigs. Pigs have a specialty of meat-and-fat and sebum. In farms of Polissya and Forest-steppe, based on potato-and beet-condensed feeding types, meat-and-fat specialization predominates. The features of the oily direction of pig breeding are common in the steppe, where the high proportion of concentrates in feed is predominant.

Sheep breeding belongs to the oldest husbandry in Ukraine. It prevails in the steppes and in the Carpathians. Wool, mostly thin-walled and semi-tangled sheepskin, which provides high-quality wool is developing in Stepp. It is based on cheap pasture and roughage. In Steppe, dry whips and pastures are used for sheep breeding. Sheep tolerate drought, cold and can even feed themselves from the snow up to 20 cm deep. The rough, fur coat of sheep prevails in Polissya and in the Carpathians, which gives high-quality, strong, warm sheepskins, from which shells are made. The production of brynza - cheese from sheep's milk is traditional in the highlands of the Carpathians.

Poultry breeding, developed on the whole territory of Ukraine, but the largest concentration of poultry (geese, ducks, turkeys, chickens) near major cities is important among livestock industries. It gives eggs, as well as feathers and down besides dietary nutritious meat. Among birds, chickens predominate, in the second place there are ducks, as well as a certain distribution of geese and turkeys. The greatest attention is paid to increasing the number of chickens for meat and eggs. Large specialized poultry farms are set up near large cities, industrial and recreational centers. The largest number of poultry farms is in Kyiv, Donetsk, Dnipropetrovsk, Kharkiv, Lugansk, Odesa, Lviv regions and Crimea.

Horse breeding is reviving all over Ukraine, which once was an important branch of livestock breeding. Horse breeding mostly takes place in the Carpathians, Transcarpathia, Podillya and Polissya. Horses are bred in specialized farms of Lugansk, Poltava and Ternopil regions.

Among other husbandry sectors we distinguish pond fish farming, silkworm, rabbit breeding, animal husbandry, and especially beekeeping. Predominantly, pond fish are engaged everywhere, breeding crucian carp, cowpea, white amur, bream, carp, and in the mountain rivers - trout.

Silkworm (breeding rasil and oak silkworms) is well developed in the steppe and partly in the forest-steppe areas.

Animal husbandry is developing in Ukraine. Fur animal husbandry is breeding of fur animals on special farms. On specialized farms and wildlife farms, fur-bearing animals breed silver-black fox, mink, blue fox, and sable.

Carriage is widespread in the forest-steppe and woodland regions, which gives twice as much meat as sheep breeding.

Beekeeping begins from ancient traditions in Ukraine, which gives valuable products - honey, wax, propolis, pollen, royal jelly. By exporting honey, Ukraine ranks first in Europe and fifth in the world. However, intensive deforestation, plowing of land, the use of cheap artificial wax, and later the use of pesticides led to the decline of this industry. Now beekeeping is widespread in all regions, and most of all - in Polissya and in the forest-steppe.

The most important natural factors of the placement and specialization of agriculture are the quality of soils, the duration of free frost period, the sum of active temperatures (heat supply), total solar radiation (light supply), humidity conditions, rainfall, probability of recurrence of unfavorable meteorological conditions (drought, frost, wind and water erosion), water availability, topographical conditions of the terrain, and, to a greater extent, natural factors affect the placement of crop sectors, with one by measure, by determining the areas of their cultivation. For a number of crops (mostly heat-loving), these areas are extremely limited, for example, grapes, tea, citrus, etc. As for others - they are much wider (barley, spring wheat, potato, etc.). For husbandry placement, natural factors have less significant effects, through the feed base. The most dependent on natural and climatic conditions is pasture livestock breeding (some areas of sheep breeding, cattle breeding, reindeer husbandry, horse breeding, etc.). Here you can distinguish such factors as the

presence of pastures, their size, composition of vegetation and the duration of their use.

The Polissya area occupies a zone of mixed forests and nearby areas of the forest-steppe natural zone. The Polissya agro-industrial zone has favorable conditions for the development of dairy and meat cattle breeding, meat-and-fat swine breeding, rough sheep breeding, flax growing, potato growing and grain farming.

Almost identical to the same natural zone as an agricultural area are such ones as Forest-steppe. Fertile, mostly black soil, soils and sufficient moisture contribute to the beet-and-corn line with meat and dairy cattle breeding and meat-and-fat pigs. Gardening is developed as well.

In the Steppe zone, which is almost identical to the same natural zone, fertile black soils and insufficient humidification have led to the development of the grain industry (wheat, rice, corn) and the cultivation of oilseeds, the development of vegetable growing, melons, viticulture, meat cattle breeding, pig farming and sheep breeding, as well as poultry farming.

Mountain and foothill areas have original natural conditions that affect the peculiarities of farming. In the Carpathian region, cereal crops, flax, hops, potatoes, developed cattle and swine breeding farming are grown. In the Carpathians, sheep are grazed on the mountain valleys. Husbandry, viticulture and tobacco production prevail in Transcarpathia.

Suburban agricultural areas of Ukraine that have emerged around large cities and industrial centers specialize in growing vegetables and fruits, production of milk, meat and eggs. Specialization of suburban areas does not depend on the natural zone. Their education determines the needs of the urban population in fruit and vegetable and livestock products. Suburban agricultural areas around large cities with specialization in the production of poorly transported products were formed - milk, meat, eggs, vegetables, potatoes, and fruits.

As a result of the land reform in Ukraine in recent years, agricultural production is going through significant changes. It has been long overdue since the collective ownership of land in Ukraine has led to low productivity, depletion of soils, and so on.

A tangible fall in agricultural production volumes occurred at the end of 20th century. In the state there was an irrational structure of land and agricultural lands with a large predominance of arable land as a result of extensive farming (involving new land in circulation, raising amount of cattle, etc.).

Transfer of land to private property gives positive results, creating conditions for the equal development of various forms of management on the ground. Intensive management should be facilitated by: changing ownership relations, increasing the number of farmer and individual peasant farms. It is this direction of agricultural development that involves increasing crop yields and livestock productivity through active breeding, soil fertility, mechanization and energy efficiency of agriculture.

The most important sector of the Ukrainian national economy is agriculture, which provides Ukraine with food independence and gives a significant part of the rural population jobs that is equally important. It also serves as a raw material base for the light and food industry. Demand for agricultural products is constantly increasing, as the number of urban population increases. In agriculture, as well as in other branches of social production, there is a constant development, and on this basis the efficiency of agricultural labor increases, which allows a smaller number of labor to produce more agricultural products.

Our state has a part of the world's reserves of black earth and 27% of arable land in Europe (one person in Ukraine has 0.68 hectares of arable land, while in Europe this indicator is 0.25 hectares).

Significant structural changes have taken place during the years of independence in agriculture in Ukraine, land and property relations have been rebuilt. As a result of land plots, about 7 million peasants became owners of certificates for land parcels (shares), the average size of which is 4 hectares.

Normal functioning of the entire economy of the country and the welfare of people depends on development of agricultural production. Today, more than 80% of the consumption fund is formed at the expense of

agricultural products. Therefore, production of it is the very first condition for the existence of mankind.

By the beginning of 2019, the rural population of Ukraine was 30% of the total population; it is also evidenced by the place of the industry in the national economy. This is not the case anywhere in Europe, as Germany, the Netherlands, France and other countries have only 5-7% of the population living in rural areas. In our country there are regions where more than 50% of citizens live in rural areas. And the largest number of rural population is in Lviv region.

In agriculture, 3.3 million people are employed, meaning 25% of all employed. Consumers are now spending the major part of their incomes on the purchase of food products and consumer goods made from agricultural raw materials.

Comparing to US consumers who spend only 1/5 of their income on food and other agricultural products, Ukrainian population consumes more than 50 percent of the total income, and the share of these expenditures for both Ukraine and CIS countries is constantly rising due to rising prices.

Therefore, the state authorities' attention to the analysis of the concrete situation in the agrarian sector of the economy clears up, and the problems that arise in connection with the need to stabilize the economy, the level and quality of consumption of food products and goods produced from agricultural raw materials increases. For this purpose, in most countries of the world, the practice of state regulation of agro-industrial production has included the development of special state support and development programs for this industry, based on specific historical and economic conditions. Thus, if for today the essence of the farmer problem in the United States is reduced in the long run to identify the factors that cause the lagging of farmer prices and revenues from the trends of price and income changes in the economy as a whole, and in the short term - to eliminate the instability of farm incomes in different years, then for most of the countries that are entering the path of a market economy, is the creation of such an economic mechanism that would eliminate dependence of most of them on food imports, provision of population food products of their own production, the consumption of which

would get closer to biologically determined norms, and in some countries it would eliminate hunger, in others – use part of the income received in agriculture for the development of other industries.

For Ukraine, agriculture is especially important because it is one of the largest sectors of the national economy. This is proved by a number of important macroeconomic parameters. The most important among them is the share of agriculture in the gross domestic product of the state (GDP).

Of particular importance is the agrarian sector of Ukraine. It produces 35% of the gross product, employs 25% of the employed population in the national economy, uses 33% of fixed assets. Consequently, the development of the state economy in general largely depends on the agrarian sector and its main component - agriculture.

Ukraine has enormous potential for the development of the agrarian sector of the national economy. The harvest of grain in Ukraine in 2018 exceeded the historical maximum in 2016. The 2018 grain production record is due to a high yield of corn, which is expected at the historical maximum. In addition, for the first time recorded record figures for gross crops and yields of soybeans and sunflowers. Ukraine has cut grain exports for the first time in five years. We want to note that the value of goods depends heavily on the degree of their processing. Therefore, it is more profitable for the country to sell finished branded products, rather than raw materials that will be exported after processing in other countries.

An important role is played by agriculture as a catalyst for the development of a market economy. Market economy is one of the greatest achievements of world civilization, it is a natural environment of humanity and the interaction of commodity producers, an environment that has a certain order and self-regulation due to the action of the main law - demand and supply. In the formation of a market economy in Ukraine, this industry, given its scale, can play (and already partially plays) an extremely important role due to its specific properties:

- 1) As agriculture has many independent enterprises that produce the same goods, agriculture is a highly competitive industry. In the long run, the

number of agricultural enterprises such as economic partnerships, agricultural production cooperatives, private enterprises, peasant (farmer) enterprises, and peasant private households may change due to the conversion of some of their types to other (for example, agricultural cooperatives in private enterprises), as well as due to the emergence of new farms. In such a large number of enterprises, each of them markets only a small share of a certain type of agricultural production from its total sales. This leads to the emergence of high competition among rural producers and at the same time puts a blindfold on any monopoly in the agrarian sector. As a result, a market environment that stimulates development in other sectors of the economy as well is created.

- 2) Agriculture of Ukraine in the short term may become the main source of export. This is facilitated by large-scale agricultural land use and fertile land. In conjunction with the hard work of the Ukrainian people, this brings Ukraine to one of the leading places in the agricultural potential. In the long run, Ukraine can not only fully meet its own needs for agricultural products but also substantially increase its export potential. Thus, agriculture can and should become an industry that will play an extremely important role in the process of Ukraine's entry into the world market.

Consequently, the development of agriculture plays a role in the development of the national economy of the country. Agriculture creates jobs, as well as reduces the poverty rate of the population. The development of agriculture is a vital factor in the formation of all sectors of the economy of Ukraine.

The level of development of the agrarian sector makes a significant impact on people's well-being both through providing high-quality food products to the population, and by generating income and, consequently, market demand. There is a need to use the achievements of scientific and technological progress - the transition to new methods of information provision and management of agriculture, the widespread use of automated systems and information technology to minimize costs and optimize the processes of agricultural production.

The degree of reduction of the total labor consumed per unit of production is measured by the economic efficiency of automation. More than 50 branches of the economy are connected to the agrarian sector. Information components make up to 70% of the cost of agricultural products. These components include: information processing, software development and implementation, automation of technological processes, automated control and control, implementation of scientifically based production technologies, creation of a unified information and communication infrastructure at agricultural enterprises, etc.

Usually while automating agricultural production processes, the cost of capital costs increases and operating costs per unit of output are significantly reduced. Consequently, the efficiency of automation is characterized by the total reduction of production costs per unit of output.

The introduction of appropriate methods reduces the time to increase the efficiency of management, reduces non-production costs, and leads to a completely new, qualitative level of planning of both economic and general activities of the agricultural enterprise. Also, the introduction of IT and automation of the agrarian sector management process allows:

- forecasting market situation;
- carrying out simulation of real agrotechnological situations, as well as operational analysis;
- substantiating managerial decisions making in conditions of uncertainty of various kinds.

Modern economy is characterized by tendencies of global informatization of society. In the emerging information society, a historically new phenomenon - information economy, a science that explores information and economic activity of a person, which involves the widespread use of electronic (information and communication) technologies - is emerging. At this stage, the information economy is noticeably developed only in several countries, but some of its elements are found everywhere. So far, at the stage of development, there is a concept of the development of the information economy and its main features are formed.

The following sectors of the information economy are singled out:

- 1) service and humanitarian;
- 2) informational and technological;
- 3) scientific and industrial.

The service-humanitarian sector is a set of industries, sub-sectors and activities whose functional purpose in the system of the national economy consists in the production, realization of services and spiritual goods for members of society. The service and humanitarian sector plays a decisive role in the formation of human capital, and also has an impact on its growth through the creation of comfortable living conditions of man.

Information technology is a set of industries, which creates fundamentally new information (for a specific time period), as well as fundamentally new information and telecommunication technologies. The production and transformation of information as a source (from the idea in the model, technology, prototypes of the future product) takes place in the information and technology sector of the information economy. Within this sector there is development of technologies for structural changes in information, resulting in an increased impact on human livelihoods.

In modern conditions, science and industrial production are integrated, undergoing the process of intellectualization and cybernetization of industrial technologies. Agriculture has become a kind of industrial production, which uses scientific and industrial methods. The scientific and industrial sector creates artificial conditions for the crop production, provides production and information services. For example, special sensors for agricultural machinery, combined with software, increase the speed and quality of signal processing, turning them into information. The use of databases allows not only finding the right sort, but also determining the sort to be created by the necessary indicators. Increasingly, within the framework of resource-saving technologies, tools for the automation of sowing complexes, which include quality control of sowing, spraying, etc., are introduced.

The role of using modern information technologies in the agrarian sphere is mainly in:

- implementation of the policy of regulation and choice of methods of monitoring agricultural processes;
- information technologies;
- liquidation of the technological gap between agricultural researchers, scientists and farmers;
- simplifying access to information that helps in decision making (weather conditions, soil condition, etc.);
- providing the community and government with real-time information needed to prevent natural disasters, as well as providing advice on methods to reduce the risk of farming;
- facilitating access to markets for the sale or purchase of resources, as well as the marketing of products and various forms of trade;
- assistance in providing the most accurate and reliable data in accordance with international standards.

Information technology in agriculture helps in:

- formation of yield maps, technology movement;
- calculation of seed requirements, material for planting, fertilizer;
- drawing up a scheme of sown areas for future years;
- assessing the state of the soil;
- formation of an electronic field magazine with the possibility of sorting harvest by year;
- forecasting of technological operations for the coming season or several years;
- drawing up reports on the presence of diseases and pests and weeds in the fields;
- division into groups of diseases, pests, weeds;
- keeping records of pesticides;
- fixing climatic forecasts and meteorological data, etc.

Different means of transmission and processing of information can be used for different purposes depending on their functionality:

- telephony → interactive voice communication, information transfer;
- computers, websites → information for agriculture and markets;

- broad-based broadcasts → experience sharing, counseling, professional communities;
- satellite channels → weather, public resources, remote sensing;
- mobile technologies → consultations, sales, banking operations, network interactions;
- internet → knowledge sharing, social media, virtual communities, banking operations, sales markets, trade, etc.;
- sensory networks → real-time information, best quantitative and qualitative data, decision-making;
- databases and analytics → analysis of agricultural information, information for decision making.

The information allows economically managing all kinds of production resources. Its intensive use reduces material and energy intensity of products. Agricultural production, based on new knowledge, accurate information, turns into economically efficient, and non-waste production.

Analysis of the productive forces, land fund, material and technical base of agriculture, labor shows that Ukraine is able itself to provide people with food for scientifically based physiological norms of consumption and have sufficient reserves of food for export.

At the present stage of development of the productive forces of society the importance of increased crop production and livestock with scientific and technological progress, the development and introduction of highly scientifically based farming systems, specialization and rational use of material, financial and human resources.

Conclusions. The development of agriculture plays a very important role in the overall economic development of the country. Agricultural production creates jobs, reduces the poverty rate of the population. This is an area of material production that is important in providing people with food, and industry is a raw material. It includes two interconnected large industries - crop and livestock, which are divided into smaller industries, sub-sectors and production. In such sphere of human activity, as agriculture, the closest human contact with the environment takes place. The development of agriculture is a

vital factor in the formation of all sectors of the economy of Ukraine. Agricultural production is most affected by the natural conditions of the territory - climate, soil and water.

The most important sector of the Ukrainian national economy is agriculture, which provides Ukraine with food independence and gives a significant part of the rural population jobs that is equally important. It also serves as a raw material base for the light and food industry. Demand for agricultural products is constantly increasing, as the number of urban population increases. In agriculture, as well as in other branches of social production, there is a constant development, and on this basis the efficiency of agricultural labor increases, which allows a smaller number of labors to produce more agricultural products.

Normal functioning of the entire economy of the country and the welfare of people depends on development of agricultural production. Today, more than 80% of the consumption fund is formed at the expense of agricultural products. Therefore, production of it is the very first condition for the existence of mankind. The fact that at the beginning of 2019, the rural population of Ukraine was 30% of the total population is also evidenced by the role of the industry in the national economy.

Nowadays, science and industrial production are changing, namely, the process of intellectualization and cybernetization of industrial technologies. Agriculture has become a kind of industrial production, which creates artificial conditions for the crop production, provides production and information services.

In the future, Ukraine can not only fully satisfy its own needs for agricultural products but also substantially increase its export potential.

Thus, scientific research into the field of material production allows us to conclude that Ukraine has enormous potential opportunities for the development of the agrarian sector of the national economy, as evidenced by a number of important macroeconomic parameters. Agriculture can and should become an industry that will play an extremely important role in the process of Ukraine's entry into the world market.

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THE INFORMATION ECONOMY FORMATION IN THE NEW ECONOMIC SYSTEM

Abstract. The basic types of economic systems are specified in general acts; the evolution of the information economy is being investigated. The differential peculiarities of the informational economy are distinguished. The information economy development is determined as the highest-level priority in Ukraine.

Jel Classification System: P 40, P41.

Keywords: economic system, information society, information economy.

Modern tendencies of economic transformation and dynamical formation of the general information space are accompanied by deepening of social contradictions, which negatively affect the restoration of the state's resource potential and cause the strengthening of scientific interest in the problems of ensuring sustainable development and productive use of the country's potential under the conditions of the information economy formation in the context of protecting social and economic interests of man and society.

The problem concerning the information economy development is becoming more and more relevant due to the fact that in the absence of the necessary theoretical and methodological support, the state's influence on

mentioned processes is fragmentary and chaotic. As a consequence, in the economy and in the social sphere, the negative phenomena and tendencies are accumulating. They manifest themselves in deformations of the socio-political and socio-economic situation in the country and the informational disorientation of using and developing Ukraine's resource potential.

The papers of A. Chukhna, L. Melnyk, B. Miziuk, V. Andrushchenko, B. Novikov, V. Pavlov, N. Apatova, L. Fedulova, Ye. Nikolaiev, V. Semynozhenko and others are devoted to the system research into the information economy formation.

However, the available fundamental researches focus on some key issues of the essence of the information economy, taking into account its resources, its product and aspects related to the use of information and innovative knowledge when forming information space. In addition, the questions of singling out the theoretical and methodological foundations of studying the information economy development in the context of the evolution of views on economic categories require further scientific research. The economic categories determine the formation of this economic system taking into consideration regularities of that or another stage of development of humanity. The foregoing proves the relevance of the topic and the purpose of the research.

The purpose of the article is substantiation of theoretical and applied principles for determining the priorities, preconditions and characteristics of the information economy formation in the economic system of Ukraine.

It is well known that in order to single out the theoretical and methodological foundations of researching into the information economy development one has to trace the evolution of views on economic categories that determine the formation of this economic system taking into consideration the regularities of that or another stage of the development of humanity. Thus, the views of various scholars on the main stages of the development of humanity most fully reflect the theory of occurrence in stages. In this context, it is important to classify the economic systems according to

the level of development of productive forces, which is mentioned in the work of such famous economists as W. Rostow, J. Galbraith, R. Arron, S. Koval.

When studying the essence of an economic system, we adhere to a classic understanding consistent with the widespread paper «Economics» by Campbell R. McConnell and Stanley L. Brue, where an economic system is a specific set of institutional structures and coordinating mechanisms. Its main feature is historicity, because it functions, develops and survives the periods of its origin and formation, decline and destruction. An American economist W. Rostow, who is the author of the theory of stages of economic growth, distinguishes five types of economic systems (Figure 1)

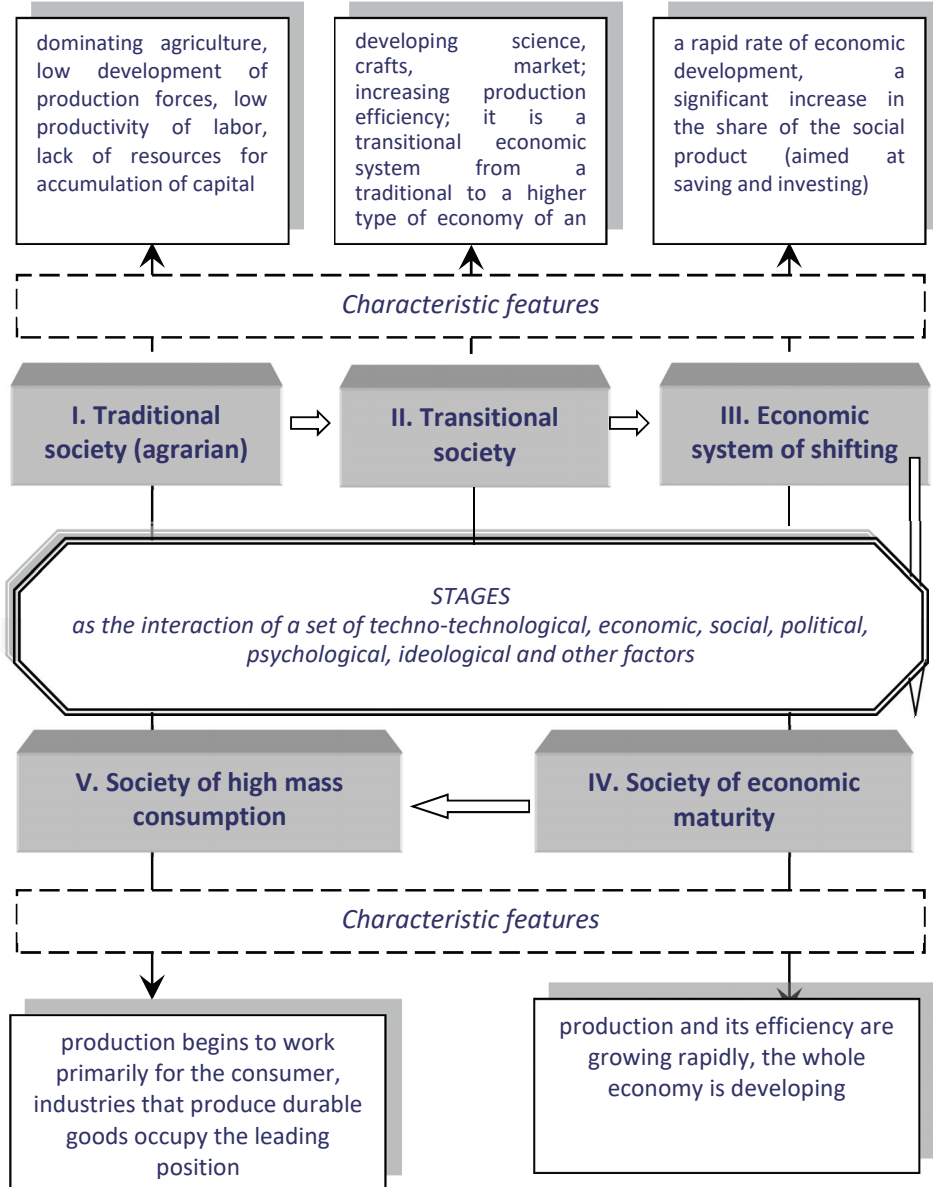
Therefore, economic systems have undergone significant evolution in their development and are divided in accordance with the methods of social division of labour and its organization, forms of ownership, types of coordination of elements of a system, etc. It is worth noting that, in the world scientific thought, different views have emerged as to the division of economic systems into types.

We adhere to the statements of American scholars D. Bell and E. Toffler about the division of economic systems into pre-industrial (including agrarian), industrial and post-industrial societies; an information society in which an information economy is formed, is the highest stage of the development of a post-industrial society. We will elaborate on the main types of economic systems, according to which we will trace the evolution of the information economy formation.

Thus, the stage of a pre-industrial society forms a primitive society (a primary archaic formation characterized by common ownership of means of production, collective labour and consumption, a low level of development of productive forces), and an agrarian society (a society characterized by a predominance of agricultural entrepreneurship, small development or a lack of industry, weak differentiation and a predominance of rural population)⁴⁸.

⁴⁸ Melnyk L.H. Economy and Information: Economy of Information and Information in Economy: Encyclopedic dictionary / L.H. Melnyk – Sumy: University's book, 2005. - p. 187-188

Figure. 1. The evolution of economic systems according to the stages of economic growth by R. Rostow



Source: compiled by the authors on the basis of the research

A post-industrial society is 1) a society in which on the basis of new technologies (mainly information ones) there is a sharp increase in output, the transition from the commodity producing economy to the economy of services, the elements of planning and control over technological changes are introduced. In this connection, in the studies of the socio-economic orientation, it is possible to distinguish such an important process as the humanization of the economy under the conditions of the post-industrial society development.

For example, M. Savina defines it as creating harmony in growth and manifestations of human abilities, establishing human's goods as a criterion for evaluating social relations in «the environment» system, on the basis of optimizing the development and use of productive forces and the environment of society. In the social structure, the number of employees in the service sector is growing, new elites are being formed (technocrats, scientists); 2) an information society (an information economy).

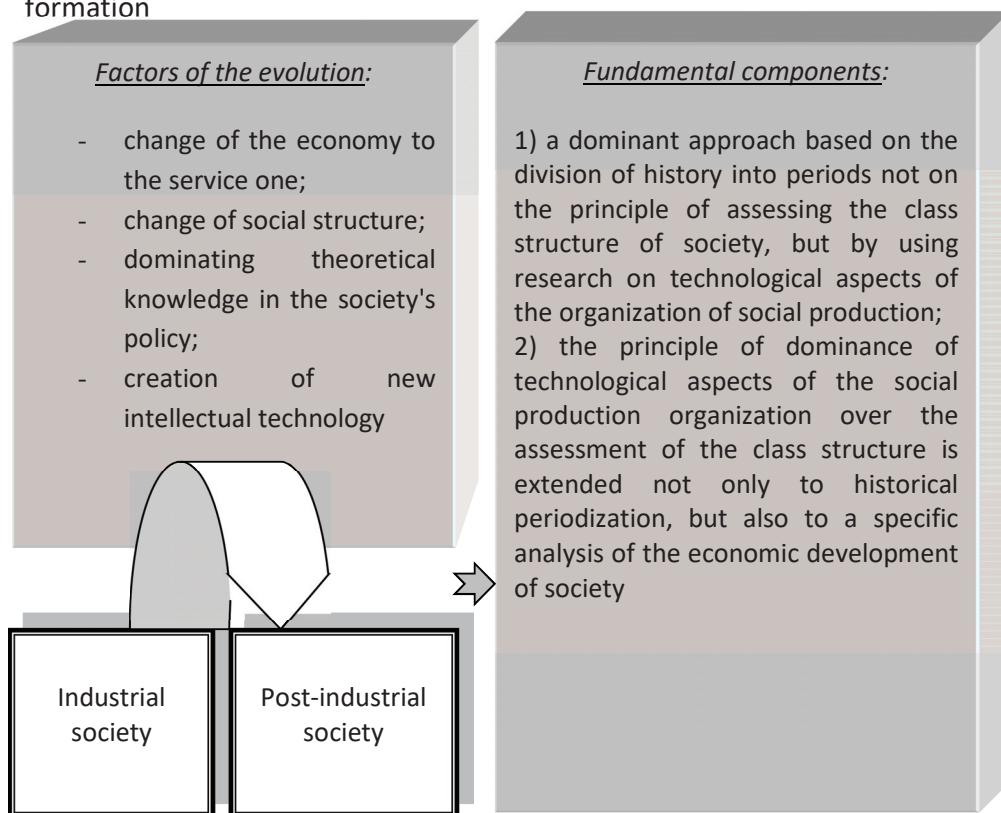
The author of the theory of a post-industrial society, an American scientist, doctor of philosophy D. Bell in his work «The coming post-industrial society: a venture in social forecasting» states that the definition of a post-industrial society more accurately reflects the formative transition from old social relations to new ones. Old social relations were based on forms of ownership, concentrated in the hands of a small cohort of people, and bourgeois culture that was grounded on the principles of economizing in meeting the needs of the individual. Whereas, new social relations, in our opinion, reflect the further formation of the information economy, the democratization of power, the creation of the most favourable conditions for self-actualization of man ⁴⁹.

In an encyclopedia, edited by V. Mochernyi, one notes that it is more appropriate to call a post-capitalist society a society of intellectual property

⁴⁹Bell D. The coming post-industrial society: a venture in social forecasting / Daniel Bell; trans. from English by V. L. Inozemtsev. – M.: Academia, 1999. - 956 p.

owners if we do not consider a formative approach⁵⁰. The theory of a post-industrial society states that the formation of such a society is an evolutionary process, in which the industrial world does not collapse, but it rather gets additional features and properties⁵¹. The basic provisions of this theory are shown in Figure 2.

Figure. 2. Basic provisions of the theory of a post-industrial society by D. Bell taking into account the evolutionary approach of the information economy formation



Source: compiled by the authors on the basis of the research

⁵⁰Economic Encyclopedic Dictionary: 2 vol. / S.V. Mochernyi, Ya.S. Larina, O.A. Ustenko, S.I. Yurii; edited by S.V. Mochernyi – Lviv: Svit, 2005. – Vol. 1. – pp. 535, 616.

⁵¹History of Economic Doctrines: Textbook: 2 parts / edited by V.D. Bazylevych - [3rd edition, revised and corrected] - K.: Znannia, 2006. – Part 2. –pp.496, 575.

It is worth mentioning that the current post-industrial society is entirely based on the production, acquisition and use of life-saving knowledge, the main creator of which is a human being that has been perceived as the fundamental wealth of the nation since the origin of the economic science. The humanization of the economy should be aimed directly at expanding the sphere of human freedom by means of a more humane attitude towards both nature and other subjects, at eliminating the causes of degradation, at protection and improvement of the human habitat.

The humanization of the economy leads to an increase in the creative content, attractiveness, and the growth of the productive strength of labour⁵². Consequently, the central subject in a post-industrial society is a human being in the relationship with the environment and society, which will be the fundamental postulate in our statements about approaches to the consideration of labour potential in modern life. A man under such conditions is not only a resource of society, but also a basis of all changes in political life, as well as in living conditions of the population. V. Inozemtsev also proves it; according to him, the main source of modern progress is no longer the interaction of man and nature, but the inner development of the individual, the possibility of their self-expression, the production of knowledge that is able to change not only the environment, but also, most importantly, their surroundings⁵³.

An English scientist U. Martin in his work argues that an information society is the highest level of industrial development⁵⁴. According to D. Lyon, an information society expresses the idea of a new phase in the historical development of advanced countries. He does not speak about the arrival of a «post-industrial» society, but about the creation of a new social vision that is the result of the «second industrial revolution», which is basically grounded on

⁵²Savina M.V. Humanization of economic relations and cultural capital of society as dominant tendencies of the modern economy / M.V. Savina // Społeczno-ekonomiczne problemy transformacji w European Srodkowej i Wschodniej / scientific editorship by Ella Libanowa. - Warszawa; Kijów; Moskwa, 2010. - pp. 164,166.

⁵³Inozemtsev V.L. Split Civilization / V.L. Inozemtsev. – M.: Academia, Nauka, 1999. - 740 p.

⁵⁴Martin W.I. The Information Society / W.I. Martin. – L., 1988. – p. 14–15.

microelectronic technology. The notion of the information society sounds like an encouraging note in the middle of a general recession⁵⁵. On the contrary, L. Melnyk identifies the information society with the post-industrial one and regards it as⁵⁶:

- 1) socio-economic formation, in which the production and consumption of information can provide a basis for the economic system and social structure of society;
- 2) a global economic and political, anthropological, social and technological project that presupposes the civilized and controlled transition to the world social order, in which the system of mass communications that is put into practice through computer telecommunication technologies, including Internet technologies, will play a dominant role in all spheres of life.

In our opinion, the fact that the majority of scientists identify the notion «information society» with the notion «information economy», is fairly controversial. We believe that it is not entirely correct, since the economic system is an element of the social structure; therefore, the information economy is one of the components of the information society. However, the information economy is formed within the boundaries of the information society and reflects all its essential characteristics.

Obviously, the main productive resource in the information economy is not traditional industrial production, but information. Therefore, it is crucial to add that the role of information in an economy of this type consists in accelerating message communications and connection, spreading a body of data more effectively, distributing electronic communications in the financial sector, and automating manual work. At the same time, the comparison of the criteria of economic, technological, personal and other characters enabled us to trace the interdependence of processes of the evolution of humankind,

⁵⁵Lyon D. The Information Society: Issues and Illusions / David Lyon // Modern Foreign Social Philosophy. – K., 1996. - p. 362-363.

⁵⁶Melnyk L.H. Economy and information: economy of information and information in economy: encyclop. dictionary / L. H. Melnyk. – Sumy: Universitetska knyha, 2005. - p. 111.

including the interrelation of parameters that characterize the labour markets and other areas of human activity. Thus, after discovering that information is the most important economic resource, we had a chance to formulate a new paradigm for the formation of an economy of information type.

Concepts and theories related to the information economy reflect the scientific direction, where scientific knowledge is the greatest cultural value and the determining factor of the human orientation in the world. These theories and concepts include the theory of an information society, the theory of information economy, the theory of a post-industrial society, the theory of a knowledge society, the theory of «a knowledge economy», the theory of a commercial economy, technocratic and technological concepts, the theory of a technetronic society, modernization theories and others.

Such prominent American scholars as D. Bell (1919), Z. Brzezinski (1928), and E. Toffler (1928) laid the foundations of the theory of an information society. The views of scientists in this area emphasized the evolutionary transition of humanity to a new type of their development, based on the dominance of information and knowledge. The emergence of the theory of information economy is the result of the development of an information society; between both of them, there is a close connection. At the same time, the theory of an information society is viewed as the methodological basis of the theory of information economy, and the theory of information economy is the component of the theory of an information society.

Today there are different interpretations of the term «information economy», which depend on the point of view of a particular scholar and method of research. However, the most common understanding of the information economy is viewing it as such a phase of society, in which the main product of manufacture is information and knowledge. The distinctive features of this economy are a more important role of information and knowledge in the life of society, a rise in the share of information communication, products and services in GDP, the creation of global information space where effective information interactions of people take place, particularly, thuman resources management ough their access to world-

wide information resources and the consumption of necessary information products and services⁵⁷.

It is vital to stress that the consumption of informational products, in contrast to the consumption of materials or energy, which causes an increase in entropy in the Universe, leads to a decrease in entropy, a rise in knowledge, and the growth of good organization in the environment. Except for this, information and knowledge in the consumption process are not destroyed and do not disappear as material goods, but they can be morally out of date and no longer consumed⁵⁸.

Based on the above considerations, the information economy can be interpreted as a separate sector of the national economy, where the intellectual product (in a narrow sense) is created. It can be regarded as a type of economic system, in which the central place is given to those industries that create the intellectual product and affect the functioning of all other industries in a decisive manner (in a broad sense). Characteristic features of the information economy are shown in Figure 3.

In addition, we would like to note that the common feature of all of the above approaches to defining the essence of the information economy is an attempt of scientists to draw attention to the widespread use of information and communication technologies in the processes of social production, distribution and consumption of public goods, which is due to the development of productive forces.

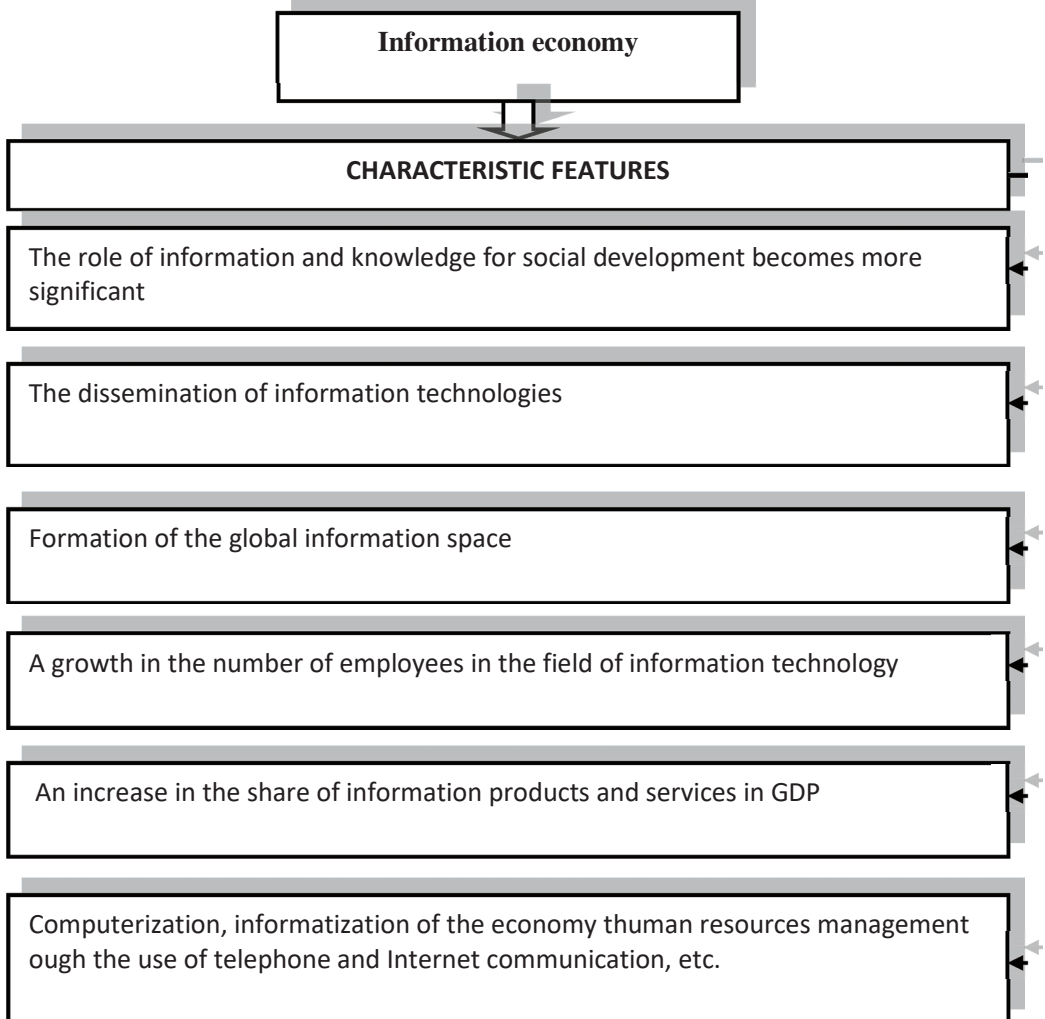
At the same time, despite the recent occurrence of the term «information economy», more and more researchers of the socio-economic policy of the state use it to conceptualize the problems of the social sphere. The scientific papers of R.P. Vasylichenko, O.N. Vershynska, O.S. Hlushchenko,

⁵⁷Bazhal Yu. Information economy [Electronic resource] / Yu. Bazhal. – Available at: http://www.ekmair.ukma.kiev.ua/bitstream/123456789/2430/1/Bazhal_informatsiyana_ekonomika.pdf.

⁵⁸Maslov A. The information society theory as a methodological basis of the information economy theory [Electronic resource] / A. Maslov. – Available at: http://papers.univ.kiev.ua/ekonomika/articles/Information_society_theory_as_a_methodological_basis_of_the_information_economy_theory_13978.pdf

D.M. Hubaidullina, R.I. Kapeliushnikova, D.V. Shakhova and others are devoted to important aspects of the functioning and activation of the information market, the substantiation of the influence of the information economy development on social and economic processes.

Figure. 3. Characteristic features of the information economy



Source: compiled by the authors on the basis of the research

For instance, D. Gubaidullina, in her scientific research interprets the information economy as stages of development of human society, the totality of all relations that arise between economic entities in the process of production, distribution, change and consumption of information, which contributes to the formation of a new informational and technological structure. It is noted that the characteristic features of the information economy are: an increase in the share of knowledge and information, a rise in the number of employees in the information industries (due to their development), high levels of obsolete and updated information products and technologies, the growth of the importance of management and regulation of the information sphere⁵⁹.

Evidently, the information economy is formed within an information society, and a knowledge economy develops within a knowledge society, which is seen as a higher level of the information society development, where the focus is not only on information, but also on the ability to work with it, to produce new knowledge. A.V. Khan, an Assistant Director-General of UNESCO for Communications and Information thinks that the information society is a functional unit of the knowledge society⁶⁰.

At the same time, we want to add that despite the proven and unconditional nature of the activation of processes of the information economy formation in Ukraine, scientists quite often emphasize the emergence of a new, innovative economy and knowledge economy. Thus, by a new economy, they mean an economy, which is based on the intensive introduction of innovation and new ways of doing business that affect the growth of productivity of labour⁶¹. Ye. Saveliev and V. Kuryliak define it as a process of production and use of new knowledge, its transformation into an independent factor of production, which plays a leading role in the system of

⁵⁹Hubaidullina D. M. (2011) Dynamics of the information economy development in Russia: extended abstract of dissertation of Candidate of Economic Sciences: 08.00.01 / D. M. Hubaidullina. – Ulianovsk. p.15

⁶⁰UNESCO World Report on Knowledge Societies [Electronic resource]: UNESCO publication, 2005 - 231 pp. – Available at: <http://unesdoc.unesco.org/images/0014/001418/141843r.pdf>.

⁶¹Alkaly R. The New Economy / R. Alkaly. – New York: Farrar, Straus and Giroux, 2003. p.20

factors of production, and the development under the «old» laws, which operates in a new way, under the new conditions and under new laws that predetermine the acceleration of the development⁶².

Conclusions. It should be stressed that the adoption the Law of Ukraine «On the basic principles of development of information society in Ukraine for 2007-2015» dated January 9, 2007 No. 537-V has regulated the priority of the information economy development at the highest level in Ukraine since 2007, and, to a certain extent, the experience of Russia and Belarus contributed to the adoption of this law. In particular, in Russia, the Council under the President on Information Society Development in the Russian Federation was created, and in Belarus, the Strategy for the Information Society Development by 2015 was approved. The said Law determines the reasons for the insufficient level of development of the information society in Ukraine, tasks, objectives and directions of its development, the principles of the national policy on the information society development, including the necessity of legislative support, the organizational and legal basis (institutional, organizational, resource support, associations of citizens; mechanisms of Ukraine's integration into the world information space and mechanisms for the implementation of the basic principles of the information society development in Ukraine for 2007-2015)⁶³.

A crucial provision is the need for legislative support of the information society development, as well as, of the information economy, since this support presupposes the revision of the current legal framework in accordance with the requirements of modern times. This is an extremely complex, complicated and resource-consuming process in the conditions of contradictory legislation of Ukraine, non-compliance of a number of provisions with European standards, politization of a decision-making process, etc.

⁶²Saveliev Ye. New economy and models of its formation in Ukraine / Ye. Saveliev, V. Kuryliak // Journal of the European Economy. - 2002. - № 1, vol. 1. - p. 25-37

⁶³About the basic principles of the information society development in Ukraine for 2007-2015: Law of Ukraine dated January 9, 2007 No. 537-V [Electronic resource] //Legislation of Ukraine. – Available at: <http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=537-16>.

In addition, the Doctrine of Information Security of Ukraine, approved by the Decree of the President of Ukraine dated July 8, 2009 No. 054/2009, is an important document that reflects the resulting aspects of the influence of the information economy on the country's development. This document defines the basic principles of Ukraine's information security, vital interests of the individual, society and the state in the information sphere, the main real and potential threats to the information security of Ukraine, as well as the directions of state policy in the field of Ukraine's information security⁶⁴.

Furthermore, in May 2013, the Cabinet of Ministers of Ukraine approved the bill of the President of Ukraine 'On the Strategy of the Information Society Development in Ukraine», devised by the State Agency for Science, Innovations and Informatization by order of the President of Ukraine, dated 03.07.2012 No. 1-1/1759 concerning the introduction of information and communication technologies in all spheres of social life, the implementation of the Initiative «Open Government Partnership» on the development of e-governance in Ukraine.

According to the Decree of the Cabinet of Ministers of Ukraine⁶⁵ the issues regarding the information society development (information economy) should be taken into account by the State Program of economic and social development of Ukraine for 2012 and the main directions of development for 2013 and 2014 (hereafter – the State Program). It should be noted here, that the State Program takes into consideration some aspects of development of the information direction.

⁶⁴The doctrine of information security of Ukraine, approved by the Decree of the President of Ukraine dated July 8, 2009, No. 054/2009 [Electronic resource]. – Available at: <http://zakon2.rada.gov.ua/laws/show/514/2009>.

⁶⁵On approval of the Action Plan for the fulfilment of tasks stipulated by the Law of Ukraine «About the Basic Principles of the Information Society Development in Ukraine for 2007-2015»: the Order of the Cabinet of Ministers of Ukraine dated August 15, 2007 No. 653-p. [Electronic resource]. – Available at: <http://zakon4.rada.gov.ua/laws/show/653-2007-%D1%80>.

However, the list of problems that need to be addressed within the framework of the information society development and the list of quantitative and qualitative indicators of the effectiveness of state policy are rather limited and it substantially reduces the essence and relevance of the process of developing the information society and evaluating its development, which contradicts the Law of Ukraine «On the Basic Principles of Development of Information Society in Ukraine for 2007-2015». In particular, the indicators of the state policy efficiency in the field of the information society development did not include, for example, the indicator of the level of competitiveness of the information technology market, the share of research organizations in the sphere of information technologies, the level of compliance with software copyright, the level of the use of information technology in educational institutions, health care, the level of innovative activity, etc. Consequently, if the State Program, which is the basis for drafting the State Budget of Ukraine, takes into account only certain aspects of the information society development, we can expect the lack of financial resources in the budget needed for the full development of the information economy and not timely performance of the tasks set by the same Program for 2013-2014. This once again proves the imperfection of legislation, its regulatory mismatch, the lack of complementarity of documents.

PART 2

OPPORTUNITIES AND THREATS OF THE DIGITAL ECONOMY

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E-TRADE IN UKRAINE: TRENDS OF DEVELOPMENT AND THREATS TO CONSUMPTION SECURITY

Annotation. The research analyzes the theoretical foundations of the definition of the e-business and e-trade categories, their interpretation is provided and interconnection is established. The dynamics of the industry development is calculated, the main trends in the world and in Ukraine are determined, in particular, the business models of the activity of Ukrainian e-trade enterprises are disclosed. Within the framework of studying the peculiarities of consumption security in e-trade, appropriate advantages are systematized, threats and risks are analyzed, and the means of their weaken for different subjects are offered. For consumers the main task is to increase the education in various areas, improve the information provision and educational infrastructure. For sellers it is important to overcome the risks of buyers distrust to e-trade, to protect their own consumer interests; to weaken the significant number of threats for business online activities. For the state the thorough and rapid update of the institutional framework in the implementation of existing EU Directives and the modernization of the e-trade technical base is necessary.

Jel Classification System: A30, D18, L81

Key words: e-trade, threats and risks of consumption security in e-trade, protection of consumer rights, institutional basis of e-trade.

Introduction. The application of modern information technologies in business forms new directions in the world economy global coordinate system. One of the following areas is e-trade, which is currently becoming the most

realistic area of electronic business in Ukraine, researches in this field of modern technologies active involvement and positively affects the development of joint industries, as well as of economy as a whole.

Domestic e-trade sector, the growth rate of which has been the highest in Europe for the last two years, generates optimistic forecasts and attracts more and more participants. However, the formation of a development strategy based on linear extrapolation of previous years success is very dangerous, which makes the actual issue of studying the real state and trends in e-trade market development.

The tendency for broaden of trading operations on the Internet is conditioned by comparative convenience (time absence and space restrictions) and purchases cheapness. Alongside, this raises the issue of their safety, which is explained by interaction peculiarities in a digital environment: remotely purchase implementation, without personal contact, without possibility of a preliminary check, time lapse of payment moment and covering purchase, complexity of control that restricts consumer rights volume⁶⁶ which are not always taken into account even in offline market. In addition, as well as any social phenomenon, which becomes a mass social manifestation and is related to scientific and technological progress, e-trade has become the object of anti-social manifestations, abuses, offenses, including crimes, which also cause the emergence of the question of social relations security⁶⁷. After all, online security and consumer protection lack are major concerns for E-trade survival.

The attention is paid to the study of essence, characteristic features and trends of e-commerce and Internet trade development in the works of both domestic and foreign scholars, in particular, Glinenko L.K., Dainovskii Y.A.,

⁶⁶Pysmenna, O.P., Baranova, A.S., Shkrinda, O.M. (2015): Protecting consumers' rights when purchasing products thuman resources management ough the Internet, Comparative and analytical right, 1, p.59-62; Gnana Dhas, C. J. (2011): E-Commerce – Consumer Protection Model. Available at: <https://www.researchgate.net/publication/327368899>; Fibrianti, N. (2017): Consumer protection in electronic transactions, International Journal of Business, Economics and Law, 12, Issue 4, p.67-69; Consumer protection in electronic commerce, Note by the UNCTAD secretariat. Second session, Geneva, 3–4 July 2017

⁶⁷Tymbaliuk, I.V. (2012): E-Commerce Security (Organizational and Legal Aspects), Legal Informatics, 3(35), p.70–77.

Kaptsoch V.Y., Leushina N.A., Novozhilova M.V., Novomlynskii L., Savitska N.L., Summer A. B., Duncan Gr. E. However, monitoring of information sources revealed imperfection of conceptual apparatus (in particular, there is still no clear delineation of the concepts of "electronic commerce and e-trade"); as well as significant discrepancies in digital data associated with the use of different techniques when evaluating individual indicators by different companies, ahead of providing forecast data as actual, etc. All this complicates the real state analysis, development dynamics and main trends in the evolution of e-trade.

E-trade security issues are developed in works of such scholars as: Andreea N., Belov S., Fibrianti N., Gnana Dhas JC, Hendriksen M., Kuzmin M., Leushina N., Martynenko S., Mikhalev A., Novozhilova M., Orlyk O., Pavlov A., Pelech M., Pismenna O., Szopiński T., Tsimbaliuk I. In their works, authors focus on describing various potential, real risks and security threats that may arise within e-business in particular: violation of intellectual property rights, unfair competition, consumer rights violations, fraud, spam (intrusive advertising), etc. This problem is considered in various aspects: technical, technological, socio-ethical (or socio-psychological, mental), organizational, administrative, political, legal, etc. In our opinion, the issue of consumption security ensuring, which characterizes the ability to create conditions for a conscious satisfaction of self-reproduction needs by subjects of economic interests without or with the least health harm, environment and society, is required. We believe that consumption safety should be considered as a prerequisite for sustainable society development: not only within product safety characteristics, production and consumption, but also with care of future welfare, in particular, deprivation of consumption society patterns.

Dynamic development and use of information technologies has led to radical changes in traditional ways of economic activity and formation of its new type - e-business. E-business is any business activity based on opportunities use for global information networks to transform internal and external communications with profit making purpose. One of e-business components is e-commerce.

In accordance with the Law of Ukraine "On electronic commerce", electronic commerce is a social relationship that arises in conclusion and / or execution of an electronic goods supply agreement and /or goods sale/ supply, works performance, provision of services / electronic services and / or implementation of other actions aimed at profit making purpose with the use of information and telecommunication systems, if, obligations of participants property nature arise in such relations, as a result of these actions ⁶⁸.

According to American scholars A. Summer and Gr. Duncan, e-commerce is any form of business process in which interaction between entities occurs in electronic way using Internet technologies ⁶⁹.

O.I. Shaleva suggests to understanding electronic commerce as the commercial interaction of business entities with goods and services (material and information) sale and purchase using information networks (Internet, cellular network, internal local network companies) ⁷⁰, narrowing the concept only to the electronic commerce, which in our opinion is not entirely correct.

N. L. Savitskaya approach is interesting, she considers the understanding of e-commerce in several meanings - narrow (as a commercial activity only of Internet providers and information technology manufacturers), narrowed (which is identified with e-trade, when it means implementation of purchase and sale of physical, digital products and services and through the Internet) and wide (all possible ways of using information, digital space and technologies for business information distribution, building relationships between market players and validity of economic activity) ⁷¹. We believe that last broad definition of this concept is most expedient.

As defined by UN Commission on International Trade Law (UNCITRAL), scope of e-commerce covers electronic activities in the form of processing,

⁶⁸Law of Ukraine "On E-Commerce" Available at: <https://zakon.rada.gov.ua/laws/show/675-19>.

⁶⁹Summer, A., Duncan, Gr. (1999): E-Commerce, NYH Publishing. 263 p.

⁷⁰ Shaleva, O.I. (2011): E-Commerce: Tutorial manual. Kyiv: Center for Educational Literature, 216 p.

⁷¹Savitskaya, N. L. (2014): Drivers and barriers to online retail development: theoretical and methodical aspects, 10, p. 236–241.

transmission of information, etc. through data communication used in trading activities context ⁷². E-commerce include: Electronic Data Interchange (EDI); Electronic Funds Transfer (EFT); E-Trade; E-Cash; E-Marketing; E-Banking; E-Insurance ⁷³.

Depending on appointment levels and participants interaction features, there are following forms of e-commerce ⁷⁴: business-to-business (B2B); business-to-consumer (B2C), consumer-to-business (C2B), consumer-to-consumer (C2C), business-to-administration (B2A), administration-to-business (A2B), consumer-to-administration (C2A), administration-to-consumer (A2C).

The characteristic features of e-commerce compared with traditional commerce are:

- a) business entities competitiveness increasing by reducing the cost of time for interaction with consumers and business partners, costs of organizing business, sales promotion (services), customer service, maintaining feedback, expanding pre- and post-sales support;
- b) expansion and globalization of markets, because for the Internet there are no geographical boundaries, time constraints; cost and speed of access to information does not depend on distance to its source (except for purchased product shipping costs). In this regard, small and medium-sized enterprises can successfully compete in global market, and users have opportunity to get maximum access to goods and services;
- c) personalization of interaction; with the help of information networks business entities can receive deployed information from each client and automatically provide goods and services at mass market prices;
- d) infrastructure changes by share reducing or total exclusion of material component (buildings, structures), staff and intermediaries;

⁷²United Nations Commission on International Trade Law. Available at: http://www.uncitral.org/uncitral/ru/about_us.html.

⁷³Shaleva, O.I. (2011): E-Commerce: Tutorial manual. Kyiv: Center for Educational Literature, 216 p.

⁷⁴Kaptosh, V.Ya. (2017): The state and peculiarities of the development of Internet commerce in the international dimension, Scientific Herald of Uzhhorod National University: Series: International Economic Relations and World Economy, 13, P.1, p.115-119.

- e) creating new products and services, such as e-delivery and support services, providing reference services, establishing contact points between customers and suppliers, etc.⁷⁵;
- f) difference in consumer "portraits"; since access to the Internet means equipment availability and certain education level, users of the network are characterized by higher income and education than the average buyer in traditional real market.

One of the most dynamic types of electronic commerce is electronic trade (e-trade), which appeared in 1993 as a result of lower cost and increased productivity of trade processes through the use of soft hardware.

In specialized economic literature, e-trade concept has many definitions. The most common ones include interpretation of I.T. Balabanov, who believed that: « E- trade is the trade through the Internet via buyer's computers and goods seller»⁷⁶. A. Summer and Gr. Duncan define electronic commerce as a process of buying and selling goods or services, in which the entire cycle of a commercial transaction or part thereof is carried out electronically⁷⁷. L.Novomlynskii characterizes e-trade as a commercial activity in the field of goods and services advertising and distribution through Internet⁷⁸.

The most complete, in our opinion, is the following definition of e-trade - it is economic activity in the field of electronic sale of goods, works and services in a remote way to consumer through electronic transactions commission using information, communication technologies and systems⁷⁹.

⁷⁵E-commerce in Ukraine. Statistics for 2015-2016, Available at <http://nuigde.biz/uk/blog/elektronnaya-kommerciya-v-ukraine-statistika-za-2015-2016goda.html>.

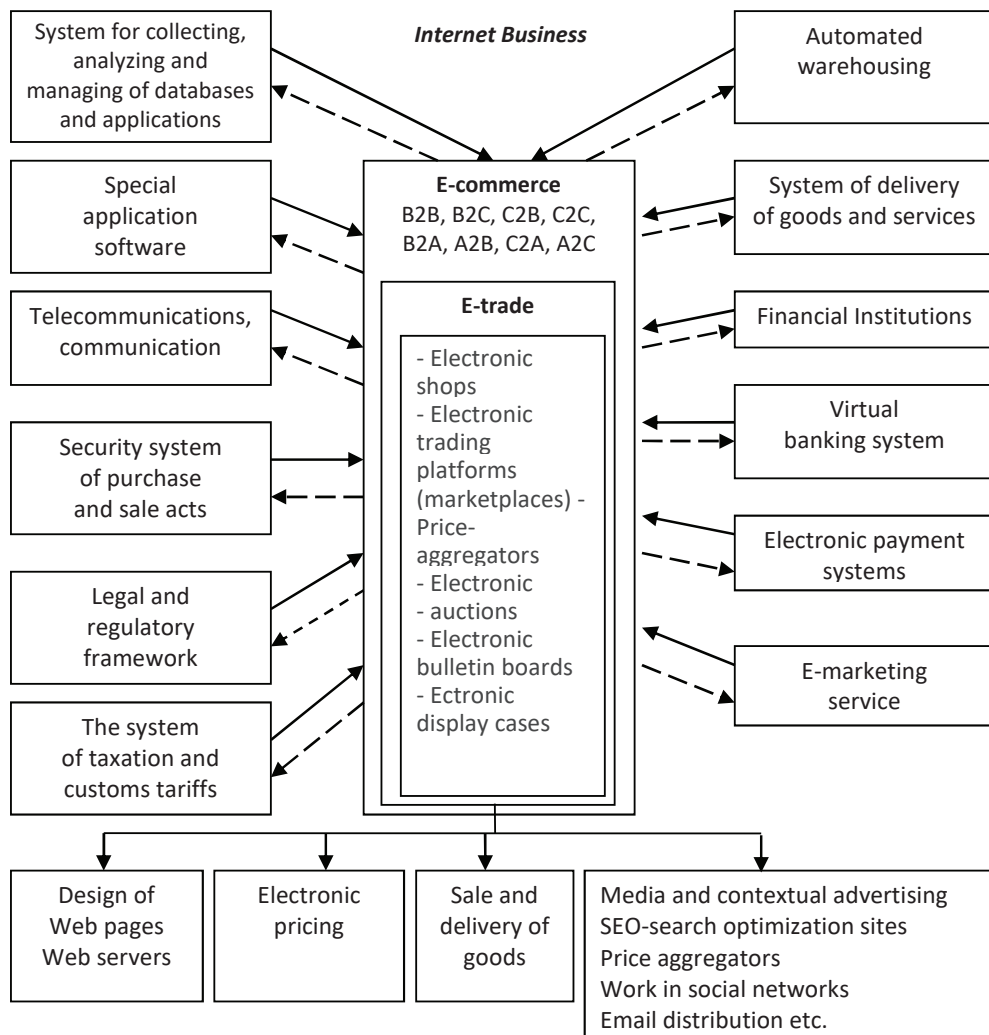
⁷⁶Balabanov, I.T. (2001): E-commerce: study guide. SPb.,335 p.

⁷⁷Summer, A., Duncan, Gr. (1999): E-Commerce, NYH Publishing. 263 p.

⁷⁸Novomlynsky, L. Anatomy of virtual trading. Available at: www.wilmark.ru/wilddesign/company.asp

⁷⁹Pleskach, V., Borodachova, N., Oleksiuk, L. (2017): As the Government of Ukraine, to develop a state policy in the field of e-commerce. Analytical Paper, 50 p.

Figure 1. Model of organizational and information infrastructure for e-commerce



Source: compiled on the basis of ⁸⁰

Elements of e-trade include: (1) participants (government, manufacturers, suppliers, realtors, sellers, buyers (consumers)); (2) electronic business processes

⁸⁰Novozhilova, M.V., Leushina, N.A. (2008): Models and methods of security in e-commerce systems, Financial and credit activity: problems of theory and practice, 5, V. 2, 71-76.

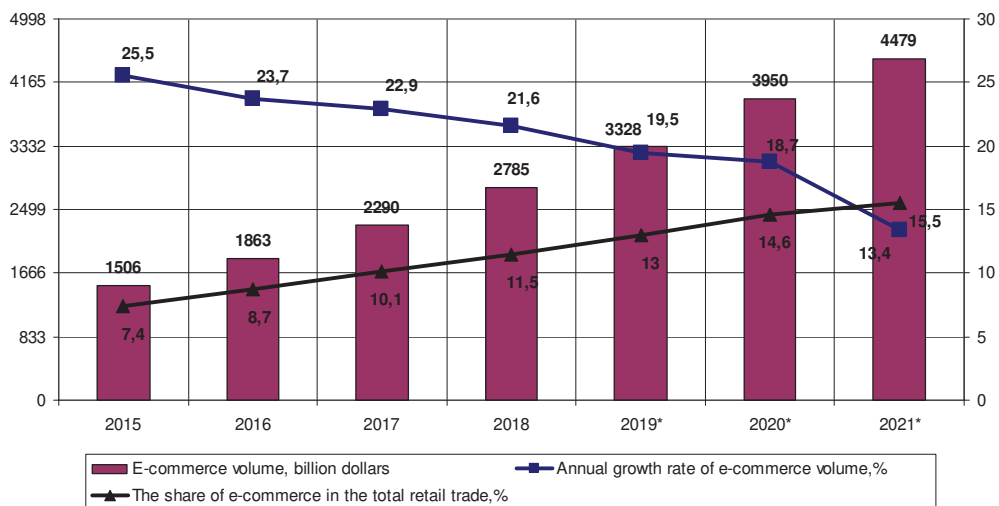
(marketing, sales, payment, support, order fulfilment, logistics, etc.); (3) networks (corporate, Internet, extranet, intranet, etc.). The main elements of electronic trading system infrastructure are (Figure 1): specialized application software; a system for collecting, analyzing databases and applications; telecommunications and communications; security system of bill of sale, services and works; regulatory support; virtual banking system; electronic payment systems; electronic logistics and delivery system for goods and services; financial institutions (brokerage companies); taxation system and Internet customs rate; e-marketing, etc. E-trade in Internet system is carried out using following business models - e-shops, electronic trading platforms, price-aggregators, electronic auctions, electronic bulletin boards and electronic showcases.

According to the research conducted by «Admitad», total world retail online trade in 2017 reached \$ 2,290 billion, which is 23% more than in previous period. At the same time, B2C turnover of online purchases in 2017 increased by 11% compared to 2016 and amounted to 2143 billion dollars ⁸¹. B2C online purchases mean purchase transactions from both online and offline retailers, as well as from online sites. It is forecasted that by 2021 the volume of world retail online trade will almost double to \$ 4479 billion. Meanwhile, electronic retailing growth rate will outstrip growth of retail traditional forms, which will increase the share of online sales in total world retail trade from 8.7% in 2016 and 10.1% in 2017 to 15.5% in 2021 (Figure 2). 85.2% of online sales in 2016 came from 10 countries, namely China (33.7%), United States (26.2%), Great Britain (7.7%), Japan (5%), France (3.2%), Germany (2.9%), South Korea (2.8%), Canada (1.6%), India (1.1%), Russia (1.0%) ⁸², while all other countries of the world provided only 14.8% of online retail turnover.

⁸¹Admitad Annual Report 2017/2018. Available at: <https://belretail.by/article/esommerce-prodaji-v-mire-po-itogam-goda-vyirosli-na-do-mlrd>

⁸²Novomlynsky, L. Anatomy of virtual trading. Available at: www.wilmark.ru/wilddesign/company.asp

Figure 2. Dynamics of world retail e-trade development



Source: compiled on the basis of ⁸³

In 2017, China continued to remain the leader in retail online market sales with turnover of \$ 600 billion, it was followed by United States with a large margin with revenue of 475 billion dollars, Japan - 125 billion dollars, Great Britain - 103 billion dollars, Germany - 57 billion dollars.

Most active online buyers are people of China and South Korea - share of Internet purchases in these countries reaches 83%, in UK - 82%, Germany - 81%, Indonesia - 79%, India and USA - 77%. Despite all the benefits of already established electronic markets, Asian online retailing is developing at a faster rate. According to the experts, by annual aggregate growth rate size of B2B sales in next five years, Malaysia will take the lead in terms of 24%, ahead of India (23%), Indonesia (21%), Philippines (18%) and China (17%) ⁸⁴.

In spite of general common feature - quite intense development in recent years, Internet trading markets of world individual countries are

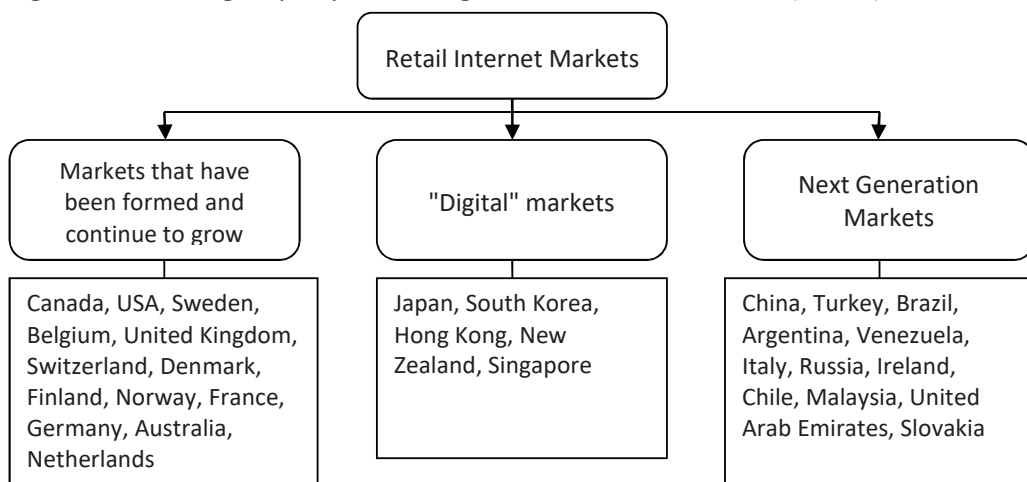
⁸³Admitad Annual Report 2017/2018. Available at: <https://belretail.by/article/esommerce-prodaji-v-mire-po-itogam-goda-vyirosli-na-do-mlrd>; Interesting facts about internet trade in the world in 2019. Available at: <https://lemarbet.com/ua/razvitie-internet-magazina/interesnye-fakty-ob-internet-torgovle/>.

⁸⁴The same.

heterogeneous in terms of their characteristics as to the volume and structure, as well as characteristics of consumers behaviour, their tastes and preferences.

According to the Global Internet Commerce Index (GRECI), world markets are divided into three groups (Figure 3).

Figure 3. Market groups by Index of global Internet commerce (GRECI)



Source: compiled on the basis of ⁸⁵

Markets of countries belonging to the first group closely approached the maturity stage. Internet coverage level of these countries is 90% or more, proportion of users who make online purchases exceeds 70-80%. Success in such markets depends on retailers' introduction of innovations, understanding of customers' behaviour motives in Internet environment, ensuring fast delivery of ordered positions, as well as consumer loyalty formation.

⁸⁵E-commerce: Outlook for the development of e-commerce of Ukraine 2017-2018 and on business in the Ukrainian market. Available at: <https://www.web-mashina.com/.../ecommerce-prognoz-elektronnoi-kommercii-ukrainy-2017-2018>: Online Retail is Front and Center in the Quest for Growth. Available at: http://www.atkearney.com/consumer-products-retail/e-commerce-index/full-report/-/asset_publisher/87xbENNHPZ3D/content/online-retail-is-front-and-center-in-the-quest-for-growth/10192#sthash.rsqRdoNX.dpuf.

Markets of the second group according to "GRECI" classification are high-tech and competitive, in the intermediate stage in their development between stages of growth and maturity, and therefore are characterized by intensification of efforts of trade enterprise subject in their position's maintenance.

Third group consists of next-generation markets, which are predominantly represented in developing countries, have a high potential for further growth at the expense of a large population and a gradual increase in Internet users, as well as increased technological development. This group includes the Ukrainian market, which is at an early stage of development, but shows a rapid growth compared to other economy sectors. Dynamics of indicators of e-trade development in Ukraine, calculated taking into account differences in valuation techniques and fluctuations of hryvnia exchange rate to major world currencies is given in Table 1.

Dynamics of Ukraine e-trade indicators is considerably higher than dynamics of traditional retail indicators in both hryvnia and dollar equivalents. This trend contributes to an increase in Internet commerce penetration from 0.6% in 2012 to 3.96% in 2017. This is due to the fact that Internet is turning into a habitual activity environment for people; it is satisfying needs more and more. In 2017 Internet connectivity level in Ukraine was 64% (for comparison: in Europe - 81.5%), while for users with income above average it is almost 100%, a similar situation is in the age group of 15-45 years, which provides vast majority of active online buyers⁸⁶.

⁸⁶In Ukraine, at the beginning of 2017, 21.6 million Internet users have been charged. Available at: <https://promo.semantrum.net/uk/2017/04/21/v-ukrayini-na-pochatok-2017-roku-narahovano-21-6-mln-koristuvachiv-internetu/>.

Table 1. Dynamics of e-trade development indicators in Ukraine

Indicator	Years					
	2012	2013	2014	2015	2016	2017
The volume of retail trade in Ukraine, UAH billion	812	888,7	901,9	1031,7	1159,3	1261,3
The volume of retail trade in Ukraine, billion dollars	101,63	111,23	75,85	47,24	45,36	47,44
The volume of e-trade in Ukraine, UAH billion	4,6	7,0	12,3	25,5	38,4	50,0
The volume of e-trade in Ukraine, billion dollars	0,58	0,88	1,03	1,17	1,5	1,88
Annual growth rate of retail trade in hryvnia equivalents, %	20,3	9,4	1,5	14,4	12,4	8,8
Annual growth rate of retail trade in dollar terms, %	17,5	9,4	-31,8	-37,7	-4,0	4,6
Annual growth rate of the volume of e-trade in hryvnia equivalent, %	46,8	52,2	75,7	107,3	50,6	30,2
Annual growth rate of the volume of e-trade in dollar terms, %	45,9	51,7	17,0	13,6	28,2	25,3
E-trade penetration in Ukraine, %	0,6	0,8	1,4	2,5	3,3	3,96
Internet penetration in Ukraine, %	50	53	57	58	63	64

Source: compiled on the basis of ⁸⁷

⁸⁷Glinenko, L.K., Dainovsky, Yu.A. (2018): The state and prospects of e-commerce development in Ukraine, Management and marketing of innovations, 1, 83-102; Retail trade in Ukraine for the year has increased by 800 billion: the regions are leaders in commodity circulation. Available at: <https://economics.unian.ua/finance/2364798-rozdribna-torgivlya-v-ukrajini-zarik-zrosla-do-ponad-800-milyardiv-oblasti-lideri-tovaroobigu.html>; E-commerce in Ukraine in 2018: figures, facts, interesting statistics. Available at: <https://ag.marketing/.../elektronnaya-kommertsiya-v-ukraine-2018/>; Official exchange rate of human resources management yvnia against foreign currencies. Available at: https://bank.gov.ua/files/Exchange_r.xls; B2C in e-commerce: European vector of Ukraine. Available at: http://www.ier.com.ua/ua/sme_development/Policy_papers_LEV?pid=5529

An important trend is that the growth rates of developed markets are falling while the Asian and East European markets are gaining pace, last of which is one of the first places in growth terms for Ukraine (table 2). As can be seen from the data in Table 1 and 2, Ukrainian e-trade market growth rate significantly exceeds the East European ones.

Table 2. Dynamics of indicators of e-trade development in Europe

Indicator	Years					
	2012	2013	2014	2015	2016	2017
The volume of e-trade in Europe, billion dollars	372,75	469,81	531,49	505,12	563,48	603,0
The volume of e-trade in Eastern Europe, billion dollars	16,64	23,02	29,68	27,17	29,28	34,84
Annual growth rate of the volume of e-trade in Europe in dollar terms, %	45,9	26,04	13,13	-4,96	11,55	7,0
Annual growth rate of the volume of e-trade in Eastern Europe in dollar terms, %	45,9	38,35	28,89	-8,46	7,8	18,9

Source: compiled on the basis of⁸⁸

In line with logic and trends of world e-trade, business models of Ukrainian e-trade companies are developing. A larger e-trade market share of Ukraine is occupied by companies that use four business models: e-store,

⁸⁸Admitad Annual Report 2017/2018. Available at: <https://belretail.by/article/esommerce-prodaji-v-mire-po-itogam-goda-vyirosli-na-do-mlrd>; Glinenko, L.K., Dainovsky, Yu.A. (2018): The state and prospects of e-commerce development in Ukraine, Management and marketing of innovations, 1, p.83-102.

electronic bulletin board, electronic marketplaces and price-aggregator; and a significant part of companies applies hybrid models such as "bulletin board + price-aggregator" (Ria.com), "supermarket + marketplaces" (Rozetka.com, Lamoda.ua).

A significant impact on Ukrainian Internet commerce development wakes growing ability to compete with foreign online salespeople. In context of announced Single Digital Market in Europe, where Ukraine has potential to participate, entrepreneurs must be prepared to meet needs of foreign consumer. At present, competitive positions of Ukraine according to international ratings are unsatisfactory, but there is an understanding of problem issues and necessary steps for their solution. In the complex, they will enhance Ukraine image as trading partner and increase the flow of goods and services across the border.

Currently main development trends of both world and Ukrainian e-tade are:

- dynamic growth of Internet commerce in developing countries and regions (including Ukraine). Number of on-line customers increases with affordable broadband and mobile Internet;
- growth of mobile commerce. Today, mobile purchases share in Ukraine is 15% (in US and Canada - 25% ⁸⁹) and continues to grow, due to: increased availability of smartphones, mobile payment development, and one-click shopping promotion;
- multi-channel - purchasing goods through different entry points that do not interact with each other (for example, sale point, internet site, social networks, mobile application);
- omni-channel – integration of all channels, which allows user to buy goods in any convenient way for him. Traditional types of business began to open online representations, popular online stores - to create regional points of "offline" issue, and in some cases - even traditional stores;

⁸⁹Pleskach, V., Borodachova, N., Oleksiuk, L. (2017): As the Government of Ukraine, to develop a state policy in the field of e-commerce. Analytical Paper, 50 p.

- goods subscription sale. Such retail format is especially popular in western market and is suitable not only for goods of regular demand, but also for maintaining constant direct communication with the client;
- enhancing capabilities and role of using large data volumes (Big Data) to identify links between them, which helps to increase site conversion and increase sales volumes;
- use of artificial intelligence to identify patterns and consumer behavior causes that allow modeling effective sales models;
- customer interaction in real time with the help of special services - chat bots, online consultants, messengers (Telegram, Viber, Skype, WhatsApp, social media messengers), live video (Periscope, Facebook Live, OK Live);
- logistic component development, which plays most important role. In coming years, due to e-trade in Ukraine, logistic networks should be established that will allow buyer to deliver goods as soon as possible;
- automated purchases return. According to research agency "Data Insight", 61% of online buyers consider possibility of convenient and free goods return to be a decisive factor in making purchase.

Summarizing research results⁹⁰ *benefits of e-trade* for consumers and businesses can be systematized in this way:

⁹⁰Gnana Dhas, C. J. (2011): E-Commerce – Consumer Protection Model. Available at: <https://www.researchgate.net/publication/327368899>; Consumer protection in electronic commerce, Note by the UNCTAD secretariat. Second session, Geneva, 3–4 July 2017; Tsymbaliuk, I.V. (2012): E-Commerce Security (Organizational and Legal Aspects), Legal Informatics, 3(35), p. 70–77; Uspensky, I.V. (2003): Internet Marketing. SPb. Available at: <http://www.aup.ru/books/m80/5.htm>; Drobysheva, V.G., Chernoiwanov, A.P. (2011): The role and place of information technology in the system of economic security of the state, Socio-economic phenomena and processes, 3-4, p.87-93; Orlik, O.V. (2016): Information technologies for ensuring e-business security, Cybersecurity in Ukraine: legal and organizational issues: conference materials, 167-169; UNCTAD (2004): E-commerce and Development Report 2004. United Nations. N.Y. and Geneva, 244; Neacsu, N.A. (2016): Consumer protection in electronic commerce, Bulletin of the Transilvania University of Brasov Series V: Economic Sciences, 9 (58), No. 1, Available at: http://webbut.unitbv.ro/BU2015/Series%20V/2016/BULETIN%20%20PDF/34_Neacsu.pdf; Boşcor, D. (2015): Export strategies adopted by Romanian SME, Bulletin of the Transilvania University of Braşov, 8(57), Series V, No.1, p.227-232.

- informational: possibility of providing and receiving maximum amount of information through the Internet, low cost of data transmission, ability to provide information about the product in different forms (text, graphics, video, etc.);
- transactional: minimal costs (time, money, effort: in operational aspect - optimal, without high costs associated with traditional contact of physical movement in commercial transactions) for a competitive offers comparative analysis, reducing time to receive information about products services, for necessary goods purchase; possibility of round-the-clock access, convenience of payment;
- market-technological: the expansion of markets for the sale of goods and services, in particular through international operations, the ability to develop a significant number of new markets, an increasing number of potential customers, producers' access to the maximum number of consumers, the ability to identify the buyer, track his wishes, an individual approach (personalization) paying more attention to satisfying the needs of customers, providing feedback (close relationships);
- organizational and managerial: minimization of financial resources (reduction of personnel costs and premises rent, relatively less cost of advertising space); ease of deploying and managing applications, an alternative, additional way of doing business.

So, due to information technologies, economic opportunities level in various production activity branches has sharply increased. At the same time, there is a problem of information sources protection ⁹¹. According to the studies⁹², risks of e-trade security are primarily caused by the open Internet nature. The number of unlawful actions in the network (for example, remote information and software attacks, fraud, interception of confidential information, etc.) is increasing rapidly every year. Thus, protection object in first place should be an information system. According to the experts, the leak

⁹¹Orlik, O.V. (2016): Information technologies for ensuring e-business security, Cybersecurity in Ukraine: legal and organizational issues: conference materials, p. 167-169.

⁹²Pirig, S.O. (2008): Payment systems: tutorial, Kyiv, Center for Educational Literature, 240 p.

of 20% of commercial information in sixty cases out of a hundred leads to bankruptcy of an enterprise ⁹³.

Since e-trade is characterized by a significant diversity of participants, characteristics and needs in terms of security, the threats to their security are diverse ⁹⁴. Paraphrasing ⁹⁵, one can distinguish following threats to economic security in the field of e-trade: (1) deliberate attacks on rights and legitimate interests of e-trade participants (offenses, including crimes); (2) technical errors, noise in communication channels caused by various factors (accidents, disasters, interruptions in power supply, etc.); (3) careless actions of participants in electronic commerce system (technical errors, improper performance of duties, etc.).

Among the main types of intruders' fraudulent acts ⁹⁶ distinguish: purchase of goods and services for details of stolen plastic credit cards; breakdown of databases containing information from plastic cards (information about plastic cards owners who make purchases in electronic stores); organization of fraudulent electronic stores. Technical mistakes can be considered as force majeure. It is necessary on the one hand to take into account probability of their occurrence in planning activities process, and, on the other hand, take measures to prevent them. Regarding negligent actions of e-trade system participants, we believe that they pose a threat to consumption security, and therefore require immediate efforts to overcome them, so let us dwell on them in more detail.

In process of consumption security studying among frequent violations, in particular from Internet stores as main violation subjects of consumer rights (based on analysis of consumer complaints to All-Ukrainian governmental

⁹³Pavlov, A.P., Kolosov, A.V. (2013). Information technology of business economic security, The world of science. Scientific Online Magazine, 1. Available at: <http://mir-nauki.com/PDF/02EMN113.pdf>.

⁹⁴Smirnova, L. Ya. (2007): Analysis of the main types of crimes in the field of e-commerce, Law and Law, 2.p. 145

⁹⁵Novozhilova, M.V., Leushina, N.A. (2008): Models and methods of security in e-commerce systems, Financial and credit activity: problems of theory and practice, 2 (5), p. 71–76

⁹⁶Drobysheva, V.G., Chernoiyanov, A.P. (2011): The role and place of information technology in the system of economic security of the state, Socio-economic phenomena and processes, p. 92

organisation "Union of Consumers of Ukraine" ⁹⁷), one can distinguish the following ⁹⁸:

- lack of information about seller and procedure for lodging claims in case of their occurrence, ignoring relevant requirements, in particular due to the geographical distance between recipient and supplier, as well as problems with determining latter location;
- goods and services supplied do not match what has been agreed; non-conformity of goods with the requirements of normative acts; mismatch of documents accompanying goods;
- refusal to refund for returning goods, in particular for goods of inadequate quality; refusal to provide replacement or warranty repair;
- goods' price change at its delivery;
- difficulties and conflicts with fact of proof of contract conclusion, purchase or order of goods through the Internet at a distance.

The problem of document acknowledgment in electronic form is evidence, and an operation conducted with the help of telecommunication networks, is considered valid in the regulation of electronic commerce in terms of its economic security ⁹⁹. Most laws in the field of electronic commerce stipulate that Internet transactions are carried out within the jurisdiction of the supplier of goods' country ¹⁰⁰. Situation is aggravated by the presence of a "gray" e-trade market (correspondingly, without taxation,

⁹⁷Complaint book / All-Ukrainian public organization "Union of Consumers of Ukraine" Available at: http://consumerunion.com.ua/ua/kniga_skarg/page/10.htm.

⁹⁸Pysmenna, O.P., Baranova, A.S., Shkrinda, O.M. (2015): Protecting consumers' rights when purchasing products thuman resources management ough the Internet, Comparative and analytical right, 1, 59-62; Consumer protection in electronic commerce, Note by the UNCTAD secretariat. Second session, Geneva, 3–4 July 2017; Uspensky, I.V. (2003): Internet Marketing. SPb. Available at: <http://www.aup.ru/books/m80/5.htm>; Kuzmina, M. M. (2014): Legal regulation of consumer rights protection in Internet commerce, Right and innovation. 3 (7), p. 36–42; Szopiński, T. (2012): E-konsument na rynku usług, Warszawa: CeDeWu, 193. p.145

⁹⁹Novozhilova, M.V., Leushina, N.A. (2008): Models and methods of security in e-commerce systems, Financial and credit activity: problems of theory and practice, 2 (5), p.71–76.

¹⁰⁰Neacsu, N.A. (2016): Consumer protection in electronic commerce, Bulletin of the Transilvania University of Brasov Series V: Economic Sciences, 9 (58), No. 1, Available at: http://webbut.unitbv.ro/BU2015/Series%20V/2016/BULETIN%20I%20PDF/34_Neacsu.pdf

accounting), in which a significant part of sale and purchase acts is carried out, in particular in B2C and C2C markets, which in turn complicates the process of ensuring consumption security in e-trade.

Thus, such threats to consumption security and respective risks for consumers and sellers during e-trade transactions can be identified (Table 3).

Table 3. Threats and risks to consumption security in e-trade in Ukraine

Threats		Risks for consumer	Risks for producer (seller)
Product safety	received goods discrepancy with declared characteristics	size, material, manufacturer (country of origin), etc.	view shown on the picture (photo, video)
		lack of opportunity for prior acquaintance	
		protection of intellectual property	unrecognized consequences of acquisition and use of goods or services that do not meet established requirements
Informational	presence of a significant amount of irrelevant and inaccurate information	inability to analyze information, its relevance and reliability	informational support of enterprise commercial activity in market conditions
	misleading advertising	false information about problems of actions	
Educational	lack of e-trade skills	lack of skills for searching, ordering, paying for goods or services on the Internet	lack of the clear understanding of risks, relevant security technologies and their technical standards by management and IT managers
		lack of knowledge of their rights and measures to protect them	

Financial	online payments	financial risk	protection of material and financial values
		fraudulent actions by the seller	fraudulent actions by the buyer
Technological	cyber attacks, viruses	both buyers and sellers are exposed, because viruses, to take an example, do not distinguish between victims	
	insecurity of personal information	customers' scepticism, misgivings, particularly about the security of bank account details and other personal data	protection of commercial secrets; staff protection
Institutional	institutional non-regulation	consumer-consumer interaction (C2C)	presence of "gray e-trade market"
		non-compliance, non-establishment, non-workability and non-control of the procedure for returning the goods	

Source: compiled by the authors on the basis of the research

Naturally, there remain current topical issues of consumer protection, which operates with physic-chemical characteristics, quality, validity, warranty, certification etc. However, issues arising from the cyberspace peculiarities, which is electronic business development environment become priority¹⁰¹.

The threats impact is compounded by ability to establish direct contacts with foreign buyers, vendors, intermediaries, rules of interaction between which are less controlled and regulated in the field of Internet commerce.

An e-business system is a reflection of opportunities and interests of goods and services' sellers and, at the same time, it is coordinated with Internet users' needs (potential buyers) in accordance with the market laws. The site reflects meeting of seller's interests with their capabilities and buyers with their needs. According to this, filling of system components of doing

¹⁰¹Neacsu, N.A. (2016): Consumer protection in electronic commerce, Bulletin of the Transilvania University of Brasov Series V: Economic Sciences, 9 (58), No. 1, Available at: http://webbut.unitbv.ro/BU2015/Series%20V/2016/BULETIN%20I%20PDF/34_Neacsu.pdf

business on the Internet is formed¹⁰². As noted in¹⁰³, we are in cusp of a very different world, in which the distinct roles of firm and consumer converge and sources of value creation are significantly changing. In our opinion, consumption security in e-trade should be considered as a dependence on possibilities of protecting interests and threats minimizing that arise in consumption process from consumers, producers (intermediaries) and state (Figure 4).

Protection of consumers' interests in the process of consumption safety ensuring is considered, first of all, through their rights protection. The latter implies compliance with e-trade in the same basic rules as in traditional one:

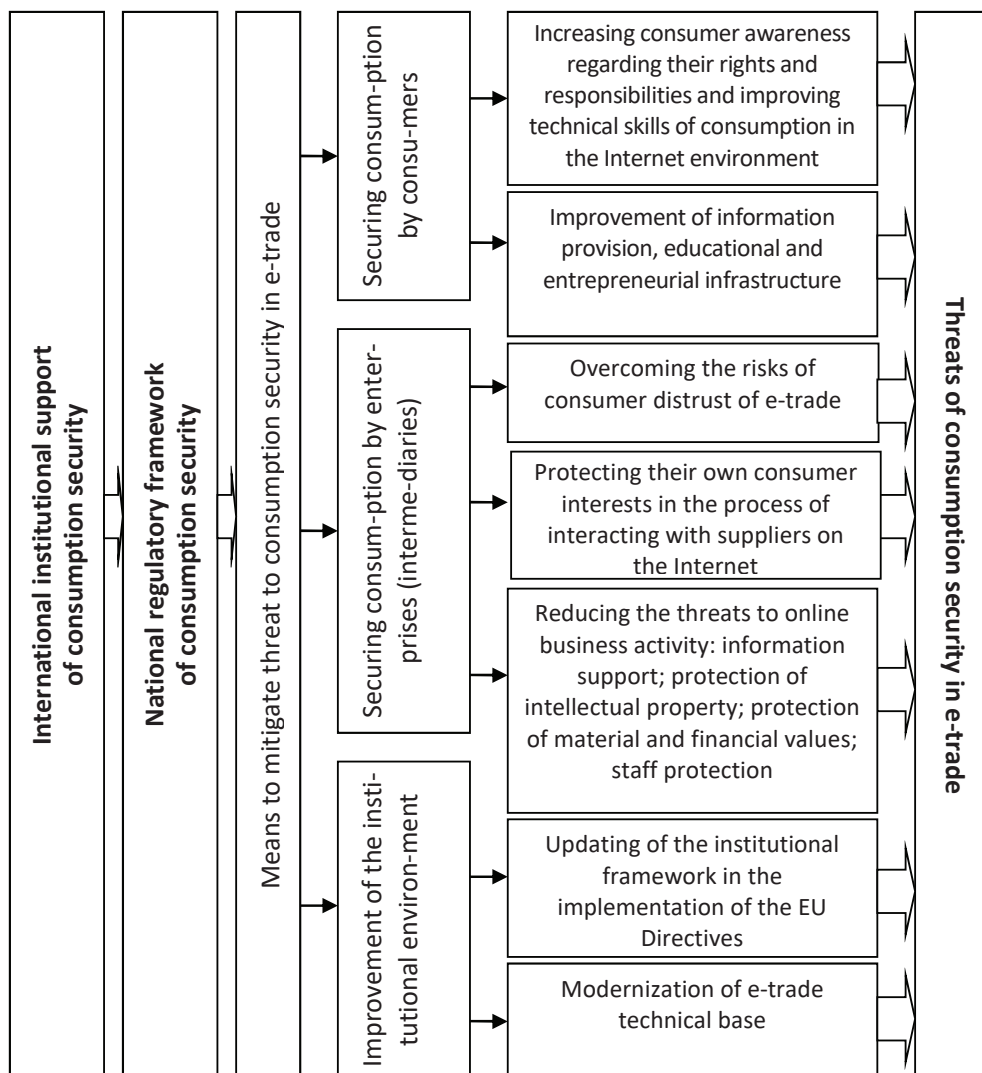
- 1) seller's duty to provide information about the goods before entering into an agreement; 2) possibility of goods returning; 3) product safety; 4) warranty obligations and restrictions on contract termination by consumer. Last feature for e-trade is a condition: if services or goods provision by electronic means of communication with consumer consent occurred before expiration of contract termination, which was reported to consumer in confirmation information.

Among the ways for consumers to protect their rights in Internet⁶⁵ there can be highlighted (at the same time, not for all of them, the action procedure in the case of non-conformity, negative results of verification) is defined:

¹⁰²Novozhilova, M.V., Leushina, N.A. (2008): Models and methods of security in e-commerce systems, *Financial and credit activity: problems of theory and practice*, 2 (5), p. 71–76.

¹⁰³Gnana Dhas, C. J. (2011): *E-Commerce – Consumer Protection Model*. Available at: <https://www.researchgate.net/publication/327368899>.

Figure 4. Main means to reduce threats to consumption security in e-trade



Source: compiled by the authors on the basis of the research

- careful study of goods and services information (vigilance when choosing goods or services), if necessary - check certificates availability and their originality;
- checking seller and manufacturer reliability, in particular by studying their location;

- extortion and storage of documents confirming purchase fact (commodity (cash) check, receipts, tokens, acts of performed work); it is also desirable to keep certificates of business entities, photographs, video footage, recordings on a dictation, all that can confirm purchase fact;
- checking the presence of all requisites in check: goods name, amount, seller, address and identification code (most Internet sellers are registered as individuals - entrepreneurs);
- checking the information on check and guarantee card for seals correspondence, checking the fidelity of filling in the warranty card;
- use of credit cards offering better protection against unauthorized purchases (a common method of card account protecting - setting a limit on payments on the Internet). In the real sector of the economy there are more threats to consumption safety than in the financial (banking) sphere.

Thus, one of the most important aspects is formation of consumers' knowledge and skills in using Internet resources and protecting their rights in online trading, due to the improvement of methods of using information through rapid development of information systems⁹³; such appropriate training should become a permanent process.

On the one hand, it is necessary to increase awareness level of consumers regarding their rights and obligations related to online stores purchase, as well as risks that Internet brings with them. The role of institutions and information sources aimed at protecting consumer rights and their education, such as European Consumer Bulletin, DOLCETA project, funded by European Commission, European Consumer Centre¹⁰⁴, which can be taken as an example for Ukraine, is important here. On the other hand,

¹⁰⁴Pelech, M. Ya., Chopinski, T. Y. (2014): Consumer protection in e-commerce (e-commerce), Bulletin of the Ministry of Justice of Ukrain, 9, p. 123-128. Available at: http://nbuv.gov.ua/UJRN/bmju_2014_9_32; The main tendencies of legal regulation in the field of e-commerce (2017): Trade Policy ProjectUSAID, International Group Development LLC, 38; Lubasz, D. (2013): Handel elektroniczny. Bariery prawne, Warszawa: Wydawnictwo Lexis Nexis, 498 p.

enabling security features require some technical skills and average user is a rare attempt to enable security features. This opens gateway for attackers¹⁰⁵, so it is important to improve technical skills of consumption in online environment.

Improving education level for online shoppers can take place either through thematic educational programs development, their dissemination and promotion, or creation of self-education conditions, in particular by improving appropriate educational infrastructure on the basis of inclusiveness. After considering specific measures to ensure product safety and consumer protection in e-trade, it should be added that the Internet environment can also help alleviate other threats to consumption safety, with long-term population welfare. Consumption security through the Internet can be positive by promoting environmental, reasonable, sustainable, socially responsible consumption. So, distribution of social advertising, personal experience, examples for imitation, challenges ("challenge-projects"), etc., through social networks helps to overcome negative effects of imposition, struggle against the threats of "consumption society", spread of positive behavior patterns ("fashion" on environmental friendliness, healthy lifestyle etc).

Despite the significant benefits of e-trade for *enterprises (producers and intermediaries)*, such as: reducing costs in areas of distribution and exchange, competition, market research, and communication policies development, there are also a number of threats caused by specifics of this type of activity.

First, there are risks associated with consumer distrust of e-trade. In order to minimize them the seller (manufacturer or intermediary, in particular the Internet-shop) should in writing or by electronic mail provide buyers with clear and understandable information about: 1) the exact data identifying the entrepreneur and the contact information; 2) the main characteristics of the goods or services; 3) the price, including payment for delivery and terms of payment, distance costs; 4) warranty obligations and other services related to the maintenance or repair of the goods; 5) other terms of delivery or

¹⁰⁵Gnana Dhas, C. J. (2011): E-Commerce – Consumer Protection Model. Available at: <https://www.researchgate.net/publication/327368899>.

performance of the contract, the procedure for accepting the claims; 6) the minimum duration of the contract, if it provides for periodic supplies of goods; 7) the period of acceptance of proposals; 8) the order of termination of the contract¹⁰⁶. Also use of advanced authentication processes or mixed models like online and off line delivery, payment through banks may help companies to make the customer feel safe while buying products online. Business which is able to create a successful model to address this grey area will only have a sustainable growth¹⁰⁷.

Secondly, an enterprise as a consumer of various kinds of resources (logistical, personnel, financial, information, management, etc.) also has to defend its interests, in particular, with regard to interaction with Internet suppliers. Thirdly, for business entities, threats to their operational, tactical and strategic activities are more widespread and diverse than for end-users. In general, company's economic security activities include four main areas: informational support of enterprise commercial activity in market conditions; protection of intellectual property (including commercial secrets); protection of material and financial values; staff protection. According to experts, cost of creating a company's security system and its optimal functioning can reach 25% of entire production process cost¹⁰⁸.

¹⁰⁶Pysmenna, O.P., Baranova, A.S., Shkrinda, O.M. (2015): Protecting consumers' rights when purchasing products through human resources management through the Internet, Comparative and analytical right, 1, p.59-62; Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council. Available at: <http://eur-lex.europa.eu>

¹⁰⁷Gnana Dhas, C. J. (2011): E-Commerce – Consumer Protection Model. Available at: <https://www.researchgate.net/publication/327368899>.

¹⁰⁸Orlik, O.V. (2016): Information technologies for ensuring e-business security, Cybersecurity in Ukraine: legal and organizational issues: conference materials, p. 167-169; Hendriksen, M. (2015): E-commerce and product safety - Key challenges. Available at: https://www.unece.org/fileadmin/DAM/trade/wp6/SectoralInitiatives/MARS/Czechumanresourcesmanagementepublic_June2015/02_M._Hendriksen_MH_DG_GROW_e-commerce_key_challenges_REV.pdf; Kozivkin, V.V. (2014): Economic security of an industrial enterprise. Available at: http://secandsafe.ru/pravovaya_baza/blogi/ekonomicheskaya_bezopasnost/ekonomicheskaya_bezopasnost_promyshlennogo_predpriyatiya.

In order to protect interests of information relations subjects, it is necessary to combine actions of different levels: legislative (defines the state legislation and standards, international standards and certification system), administrative and procedural (is defined in organization itself, enterprise administration, by creating special procedures for protection information and clients interests), software and technical (also is provided within the enterprise, but has a number of related features, in first of all, with the security of information on the Internet, security of electronic payments, threat of unauthorized disclosure of confidential information or such as a commercial secret). In order for e-trade as a business to have a predominantly positive social impact, its potential participants need to be sure in appropriate security, including state security. In particular it concerns protecting consumer rights, providing accurate information, and regulating procedure, if necessary, for receipt and return goods or services¹⁰⁹.

Study of world experience in regulation and administration of e-trade shows existence of fundamentally different models: American (absolute non-interference of the state), Chinese (an instrument for promoting Chinese goods to external markets) and European (total regulation and registration of subjects of e-trade)¹¹⁰. The last, in our opinion, taking into account organizational and mental characteristics of business entities of Ukraine, is the most acceptable for our country. Also, the obligations on institutional basis improvement taken in connection with signing of Association Agreement between EU and Ukraine (Chapters 6 "Establishment of business activity, in services trade and e-trade" and 7 "Current payments and movement of capital" Title IV of the Association Agreement) also apply to e-trade. Implementation of large number of European acts in this area is envisaged (Figure 5), in particular Directive 2000/31 / EC of European Parliament and of EU Council (E-Commerce Directive), which covers certain service provision

¹⁰⁹Tymbaliuk, I.V. (2012): E-Commerce Security (Organizational and Legal Aspects), *Legal Informatics*, 3(35), p.70–77; Budyansky, P.S. (2016): The role of information technology in the modern economy. Available at: <http://economyar.narod.ru/budjnskii.pdf>.

¹¹⁰Pleskach, V., Borodachova, N., Oleksiuk, L. (2017): As the Government of Ukraine, to develop a state policy in the field of e-commerce. Analytical Paper, p.50.

types (business-to-business, business-to-consumer, etc.), which are carried out for reward electronically¹¹¹.

Unfortunately, European rules of e-trade regulation have not been implemented into Ukrainian legislation to date. Existing regulatory framework needs a substantial and rapid update. This is due to this type of trade specifics (absence of a paper contract form, a specific procedure for confirming the sale, lack of information about product supplier or service provider, identification of purchasing process by both sides etc.), increase volume of cross-border sales and consolidation of e-trade in a global context, significant vulnerability of consumers and manufacturers rights during electronic sales operations.

Accepted in 2015, the Law of Ukraine "On E-Commerce"¹¹², for the first-time regulated e-commerce (e-trade and the use of electronic money) and recognized electronic transactions on an equal footing with written ones. The electronic agreement is signed by electronic digital signature (EDS), but the procedure of signing is not covered by the normative act. The law does not cover all e-trade models (G2G, G2B, G2C, C2C, E2B, etc.), basic types of e-services, principles of legal regulation, in particular the contract freedom principle. It needs to improve terminological apparatus of e-trade, to regulate personal data protection mechanism, to resolve issues related to disputes between the buyer and the seller, protecting consumer rights, regulating the mechanism for providing electronic services, etc

¹¹¹Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market («Directive on electronic commerce»). Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:32000L0031>

¹¹²Law of Ukraine "On E-Commerce" Available at: <https://zakon.rada.gov.ua/laws/show/675-19>.

ECONOMIC SECURITY AT RISKS: FINDINGS FROM THE DIGITALIZATION OF THE NATIONAL ECONOMY

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Figure 5. Structural and functional construction of institutional basis modernization of e-trade in Ukraine in the process of European integration

	EU legislation	Normative-legal base of Ukraine	Institutions responsible for certain areas in Ukraine
Communications and electronic communications	Directive 98/84/EC on the legal protection of services based on, or consisting of, conditional access, Directives 2002/21/EC, 2002/20/EC, 2002/22/EC for electronic communications networks and services	Draft Law of Ukraine "On Electronic Communications" Laws of Ukraine "On Telecommunications", "On Basic Fundamentals of Cybersecurity of Ukraine"	National Commission, which carries out state regulation in the field of communication and informatization
General regulation of e-trade	Directive 2000/31/EC on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market	Law of Ukraine "On electronic commerce"	No organization
Legalization of electronic documents and signatures	Directive 1999/93/EC on a Community framework for electronic signatures	Laws of Ukraine "On electronic digital signature" and "On electronic documents and electronic document circulation"	State Agency for E-Governance in Ukraine
Protection of consumer rights in e-trade	Directive 97/7/EC on the protection of consumers in respect of distance contracts	Law of Ukraine "On consumer rights protection"	State Service of Ukraine for Food Safety and Consumer Protection
Protection of personal data	Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)	Law of Ukraine "On the protection of personal data"	Commissioner of the Verkhovna Rada of Ukraine for Human Rights

- valid documents or institutions
 - documents or institutions that need improvement
 - documents or institutions that need updating

Source: compiled by the authors on the basis of the research

Despite act of the law for 4 years, no significant progress has been made in e-trade regulation, as much of the e-commerce market is in the shadows. There is a lack of clear mechanisms for accounting, taxation system creates barriers to its implementation.

Laws on electronic documents and signatures legalization ("On electronic digital signature", "On electronic documents and electronic document circulation") should also be updated in accordance with EU requirements (Directive No. 1999/93 / EC ¹¹³) in relation to the transition from e-signature and electronic document management to fully regulate trust e-services.

So, from July 1, 2016, EU entered into an act entitled "Electronic Identification and Authentication and Trust Services" (eIDAS Regulation), which introduced new standards for electronic transactions. EIDAS Regulation extends the powers and scope of Directive 1999/93/EC. Prior to the new act introduction, in most cases consumers living in the EU could not use electronic identification in other EU countries. Thanks to eIDAS, it has become possible to obtain qualified e-signatures, which are recognized in all EU countries. The regulation allows countries to set their own requirements in national legislation as to which kind of e-signature can be used in specific circumstances ¹¹⁴.

Ukrainian consumer protection legislation in EU consumer policy context, which focuses on consumers' needs rather than producers, is also needed. EU Consumer Policy Action Program has four priorities - consumption safety, consumer information and education, consumer rights development and proper redress in case of violations, and enforcement. Accordingly, Ukraine should implement Directive 97/7 / EC of European Parliament and EU Council on consumers protection in distance contracts of May 20, 1997 ¹¹⁵.

¹¹³Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31999L0093>.

¹¹⁴EDS: Experience in Poland, Germany and Canada. Available at: <https://www.apteka.ua/article/480412>

¹¹⁵Directive 97/7/EC of the European Parliament and of the Council of 20 May 1997 on the protection of consumers in respect of distance. Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A31997L0007>

Improvements should relate, first of all to: harmonization of notion of entering into a contract "outside trade or office premises" and "at a distance", as well as the concept of "remote communication"; development, in addition to judicial consumers protection for resolving disputes in domestic e-trade market, initiatives to promote extra-judicial mechanisms, and introduction of standardized complaints forms. Significant attention is needed to the regulatory e-taxation issue, use of cross-border e-services, technical regulation of communication networks, activities of electronic services providers etc., which are regulated in EU by separate Directives (2002/21 / EC "On a Single Regulatory Framework for Electronic Communications Networks" 2002/20 / EC "On the authorization of electronic communications networks and services", 2002/22 / EC "On universal services and users' rights in relation to electronic communications networks and services", 2002/77 / EC "On competition in the markets for electronic communications networks and services ", 98/84 / EC "On the legal protection of services based on, or consisting of conditional access ") ¹¹⁶.

Significant development problem of e-trade in Ukraine is the lack of a body responsible for formulating and implementing state policy, monitoring and adjusting regulatory and legal provision, statistical accounting of operations.

Currently, the regulation is carried out by the State Agency for e-Governance (it is within the competence of Ministry of Economic Development and is responsible for policy implementation in the areas of e-governance, informatization, development of information society, formation and use of national electronic information resources, digitization of public authorities¹¹⁷) and State Committee for Trade and Security (competence of Ministry of Agrarian Policy and Food and Consumer Protection) in consumer protection field ¹¹⁸.

Ministry of Economic Development and Trade should ensure the formation and implementation of: state policy on business development on-

¹¹⁶Pleskach, V., Borodachova, N., Oleksiuk, L. (2017): As the Government of Ukraine, to develop a state policy in the field of e-commerce. Analytical Paper, 50. p. 24

¹¹⁷State Agency for Electronic Governance of Ukraine. Available at: <https://www.e.gov.ua/ua>

¹¹⁸State Service for Food Safety and Consumer Protection. Available at: <http://www.consumer.gov.ua/>.

line, state policy in the field of price control and use of electronic payment systems.

In addition to existing e-trade regulators, a separate body should be set up, whose functions should include monitoring of e-purchases number, complaints, compensation amounts, liability of offenders and consumers.

By analyzing the prospects of an institutional basis for e-trade development in Ukraine, scholars note that its normative-legal and organizational regulation, taking into account European model, can be provided in several ways: (1) to leave current policy unchanged; (2) the function of realization of state policy provide to the Ministry of Economic Development and Trade; (3) create a separate interagency working group to develop e-commerce development concept.

In the first scenario, in a self-regulatory context, in the short run, business representatives will benefit from lack of proper control. However, consumers at the same time can't protect themselves from many risks. The third scenario on the basis of a democratic policy option can, on the one hand, take into account opinion of all market participants, and on the other hand, it is less realistic due to the low inclusion of powerful companies' leaders and country senior management in the process of reforming. In our opinion, most acceptable scenario is the functions of the Ministry of Economic Development and Trade expansion, which will add to centrality, comprehensiveness and predictability of e-trade development in Ukraine.

Thus, it can be affirmed that e-trade development in Ukraine today is based on the self-regulation principle; a significant share of the market is in the shadows, there is a serious vulnerability of consumer rights. The institutional basis for e-commerce development requires a thorough and rapid update on implementation of existing EU Directives relating to e-commerce development, protection of consumers' rights and personal data in electronic transactions, improvement of electronic contracts and electronic digital signatures. Considerable attention is needed to modernize technical e-trade base - providers, communication systems and networks, data protection technologies.

Conclusions. Analysis of theoretical foundations for determining e-business categories has allowed us to conclude that e-commerce should be defined as all activities in the field of trade using information space and technology. E-trade is a narrower sphere and covers the field of electronic purchase and goods sale, works and services in a remote way through implementation of electronic transactions using information and communication technologies and systems.

E-trade in Ukraine is one of the most developing industries with growth rates, which in recent years significantly exceed the European ones. In line with logic and trends of world e-trade, business models of Ukrainian e-trade companies are developing.

The main trends of e-trade development are: dynamic growth of Internet commerce; multicanality; omnicality; increase of mobile commerce; sale of goods under the subscription; increasing use of large data volumes (Big Data) to identify links between them; use of artificial intelligence to identify patterns and causes of consumer behaviour; allowing to model effective sales models; interaction with the client in real time; logistic component development.

Within the studying framework peculiarities of consumption security in e-trade, appropriate advantages are systematized, threats and risks are analyzed, and means of their weakening for different subjects (consumers, enterprises, state) are offered. As for consumers, main emphasis was placed on improving the level of education, both in terms of technical skills of using Internet and protection against fraud and crime, and in terms of knowing their rights and measures to uphold them. It is also important to improve information provision and educational infrastructure. It is significant for sellers to overcome the risks associated with consumers distrust of e-trade, protecting their own consumer interests in the process of interacting with Internet suppliers; presence of a large number and variety of threats for business online activities. From the state side, a thorough and rapid update of the institutional framework in existing EU Directives implementation and e-trade technical base modernization are necessary.

Ways to overcome obstacles to implementing the experience of developed countries in securing consumer in e-trade, both in terms of protecting consumer rights, securing long-term goals for human development, and in terms of improving enterprise performance, in particular within the modules of the management system quality need a follow-up study.

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FORMATION AND DEVELOPMENT OF AN INNOVATIVE ECONOMY IN THE AGE OF BUSINESS GLOBALIZATION BASED ON THE IMPLEMENTATION OF INDUSTRY 4.0 AND LOGISTICS 4.0 CONCEPTS

Abstract. The article is devoted to the study of the peculiarities of the innovative economy formation in the conditions of business globalization, strengthening of the European integration processes and aggravation of competition. The relevance of the transition to new criteria for obtaining competitive advantages on the basis of the wide use of modern IT technologies in various fields, even those that are not technically interconnected, has been proved. The outstanding characteristics of the Industry 4.0 and Logistics 4.0 concept were distinguished, the concept being a complex integrator of specialized functions in the intermediate links of creating added value. The content of new trends of the innovative economy in the field of logistics was presented. Examples of their proper use in the practice of foreign and domestic business were presented. The factors that enhance the interaction of economic phenomena and processes with the implementation of the Industry 4.0 and Logistics 4.0 concepts were defined. There was a schematic model developed of logistics transformation into the most important component of the modern knowledge economy based on the interaction of the Industry 4.0, Internet of Things and Logistics 4.0 concepts. New challenges and external factors were identified that dictate the need for a qualitative change of the logistics sphere - its functional load and information display. There were the prospects determined for the development of a reasonable economy based on the Logistics 4.0 and the Internet of Things, as well as the main obstacles for their implementation

Jel Classification System: R40, L81, L86, L87, L90, M15, O3

Keywords: business globalization, knowledge economy, innovative economy, digital economy, Industry 4.0 concept, Logistics 4.0 concept, development, transformation of economy, integration, technology, industry

Introduction. Innovative passivity, economic reforms in Ukraine stretched in time and space reflect on the lack of a systematic approach to solving systemic problems of business entities at different levels of governance, including, in particular, logistical ones. In the Global Innovation Index for 2017-18, Ukraine was ranked 50th out of 127 countries, and in the World Digital Competitiveness Ranking, it was ranked 60th out of 63 countries¹¹⁹. The peculiarity of logistics as a type of economic activity (TEA) is that it: firstly, acts as a connecting link between various participants in business transactions at the stage of physical sales of material flows, the intensity of which will influence the rhythm and flexibility of production systems; secondly, it is a complex integrator of specialized functions in the intermediate links for creating added value in the country and/or abroad; thirdly, it is a peculiar socio-economic space for the organization and implementation of modern information and communication technologies (ICTs), to which there is a growing society interest in the knowledge economy; fourthly, it is a promising platform for approbation of technological innovations and new business models of enterprises in terms of digitization of the economy (Industry 4.0).

Ukraine is striving to become a full member of the EU in the next decade, which is formalized in the revised Constitution of Ukraine¹²⁰, a prerequisite for which is the formation of a powerful, technologically advanced economy. The achievement of such a goal requires the development and implementation of a qualitatively new economic model of development, where the systemic industries and logistics networks will become top priority, because it is

¹¹⁹Ukraine in the global ratings of 2017-2018. Available at: <https://www.uifuture.org/post/ukraina-u-globalnih-rejtingah-2017-2018/>

¹²⁰The Parliament introduced amendments to the Constitution on the course of Ukraine for the EU and NATO. Available at: <https://www.radiosvoboda.org/a/news...eu.../29756463.html>

impossible to gain competitive advantages in the global world in the 21st century by introducing only competitive models based on the criteria of comparative advantages (cheap labor, rich natural resources) as it is foreseen in the traditional economic model for developing countries or Third World countries. This is explained by the fact that it is necessary to weaken the financial dependence of the results of economic growth on the volumes of manufactured products or services rendered, including in the field of transport logistics - on the volumes of freight or passenger transportation, while at the same time to expand the range of logistics services on the basis of creation the intelligent warehouses of critical products and "intelligent logistic factories" with minimal harm to the environment in the economy of sustainability; increase the competence of employees, their competitive dynamic advantages on the global labor market.

As emphasized in the paper ¹²¹, modern challenges, both of civilizational and Ukrainian scale, are to a large extent due to the nature and trends of the innovative component of national economies. J. Schumpeter was the first one to pay attention to this important phenomenon a century ago. He developed a new theory of economic development with an emphasis on scientific and technological innovations, which are the main factor of economic development of a country. Ukraine is approaching the EU, "based on 95% in the third and fourth wave of innovation..., the Ukrainian economy operated with a profitability of 3-6% and created the innovative component of added value per unit of production that is lower by one-two orders compared with the economies of the 5th and 6th wave» ¹²².

The space of national economy globalization and activation of the business innovative activity is becoming wider under the influence of a new wave of industrial revolution - Industry 4.0, which not only changes the traditional attitude to the production at full integration of flow of data and

¹²¹Global trends and perspectives: the global economy and Ukraine. / Acad. Editorship by V. Yurchyshyn - Kyiv: Zapovit, 2018 - 202 p.

¹²²Zghurovskiyi M. Foresight of the Economy of Ukraine on medium-term (2015- 2020) and long-term (2015-2030) temporal horizons. // Kyiv, NTUU "KPI" 2015, 35p.

goods, but also enhances the synergy of business structures by altering their functional load ¹²³:

- the volume of work in progress reduces the integrated interaction throughout the supply chain;
- attracting highly skilled workers to control and manage the future factory (plant) strengthens their competitive advantages in the labor market;
- manufacture of goods for individual orders in small batches will be effective in case of rational interaction between machines or between people and machines.

Globalization of business demonstrates the removal of restrictions on intellectual activity in the conditions of information and network technologies in order to generate income or other benefits ¹²⁴. The main factors behind the accelerated development of globalization processes are:

- removing barriers in the customs and tariff area on the way of the movement of capitals, goods and services that compress space and time to accelerate the conduct of business ¹²⁵;
- technical progress in the field of telecommunication, development of the Internet;
- development of Industry 4.0 and logistics services;
- change in the productivity of economic resources in the developed countries and in the developing countries, which increases the intensity of international logistics flows (material resources, components and finished products);
- changing the strategy of TNCs in foreign markets in the conditions of increasing environmental, financial, product and social crises, which

¹²³"Industry 4.0" The future performance and growth in the industry: BCG. Available at: http://img-stg.bcg.com/Industry_4_0_RU_tcm27-41510.pdf

¹²⁴Butnik-Siverskyi O. B. Innovation studies and intellectual economy (theoretical and methodological aspect). Available at: <http://dspace.nuft.edu.ua/jspui/bitstream/123456789/9802/1/innovatika.pdf>

¹²⁵Vershytskyi A.V. The impact of globalization processes on management of the companies. Culture of the Black Sea Coast nations. - 2007 - No.118. - p. 33-37.

stimulates the search for models of the domestic business integration into the global business environment;

- the need for redistribution of currency, logistic and marketing risks through the development of activities in the domestic and foreign markets, especially in the unfavorable market situation in Ukraine;
- improving of the institutional environment for migration of capital, liberalization of foreign currency export/import operations and implementation of innovative tools in financial markets (including cryptocurrency);
- weakening of the country's financial capabilities in solving the problem of constructing a modern international logistics infrastructure that stimulates globalization of financial markets of borrowings, concentration of the necessary liquid assets of business entities for obtaining loans and introducing progressive changes in their business;
- other force majeure circumstances (the annexation of Crimea by Russia, the war in Donbass, trade wars between the countries of the Triad "USA-Europe-Japan"), which increases the level of transaction costs of commodity producers and their intermediaries.

The main topic of this year's World Economic Forum (WEF) in Davos is "Globalization 4.0: Shaping a Global Architecture in the Age of the Fourth Industrial Revolution" ¹²⁶. The global debt burden is at a higher level than before the global financial crisis of 2008 and is about 225% of the GDP. The total amount of loans currently reaches 250 trillion dollars, where the corporate debt is 29 billion dollars, so that's why the international consolidation of efforts for further cooperation is needed more than ever. The world that is on the threshold of the Fourth Industrial Revolution needs significant changes in the future education system: the world spends 10 trillion dollars on teaching 1.5 billion children, but the educational programs also need fundamental changes.

¹²⁶Davos 2019: the main messages of the World Economic Forum. Available at: <https://inshe.tv/economics/2019-01-28/407270/>

There is an active redistribution of markets in the 21st century, including logistics, IT industry. G. Soros, Chairman of the Open Society Institute and founder of the International Investment Fund, considers using, for example, self-training machines and artificial intelligence as a tool of control on the part of totalitarian authorities to be a “deadly danger”. It was emphasized at this Forum that the world faces a crucial task - to define the boundary between providing access to data and loss of confidentiality, because when computer algorithms start learning independently, there is a risk of loss of control over the digital economy and its segments: confidentiality and consolidation of trust are critical to business. J. Soros stated that with the help of infrastructure investments in the framework of the project "New Silk Road", China is trying to expand its political and economic influence on the Member States and, if Chinese companies will be able to establish dominant positions in the market of the fifth-generation mobile communication technology (5G), then, in his words, this would mean unexpected risks for the rest of the world in the field of information security. This once again confirms the thesis that in the knowledge economy, it is necessary to properly manage various risks and safety (including informational one) in the field of production, exchange, consumption, logistics.

There is a revival of positive potential of international and cross-national cooperation at a new level in the framework of globalization, as evidenced by the "New Silk Road" project¹²⁷. According to R. Zhanhozha, the initiative of China to start the project of the revival of the ancient transcontinental transport trade corridor "New Silk Road" could be the reason for radical geopolitical reformatting of a significant segment of the Eurasian continent. Main advantages of this New Silk Road project are: to create a new road transport infrastructure for upgraded connections and new commercial and economic hubs across the road between China, the

¹²⁷Zhanhozha R. Project "New Silk Road" as a factor of diversification of transnational trade and economic relationships / P. Zhanhozha // Ukraine: events, facts, comments. - 2017. - No. 10. - p. 38-42.

Asia-Pacific region (APR) and Europe; its efficiency, safety and increased competition implies creating clusters of interdependent Trans-Eurasian corridors; in conditions of accelerated globalization, the transit potential can be realized as quickly as possible (today almost 2 thousand trains cross Eurasia in the western direction); integration of the countries, which the New Silk Road will cross, into a single market, covering almost 65% of the world's population, 75% of energy resources and 40% of the world GDP. The new geo-strategic situation gives a unique chance to all GUAM countries (Georgia, Ukraine, Azerbaijan, Moldova) to renew and intensify their activity towards the creation of a transport and communication corridor as part of the macro project "New Silk Road".

New trends in the digitization of the economy are differently identified by analysts and researchers in the business environment. If in Europe, as a rule, they talk about Industry 4.0, then in North America - about the establishment of the Industrial Internet. Companies, organizations and governments implement solutions that not only affect the industry and the competitive environment, but also radically change the customary, traditional approaches to production, management and search for forms of interaction between players. The results of the integration of new technologies suggest that, due to the complex implementation of digital transformation tools (DX), the efficiency of the use of fixed assets, investments and resources is increasing ¹²⁸. By 2020, the German industry will receive investments to implement the concept 4.0 of about 40 billion euros ¹²⁹. At the same time, even the top managers of the world leading companies cannot fully explain what is hidden behind such concepts as the "Fourth Industrial Revolution".

The long process of transition from the stages of mechanization (industry 1.0), mass production (industry 2.0) and automation (industry 3.0) to the digitization of the economy (Internet of Things and Services - Industry 4.0) directly and indirectly affected the scope of modern logistics (logistics 4.0). The

¹²⁸Zahnetko A. Transform it. Available at: https://ko.com.ua/transformiruj_jeto_118442

¹²⁹Industry 4.0 - Chancen und Herausforderungen der vierten industriellen Revolution. Available at: https://www.pwc.ch/de/publications/2016/pwc_studie_industrie_d.pdf

transition to the level 4.0 is accompanied by an increase in the interaction of global and national trends in the development of the real economy, the IT sector, stock markets, the rapid growth of new technologies that are virtually absent in 3.0 – such as predictive data analysis, artificial intelligence, mass robotics, etc.¹³⁰ Actually, new segments, such as smart sensors, real-time control, drones, local service, 3D printing, cybersecurity, etc. are the basis of "landscape 4.0". The Predictive Analytics model in marketing is based on an analysis of the past activity of a buyer and points to his behavior in the future, which makes it possible to formulate an actual marketing strategy.

In order to maximize the impact of each investment, companies must correctly identify new trends in logistics, key business goals, set key indicators and monitor them before, during, and after the introduction of marketing events or promotional campaigns. M. Kukkelhaus from DHL highlights six technologies that will change logistics due to the impact of Industry 4.0. on it¹³¹:

- Big data - a company can safely give advice to its customers and suppliers in the case of potentially unsuccessful deliveries.
- Sensor technologies - DHL intends to expand the use of sensor technologies in logistics and sees enormous potential in using motion sensors and depth in the field of logistics.
- Augmented reality - the augmented reality glasses can scan barcodes and lists that specify the location and delivery point of the product. In addition, DHL launches smart glasses for warehouses in Europe, USA and Asia.
- 3D printing - DHL has conducted tests using 3D printing on the types of products that are available at the company's warehouses. At this stage,

¹³⁰Yurchak O. Industry 4.0 landscape in Ukraine 2017 - version 1.0. Available at: <https://industry4-0-ukraine.com.ua/category/smart-%D1%96%D0%BD%D0%B4%D1%83%D1%81%D1%82%D1%80%D1%96%D1%97/%D1%82%D1%80%D0%B0%D0%BD%D1%81%D0%BF%D0%BE%D1%80%D1%82/>

¹³¹Technologies that will change the logistics by 2030 - DHL. Available at: <https://news.finance.ua/ru/news/-/385400/6-tehnologij-yaki-zminyaty-logistyky-do-2030-roku-dhl>

there are still difficulties in terms of quality, value and responsibility for the product. About 80% of the products are not suitable for 3D printing.

- Robots - about 80% of warehouses worldwide are handled manually. DHL now tests robots that can work alongside the warehouse operators.
- Drones - DHL considers drones a very promising technology. The company tested its own drone Parcelcopter in Germany in May of 2016.

Updating the model range of machinery and equipment using modern software means developing a new approach to the formation and management of the safety of innovative products in the field of their industrial or household use. Thus, the Boeing company released in March of 2019 an official recommendation to all airlines to temporarily suspend flights of the Boeing 737 MAX aircraft (such a decision was preceded by two air crashes involving this model)¹³². More than 25 airlines in 2019 suspended the use of Boeing airplanes of this *model*. *Cost of the shares* of the American *Boeing company* fell by 11,3% after the plane crash. This means that in the strategic plans of innovative companies or factories of the future, the important role should be dedicated to the options of technical and environmental safety and the costs associated with their accomplishment: a social value/costs/risks.

The global view on logistics flows in the 21st century of the origin of a new 4th wave of the industrial revolution allows:

- making more informed decisions on the so-called economy, sociology, safety and ecology;
- reducing logistics costs by providing tools for exchanging information between trading partners and business partners;
- facilitating communication between partners;
- increasing the sensitivity of management and the elasticity of logistic assets and human intellectual capital to market changes;

¹³² All flights of Boeing 737 MAX were stopped for the airplane software updating. Available at: <https://habr.com/en/post/443806/>

- identifying systemic problems in providing the highest levels of technical and information security - in transport logistics, in the process of promoting goods/services to the end user;
- finding new points or zones of economic growth and technological breakthrough.
- The Factories of the Future (FoF) Plan for 2014-2020 defines the ways to create high added value of production technologies for future factories that will be highly productive, environmentally friendly and socially sustainable.

Fulfillment of an order through transfer of cargo along the supply chain includes thousands of common and individual movements of stocks with a different time period, and a certain percentage of these movements are unnecessary, potentially counter-productive, which becomes the object of diagnosis of the current status and management in modern logistics.

The liberalization of the movement of goods, services, capitals and labor force (the four principles of freedoms in the EU) requires acceleration of the pace of digitization of the economy and in particular, the introduction of modern information and communication technologies (ICTs). Back in the 1990's, a number of projects related to the information society appeared in Europe: "Electronic Europe - Information Society for All", "Electronic Government", electronic customs. Interesting in this context is the Digital Economy and Society Index (DESI), which summarizes the relevant indicators of Europe's digital indicators and monitors the evolution of EU member states in the digital competitiveness field¹³³. The new DESI 2018 report includes:

- Communications - Development of the Broadband Communication in the EU;
- Human Capital - Digital Inclusion and Skills;
- Using Internet Services;
- Integration of Digital Technologi;

¹³³The Digital Economy and Society Index (DESI) <https://ec.europa.eu/digital-single-market/en/desi>

- Digital Public Services;
- EU ICT Sector and its Research Work;
- Research and Innovations: ICT Projects in Horizon 2020 Digital.

Denmark, Sweden, Finland and the Netherlands have the most advanced digital economies in the EU, followed by Luxembourg, Ireland, Great Britain, Belgium and Estonia. Romania, Greece and Italy have the lowest marks in DESI. Poland, which joined the EU in 2004, has improved the Digitalization Index (DESI) in 2017-18 from 50.8 to 54.0 points¹³⁴. However, it ranked the last 28th place among the EU countries in terms of - range of the fixed broadband communications, and the 26th place - development of the broadband fixed communications. In 2014, Poland adopted the National Broadband Communication (NPS) Plan, where it was provided to increase the communication channel capacity of 30 Mbit to 100% by 2020. Access to fast and high-speed broadband services is a prerequisite for the competitiveness of the economy.

Industry 4.0 blurs the boundaries of companies, industries and sectors, as technological breakthroughs are often accompanied by the horizontal/vertical integration processes in the industry of production or supply of intermediate and final products for consumers, purchases and acquisitions. According to the KPMG consulting company, the volume of mergers and acquisitions (M&A) deals in the world since the beginning of 2018 has already reached 1 trillion dollars. According to the Financial Times, it is the fastest growth in history¹³⁵. Ukraine, where more than 50% are the internal M&A deals, is very different from Europe, where domestic transactions are substantially smaller than cross-border ones. All deals are either aimed at acquiring assets by Europeans outside the EU or by acquiring assets from foreigners in the EU. Marketing strategies of newly established large

¹³⁴Indeks gospodarki cyfrowej i społeczeństwa cyfrowego (DESI)1 2018 Sprawozdanie krajowe dotyczące Polski http://ec.europa.eu/information_society/newsroom/image/document/2018-20/en-desi_2018-country-profile-lang_4AA5832E-C9B3-06C3-2FC79E4892C59A17_52340.pdf

¹³⁵Merged and taken over. Which assets were bought in Ukraine in the past year and by whom. Available at: <https://biz.nv.ua/ukr/publications/zlilisja-i-pohlinulisja-khto-i-jaki-aktiviv-kupiv-v-ukrajini-v-minulomu-rotsi-2459698.html>

companies introduce new approaches to market monitoring, including in the market of logistics services in different channels of value creation. The general direction of M&A is more and more connected with the technologies, and practical interest in venture investments in Ukraine is increasing for the implementation of projects and startups in the field of innovative technologies and business processes. Often, these are startup companies that are focused on the development of various IT tools and solutions that can be applied to completely different technologically unrelated sectors – logistics, financial sector, services, manufacturing, etc. For faster promotion of business ideas, the best foreign practices, such as Logistics 4.0, are of great importance.

Germany is among the technological leaders too; it occupies a quarter of the European market of logistic services, even 5 years ago it raised three times more workers than such well-developed sectors as electronics and mechanical engineering¹³⁶. Operational speed and quality of logistics services in Germany in the late 80's brought the increasing value compared to logistics costs, while such results were the fruit of a collaborative work of providers of those services and competent coordination of all subjects - participants in the logistics chain. The new millennium has challenged the logistics of many players in the global market, including German, such as the Raben's group, because of the new challenges of global integration of the logistics chain for the joint creation of value. New trends were strengthened – buyouts and acquisitions for solidifying competitive advantages in global logistics markets – the Raben Group bought the Birkart Systemverkehre GmbH Company in 2005, there was a successful merger with Eurocargo, located in the city of Stuhr, near Bremen, also the Balter Group of Companies with affiliates in Koblenz and Hera, as well as the Weisshaup Company were purchased. Similar purchases and acquisitions, activation of the logistics sphere have led to an increase in Germany's share in the European logistics market to 25 percent (930 billion euros). The emphasis in the Raben Group's business model has

¹³⁶10th anniversary of the Raben group in Germany. Available at: https://ukraine.raben-group.com/fileadmin/user_upload/global/MediaCenter/PUBLIKACJE/RABEN_AUTOPORTRET/RABEN_Autoportret_VI_2015_EN.pdf

changed: significant investments in the development of domestic and international transportation and contract logistics required IT support of logistics solutions throughout the logistics network.

An illustrative example in this context is the digital transformation in Germany's rail transport industry, which encompasses various technological and managerial processes as separate chains of public value creation:

- Intelligent locomotives (information on the state and location in real time);
- Automatic warnings (driver gives an error message in digital form);
- Dispatch center (integrates all information about rolling stock and other assets);
- Digital diagnostics (identifies the faults of cars through the system of virtual diagnostics);
- Intelligent cars - send information about the location and their status;
- RAM reports (fleet availability and rolling stock analytics) and LCC (priorities in replacement, repairs);
- Regulations (preventive maintenance based on structured data and models);
- Repair shop management system (time alignment for repair work);
- Digital control of MRO (collection and analysis of information on the need for repair of assets, data on capacities);
- Optimization and automation of processes (analytics on optimization of the whole chain of values).

About 17 million registered database customers should get a new central online access to human resources management through the "Bahn ID" by July of 2019 in Germany. The project is part of a 200-page "Agenda for Better Rail Transport"¹³⁷. In the future, railway customers will receive faster information on their smartphones about alternatives for missed trains or for carriages; in addition, there will be driving time estimates, as well as the ability to quickly

¹³⁷Die Bahn will ihren Datenschutz heben. Available at: <https://www.tagesspiegel.de/wirtschaft/digitalstrategie-die-bahn-will-ihuman-resources-management-en-datenschutz-heben/23808884.html>

book a database and formed tickets, optimized travel bonus service and registration of comfort.

The processes of European integration of business structures also affected the logistics sphere with a significant potential for its expansion in different directions, using various means of transport. The most important turning points in the transport industry were the intensive development of intermodal transportation and services, as well as the introduction of a common electronic monitoring system for road freight transportation across Europe ¹³⁸. The cooperation of international logistics operators puts new challenges in the field of logistics related to the use of the e-commerce potential (its turnover exceeds 1200 billion dollars), and with the emergence of a new trend – accelerating the pace of e-commerce development. Therefore, not only courier services can benefit in a certain way, but also the logistics operators that are already involved in different spheres. Virtual enterprises, along with advanced and traditional organizations, are developing new strategies for tracking orders and responding to changes in real time while handling and transporting materials when they migrate through the supply chain from supplier to customer ¹³⁹.

The functional load of railway transport and the EU transport policy in general is changing significantly in Europe, which includes transferring of 30% of today's road traffic at a distance of more than 300 km to the railway and shipping network by 2030, and by 2050 – of more than 50%. Accordingly, it is necessary to consider the prospects for the development of the European railway in the new coordinate system, ensuring the transparency of tender processes for selected international rail connections, intermodal and combined transportations, principles of optimization of transport routes, etc. Thanks to the electronic system of monitoring the road transportation of goods across Europe, the positive effect of competitiveness and efficiency

¹³⁸Aytoni B.K. Trends and challenges of the European logistics. Available at: https://ukraine.rabengroup.com/fileadmin/user_upload/global/MediaCenter/PUBLIKACJE/RABEN_AUTOPORTRET/RABEN_Autoportret_VI_2015_EN.pdf

¹³⁹Logistics in the 21st Century. Available at: <https://www.supplychainmarket.com/doc/logistics-in-the-21st-century-0001>

factors of road transport in Europe can be strengthened, in particular, by limiting the possibility of VAT fraud, by improving control over the movement of goods in individual countries, by consolidation of electronic versions of consignment bills, invoices and transport fees with special electronic devices, etc. Thus, the German Raben's Group uses email/SMS that directly contacts personal manager; this system provides uninterrupted access to accounts, payment statuses and other documents (myRaben.com will eventually replace the current Track&Trace shipment tracking system).

The future of distribution will depend on the development of new logistics approaches in business management and solving current problems:

- understanding of the financial model by the supplier, manufacturer and consumer-customer, as well as its information support and updating depending on market situations;
- transparency of informational support of business models using the results of monitoring of the market of logistic services;
- increase in the responsibility of transport logistics for the safety of movement, economic and national security of the state in the conditions of trade wars and military conflicts;
- eliminating the unclear definition of responsibility and safety zones in all aspects of sales/logistics/finance;
- overcoming the lag in the pace of using modern IT technologies in the practice of logistic subject;
- expanding the scope of implementation of clean technologies and automated processes in the logistics sphere in the context of sustainable development¹⁴⁰.

It is no coincidence that the lion's share of companies of the top ten (7 out of 10) in terms of market capitalization in 2018 are high-tech companies,

¹⁴⁰The future of the distribution is in successful cooperation of a distributor and a manufacturer: results of the conference DISTRIBUTION MASTER-2017. Available at: https://trademaster.ua/ryinki_nonfood/312564

while energy companies did not even make the Top 10¹⁴¹. Industry 4.0 is a qualitative leap in both the technical equipment of production dominated by investments in the development of intangible assets (know-how, patent registration for inventions or industrial designs, promotion of the brand of clean technologies, creation of prerequisites for eco-systems, etc.). However, the Industry 4.0 is emerging thanks to the participation of professionals of a high level of training in the development of knowledge economy, constant strengthening of their competences in a creative environment in terms of both the vertical and horizontal integration based on the new business models that are related to different spheres of vital activity of the enterprise and other business partners as members of the joint product.

In terms of Industry 4.0, marketing and financial issues, namely, competent product segmentation, the creation of preconditions for choosing a product segment for any manufacturer and in any market (domestic and/or foreign), financial control, etc., are updated. This is due to the fact that product segments are not only the basis for a convenient consumer choice for target customers, but also for their own further positioning (common abbreviations of product categories in industrial ACS are designated as PLC, RTU, DCS, SCADA, industrial fieldbus & networks, APS, PLM, MES). As O. Yurchak remarks, such product segments help industrial consumers to make their choice faster and more efficiently, and to better position new suppliers and innovators, including in the market of logistics services.

A separate scientific and applied research is required for a problem of segmentation of the banking sector in terms of digitization of the economy and the growth of the risks of cybercrime associated with cryptocurrency, uncontrolled flows of trade in financial instruments through trading robots, the introduction of contactless payments through smartphones, etc.¹⁴². According to Yu. Prozorov, cryptocurrencies (bitcoins and altcoins) have a new

¹⁴¹How ten the most expensive companies in the world look like. Available at: <https://112.ua/mnenie/kak-vyglyadit-desyatka-samyh-dorogih-kompaniy-mira-456715.html>

¹⁴²Cryptocurrencies: discussions on nature, risks and perspectives. / State Institution "Institute of Economics and Forecasting of the NAS of Ukraine", 2017.

complex economic nature: at the initial stage, they act as virtual minerals, then as digital goods, in the process of circulation – as quasi-money, and then as a financial asset with the corresponding quotations on stock exchanges, and the financial instruments derived from them - tokens - as derivatives for a basic digital asset ¹⁴³.

In turn, marketing of innovations contributes to diffusion of innovations, increase of scales of new segments in conditions of acceleration of STP, when new technological segments - such as AI (Artificial Intelligence) or VR/AR (Virtual and Augmented Reality) emerged. A combination of new technologies and factors of production is considered in the works of J. Schumpeter as an innovation. The principled position in his theory is the conclusion that the new, as a rule, does not grow from the old, but appears next to the old, which eventually displaces it ¹⁴⁴. Japan's post-war experience shows that the initial technological leaps were originally in a small number of industries (with the subsequent diffusion of innovations), which proved their potential competitiveness on the domestic and foreign markets (in case of significant financial support of the state, but subject to a proven innovation efficiency). New areas of applying the innovations are also innovations that bring a certain synergistic effect in related industries. Thus, the term "Smart" is used depending on the scope of innovation, digital economy (Smart Agro, Smart Factory, Smart City), and in a certain intermediate link to the creation of public value, or in relation to value chain (Smart Logistic, Smart Manufacturing).

In a narrower sense, Logistics 4.0 involves the creation of networks and integration of logistics processes inside and outside of trading companies and production facilities to a level of decentralized real-time monitoring of logistics networks ¹⁴⁵. Some of the central goals of the fourth industrial revolution can

¹⁴³Digitalization - speculative end in itself or means for transformation of the economy? Available at: http://razumkov.org.ua/uploads/article/2018_global_trends.pdf

¹⁴⁴Schumpeter J. Theory of Economic Development. M, 1982. The quotes listed further are from pages: 180, 369 390, 405.

¹⁴⁵Was ist Logistik 4.0? Alles zum Thema Digitalisierung & Logistik. Available at: <https://www.mm-logistik.vogel.de/was-ist-logistik-40-alles-zum-thema-digitalisierung-logistik-a-692722/>

only be achieved with the help of adapted logistics. These include, above all, the main features of Industry 4.0, such as: network, decentralization, real-time capabilities or service orientation.

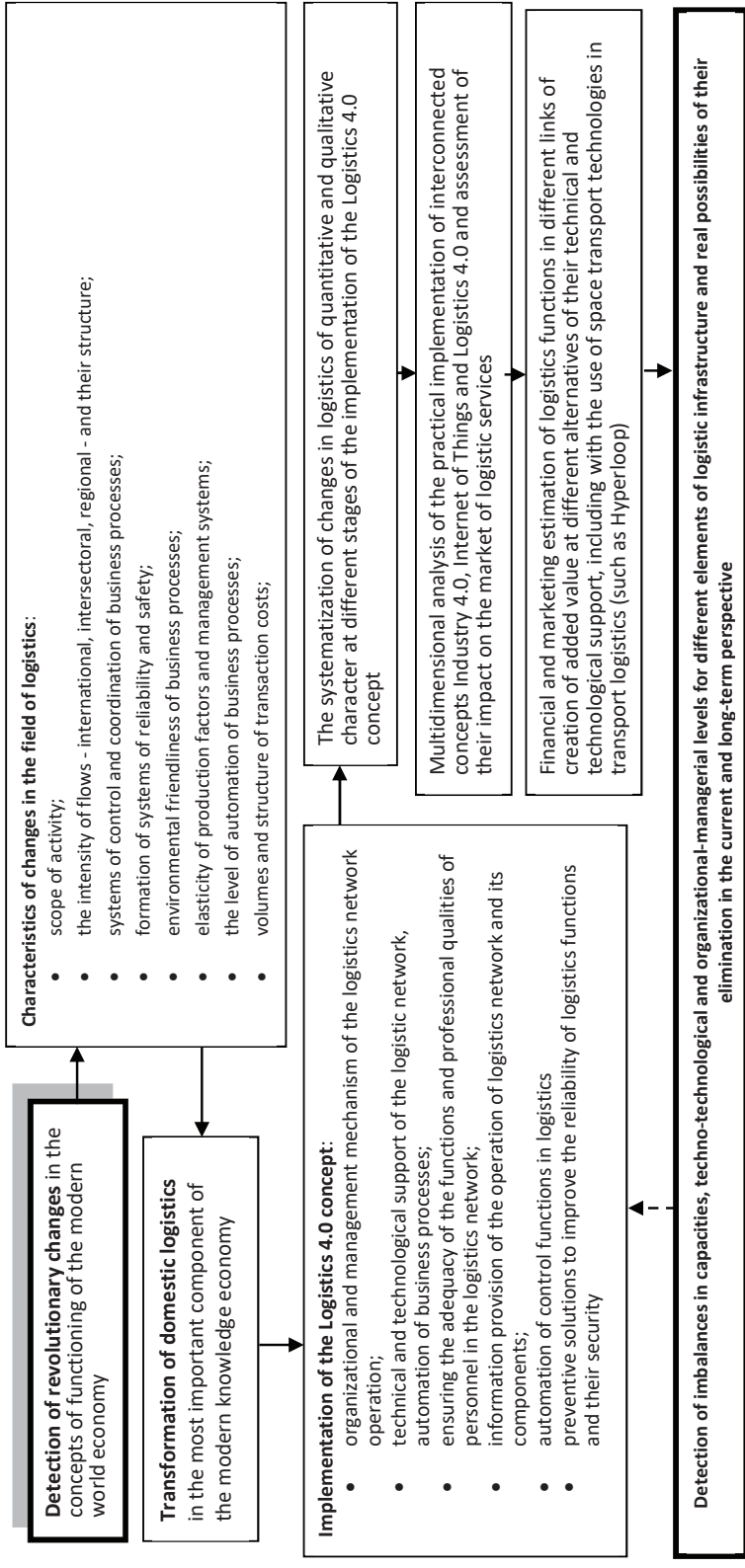
Managerial decisions include cyber-physical systems (CPS), which consist of interconnected embedded systems through communication networks. Such innovative activity is becoming increasingly important for companies that wish to successfully position themselves on the market. Some of the central goals of the fourth industrial revolution can only be achieved with the help of adapted logistics, Figure 1). Thus, Logistics 4.0 differs from traditional logistics by the following properties:

- high intensity of network creation and optimization of supply chains;
- integration of logistics processes both inside and outside of production, intermediary and trading companies and production facilities;
- organization of decentralized control over the activity of logistics networks in real time mode;
- development of appropriate logistics solutions using cyber-physical systems (CPS), which consist of interconnected embedded systems – communication network;
- high flexibility of logistics platforms and controllability of processes and objects of logistic networks (Figure 1)
- In recent years, there are other features based on the interaction of the Industry 4.0, Internet of Things and Logistics 4.0 concepts:
- service orientation in the further development of logistics at different levels – operational, current and strategic;
- organization of flexible logistic infrastructure at the international, national and regional levels;
- increasing the practical value of databases of subjects of modern logistics, their legal protection as objects of intellectual property, and providing access to logistic information of logistic network participants (Figure 2).

ECONOMIC SECURITY AT RISK: FINDINGS FROM DIGITALIZATION OF THE NATIONAL ECONOMY

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Figure 1. Transformation of logistics into the most important component of the modern knowledge economy: interaction of the Industry 4.0, Internet of Things and Logistics 4.0 concepts

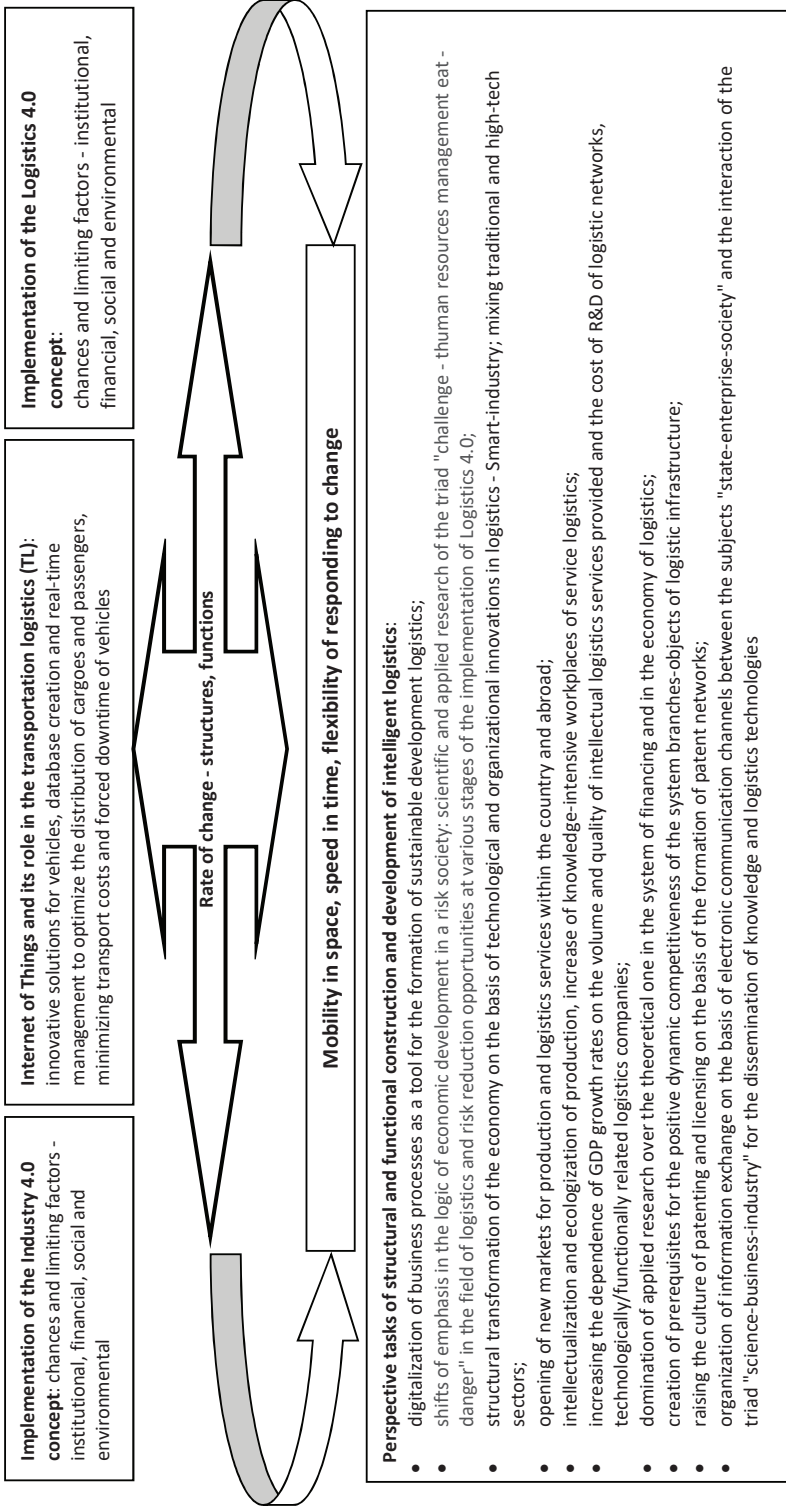


Source: compiled by the authors on the basis of the research

ECONOMIC SECURITY AT RISK: FINDINGS FROM DIGITALIZATION OF THE NATIONAL ECONOMY

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Figure 2. Prospects for the development of a smart economy based on Logistics 4.0 and Internet of Things



Source: compiled by the authors on the basis of the research

Industry 4.0 begins to be included into the transport and logistics sector and the fourth industrial revolution, eroding the boundaries between man and machine more often ¹⁴⁶. It is important to note that the new generation of Y and Z are entering the labor market with new needs and high demands for the quality of goods and services. The world is demonstrating success from introducing logistics innovations through intellectual work in the industry's R&D sector, since only the processing industry forms and reveals the logistical potential of newly created enterprises in new types of economic activity, contributes to the emergence of new economic growth. In order to move to a higher technological level of development - Logistics 4.0 - participants in market transactions require investments, generation of net profit, incl. from other activities.

Thus, for example, the private Czech railway operator LEO Express carries on bus transportations with subsequent transfer to the company trains, which increases the competitiveness of the carrier itself ¹⁴⁷.

The industrial field for rail transport is often perceived as a traditional field and "resistant" to new products ¹⁴⁸.

The management competencies in the field of rail transport will influence how effectively and quickly will be the ideas of Industry 4.0 in this sector and what effects it can and should bring, especially in the context of the competitiveness of the enterprises. The market of so-called smart values is expanding - a smart city, a smart company, a smart need. This concerns the content of logistics flows and the quality of managing them.

The "Internet of Things" concept, the essence of which is to integrate real and virtual worlds will make a definite impact on the world in the future. Therefore, for the effective use of the "Internet of Things" potential in

¹⁴⁶Przemysł 4.0 wracza do logistyki i transportu. Available at: <http://www.portalspozywczy.pl/technologie/wiadomosci/przemysl-4-0-wracza-do-logistyki-i-transportu,156764.html>

¹⁴⁷Czech railroad operator LEO Express starts working in Ukraine. Available at: http://cfts.org.ua/news/cheshskiy_zh_d_operator_leo_express_nachinaet_rabotu_v_ukraine_29708

¹⁴⁸Przemysł 4.0 dla Transportu. Available at: <http://www.prawoilogistyka.pl/Wydarzenia/przemysl-4-0-dla-transportu/>

business, education and the state, it will be necessary not only to create capacities for processing a large number of diverse information, but also to prepare data analysts (big data analysis) that have tools and methods for converting data into information. Thus, data analytics is expected to grow by 16% in the USA by 2020. According to "Daxx" that has teams of developers in Ukraine, the average annual salary of the Ukrainian developer is 27 thousand dollars, whereas in the USA it is 90 thousand dollars, in Switzerland - 82 thousand dollars, Denmark - 69 thousand dollars¹⁴⁹.

Various government programs to stimulate R&D are important in this context of Industry 4.0. An illustrative example can be the development and implementation of a preparatory program for incentives to launch R&D in the industry in Israel¹⁵⁰. This program is considered an additional tool launched by the Agency for Innovation of industrial sectors and aims to help companies launch R&D improvement processes. The purpose of developing such programs is to accelerate innovation-oriented changes in industrial enterprises, which should increase their competitiveness. The basic support provided by this program is to assist in identifying new products or processes (assistance from consultants in research and use of appropriate improvement techniques to formulate innovative ideas). Feasibility Examination is the area that aims to assess the feasibility of introducing the innovative ideas. Companies that applied to the R&D support program receive:

- professional advice on identifying technological breakdowns and their capabilities;
- determine directions and strategies of development and corresponding changes in production;
- improve production processes, and thus implement an expanded R&D program.

¹⁴⁹IT industry: trends and forecasts of development. Information prepared by the European Information and Research Center. Available at: <http://euinfocenter.rada.gov.ua/uploads/documents/29337.pdf>

¹⁵⁰Preparatory incentive program to launch R&D in the industry in Israel. Available at: <https://industry4-0-ukraine.com.ua/2019/03/12/p%D1%96dgotovcha-programa-stimulyuvan-ya-do-zapusku-rd-v-promislovost%D1%96-v-%D1%96zra%D1%97%D1%96/>

According to the report of the World Economic Forum 2016-2017 in the field of global competitiveness, Israel is the 2nd most innovative country in the world among 138 countries, has the largest number of world startups per capita in the world, is home to 350 R&D centers of the largest companies in the world, including Microsoft, Apple and Google. Another example is Estonia, which is the world leader in the development and application of digital logistics¹⁵¹. From analyzing data and single windows of the country to mobile applications and delivery robots, Estonia improves the efficiency of the supply chain. The R&D ecosystem uses the global proof of the concept, as it is trusted by such global organizations as Kuehne + Nagel and NATO, as well as such startups of Transferwise and Taxify. Estonia has a common ecosystem for industrial research and development.

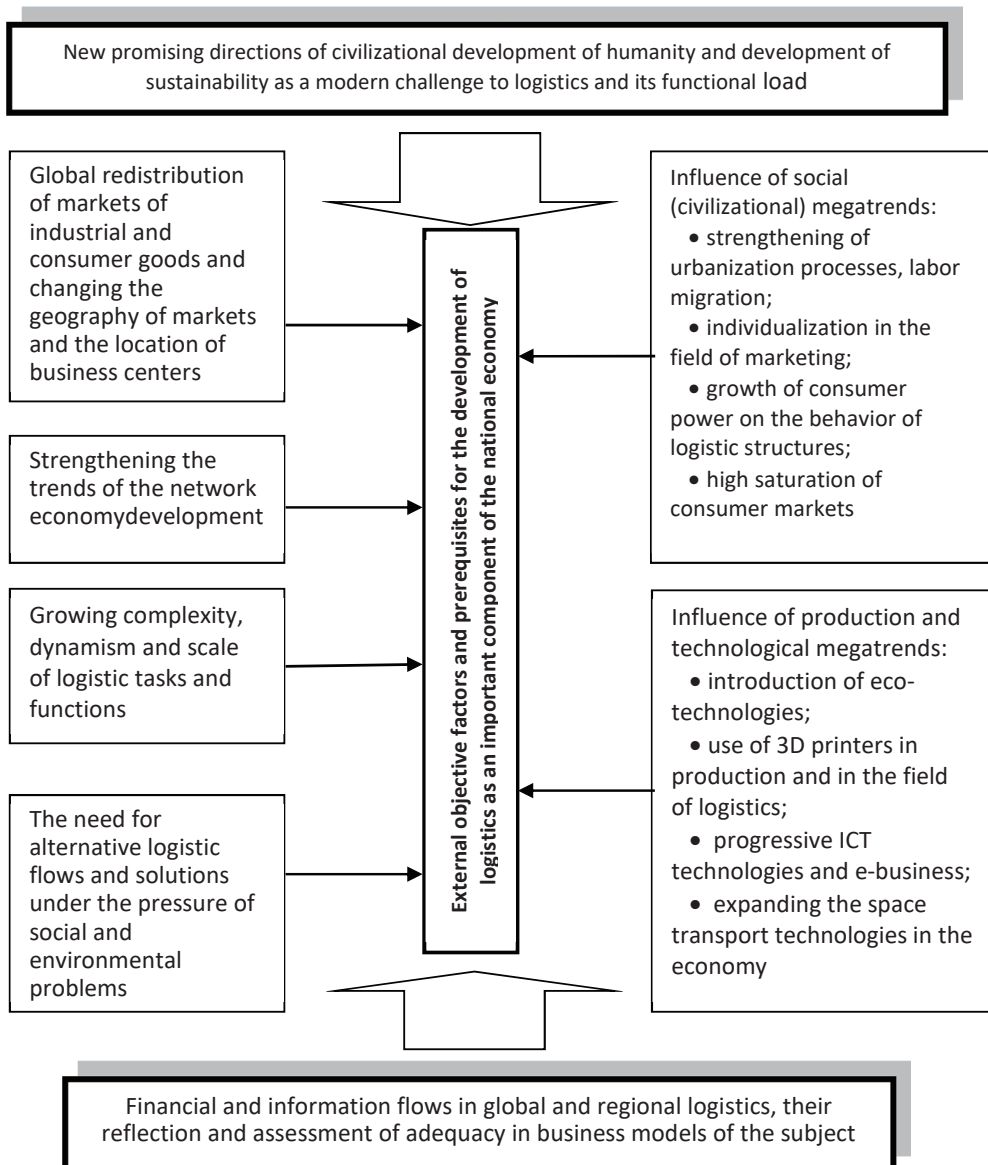
To create a common vision and roadmap for digital transport and logistics, the European Commission has established the DTLF in 2015 that brings together the interested parties from different transport and logistics communities from both the private and public sectors¹⁵². The DTLF has the authority to help determine the need for action at the EU level and support their development and implementation, as appropriate.

The development of technologies is a megatrend of the development of the world economy. In the comprehensive study of the OECD "Review of Science, Technology and Innovation" of 2016, there was a review of projected growth of this sphere by the developed countries and the 40 key technologies of the future were distinguished in the digital sphere, in the areas of energy and environment, biotechnologies and advanced materials. Technological innovations are a powerful driving force of the 21st century, which radically changes the scope of logistics (Figure 3), the division of labor in national economies and in global business.

¹⁵¹Digital logistics [Electronic resource]. - Available at: <https://investinestonia.com/business-opportunities/digital-logistics/>

¹⁵²European Commission - Digital Transport and Logistics Forum (DTLF). Available at: <http://www.51biz.lu/article/dtlf>

Figure 3. New challenges and external factors that dictate the need for a qualitative change in the scope of logistics – its functional load and information display.



Source: compiled by the authors on the basis of the research

The speed of their implementation will affect the scope of the solution to current problems (economic, environmental and social), as well as the emergence of new formats of eco-business, e-management of the economy and State institutions – the future of society in general. Trends in the development of IT sphere are global, so conclusions about the demand for professions in the United States (Table 1) can be extrapolated to other countries, including Ukraine.

Table 1. The share of demand for US data analysts by sectors (in %)

Specialists	Services sector	Finance and insurance	Production	Information	Healthcare	Retail trade
Functional analysts	23	34	9	5%	8	4
Data system developers	41	14	14	10	5	3
Specialists in data analysis	34	25	9	6	7	3

Source: compiled on the basis of ¹⁵³

To create a digital economy and ecosystems, young talents have to be trained. Based on the study of French experience in Ukraine, the most innovative school of programming - UNIT Factory (900 IT-students) has been created, which enhances the concentration of talents and the growth of business of residents ¹⁵⁴.

In particular, the technical infrastructure for creating new products comprises the following: the FabLab Fabricator - one of the largest laboratories of rapid prototyping in Ukraine, belonging to the global network of FabLab workshops; Sensorama Lab - a laboratory focused on the development of technologies of the augmented (AR) and virtual (VR) reality; BlockchainLab - a

¹⁵³The Quant Crunch: How the Demand for Data Science Skills Is Disrupting the Job Market. Available at: <https://ibm.co/2w4GA1k>.

¹⁵⁴UNIT Factory. Available at: <https://unit.city/ecosystem/>

company focused on researching and implementing technologies based on blockchain and cryptocurrencies. In addition, within the framework of UNIT Factory, the following partner accelerator programs were created: Telecom-accelerator Radar Tech with the support of Kyivstar; Agro-accelerator - a unique competition program from Radar Tech, Agrohubs etc.

Unfortunately, there are very few genuine innovations in the Industry 4.0 of the world class and of Ukrainian origin in Ukraine¹⁵⁵. There are no websites presenting segments and the country, catalogs, analytics, system communications. The IT sector of Ukraine aspires to integrate into other platforms with its services, the PCS integrators make their application solutions on the PLC-SCADA platforms from 3 to 5 world manufacturers. At the same time, the world of 4.0 with its significant expansion in the software has already created breakthrough opportunities for developers. It should be noted that in a number of IT segments, the dependence on capital investment in production becomes not so critical. An example can be the integrated information management systems for business, production (IT-Enterprise) developed in Ukraine, which significantly pushed international companies in the domestic market (such as SAP), and also successfully enter the world markets. However, the capacity of one IT-Enterprise is not enough to take a significant step in country's positioning in the international markets. This requires a major consolidation of efforts and the ecosystems and clusters play a key role in it.

Full control over the implementation of the "Digital Order in Ukraine" is carried out by the Ministry of Economic Development and Trade (MEDT), which recognized that the absence of a long-term state strategy is a major issue on the way of building a digital economy and an information society¹⁵⁶. For example, the Australian Roadmap for Development presents detailed plans for digital transformation by 2040. Institutionalization of cluster policies and initiatives at the level of governmental structures for the purposes of lustering

¹⁵⁵Industry 4.0. Available at: <https://industry4-0-ukraine.com.ua/2019/03/03/positioning-of-novovators-4-0-why-and-how/>

¹⁵⁶Digital Economy in Ukraine. Available at: <https://issuu.com/mineconomdev/docs/4.2>

acceleration in the sphere 4.0 either on regional or national level is practically absent¹⁵⁷.

Conclusions. The formation of an innovative economy in the developing countries, especially in Ukraine, is impossible without removing the chaotic, spontaneous approach in pursuit of the image based on the use of large databases (DBs). There is a need for a full-scale digitalization of key sectors of industry, energy and infrastructure, creation of clusters based on the roadmaps of the digital transformation in the targeted sectors, the maximum integration of innovations 4.0 in the strategy of the defense complex and safety of Ukraine. Industrial high-tech clusters have to address a number of important tasks, both in terms of increasing value in the chains of their ecosystems and in the growth of exports with high added value. It is relevant to create a special trade mission for the export of products and services in the field of Logistics 4.0.

The process of implementation of Logistics 4.0 and its effective interaction with the Industry 4.0 concept requires the creation of a network of reliable partners, development of affiliate marketing and should be transparent to all interested parties, which is one of the key features of the knowledge economy. Ukraine's joining the global market of government procurement (WTO GPA) in 2017 did not significantly affect the growth rate of the development of the digital economy and the market of logistic services, reflecting the unsystematic character of management of innovative processes at the macro level and technological unreadiness of the logistic structures to innovations at lower management levels.

Improving Ukraine's image in the world community and among the countrymen will be the turning point in history, when the domestic economy is not going to be a raw material colony for other countries, and the development of recycling industrial sector will determine the demand for innovations that will ensure the transformation of the Industry 4.0 and

¹⁵⁷Yurchak O. Ukrainian Strategy of Industry 4.0 - 7 directions for the development. Available at: <https://industry4-0-ukraine.com.ua/2019/01/02/ukrainska-strategiya-industrii-4-0-7-napriankiv-rozvitku/>

Logistics 4.0 prospects into an actual reality. This requires the formation of a new political elite that can demonstrate not only its strategic vision of the future of Ukraine in various vectors - economic, political, social, but also bear responsibility for the development and implementation of a long-term state strategy for economic development and society.

In the conditions of globalization of business, digitalization of business transaction of the world leaders in post-industrial countries and openness of the domestic economy, the competitive advantages of nations and economies are significantly changing. It is relevant to replace the criterion of comparative advantages in providing dynamic competitiveness based on innovations, including digitalization of the economy. Accordingly, in the new coordinate system it is necessary to consider:

- substantial training of specialists and the skills of society as a whole to enrich knowledge and master high technologies;
- formation of the system of investment support for the priorities of economic and human capital development;
- protection of databases as strategic assets;
- creating transparent accounting – e-customs, the electronic government management and electronic transactions that enable eradication of corruption schemes in economy, education, business.

This implies the need for expansion of the subject area of scientific and applied research in the development of an open economy under the influence of the growing pace of scientific and technical progress and society in general, since social connection, as follows from its deep content, is informational.

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SIMULATION MODEL AS A DIGITAL MARKETING TOOL AT THE MICRO LEVEL

Abstract. The areas of application of digital technologies at the micro level are defined. The urgency of using model-simulators as digital marketing tools on an example of the pharmaceutical industry is proved. The model-simulator of formation of the advertising strategies of pharmaceutical companies as important components of general marketing strategies is offered. The software platform for creating the model is AnyLogic system. The experimental base, obtained as a result of operation of the model-simulator, is analyzed. Possibilities of various types of experiments carried out using the multilevel paradigm of simulation are shown according to the data of the leading enterprises of the domestic pharmaceutical industry. The questions about involving the cloud technologies and scenarios for their use are considered in the framework of application of model-simulators in the process of making managerial decisions.

Jel Classification System: M31, M37, C63

Keywords: digital marketing, marketing strategy, pharmaceutical company, simulation modeling, model-simulator, multilevel simulation paradigms, simulation experiment, AnyLogic system, cloud technologies.

Introduction. Digital marketing, as a complex of information solutions, is one of the basic components of the development of modern Ukrainian

business¹⁵⁸. However, its potential is not fully utilized despite certain achievements. Specialists determine the following options for the application of digital technologies at the micro level¹⁵⁹:

- using the Internet as a means of finding information, ordering goods and services.
- availability of an organization's Web site with information that says about the company and offered products.
- using the Internet as an independent business.
- including the Internet in the contour of business: the business structure is preserved, but more or less fully the opportunities of digital marketing are using, which, accordingly, increases the efficiency of the business itself.

The urgency of digital technologies in the course of marketing activities is particularly significant for industries with flexible production and marketing systems, high levels of competition, a significant segmentation of the commodity market, import dependence along with sustained growth and innovative direction¹⁶⁰. In particular, the pharmaceutical industry is included in these industries.

The main trend of the Ukrainian pharmaceutical market is the competition between domestic and foreign producers. Therefore, the top priorities of marketing policy for each company-manufacturer are the following:

- A study of market demand for pharmaceutical products, that is, the benefits of specific groups of potential users, which include medical staff and directly users-patients.

¹⁵⁸Lamberton, C. & Stephen, A.T. (2016). A Thematic Exploration of Digital, Social Media, and Mobile Marketing: Research Evolution from 2000 to 2015 and an Agenda for Future Inquiry. *Journal of Marketing*. – № 80(6). – pp. 146-172.

¹⁵⁹Lylchak, Z. (2012). State and perspectives of digital-marketing development. *Bulletin of Lviv Polytechnic National University*. – № 749. – pp. 200-206.

¹⁶⁰Bleier, A., Harmeling, C.M. & Palmatier, R.W. (2019). Creating Effective Online Customer Experiences. *Journal of Marketing*. – № 83(2). – pp. 98-119.

- Formation of an innovative-active product strategy that meets the requirements of the market.
- Development of an effective pricing policy.
- Formation of balanced advertising strategies for the promotion of products in the relevant segments of the pharmaceutical market.
- Development of specific marketing activities with taking into account the actions of competitors.

According to the stated tasks, the information problem of pharmaceutical companies is to provide prompt support for the exchange and storage of large volumes of information with a high degree of safety. It matters both for a particular pharmaceutical company and for the industry as a whole – from the point of view of ensuring its competitiveness and development in the conditions of the expansion of foreign manufacturers.

At the same time, the potential range of digital marketing opportunities is much wider. Many literary sources of domestic and foreign authors is devoted to consideration of its tool base and directions of its application in the pharmaceutical industry ¹⁶¹. The tools of analytics, development and promotion of managerial decisions in conditions of an indefinite business environment of the enterprises operation occupy a separate niche. One of the most advanced platforms for creating such tools is simulation modeling.

The three main existing paradigms of simulation modeling – Discrete Event, System Dynamics and Agent Based – are used to create model-simulators with application in various branches of the economy. Relevant applications are regularly presented in professional international forums: Winter Simulation Conference (WSC), International System Dynamics Conference, ASIM (German-speaking community of simulation modeling), ИМОД («Simulation modeling. Theory and practice»), European congress EUROSIM, webinars and publications by one of the world's leading organizations in the field – The AnyLogic Company.

¹⁶¹Jawaid, M. & Ahmed, S.J. (2018). Pharmaceutical Digital Marketing and Its Impact on Healthcare Physicians of Pakistan: A National Survey. *Cureus* – № 10(6).

However, the proliferation of simulation modeling in the area of creation of marketing strategies for the development of domestic enterprises is still negligible. This also applies to pharmaceutical companies. Although the pharmaceutical companies of the world in recent years began to address the introduction of simulation technologies. Latest examples:

- Developments of the Sterling Simulation consulting firm for pharmaceutical manufacturers: agent model of pharmaceutical marketing¹⁶².
- Developments by Bayser Consulting firm regarding the launch and promotion of a pharmaceutical product: agent model of launch strategy formation¹⁶³.

An additional proof is that the theoretical and applied achievements in using simulation in other areas make it possible to position this mathematical apparatus as a flexible tool for making managerial decisions. The experimental database of marketing information obtained in this study confirms this reference.

Any simulation model is an integrated environment for the study of stochastic processes of different nature in dynamics with parametric settings for specific conditions and experiments. Migration of simulation calculations into the cloud especially promotes development of their use as tools of digital marketing.

The main areas of using cloud technology in simulation are¹⁶⁴:

- Using the cloud as computing power. This is especially true for "multi-pass" types of experiments: Monte Carlo, Variation of parameters, Optimization.

¹⁶²Sterling Simulation. A Pharmaceutical Company Decides on a Marketing Strategy Using Agent-Based Modeling. Available at: <https://www.anylogic.com/a-pharmaceutical-company-used-agent-based-modeling-to-decide-on-a-marketing-strategy/>.

¹⁶³Bayser Consulting. Modeling of a Pharmaceutical Product Launch. Available at: <https://www.anylogic.com/modeling-of-a-pharmaceutical-product-launch/>.

¹⁶⁴Borshev, A. (2017). Migrating simulation to the cloud. IMMODO-2017. Available at: <http://simulation.su/uploads/files/default/2017-immod-18-26.pdf>.

- Using the browser as a universal environment for working with the model: working with versions of the model; task of input parameters; planning and implementation of complex experiments; review, analyze and export results; providing animation of a remotely implemented model and implementing its interactivity (interactive model management while performing experiments).
- Cloud technologies as a general platform for collaborative work with models. In fact, something like a social network for simulation models occurs when working with models that are in the cloud.
- Using the cloud to deliver the model to the customer.

The security issue is particularly acute in conditions of using cloud-based applications. The policy of pharmaceutical companies inherent in this type of business does not facilitate the placement of data in third-party cloud services. At the same time, the refusal of their functionality can cause significant losses for the volumes and efficiency of the calculations. A universal solution to this problem is the use of the private cloud (cloud-based applications deployed on the private infrastructure of the company)¹⁶⁵. It is also possible to lease a cloud provider share.

Thus, from the point of view of using model-simulators as tools of digital marketing, an important issue is not only the mathematical implementation of models, but also the choice of software platform for its implementation. Incidentally, this is important both for planning and conducting simulation experiments, and for providing efficient cloud migration, storage and data security capabilities.

One of the most powerful modern software platforms for the creation of industrial simulation applications is the system of multi-level simulation AnyLogic. The system supports all basic simulation approaches and their combinations, provides customization of various types of simulation experiments: Standard, Optimization, Variation of parameters, Comparison of

¹⁶⁵Gowresh, N., Brundha, E.J. & Murthy, N. (2015). A Survey on Privacy Preserved Mobile-Access Health Care Data with Auditability using Cloud. *International Journal of Innovative Research in Computer and Communication Engineering*. – №3(5). – pp. 170-176.

runs, Sensitivity analysis, Monte-Carlo, Calibration, Non-standard. The issues of information security and support of processes of using cloud technologies are solved based on this platform.

The system provides sufficiently visual of conducting experiments. AnyLogic Cloud uses graphic technology to support animation – the canvas technology for 3D animation and SVG (Scalable Vector Graphics) technology to support 2D animation.

The use of cloud-based technologies ensures the collective work of users with models created in the AnyLogic environment. AnyLogic Cloud implements user-friendly technology, which stores the input parameters and results of all model, runs according to the specific parametric settings in a single database. It does not matter which user ran the model before: if the parameters are found in the general database, no imitation is performed. That is, a particular user can take advantage of results previously obtained by other users. Thus, the principle of collective work with simulators is realized in practice, which, of course, is convenient and can be successfully used in the process of developing and making managerial decisions due to a significant reduction in the time of conducting "multi-pass" experiments.

According to the above, the choice of AnyLogic system as a platform for the creation of model-simulators for the marketing activities of pharmaceutical companies can be justified by the peculiarities of their functioning in an uncertain highly competitive environment - intense changes in the supply of new products and the changing market demand, seasonal component, storage characteristics and transportation of medicines, etc.

Any company is interested in increasing sales and expanding its client base, but the means to achieve these goals are not always obvious. To select the most rational marketing and sales strategy, professionals need to analyze a huge number of factors that affect its success, for example: levels of income, product features, competitors' actions, trends in the development of modern technologies, market and customer requirements, production capacity, market segmentation, national features of potential buyers. In addition, most of the factors must be considered in the dynamics.

Due to the use of simulation technologies, the cost and complexity of research is significantly reduced, that is very significant for the pharmaceutical industry.

Pharmaceutical products have a significant range, which is constantly changing according to industry specifics. Individual medicines groups differ in technology of production, control, storage and promotion in the relevant segments of the pharmaceutical market. This creates the need for continuous study of target audience and targeting them to advertising companies.

The leading pharmaceutical companies in the world are spending a lot of money on researching the impact of marketing (in particular, advertising) strategies on specific target groups of potential users in the industry. The results of such research are of interest due to the fact that global companies are developing and introducing innovative pharmaceutical products on the market, and therefore are "legislators" of marketing strategies. Perhaps, to a lesser extent, but similar studies are conducted in different countries of the world, demonstrating the wide geography. Let us consider some examples.

The results of research, aimed at identifying the relationship of target groups of pharmaceutical users with specific sources of information that influence their choices, are important. That is, the behavior of users is studied in relation to information retrieval channels (one of the applications of digital marketing).

Certain developments are devoted to the study of factors influencing the preferences of medical personnel of hospitals in the process of forming their recommendations to patients¹⁶⁶. The results are based on cross-sectional studies conducted on the basis of private and public hospitals in the Karachi city, as well as information from national and transnational pharmaceutical companies operating in Pakistan. Although data processing was automated and realized using the AMOS 7 package, the complexity of the research led to

¹⁶⁶Ahmed, R. R., Vveinhardt, J., Streimikiene, D. & Awais, M. (2016). Mediating and marketing factors influence the prescription behavior of physicians: An empirical investigation. *Amfiteatru Economic*. – № 18(41). – pp. 153-167.

a significant limitation the number of intermediaries (doctors, pharmaceutical staff) and marketing factors that were subject to study.

Materials from similar empirical studies are presented by scholars from Asia ¹⁶⁷ and America ¹⁶⁸. In particular, the latter study in detail the effect of direct and contact advertising.

Researchers from Italy ¹⁶⁹ presented a model of the target audience's behavior of users of unpatented medicines. The model takes into account a large number of factors of influence - demographic, self-identification, previous behavior, perceptions of risks, etc. The object of the study was the Italian market of unpatented medicines. The aim of the research was to develop marketing activities (in particular, the use of digital technologies) to reduce the risks of the use and promotion of non-proprietary medicines within the "high-risk" groups of users.

Field studies, undoubtedly, are very important. However, only reducing the complexity and cost of experiments will make them accessible to most firms. At the same time, it is worth considering that significant costs not always are associated with a correspondingly significant effect. This thesis can be illustrated by the results of research by scientists from Washington ¹⁷⁰. Materials from 25 significant field experiments with large American retailers and brokerage companies (with millions of customers and spending more than \$ 2.8 million on digital advertising) have proved that measure the impact of advertising is difficult (virtually impossible). At the same time, it has been proved that the holding of experimental advertising companies amounted to more than 10 million man-weeks, so it is considered appropriate in terms of academic study of the process itself.

¹⁶⁷Biswas, K. & Ferdousy, U. K. (2016). Influence of Pharmaceutical Marketing on Prescription Behavior of Physicians: A Cross-sectional Study in Bangladesh. *Journal of Accounting & Marketing*. – № 5(2). – pp. 1-4.

¹⁶⁸Costea, D., Carter, F., Chou, S.-Y. & King, A. (2012). Is Advertising Effective or Not? Evidence from the Pharmaceutical Market. *NMIMS Management Review*. – № 12. – pp. 9-28.

¹⁶⁹Zerbini, C., Luceri, B. & Vergura, D. (2017). Leveraging consumer's behaviour to promote generic drugs in Italy. *Health Policy*. – № 121(4). – pp. 397-406.

¹⁷⁰Lewis, A. & Rao, J. M. (2015). The unfavorable economics of measuring the returns to advertising. *The Quarterly Journal of Economics*. – pp. 1941–1973.

Attracting the mathematical apparatus contributes to increasing the effectiveness of the process of forming marketing strategies of enterprises. In particular, in the field of research of advertising as a component of general marketing strategy, there is certain experience of domestic and foreign scientists¹⁷¹. Certain scientific developments contain a detailed overview of literary sources on the use of mathematical methods in the field of dynamic advertising¹⁷².

In general, optimization methods were the most widespread. An example of defining an analytical solution to the problem of evaluating the effectiveness of advertising is the work of Russian scientists¹⁷³. It presents a model of optimal management of advertising costs. The decision of the optimization problem is reduced to the solution of the system of non-linear integral equations of Volterra type and integral functionality of quality.

However, the use of classical mathematical methods, as a rule, reduce the complexity of computations not significantly, and most importantly, obtaining an analytical solution is not always possible in the absence of clear algorithmic dependencies and recursiveness of formulas.

Analysis of advertising capital in the pharmaceutical industry, developing and making managerial decisions on the distribution of capital by sources of advertising is the main trend of research by scientists in the West. Simulation is a modern apparatus for the application of model-simulators, aimed at the introduction and prediction of the effects of any management decisions.

The use of simulation models offers many advantages over the implementation of experiments over a real system and the use of other methods, namely: cost, time, accuracy, visibility, universality, etc. The simulation model of the pharmaceutical company's marketing activity allows

¹⁷¹Leeflang, P. S. H. & Wieringa, J. E. (2010). Modeling the effects of pharmaceutical marketing. *Marketing Letters*. – № 21(2). – pp. 121-133.

¹⁷²Huang, J., Leng, M. & Liang, L. (2012). Recent Developments in Dynamic Advertising. *European Journal of Operational Research*. – № 220(3). – pp. 591–609.

¹⁷³Lutoshkin, I. V. & Iamaltdinova, N. R. (2016). The existence of a solution to the problem of managing advertising expenses with distributed delay. *News of Irkutsk State University*. – № 18. – pp. 48–59.

management to analyze in a short time the current state of affairs, optimize the current activities of the company, reduce the cost of advertising, and develop a plan for further action.

The leading hypothesis of this study is to prove the possibility of using model-simulators in the formation of pharmaceutical companies' advertising strategies as important components of common marketing strategies implemented on the platforms of information and digital technologies.

The research objects are leading enterprises of the domestic pharmaceutical industry – OJSC "Farmak", Corporation "Arterium", CJSC "Pharmaceutical firm "Darnitsa".

The environment for the development of models is the system of multilevel simulation modeling – AnyLogic.

Within the framework of creating the model complex of the production and marketing system of the pharmaceutical company, a model-simulator was developed – a module of the advertising activity of the enterprise. The methods of System Dynamics and Agent-Based modeling are used. Developed within the complex, the model-simulator is aimed at working out the following solutions in the field of strategic advertising:

- Investigating the optimal level of prices for the product assortment in order to maximize revenue from sales.
- Minimizing advertising budget and its distribution to promote original and generic medicines.
- Monitoring the effectiveness of researching new medications and reproduction of existing ones, depending on the duration of the life cycle.
- Determining the preferences of potential buyers depending on the level of demand and prices for assortment.
- Monitoring and forecasting the reaction of the target audience to product advertising, tracking the level of information about the product, etc.

The model-simulator allows creating the basis for making grounded decisions, which is quite typical for the enterprises of the studied area. This is facilitated by a large number of types of experiments that offer modern

platforms of multilevel simulation modeling. AnyLogic tools allow conducting various experiments by type of analysis:

- Standard (simple) experiment. Launches a model with predefined values of parameters, supports virtual and real time modes, animation, and debugging of the model.
- Variation of parameters. Performs several "runs" of the model with variations of one or more parameters, with the ability to use replication.
- Comparison of "runs". Allows interactively setting different parameters values and running a model with these values. Visually compares the results of "runs" in scalar form or in the form of data sets.
- Optimization. Finds the values of the parameters at which the optimal value of the given target function is achieved. There may be a number of constraints on the values of the parameters and variables of the model. The optimization progress schedule is displayed.
- Sensitivity analysis. Performs several "runs" of the model, varying the value of parameter and showing how the simulation results depend on these changes.
- Calibration. The values of the model parameters are fixed with the help of the optimizer, with which the results of the simulation most accurately correspond to the given data. Data can be given in scalar form or in the form of data sets. The visualization of the calibration progress and the results correspondence to each given criterion is carried out.
- Monte-Carlo. Gets and displays a set of simulation results for a stochastic model or for a model with stochastically changing parameters.
- Non-standard. Launches an experiment with a non-standard script that is completely written by the user. The experiment has not got built-in graphical interface or definite behavior.

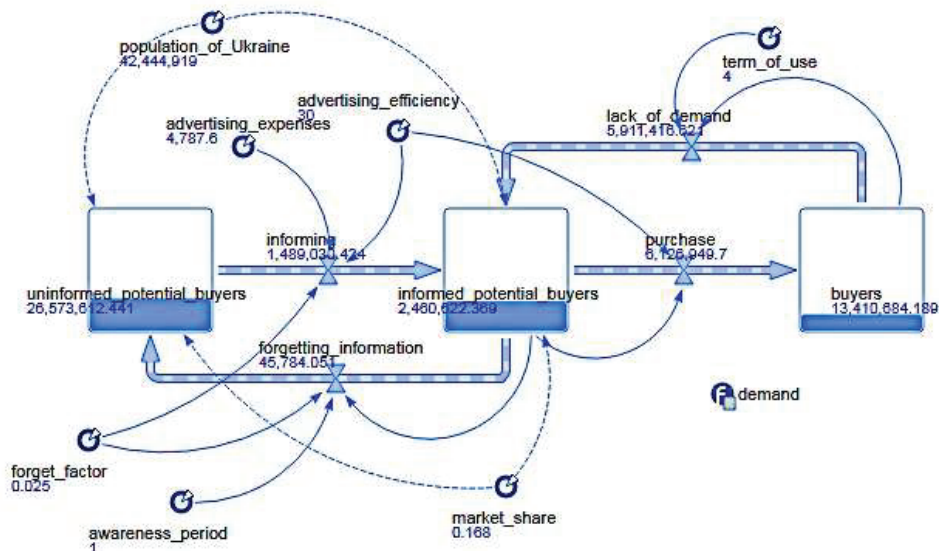
Performing a Standard experiment allows management to adjust the required amount of expenses for advertising tools; to determine the reasonable period of the advertising campaign of pharmaceutical products; to optimize the effectiveness of marketing costs; to maximize revenue from advertising campaigns. The simulation model provides the possibility of

conducting computer experiments with the aim of choosing the optimal combination of advertising strategies to minimize the costs of their implementation, provided they maximize revenue from sales.

The built-in model-simulator allows management to perform a Simple experiment with three levels of detail advertising costs:

1. advertising costs are presented in the general form (Figure 1). The components of advertising costs remain unknown to the user, it cannot affect individual sources of advertising.

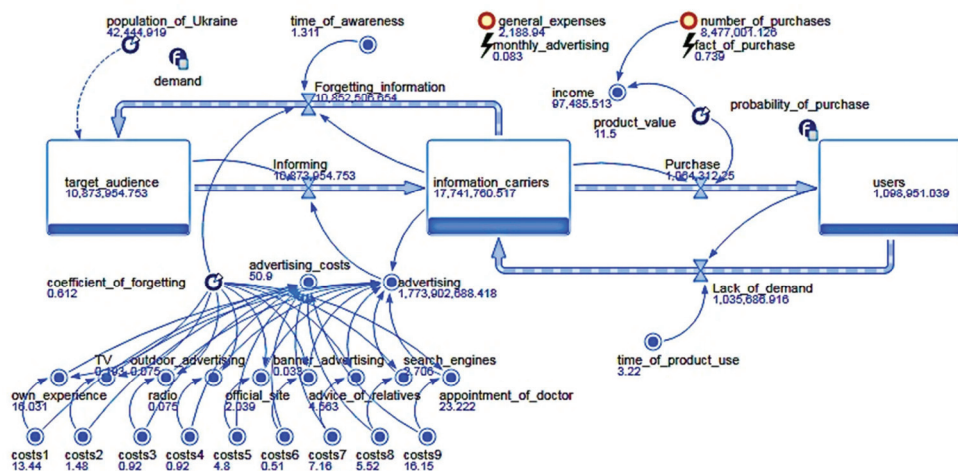
Figure 1. The first level of detail the advertising costs



Source: compiled by the authors on the basis of the research

2. Advertising costs are represented by variable accumulating due to the main sources of advertising, including Internet resources (Figure 2).

Figure 2. The second level of detail the advertising costs



Source: compiled by the authors on the basis of the research

The main sources of informing potential buyers about the medicines of this group with the corresponding rating are ¹⁷⁴:

- own experience (87%);
- appointment of a doctor (79%);
- the advice of a pharmacist in a pharmacy (58%);
- recommendations of native / friends (55%);
- searching for information on the Internet through search engines (27%);
- search for information on the Internet on specialized websites (23%);
- advertising on television (14%);
- recommendations of forum users (12%);
- expert advice on a specialized site (11%);
- recommendations of friends in social networks (10%);
- on-line advertising (4%);
- advertising on sales places (4%);
- magazines / newspapers (2%).

¹⁷⁴Smirnova A. Digital Pharma – farm market analysis reports. Available at: <http://adpage.com.ua/digital-pharma-аналитические-отчеты-о-фарм-рынке>.

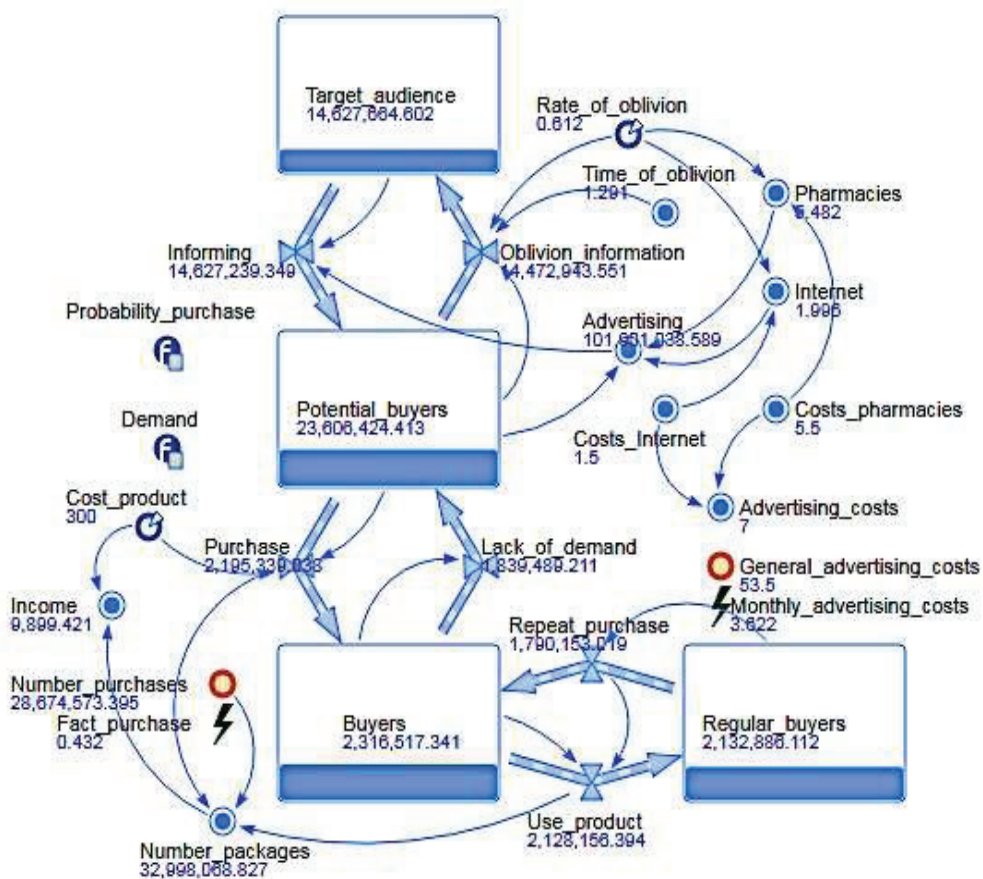
Foreign authors conduct many researches on the effectiveness of Internet advertising ¹⁷⁵, so this level of detail of advertising costs can be applied as a mathematical apparatus for the implementation of such studies. However, such a significant level of detail is complicating the model, significantly increasing the number of variables, which adversely affects the speed of user queries.

3. advertising costs are represented by variable accumulating due to expenses of promotion in Internet sources and promotion in pharmacy points (representatives) (Figure 3).
4. this level of advertising costs is optimal. The model is fast, the conditions for expansion and deepening are given, a new storage is added – Regular_buyers.
5. experiment Variation of parameters is a procedure for evaluating the influence of input hypotheses and the values of key factors on the model's indicators output. The experiment with variation of model parameters helps to assess how sensitive the model's forecast is to change the hypotheses underlying it.

AnyLogic provides a mechanism for automatically launching a model for a given number of times with a change in the value of the selected parameter. This experiment performs several "runs" of the model, varying the value of one of the parameters and showing how the simulation results depend on these changes. When experiment is run, it is possible to study and compare the behavior of the model at different values of the parameters using graphs.

¹⁷⁵Zhang, Y., Trusov, M., Stephen, A.T. & Jamal, Z. (2017). Online Shopping and Social Media: Friends or Foes? *Jornal of Marketing*. – № 81(6). – pp. 24-41.

Figure 3. The third level of detail the advertising costs



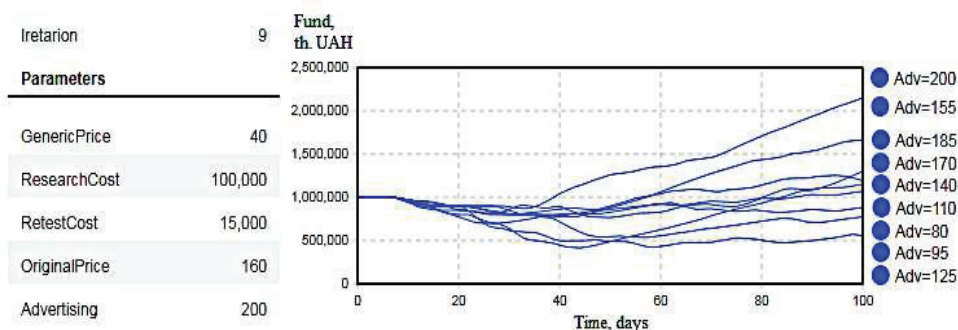
Source: compiled by the authors on the basis of the research

The experiment Variation of parameters was conducted to assess the dynamics of capital change, depending on the parameter Advertising (Figure 4).

The figure 4 shows that capital growth occurs when advertising costs amount to at least 140 th. UAH. Otherwise, the company may suffer significant losses.

Figure 4. The experiment Variation of parameters

Pharma : Parameters_Variation



Source: compiled by the authors on the basis of the research

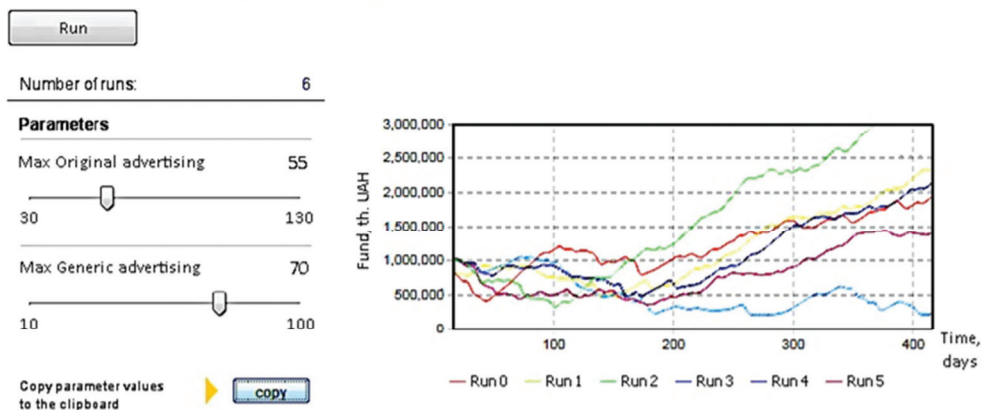
Considering medicines as a market product category, the understanding of the terms "original" and "generic" (reproduced) medication is also important. The original (innovative) medicinal product is the product, first introduced to the pharmaceutical market, containing a new synthesized or received in another way active pharmaceutical ingredient, authorized for medical use and patented for a certain period of time. A reproduced medicinal product (generic) is a copy, which corresponds to an innovative (original) medicinal product by therapeutic efficacy and safety. It is manufactured by a pharmaceutical company after expiration of the patent protection period¹⁷⁶.

Promotion of the pharmaceutical company's product portfolio can also be divided into two parts: the cost of advertising for original medicines and the cost of advertising generic medicines. Company management regularly makes informed decisions about the distribution of capital between these two flows. The results of experiments Comparison of "runs" can serve as the basis for making such decisions. This type of experiment during execution allows the user to customize the selected parameters in any combination and displays all the "runs" on one graph. (Figure 5).

¹⁷⁶Levytska O. (2016). Medicinal products as objects of the pharmaceutical market (part 2). *Pharmacist Practitioner*. Available at: <http://fp.com.ua/articles/likarski-zasobi-yak-ob-yekti-farmatsevtichnogo-rinku-chastina-2/>.

Figure 5. Experiment Comparison of "runs"

Pharma : Comparison_of_runs



Source: compiled by the authors on the basis of the research

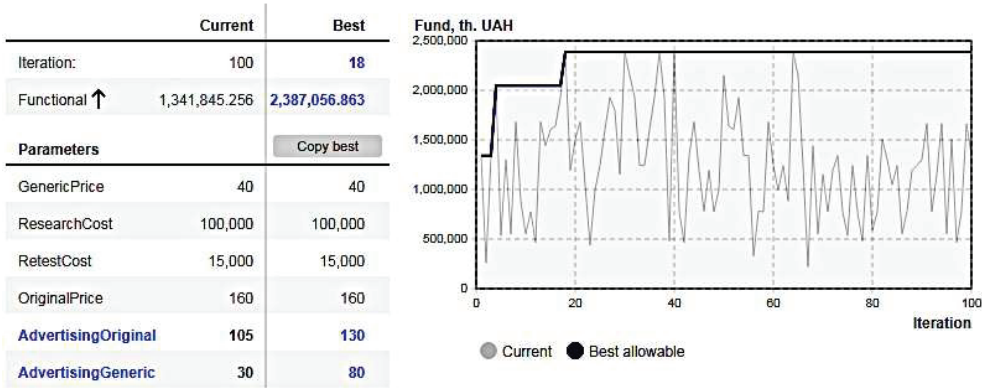
The graph clearly shows that the maximum increase in capital occurs in the settings corresponding to Run 2. The worst combination of parameters is Run 3.

Experiment Comparison of "runs" serves to visualize the dependence of the output variable on the input parameters. There is a need to use the Optimization experiment to quickly find the optimal values of all input parameters to achieve the best result. The Optimization experiment looks for the value of the parameters at which the optimal value of the given target function is achieved – maximization or minimization.

Thus, the implementation of the Optimization experiment to maximize the size of capital, depending on the cost of advertising for original and generic medicines, has allowed finding the optimal values of these parameters (Figure 6).

Figure 6. Optimization experiment

Pharma : Optimization



Source: compiled by the authors on the basis of the research

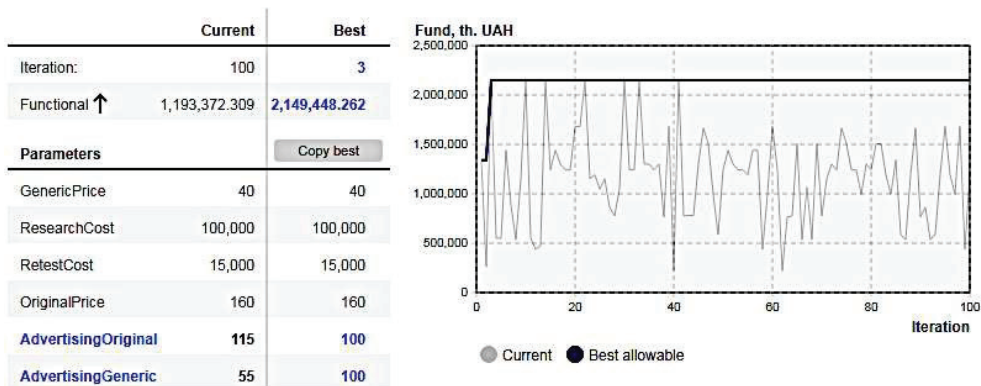
The system executed 100 iterations and determined that the maximum capital gain is achieved at the 18th iteration, when AdvertisingOriginal costs are 130 th. UAH, and AdvertisingGeneric is 80 th. UAH. The total amount of advertising costs was 210 th. UAH.

It is a possible case when the firm does not have sufficient amount to finance advertising costs at the optimal level. For example, the total advertising costs should be no more than 200 th. UAH. In this case, the Optimization experiment is subject to restriction (Figure 7).

Given the restriction of advertising capital, the optimal cost of advertising for original and generic medicines was 100 th. UAH, the growth of capital during the simulation decreased by almost 140,000 th. UAH. That is, the reduction of initial advertising capital by 10 th. UAH has led to a loss of profit of 140,000 th. UAH. Such a conclusion can serve as an incentive to find additional investments and increase the initial capital for advertising, because then the company will not only pay off investors, but will also receive significant profit.

Figure 7. Optimization experiment with restriction

Pharma : Optimization



Source: compiled by the authors on the basis of the research

For large pharmaceutical companies operating throughout Ukraine and abroad, the analysis of data from specific regions to determine the optimal plan for advertising strategy is the necessary condition for successful business. For example, quite different levels of morbidity, provision of pharmacies and special stores, citizens' incomes, medical expenses, age limits of the population, etc. exist in different regions of Ukraine. Taking decisions on price setting for medicines, distributing funds from sources of advertising, placing drugs on pharmacies depending on demand and other complex issues in each region for managers of pharmaceutical companies is a priority task.

AnyLogic tools allow companies to build a model that takes into account the characteristics of different regions of the country and collects consolidated statistics for selected parameters.

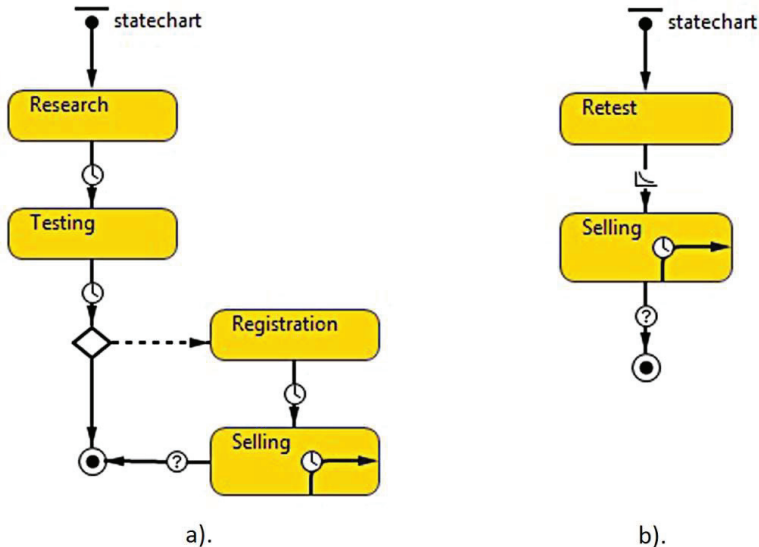
In this figure, the main agent is the user of medicines located in the system in four states:

- Target audience.
- Potential buyers.
- Buyers of original medicines.
- Buyers of generic medicines.

One of the important blocks of the pharmaceutical company's advertising activity module is a block of studies on the stages of the medicines' life cycle. The dynamic changes in the uncertain, stochastic environment are carried out during the simulation, while in most studies on this issue econometric methods, less flexible, are used¹⁷⁷.

As noted earlier, in the pharmaceutical industry, medicines are clearly divided into original and generic ones. Thus, 2 types of statechart of medical products exist in the model-simulator of pharmaceutical enterprises' advertising activity: original (Figure 8, a) and generic (Figure 8, b).

Figure 8. Statechart of original and generic medicines



Source: compiled by the authors on the basis of the research

The original medicines in the system can be in four states: Research, Testing, Registration and Selling, while generic medicines – only in two: Retest

¹⁷⁷Sharma, A., Saboo, A.R. & Kumar, V. (2018). Investigating the Influence of Characteristics of the New Product Introduction Process on Firm Value: The Case of the Pharmaceutical Industry. Journal of Marketing. – № 82(5). – pp. 66-85.

and Selling. This is due to the fact that the original medicines pass through a complete cycle of preclinical and clinical studies and compulsory registration.

Conclusions. With this model of advertising activity, a pharmaceutical company in real time can track customer behavior and the life-cycle of medicines, taking into account the volatility and instability of the pharmaceutical market. Reproduction of stochastic nature of the investigated processes and dynamics of their changes by means of simulation provides a sufficient level of adequacy of the developed model application; increases the reliability of the results. The presence of different types of experiments allows management to get statistical and predictive values in a variety of situations with the possibility of setting specific parameters.

Thus, the use of model-simulators is extending the range of the problem's scope and allows quickly refining the results of forecasts as additional information is received.

The selection of software platforms for the implementation of simulation experiments that provide a sufficient level of data security (in particular, AnyLogic, ARENA) becomes particularly relevant in the context of the adoption of the new information security policy General Data Protection Regulation (GDPR) by the European Community in May 2018. GDPR requirements are extended to a significant part of Ukrainian companies, too. In particular, according to experts, the pharmaceutical industry is one of the first in the list recommended to consider new standards of protection.

The conclusion is confirmed by analysts of the consulting company Criteo¹⁷⁸, which annually publishes forecasts of market trends for the next year. According to the company, the main trends of digital marketing in 2019 will be follows:

- GDPR continues to improve data protection legislation throughout the world: it is anticipated to develop the newest data protection practices.

¹⁷⁸Spielman, M. (2018). Criteo Commerce & Digital Marketing Outlook 2019. Available at: http://www.criteo.com/ru/wpcontent/uploads/sites/10/2019/02/Criteo_2019_Trends_RU.pdf.

- Strengthened control over closed platforms: Facebook, Google and Amazon are expected to introduce new technologies for data exchange and privacy protection for users.
- The proportion of video ads in the marketing budget of companies will grow significantly.
- Brands and retailers will unite within an information partnership.
- The use of non-traditional mathematical and technological tools in digital marketing will spread: in particular, the spread of the use of artificial intelligence technologies is predicted.
- Advertising activity will go over into the interior circle of companies: it is expected, that cloud services and artificial intelligence solutions will allow brands to purchase digital advertising directly to the company and refuse to work with agencies.
- The development of voice and visual technologies in marketing will continue.

Increasing the role of advertising and moving it directly to the level of companies will further increase the demand for flexible tools for developing effective advertising strategies. In these conditions, the role of model-simulators will increase even more.

From the given positions presented in this study, the simulation model is quite typical due to open nature and modular architecture. Fragments of experiments carried out on the materials of the leading enterprises of the Ukrainian pharmaceutical industry confirm its effectiveness and adequacy to the current conditions of implementation, which allows recommending the developed model application for wide implementation.

PART 3

**DIGITAL SECURITY RISK MANAGEMENT FOR ECONOMIC
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**MODELING EFFICIENCY OF ADVERTISING OF ENTERPRISES
IN THE CONDITIONS OF THE DIGITAL ECONOMY**

Abstract. The article analyzes the effectiveness of advertising messages of enterprises as the set of linked elements. The authors determine the effectiveness of media for advertising messages and classify methods for evaluating the effectiveness of advertising messages. The article discloses the effects caused by advertising messages of enterprises. The authors classify possible reactions to advertising messages depending on types of placement. The article shows the interplay between dynamics of sales of metal production and periodic placement of advertising messages by "GLOBAL TRADE" LTD during four periods of the second quarter of 2017. The authors prove that the current advertisement effect is the growth of sales right after advertising messages placement. The manifestation of the current advertisement effect has enabled the authors to determine that the function of the current advertisement effect is a periodic one suitable for expression in Fourier series on an interval.

Jel Classification System: M 390, C 190

Keywords: Advertising messages, current effect, dynamic effect, content effect, media effect, regression analysis, Fourier series.

Introduction. Advertising messages are the core of advertisement impact on consumers. Via advertising messages, enterprises reach the largest possible number of potential consumers or concentrate on a specific segment

of their target audience. Being the central element and key tool of advertisement, advertising messages present advertisers to their target audience; concentrate the majority of elements of advertisement communications; foster attracting potential consumers and shaping their positive attitude towards enterprises and their products.

For example, P. Resnick and R. Zeckhauser (2002)¹⁷⁹, P. Resnick, R. Zeckhauser, J. Swanson, and K. Lockwood (2006)¹⁸⁰ analyze pricing and sales considering advertisement and its retroactive effect.

M. Anderson and J. Magruder (2012)¹⁸¹; J. Berger, A. Sorensen, and S. Rasmussen (2010)¹⁸²; P. Chintagunta, S. Gopinath, and S. Venkataraman (2010)¹⁸³; disclose the role of consumers Internet feedback in increasing sales.

D. Mayzlin and J. Shin (2011)¹⁸⁴ emphasizes that many markets are characterized by imperfect consumer information—consumers are often poorly informed about the existence, price, and attributes of products. Therefore, there is a problem of evaluating the advertising responses of the target audience of consumers.

M. Luca (2012)¹⁸⁵ views product quality through the lenses of investment in advertisement. Technological advances over the past decade have led to the proliferation of consumer review websites, where consumers

¹⁷⁹ P. Resnick and R. Zeckhauser. (2002). Trust Among Strangers in Internet Transactions: Empirical Analysis of eBay's Reputation System. *The Economics of the Internet and E-Commerce*, 11.

¹⁸⁰ P. Resnick, R. Zeckhauser, J. Swanson, and K. Lockwood. (2006). The value of reputation on eBay: A controlled experiment. *Experimental Economics*, 9(2):79101..

¹⁸¹ M. Anderson and J. Magruder. (2012). Learning from the Crowd: Regression Discontinuity Estimates of the Effects of an Online Review Database. *The Economic Journal*, doi: 10.1111/j.1468-0297.2012.02512.x

¹⁸² J. Berger, A. Sorensen, and S. Rasmussen. (2010). Positive Effects of Negative Publicity: When Negative Reviews Increase Sales. *Marketing Science*, 29(5):815827...

¹⁸³ P. Chintagunta, S. Gopinath, and S. Venkataraman. (2010). The Effects of Online User Reviews on Movie Box Office Performance: Accounting for Sequential Rollout and Aggregation Across Local Markets. *Marketing Science*, 29(5):944957.

¹⁸⁴ D. Mayzlin and J. Shin. (2011). Uninformative Advertising as an Invitation to Search. *Marketing Science*, 30(4):666685.

¹⁸⁵ M. Luca. (2012). Reviews, reputation, and revenue: The case of yelp.com. Harvard Business School Working Paper.

can share experiences about product quality. These reviews provide consumers with information about experience of goods. Existing mechanisms aimed at solving information problems are imperfect: chain affiliation reduces product differentiation, advertising can be costly, and expert reviews tend to cover small segments of a market.

L. Pierce and J. Snyder (2008)¹⁸⁶, argue that advertisers are able to optimally determine decisions made by consumers.

W. Dziuda (2011)¹⁸⁷ discloses the impact of information structure on the effectiveness of advertisement, while A. Chakraborty and R. Harbaugh (2010)¹⁸⁸ reveal the consequences of cases when advertisers have the access to private information of potential consumers.

The case of symmetric information, when the identity and incentives of the sender are well-known, E. Kamenica and M. Gentzkow (2011)¹⁸⁹ consider the information symmetry, when identification and incentives of advertisers are well-known. This group of researchers underlines that while making decisions consumers actually take into consideration that advertising messages come from biased counter-partners. This theory of market reactions is based on the assumption of the direct correlation between advertising messages and purchases measured by sales, market shares and brand choices. In this context, advertising messages are viewed as a communication form aimed at translating quality of goods and services into the language of consumer needs.

D. Mayzlin (2006)¹⁹⁰, C. Dellarocas and C. Wood (2007)¹⁹¹ research models of advertisement effects, when consumers are not able to distinguish

¹⁸⁶L. Pierce and J. Snyder. (2008). Ethical Spillovers in Firms: Evidence from Vehicle Emissions Testing. *Management Science*, 54(11):18911903.

¹⁸⁷W. Dziuda. (2011). Strategic Argumentation. *Journal of Economic Theory*, 146(4):13621397.

¹⁸⁸Chakraborty and R. Harbaugh. (2010). Persuasion by Cheap Talk. *American Economic Review*, 100(5):123612382.

¹⁸⁹E. Kamenica and M. Gentzkow. (2011). Bayesian Persuasion. *American Economic Review*, 101(October): 25902615.

¹⁹⁰Mayzlin. (2006). Promotional chat on the internet. *Marketing Science*, 25(2):155163.

¹⁹¹C. Dellarocas and C. Wood. (2007). The sound of silence in online feedback: Estimating trading risks in the presence of reporting bias. *Management Science*, 54(3):460476.

between objective and biased advertising messages and try to make decisions based on Internet advertisement. Communication channels unite all participants of communication and media. The relevant response on advertising messages is the set of consumer feedback resulted from the contact with them.

D. Mayzlin (2006)¹⁹² sets out conditions for persuasive online-reviews, proving that the effectiveness of advertising chat declines with the growth in the number of unbiased consumers participating in online-forums. C. Dellarocas and C. Wood (2007)¹⁹³ argue that there is a point of equilibrium when investment in advertising chats increase the sales. These researchers state that expenses on online-advertisement could be reduced via developing technology for concentrated advertising messages aimed at fostering purchases.

Studying manipulation of reviews via publication of fake positive feedback on products, Q. Ye, R. Law, B. Gu, and W. Chen (2010)¹⁹⁴ apply the ratio between reviews of feedback and utility of voices as the indicator of manipulation.

Measuring the impact of online-feedback on making decisions by consumers, I. Vermeulen and D. Seegers (2009)¹⁹⁵ conclude that online-reviews raise the awareness of consumers and improve their attitude towards products.

Thus, advertising messages of enterprises are the form of offering goods and services aimed at influencing the target audience of consumers of their production. Advertising messages shape the consumers' understanding of features of goods or services.

¹⁹²Mayzlin. (2006). Promotional chat on the internet. *Marketing Science*, 25(2):155163.

¹⁹³C. Dellarocas and C. Wood. (2007). The sound of silence in online feedback: Estimating trading risks in the presence of reporting bias. *Management Science*, 54(3):460476.

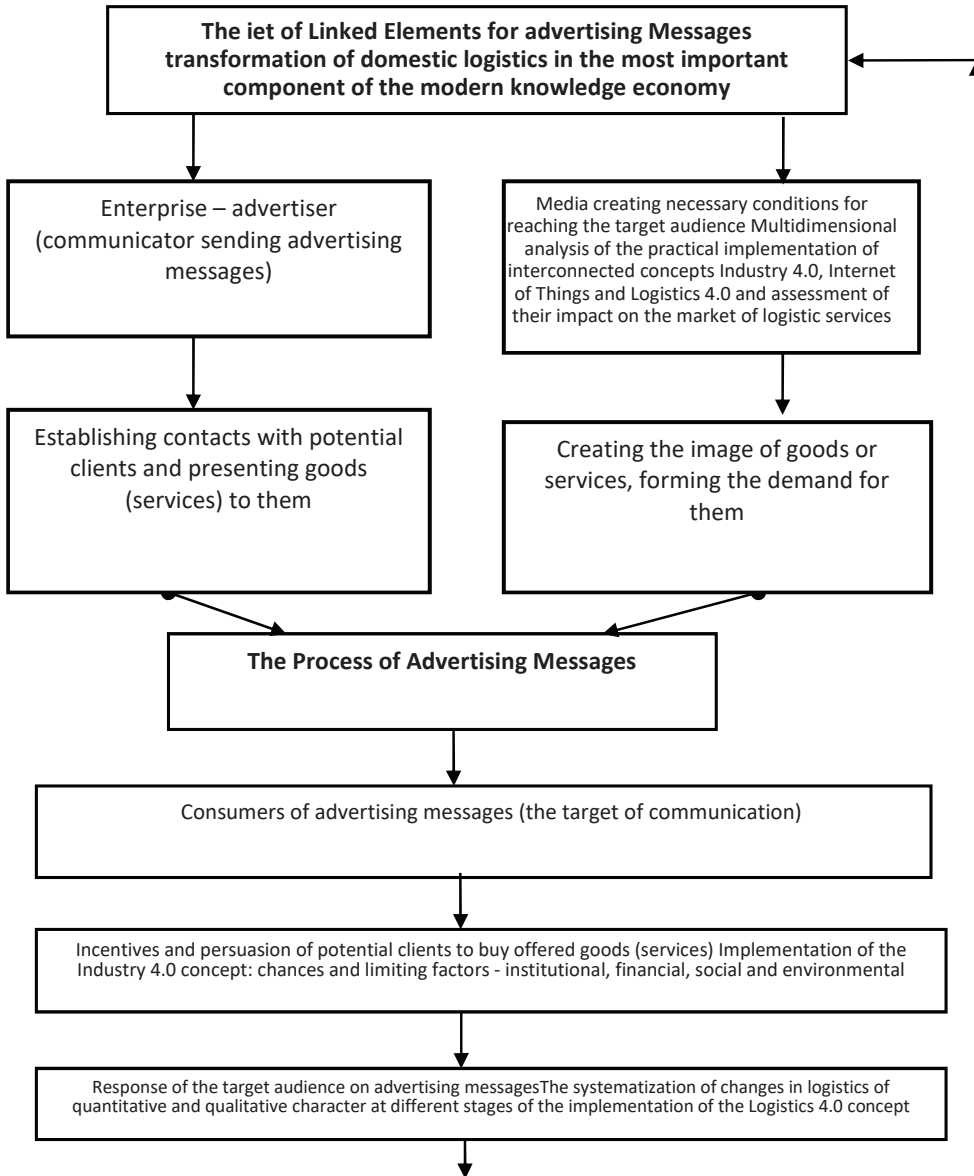
¹⁹⁴Q. Ye, R. Law, B. Gu, and W. Chen. (2010). The influence of user-generated content on traveler behavior: An empirical investigation on the effects of e-word-of-mouth to hotel online bookings. *Computers in Human Behavior*, 27(2):634639.

¹⁹⁵Vermeulen and D. Seegers. (2009). "Tried and tested: The impact of online hotel reviews on consumer consideration". *Tourism Management*, 30(1):123127.

1. The analysis of effectiveness of advertising messages

Figure 1 represents the set of linked elements necessary for advertising messages of enterprises.

Figure 1. The set of Linked elements for advertising messages



Source: compiled by the authors on the basis of research

The economic effectiveness of advertisement is featured by the impact of advertising messages on sales considering such indicators, as rate of return, market share etc. Formalization in modelling should consider not only the complicated separation of different advertisement efforts, for example connected with promotion of production, but also competition, economic and political climate, technology and sociocultural environment. To evaluate the economic effectiveness of advertising messages of enterprises it is necessary to compare volumes of sales before and after advertising messages, and to analyze the ratio of received profit to expenses on advertising messages.

To evaluate the effectiveness of media for advertising messages, the following indicators are taken into consideration: the volume of sales of issues, coefficient of feedback of the target audience, etc. (Table 1).

Table 1. Evaluating the Effectiveness of Media for Advertising Messages

Indicator	Output data
The cost of advertising space	Price for placement of advertisement in this particular medium
The useful audience	The target audience in general audience of this medium
The relevance of a medium to the target audience	The ratio of the useful audience to the general audience of a medium
The weighted average quantity of the useful audience	The sum of the useful audience and the part of the general audience, which does not belong to the target audience, but influences decisions of consumers, divided by the general amount of the target audience of this medium
The overlapping audience	The audience common for several media
The non-overlapping useful audience	The quantity of consumers familiar with at least one of media
The audience coverage	The ratio of the non-overlapping useful audience to the total target audience, in percentage
The net coverage	The quantity of people contacting with the advertisement at least one time, when there are several media with one placement of advertising messages
The gross coverage	The sum of coverage by separate media
The internal overlapping	The general coverage by several media
The external overlapping	The gross coverage minus internal overlapping
The cumulative coverage	Net coverage = Gross Coverage – Internal Overlapping

by one medium with multiple placements of advertising messages	
The cumulative coverage by several media used one time	Net coverage = Gross Coverage – External Overlapping
The combined coverage by several media used several times	Net coverage = Gross Coverage – External Overlapping – Internal Coverage
The frequency	Probability of getting acquainted with an advertising message
The measure of useful penetration	The share of target audience covered by a medium
The integral assessment factor	The sum of assessment factors using one medium several times
The assessment fact	The coverage of a specific target audience only by a medium divided by the general coverage by this medium
The selectivity index	The percentage of the target market audience for this medium divided by percentage of population of this region in general population
The comparative cost per 1000 rows (per 1000 persons)	The rate per line divided by the circulation and multiplied by 100000
The price per 1000 copies	The rate per page divided by the circulation and multiplied by 100000
The price per 1000 readers (listeners, viewers)	The rate per page divided by the number of readers and multiplied by 100000. The cost of one minute of advertising time divided by the number of listeners

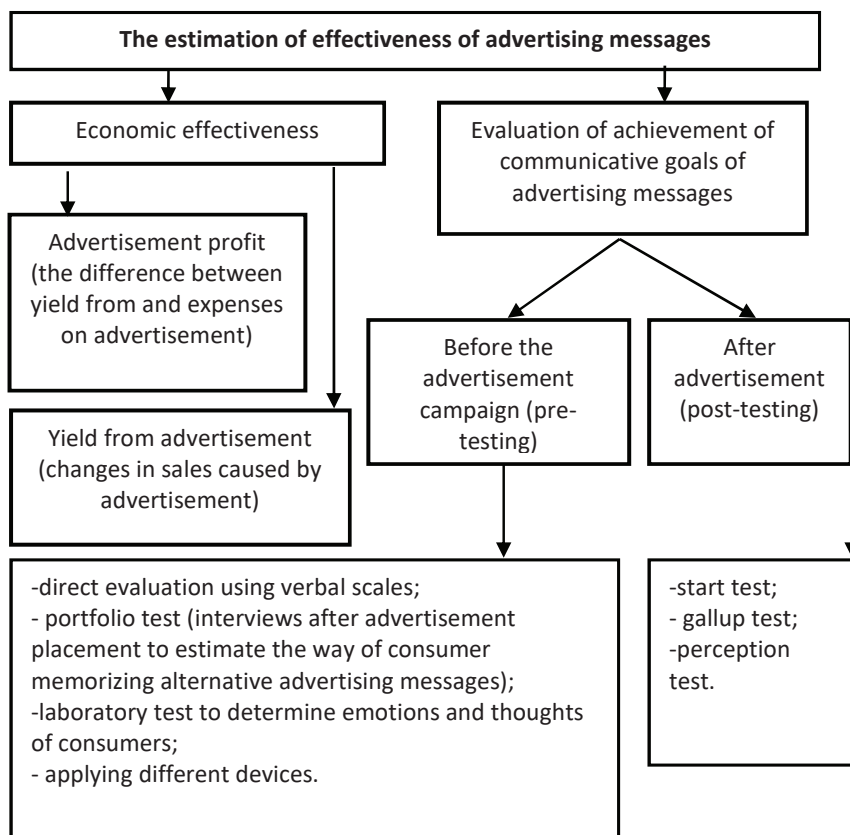
Source: compiled by the authors on the basis of research

Thus, the analysis of effectiveness of advertising messages of enterprises is based on modeling market response. The objective function in modeling is usually sales, profit or market share. As a rule, independent variables are expenses on advertising messages and other technological parameters.

Figure 2 shows the block diagram of estimating the effectiveness of advertising messages, measuring the effectiveness of advertisement placement and its operative correcting.

All the above-mentioned methods for determining the effectiveness of advertising messages rely on real feedback on advertising messages. However, it is very important to evaluate the effectiveness of changing advertising messages in advance, while creating new advertising messages or starting new strategies.

Figure 2. The estimation of effectiveness of advertising messages of enterprises



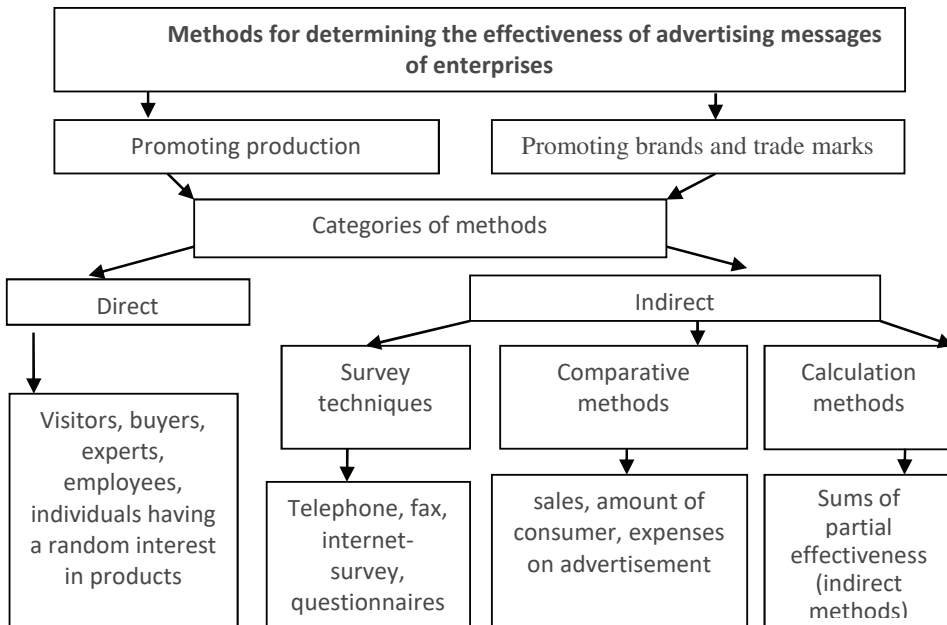
Source: compiled by the authors on the basis of research

Figure 3 indicates the classification of methods for determining the effectiveness of advertising messages of enterprises.

Figure 4 provides plots of typical relationship between the effectiveness of expenses on product promotion and stages of willingness of consumers to purchase this product. The notation keys are as follows: A – awareness of a product; B – perception; C – confidence; D – orders; E – repeat orders.

The research on the impact of advertising messages on sales implies the necessity to gather statistical data during a certain time period, for example, a week, a month, a quarter. Enterprises advertise their production using content versions (different ads) of different duration (from 1 to 4 or from 2 to 8 weeks) in a target consumer audience.

Figure 3. Methods for determining the effectiveness of advertising messages of enterprises

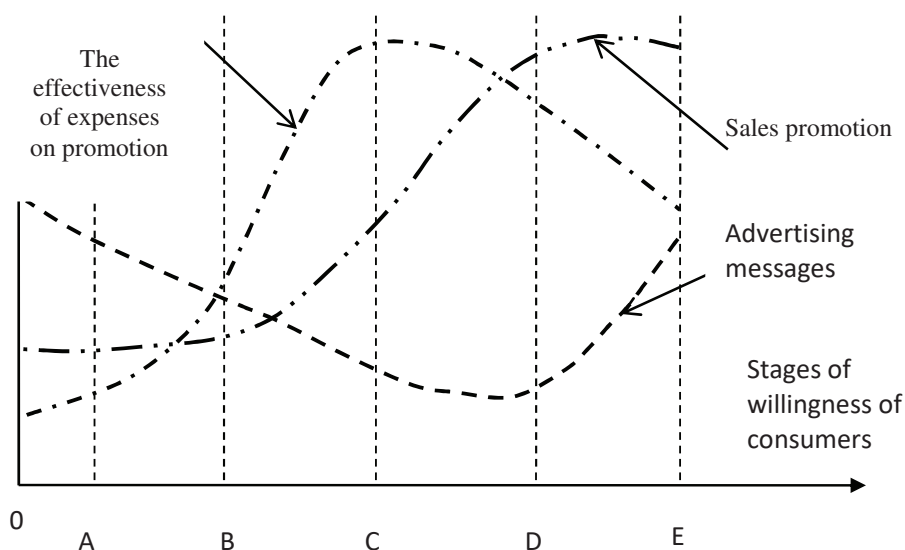


Source: compiled by the authors on the basis of research

The research on the impact of advertising messages on sales implies the necessity to gather statistical data during a certain time period, for example, a week, a month, a quarter. Enterprises advertise their production using content

versions (different ads) of different duration (from 1 to 4 or from 2 to 8 weeks) in a target consumer audience. The impact of advertisement on sales can be the result of different factors. The effectiveness of advertising messages steady declines over time with no improvement, and the depreciation starts from the very moment of placing advertising messages. Besides, the effects of cooperation are observed, for example, if the quality of media is considered.

Figure 4. The effectiveness of expenses on product promotion

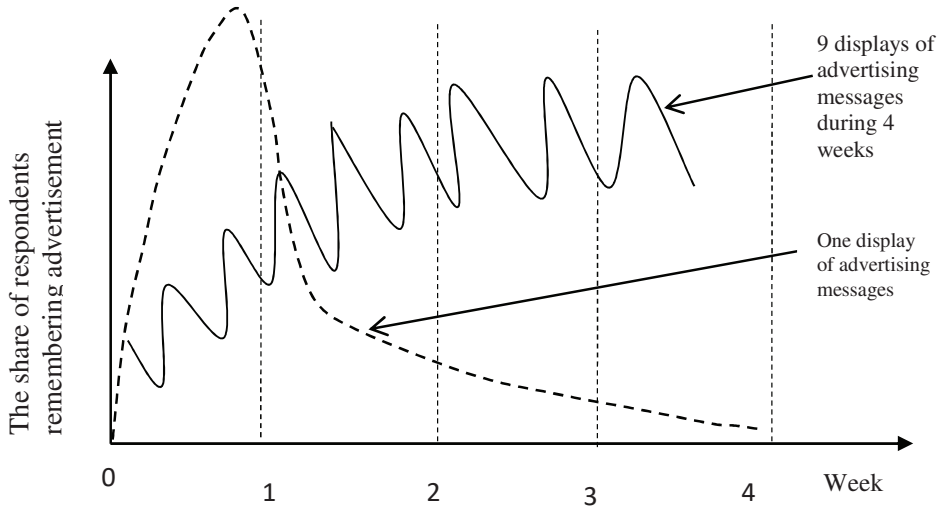


Source: compiled by the authors on the basis of research

2. The analysis of effects of advertising messages

The frequency of repetition of advertising messages influences their effectiveness, but there is no consensus on methodology for determining the optimum value of this indicator. It is worth mentioning, that decision upon the number of displays of advertising messages should consider the effect of memorability of advertisement, which is also important for developing the schedule of displays of advertising messages for the target audience (Figure 5).

Figure 5. The effect of memorability of advertising messages

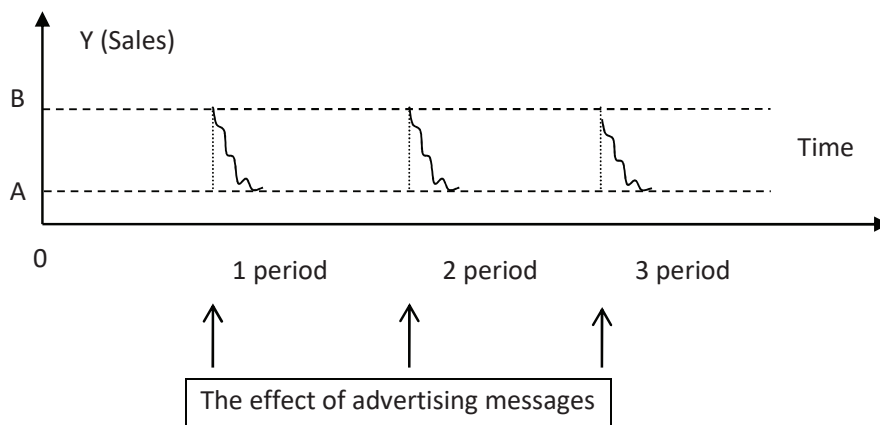


Source: compiled by the authors on the basis of research

We emphasize that the effectiveness of advertisement depends on such factors, as: marketing context of placement (dependence on a subject of advertisement, target audience and communicative situation on a market); parameters of media planning; type, contents, structure and other features of advertising messages.

Let us analyze the after effect of advertising messages of enterprises. Figure 6 shows the current effect of advertising messages of advertising messages, where axis OX is time, and axis OY – sales. The dotted line $Y = A$ illustrates the basic level of sales. The dotted line $Y = B$ illustrates the achieved level of sales as the increase in sales up to point B as the result of effect of advertising messages.

Figure 6. The current effect of advertising messages



Source: compiled by the authors on the basis of research

Figure 6 indicates that the sustainability of a current effect is little. Thus, the current effect of pricing surpasses the effect of advertising messages. This effect of advertising messages does not show any sustainability. In case of the current effect of advertising messages, we can determine the effectiveness of advertising messages as the ratio of profit derived from advertisement to expenses on advertising messages. The profit derived from advertisement is percent of product of the volume of sales influenced by advertisement, amounts of visits to a company and profitability.

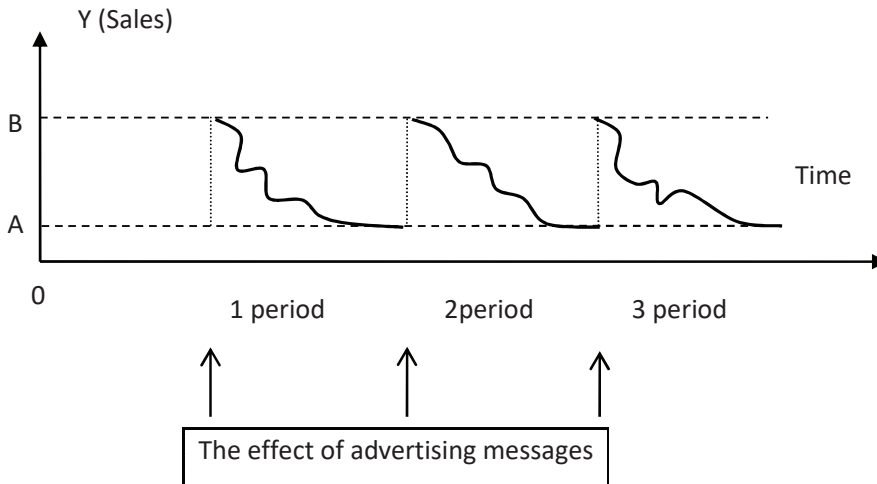
Thus, the current effect of advertisement is the increase in sales taking place right after advertising messages.

Figures 7, 8 indicate temporary effects of advertising messages of enterprises as the continuation of the current effect during certain time.

Such temporary effects can be short-term and long-term ones caused by the following factors:

- Delay of impact of advertisement;
- Delay of consumer response;
- Delay of purchase due to efficient stocks belonging to consumers;
- Delay of purchases by consumers, which have found out about products from others who saw the advertisement.

Figure 7. The temporary current short-term effect of advertising messages



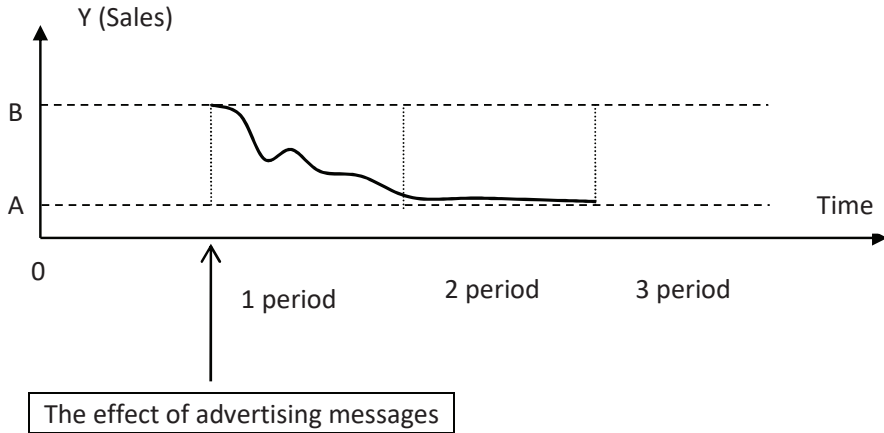
Source: compiled by the authors on the basis of research

As a rule, the temporary current effect of advertising messages is a short-term one (Figure 7), sometimes it is a long-term one (Figure 8) due to the summation of data in a long period.

Figure 9 shows the long-term sustainable effect of advertising messages, when the basic level of sales $Y = A$ increases up to the level $Y = A_1$.

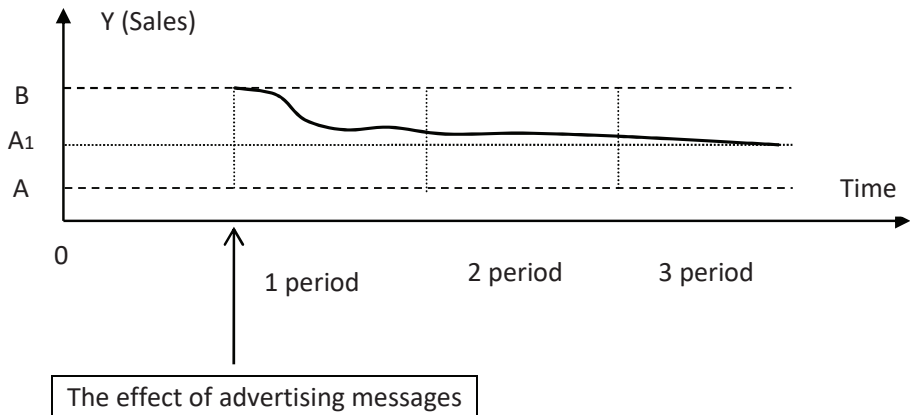
It is worth mentioning, that the long-term sustainable effect of advertising messages of enterprises is a rare phenomenon, sometimes it is observed even after the end of an advertising campaign. As a rule, this effect is explained by the effect of memorizing connection or interplay between unknown facts.

Figure 8. The temporary current long-term effect of advertising messages



Source: compiled by the authors on the basis of research

Figure 9. The long-term sustainable effect of advertising messages

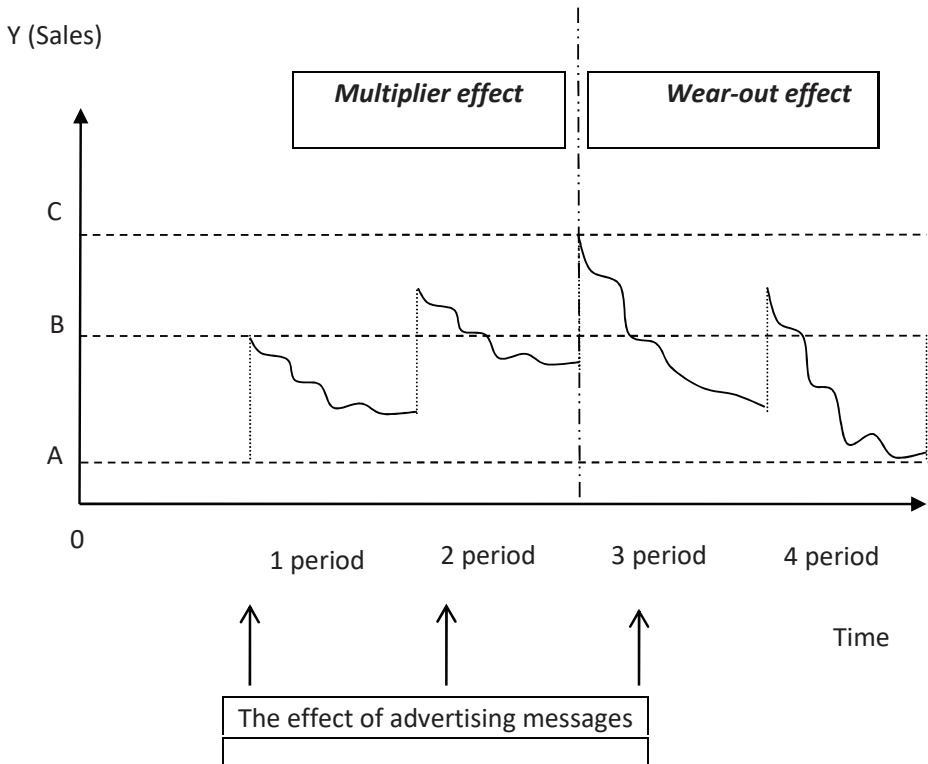


Source: compiled by the authors on the basis of research

Figure 10 demonstrates the dynamic effect of advertising messages of enterprises (it changes over time). For example, if advertising messages are displayed during a month equally spread in weeks, then a slight increase in

sales is observed growing with each display up to the third week, even though the level of advertising messages is constant. It is a multiplier effect. Then sales return to the basic level of sales – a wear-out effect: a decreasing response of sales on advertisement during the advertising campaign, if the level of intensity of advertising messages is constant. We emphasize that advertising messages are delivered in a competitive environment, so, it should be considered to avoid mistakes in estimating the elasticity. The simplest method for determining the effectiveness of advertising messages of enterprises in a competitive environment is modeling sales and intensity of advertising messages in relation to all other advertising messages in a market place.

Figure 10. The dynamic effect of advertising messages of enterprises



Source: compiled by the authors on the basis of research

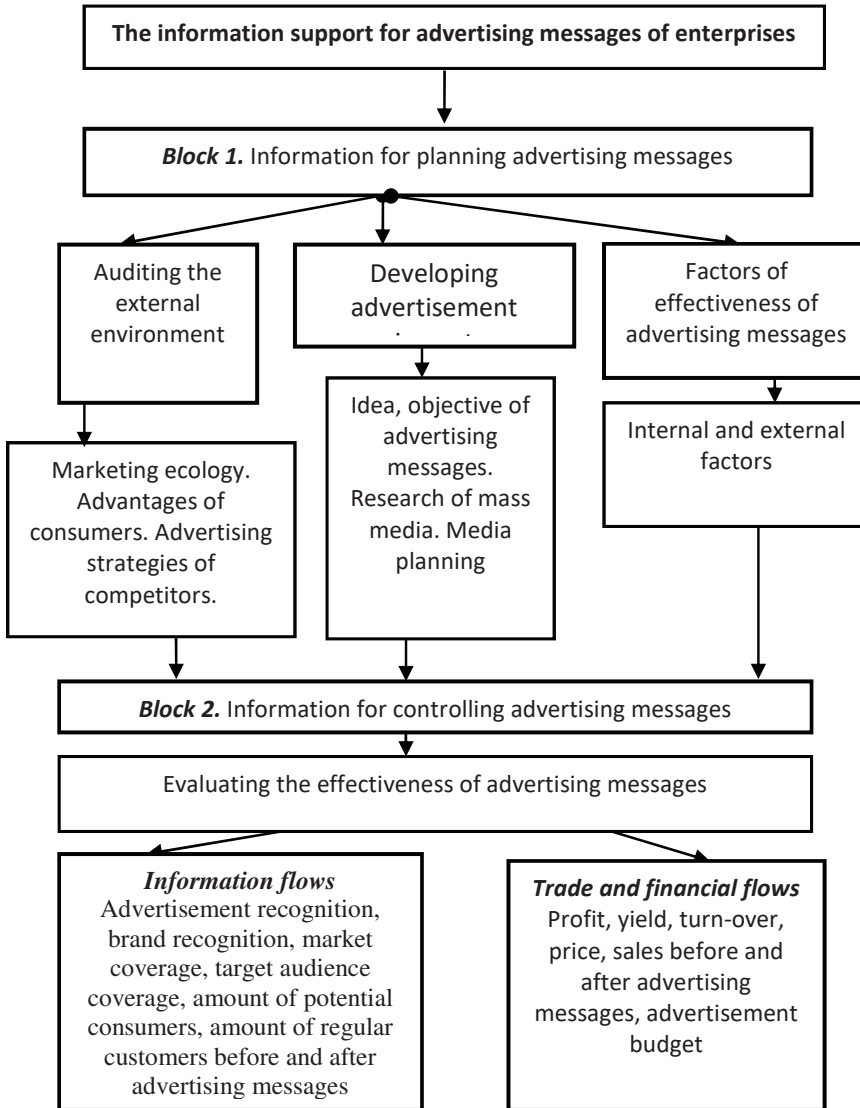
Therefore, a competitive position in the market and brand recognition play the essential role. For example, big enterprises can earn more than smaller ones having the same intensity of advertising messages due to consumer popularity and loyalty. It is a differentiated effect. Competitive advertisement decreases the effectiveness of advertisement of a specific enterprise. The simplest method for determining the response to advertisement in a competitive environment is a measurement and modeling of sales and advertisement of the target direction relative to all other objective directions in the market.

Besides effects of advertising messages of enterprises shown in Figures 6-10, there are also content and media effects. The content effects are the differences in reaction on advertising messages. As a rule, developers of models describe the reaction of consumers or markets on advertisement measured in aggregated units without considering the content. Therefore, the topical task is to consider the measurement of content of advertising messages of enterprises in modeling functions of response on advertising of enterprises. In addition, we need to consider the budget allocation among different media in modeling functions of response to advertising campaign of enterprises.

It is worth mentioning, that models of advertising messages of enterprises (models of frequency of advertising messages, models of response to advertisement, and complex models of advertising campaigns) are aggregated ones and not connected with each other. As a rule, models include not only models and techniques of traditional media planning, but also estimation of effectiveness of advertising campaigns. However, these models do not comply with requirements, for example, set by Internet-advertisement and do not include the evaluation of advertising messages themselves.

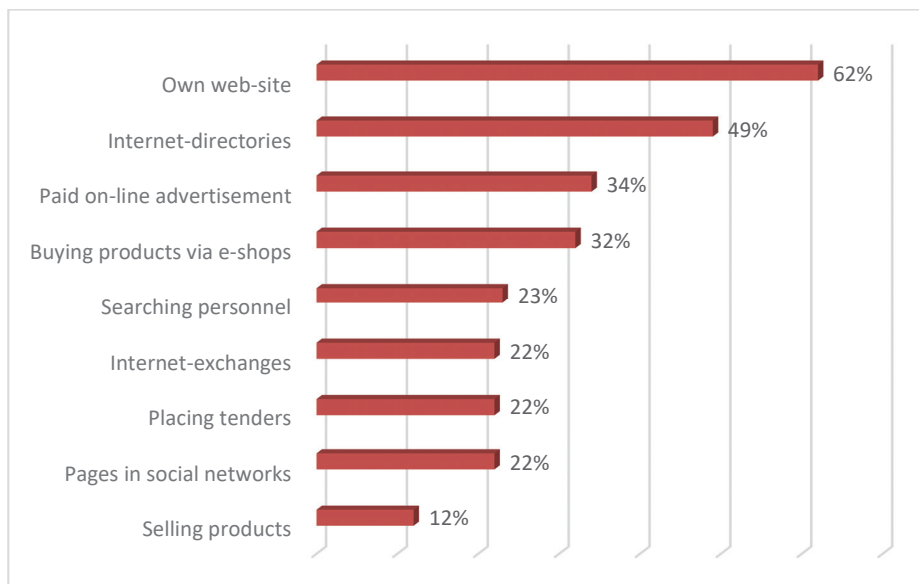
Figure 11 demonstrates the model of information support for advertising messages of enterprises.

Figure 11. The model of information support for advertising messages of enterprises



Source: compiled by the authors on the basis of research

Figure 12. Using the Internet for promoting products, searching partners and trade, percent of enterprises



Source: compiled by the authors on the basis of research¹⁹⁶

Even though Ukrainian business entities have enough technical capabilities to access the Internet, they still prefer to use simple popular services, such as web-sites and Internet-directories. The rest of opportunities (searching business partners, promoting own companies, trade) provided by the Internet is used by less than 50% of respondents, paid advertisement is applied by only 34% of them.

It is interesting that 12 percent of enterprises sell products via the Internet, while 7 percent use their own e-shops, but, at the same time, almost one third of enterprises (32 percent) buy products for their business needs via Internet (Figure 12).

Enterprises almost do not use Internet opportunities for organizing effective work. Only 20 percent of respondents send data from mobile devices

¹⁹⁶Ilyashenko S. M. Tools and methods of product promotion in the Internet: An analytical review / S.M. Ilyashenko, T. E. Ivanova // Marketing and innovation management. - No. 3, 2015. - P. 20-32.

to servers, use services of common file editing or time planning, organize web-conferences.

Figure 13. Using the Internet for organizing common work, searching partners and trade, percent of enterprises



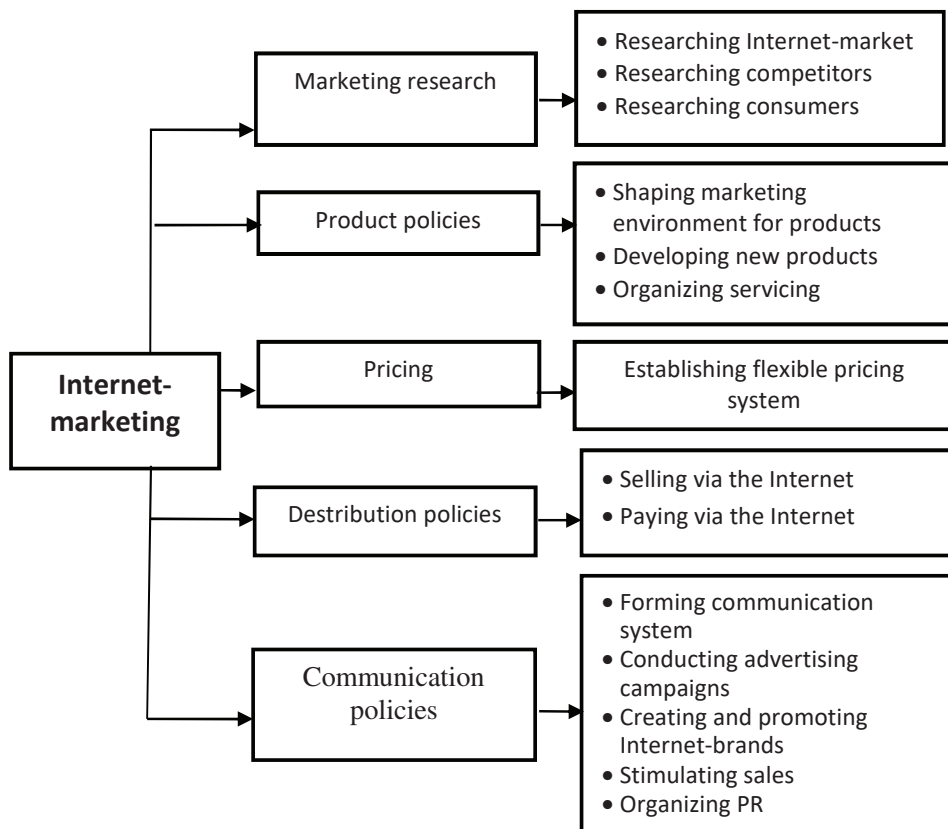
Source: compiled by the authors on the basis of research ¹⁹⁷

We need to state, that respondents for the research conducted by company GFK (Figures 12-13) were heads and deputy heads of 1017 Ukrainian enterprises. The sample was representative for Ukrainian enterprises by an number of employees, regions, types of business activity, the maximum sampling error was 3,1%.

Figure 14 illustrates the opportunities of the Internet for marketing of modern enterprises.

¹⁹⁷Ilyashenko S. M. Tools and methods of product promotion on the Internet: An analytical review / S.M. Ilyashenko, T. E. Ivanova // Marketing and innovation management. - No. 3, 2015. - P. 20-32.

Figure 14. The structural scheme of using the Internet in the marketing system of enterprises



Source: compiled by the authors on the basis of research

Therefore, using the Internet has new peculiarities and advantages if compared with traditional marketing, including:

1. The key role shifts from manufacturers to consumers.
2. Globalization of activity and reducing transaction costs.
3. Personalization of cooperation.
4. Reducing transformation costs.

Thus, the impact of advertising messages on indicators of effectiveness of business activity can be stated as follows: if around 90 percent of consumers can see advertising messages, then probability of contact equals

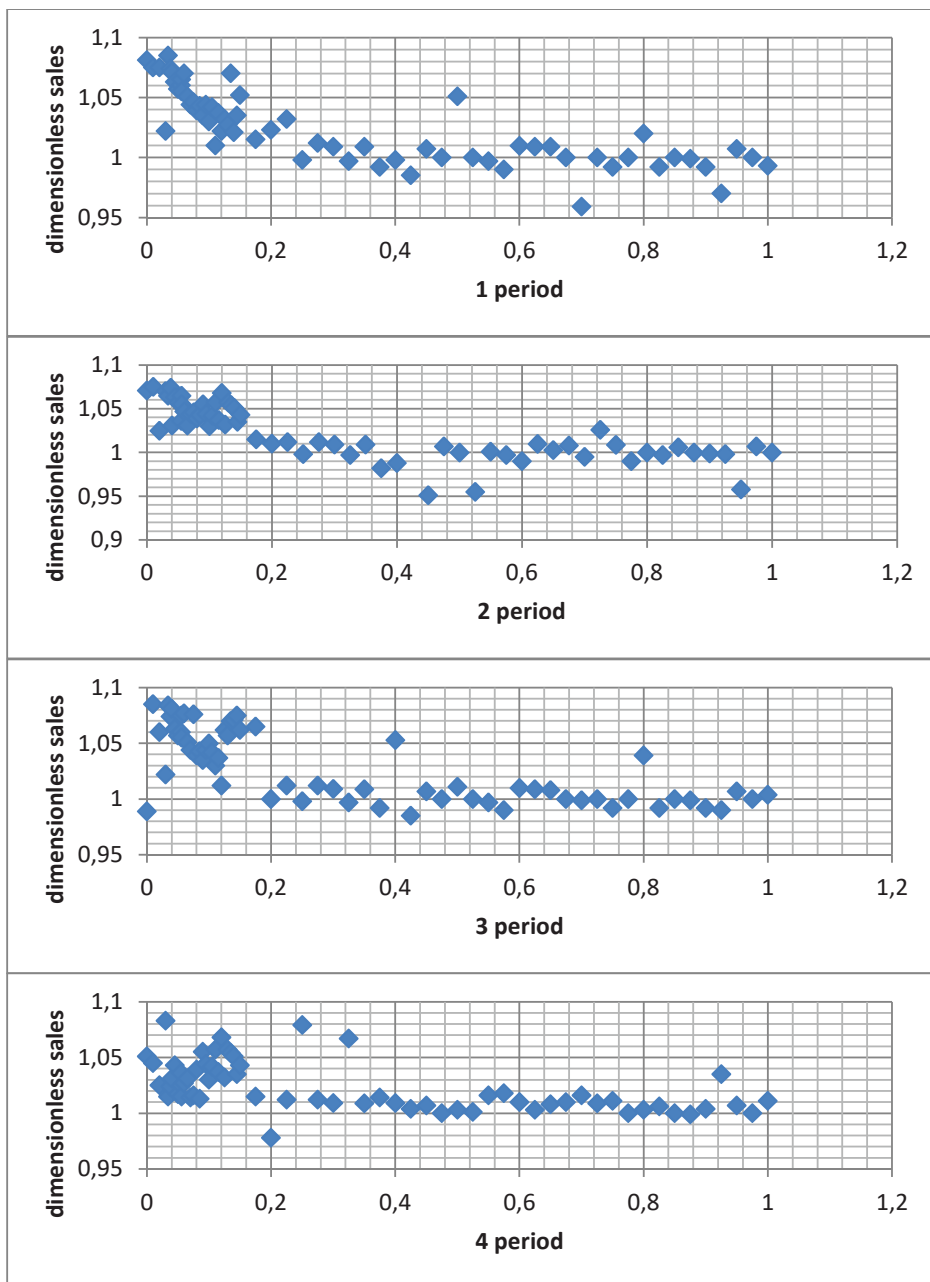
0,9. If out of these 90 percent of potential buyers only 60 percent pay attention to advertising messages, then 54 percent of the target audience are involved in processing information. Assuming, that one third of that processing information will think of buying products, then there are only 18 percent of potential buyers. If only 70 percent of interested customers afford to buy products, then we have only 13 percent of the target audience as potential buyers. Such calculations help to understand the mechanism of an advertisement impact on the effectiveness of expenses on advertisement, so, it means to maximize potential buyers at each stage, as each following stage decreases the share of potential buyers up to losses.

Thus, the research shows that enterprises need technologies of active selling via the Internet and qualified personnel familiar with such technologies. It is worth mentioning, that the basis of information support for the target audience consists of three economic and technical decisions: advertisement text, budget and distributing advertising messages in mass media. Previously, researches in three dimensions were separated, not connected with each other, but nowadays, there are technical tools and models of communicative processes able to cover all components of advertising messages.

3. Statistical research of sales of metal production in the context of advertising messages

The statistical research of sales of metal products in the second quarter of 2017 with intensified advertisement at the beginning of each three weeks. The research object is the analysis of sales of metal products as the response on advertising messages of "GLOBAL TRADE" LTD. Figure 15 indicates the reaction of sales of metal products during 4 time periods of the second quarter of 2017 with uniform periodic display of advertising messages of "GLOBAL TRADE" LTD.

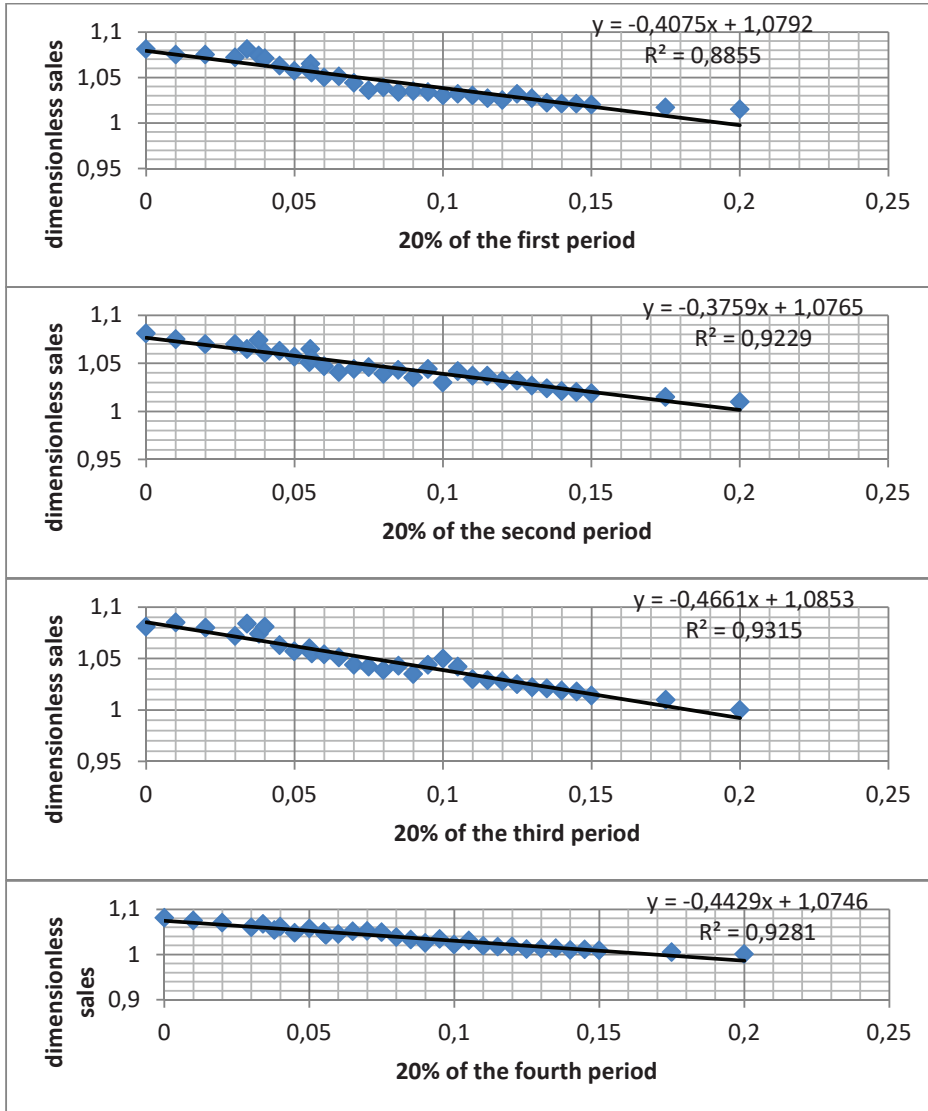
Figure 15. Reaction of sales of metal products during 4 periods with uniform periodic placement of advertising messages of "GLOBAL TRADE" LTD



Source: compiled by the authors on the basis of research

The behavior of sales shows almost the same reaction during first 20 percent of each period, then sales fluctuate around the basic level of sales (it equals 1,0 in dimensionless measurement). Figure 16 shows direct regressions of reaction of sales during first 20 percent of periods.

Figure 16. Reaction of sales of metal products during 20 percent of periods



Source: compiled by the authors on the basis of research

Table 2 presents regression equations and determination coefficients.

Table 2. The regression analysis of reaction of sales of metal products on uniform periodic placement of advertising messages of enterprises

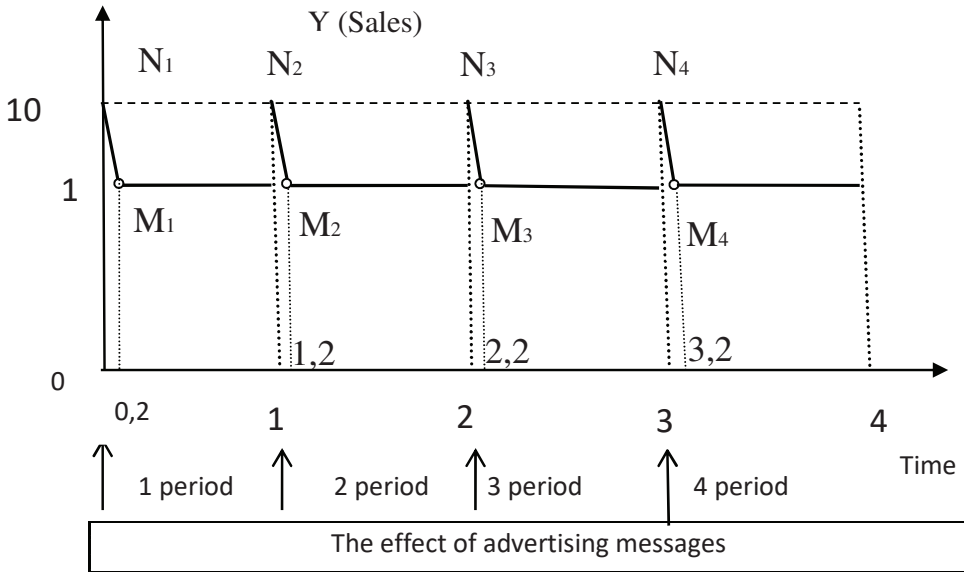
Period	Regression equation on the time interval (0; 0,2)	Determination coefficient	Regression equation on the time interval (0; 0,2)	Determination coefficient
1 period	$Y = -0,4075x + 1,0792$	0,8855	$Y = 1 + 0,00027x$	0,9871
2 period	$Y = -0,3759x + 1,0765$	0,9229	$Y = 1,001 + 0,00019x$	0,9937
3 period	$Y = -0,4661x + 1,0853$	0,9315	$Y = 1,0056 - 0,00001x$	0,9973
4 period	$Y = -0,4429x + 1,0746$	0,9281	$Y = 1,00701 + 0,00002x$	0,9911

Source: compiled by the authors on the basis of research

Considering Table 2 and Figures 15-16, we can illustrate the expression of the current effect of advertising messages as the reaction of sales of metal products (Figure 17).

We think that mathematic modeling of advertising messages of enterprises requires expressing the periodic function (Figure 17) in Fourier series. We determine that the function of reaction of sales to periodic continuous advertising messages is a periodic function with the period of $T=1$ ($2l=1$, $l=1/2$).

Figure 17. The expression of the current effect of advertising messages of enterprises



Source: compiled by the authors on the basis of research

Therefore, this function (Figure 17) can be expressed in Fourier series on the interval $[0,2l] = [0,1]$ applying the following formulas:

$$a_0 = \frac{1}{2l} \int_{c-l}^{c+l} f(x) dx,$$

$$a_n = \frac{1}{l} \int_{c-l}^{c+l} f(x) \cdot \cos\left(\frac{n\pi x}{l}\right) dx, \quad n \in N, C \in R$$

$$b_n = \frac{1}{l} \int_{c-l}^{c+l} f(x) \cdot \sin\left(\frac{n\pi x}{l}\right) dx, \quad n \in N, C \in R$$

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cdot \cos\left(\frac{n\pi x}{l}\right) + b_n \cdot \sin\left(\frac{n\pi x}{l}\right) \right)$$

We write down the equation of the stated above function represented by a line segment passing through points N_i, M_i . Then we determine the

coordinates of points from the set of lines of regressions in the confidence interval with minimum dispersions.

Coordinates of points: $N_i(t, 1.08), M_i(t + 0.2, 0), t = \overline{0, 3}$.

Then the equation of line N_1M_1 can be expressed as the equation of line passing through two sets of points:

$$\begin{aligned} \frac{y-1}{1.08-1} &= \frac{x-0.2}{-0.2} \Rightarrow \frac{y-1}{0.04} = \frac{x-0.2}{-0.1} \Rightarrow \\ \Rightarrow y-1 &= -0.4x + 0.08 \Rightarrow \end{aligned} \quad (2)$$

$$\Rightarrow y = -0.4x + 1.08$$

We find coefficients of Fourier series using formulas (3):

$$a_0 = \frac{1}{1} \int_0^{0.2} (-0.4x + 1.08) dx = \left(-\frac{0.4x^2}{2} + 1.08x \right) \Big|_0^{0.2} = 0.208, \quad (3)$$

We find next coefficients a_n via integration by parts:

$$\begin{aligned} a_n &= \frac{1}{1/2} \int_0^{0.2} (-0.4x + 1.08) \cdot \cos\left(\frac{n\pi x}{1/2}\right) dx = \\ &= \left| \begin{array}{l} -0.4x + 1.08 = U, \quad -0.4Dx = DU \\ \cos\left(\frac{n\pi x}{1/2}\right) dx = DV, \quad V = \frac{1}{2n\pi} \sin\left(\frac{n\pi x}{1/2}\right) \end{array} \right| = \end{aligned} \quad (4)$$

$$\begin{aligned} &= 2 \left((-0.4x + 1.08) \cdot \frac{1}{2n\pi} \sin\left(\frac{n\pi x}{1/2}\right) \Big|_0^{0.2} + \frac{0.4}{2n\pi} \int_0^{0.2} \sin(2n\pi x) dx \right) = \\ &= 2 \left(\frac{\sin 0.4n\pi}{2n\pi} - \frac{0.4 \cos 2n\pi x}{(2n\pi)^2} \Big|_0^{0.2} \right) = \frac{\sin 0.4n\pi}{n\pi} - \frac{0.8}{(2n\pi)^2} (\cos 0.4n\pi - 1). \end{aligned}$$

Finally, coefficients a_n equal:

$$a_n = \frac{\sin 0.4n\pi}{n\pi} - \frac{0.8}{(2n\pi)^2} (\cos 0.4n\pi - 1). \quad (5)$$

Analogically, we find next coefficients b_n applying the method of integration by parts:

$$\begin{aligned} b_n &= 2 \int_0^{0.2} (-0.4x + 1.08) \cdot \sin\left(\frac{n\pi x}{1/2}\right) dx = \\ &= \left| \begin{array}{l} -0.4x + 1.08 = U, \quad -0.4Dx = DU \\ \sin\left(\frac{n\pi x}{1/2}\right) dx = DV, \quad V = -\frac{1}{2n\pi} \cos\left(\frac{n\pi x}{1/2}\right) \end{array} \right| = \\ &= 2 \left((-0.4x + 1.08) \cdot \left(-\frac{1}{2n\pi}\right) \cos\left(\frac{n\pi x}{1/2}\right) - \frac{0.4}{(2n\pi)^2} \sin(2n\pi x) \right) \Bigg|_0^{0.2} = \quad (6) \\ &= \frac{-\cos 0.4n\pi}{n\pi} + \frac{1.08}{\pi n} - \frac{0.8}{(2n\pi)^2} \cdot \sin 0.4n\pi. \end{aligned}$$

Finally, coefficients b_n equal:

$$b_n = \frac{-\cos 0.4n\pi}{n\pi} + \frac{1.08}{\pi n} - \frac{0.8}{(2n\pi)^2} \cdot \sin 0.4n\pi. \quad (7)$$

Substituting values of coefficients from formulas (3.3) in the form (5-7), we receive the function (3) as the Fourier series:

$$f(x) = 0.208 + \sum_{n=1}^{\infty} \left\{ \frac{\sin 0.4n\pi}{n\pi} - \frac{0.8}{(2n\pi)^2} (\cos 0.4n\pi - 1) \right\} \cos(2n\pi x) +$$

$$+ \left\{ \frac{-\cos 0.4n\pi}{n\pi} + \frac{1.08}{\pi n} - \frac{0.8}{(2n\pi)^2} \cdot \sin 0.4n\pi \right\} \cdot \sin(2n\pi x). \quad (8)$$

Formula (8) enables the development of modeling advertising messages of “GLOBAL TRADE” LTD as the reaction of sales of metal products to periodic continuous advertising messages during certain time period, and as the expression of the current effect of advertising messages.

Conclusions. Thus, we classify the possible effect of advertising messages of enterprises depending on types of advertising messages, show the reaction of sales of metal products during 4 periods of the second quarter of 2017 with uniform periodic placement of advertising messages of “GLOBAL TRADE” LTD. The current effect of advertisement increases the sales of products right after displaying advertising messages. The manifestation of the current effect of advertising messages of enterprises enabled us to determine that the function of the current effect of advertising messages of enterprises is a periodic function able to be presented in Fourier series on an interval. It provides the opportunity for modeling reaction of sales of advertising messages of enterprises in the form of a continuous function.

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UKRAINIAN BUDGET SECURITY: FOUNDATIONS AND DIRECTIONS OF PROVISION IN TERMS OF THE DIGITAL ECONOMY DEVELOPMENT

Abstract. The development of the research on state budget security and main methodological framework and directions of its ensuring for the national economy steadiness increases.

Theoretical bases of the state budget security are founded on the updated theories of state finances, budget and economic security. Methodological bases of the research are founded on dialectical, functional, protective and system approaches, according to which budget and economic security are reviewed in their cause and effect dependence.

Conceptual bases of the budget security are developed and its place in the system of state economic security is defined.

Initial categories of the state budget security research related to the concept content, such as “budget”, “budget process”, “budget system”, “security”, “budget security” are defined.

It has been determined that the state budget is a systemically important state budget security element, and a form of budget security aspect is reflected in the system of assessments that characterize its level in dynamics and relatively optimal value of indicators and integral index.

The object of budget security is the level of state budget execution, efficiency of the budget resources usage, budget process, and budget system.

The object of budget security is activity of state authorities, financial institutions, and budget policy instruments aimed at the implementation of an adequate level of budget security in terms of the digital economy development in Ukraine.

The state policy strategic priorities concerning strengthening of budget security under current conditions are offered. The criteria for the effectiveness of the strategic priorities of the budget policy in accordance with the provision and strengthening of the state budget security are determined.

The essence and role of budget security as the dominant component of financial security of the state are determined. The structure and main characteristics of the Ukrainian budget security have been developed. The main strategic target priorities while forming the directions of ensuring budget security of Ukraine in terms of digital economy development are proposed.

The applied recommendations create a sound basis for building an entire system for ensuring Ukraine budget security. The research scientific results were used by the state and local authorities while improving the existing regulatory and methodological provision, and creating policy documents for the safe budget system development and inter-budget relations in Ukraine. In particular, strategic priorities for ensuring budget security have been implemented in the work of the Budget Committee of the Verkhovna Rada of Ukraine when adopting a draft bill and preparing appropriate recommendations for legislative documents of the budget process organization.

Jel Classification System: A 10, F52, O 10, P 41, Q 01, R 10, R 58

Keywords: security, security budget, financial security, the state budget, threat, budget policy

Introduction Ukraine is facing extremely complex and responsible tasks related to the scale of global problems that are on the agenda and constitute significant threats to Ukraine's budgetary security by hampering the effective development of the national economy.

The basis of the state financial stability under globalization is improvement of the budget process and directions on the effective budget system formation from the standpoint of safe development, while the proper place should be given to the issues of strengthening the state budgetary security.

The mentioned above actualizes an in-depth study of the theoretical and methodological foundations of budget security and the directions of its provision.

Conceptual approaches to the definition of the essence and content of the budget security concept have been investigated by domestic experts (Baranovsky, 2014; Vlasyuk, 2016)¹⁹⁸. Budget security has been considered in

¹⁹⁸Baranovs'kyi, O. (2014). Security philosophy: monograph: in 2 t. Kyiv: UBS. NBU, pp. 11-81; Vlasyuk, O. (2016). National security of Ukraine: the evolution of domestic policy problems. National Institute of International Security Problems at the National Security and Defense

ensuring the strategy of socio-economic development of the state (Kolisnyk, 2009)¹⁹⁹. It separates the budget component and explores the threats and influence factors (Martyniuk, 2013)²⁰⁰. The studies of theoretical analysis on budgetary security are provided in the work by V. Muntian, G. Pasternak-Taranushenko, S. Pyrozhev and others. However, modern economic science lacks unambiguity in defining the notion of "budget security", theoretical substantiation of the essence and specifics as well as directions of its provision, so many questions are open and controversial.

Dynamics and polystructure of processes forming a system of budget security ensuring as well as their inadequate theoretical and methodological foundation require systematic scientific approach to the stated problem. The study of the principles of budget and other constituents of the state economic security provision in terms of the digital economy development is relevant.

The main principles of the state budget security are thematically disclosed within the theory of state finances, budget and economic security. At the basis of budget security theoretical generalization, the initial categories and related concepts such as "budget", "budget process", "budget system", "security", "budget security" are defined. Structural and functional analysis has been used to systematize the evolution of the state budget security scientific concepts. The preference is given to a system approach as it is aimed at defining the essence of the state budget security subject and the process as an independent system having numerous elements and relations concerning research subject formation and development. It is the budget system which possesses the leading role in the state financial system.

In fact, there is no component of national security that would not directly depend on the level of the state budgetary security. In terms of

Council of Ukraine. [online] Available at <http://www.niss.gov.ua/content/articles/files/Vlasuk-fin-99d56.pdf> [Accessed 17 December 2017].

¹⁹⁹Kolesnik, O. (2009). Budget to ensure security of socio-economic development: Author. Dis. candidate. Econ. Sciences specials. Ternopol, Ukraine.

²⁰⁰Martyniuk, V. (2013). Assessment of the national economy based on the integral index of economic security. *Economics, management, entrepreneurship*, 25 (I), p. 179-188.

European integration and financial globalization, each country seeks to preserve its financial independence, and therefore the state budget security is the dominant source of financial security. At the same time, the level of budget security is interdependent and interrelated with other components of the state national security.

At the current stage of security science development, budget security as an economic category, is poorly investigated and is mainly considered under financial or economic security.

Despite the urgency of the problem, today there is no single universally accepted definition for the essence of budget security; the semantics and morphology for this concept vary depending on the tasks, place, as well as the presence of internal and external threats at this stage of society development.

The urgency of the research of budget security issues at the current stage is due to the fact that Ukraine has a deficit state budget for many years, which requires the use of additional resources in the form of external and internal borrowings, money emissions and other measures that affect adversely the level of the state financial security as a whole.

Particular actuality of the state budget security study is explained by conditions of digital economy development, which is based on the digital informational technologies. This significantly influences the condition and states of the problem of provision not only the budget security but all the other constituents of Ukraine's national security.

At present, the digital economy is developing at an unpredictable speed, dramatically changing the essence of the very national economy, implementing qualitatively new managerial models based on the modern digital technologies, ensuring transition from effectiveness and rationality to focusing on openness, democratization, socialization, creativity of institutional processes, a variety of effective ways of the national economy development.

At the current stage of security science development, fiscal security as an economic category, is poorly investigated and is mainly considered under financial or economic security. However, in the scientific literature there are three main conceptual approaches to the definition of the essence of the state

budgetary security, but some scholars propose to consider this category comprehensively by combining existing approaches:

- 1) budget security as a condition for the budget system security from internal and external threats, which ensures the state ability to finance the realization of its functions in accordance with national interests;
- 2) budget security as a set of conditions for the budget system stability, a priority role, which is determined by the objective necessity for a balanced budget;
- 3) state budget security as a condition for the state solvency, taking into account the balance of revenues and expenditures of state and local budgets and the efficiency of using budget funds.

The most complete definition for the state budget security within the framework of the first conceptual approach was proposed by O. Baranovsky, according to which "one must understand budget security as a condition and measures for ensuring the budget sovereignty of the state (the possibility of implementing an independent fiscal policy taking into account the specifics of the the national budget system functioning); solvency (a budget potential level) of the state and its regions, local communities, economic entities and households in order to fulfill their functions and ensure functioning and vital functions, taking into account the balance of incomes and expenditures of the state and local budgets, corporate budgets and household budgets and expediency, legality, timeliness and socio-economic efficiency of using budget funds at all levels"²⁰¹.

The second conceptual approach is based on the understanding of the state budget security as the budget system stability, which ensures balanced and deficit-free budget.

²⁰¹Baranovsky, O. (2014). Security philosophy: monograph: in 2 t. Kyiv: UBS. NBU, p. 597.

In particular, according to S. Kireyev, fiscal security is characterized by the budget balance degree, hence the size of deficit or deficit-free budget, and the fiscal security level is inversely proportional to the budget deficit level²⁰².

The third approach is based on the understanding of fiscal security as defense of the budget system and all its elements from internal and external threats, which ensures the state ability to finance the realization of its functions in accordance with national interests, and this approach is followed by V. Dets²⁰³.

O. Demenok and V. Glukhova argue that fiscal security is the ability of the budget system to ensure the state financial independence and the effective use of its budget funds in the process of performing social protection functions; public administration and international activities; financing of science, education, culture, health care; ensuring the national security and defense, implementing the investment and environmental policies²⁰⁴.

O. Kolisnyk characterizes the theoretical approaches to a comprehensive understanding of fiscal security as an economic concept. Based on the use of philosophical categories "content" and "form", it is substantiated that the content of budgetary security manifests in the ratio of budget funds, parameters of their formation and distribution and the total needs for recipients of such resources; by the form, budget security is manifested in the system of assessments that characterize its level; the budget security objects are budget funds, quantitative and qualitative characteristics of their distribution between the links of the budget system, socio-political, legal and procedural aspects of the budget process, serving as indicators and criteria for assessing and ensuring the budget security; the subject is the activity of the state, aimed at guaranteeing a certain level of budgetary security by

²⁰²Kireyev O.I., Mishch V.I. (2005). Improvement of coordination of monetary and fiscal Policy: Information and analytical materials. Kyiv: Center Researches of the National Bank of Ukraine, 2005 - 96s.

²⁰³Dets, V. (2008). Intergovernmental budget adjustment in the system of economic security: Author. Dis. candidate. Econ. Sciences specials. Kyiv, Ukraine.

²⁰⁴Demenok O.V., Glukhov V.I. (2010). Ukraine security budget as part of the financial security of the state: state and prospects. Available at http://www.nbu.gov.ua/portal/soc_gum/nie/2010_1/016-022.pdf.

influencing its object²⁰⁵. Budget security is regarded as financial conditions expressed in the volume of budget resources and the principles on their formation and distribution, which ensures the ability of the state and society to self-preservation and development. According to the scientists' research, fiscal security is considered as a prerequisite for the implementation of the effective state of financial and economic policy as the basis for achieving the national interests. Rational budget use as the financial basis for state regulation of a market economy should ensure the regulation of economic and social processes aimed at society interests, create the preconditions for economic development in the country. Therefore, an important direction for economic policy is the balance achievement in the state financial sphere as an indispensable condition for the steady growth of the economy and the realization of national interests²⁰⁶.

When considering the budget security of the national economy from the standpoint of the system approach, it should be presented in the state economic security system, taking into account the provisions of the current legislation and guidance materials, that is, the method of regular relation of the system elements.

The system-forming element of budget security of the state is the state budget, which is a multi-aspect concept. As an instrument of state policy, budget plays a key role in ensuring social and economic development of the state and realization of its national interests, namely: the volume and structure of the revenue and expenditure parts of the budget influence the functioning of all economy sectors.

The essence of state budget security is investigated, its place in the general system of state economic security is determined. Financial globalization essence is investigated; its main characteristics are highlighted, influence objective preconditions and factors in budget security are studied. It

²⁰⁵Kolesnik, O. (2009). Budget to ensure security of socio-economic development: Author. Dis. candidate. Econ. Sciences specials. Ternopol, Ukraine.

²⁰⁶Baranovsky, O. (2014). Security philosophy: monograph: in 2 t. Kyiv: UBS. NBU, p. 607.

is proved that financial globalization as a contradictory process has a dual influence and generates asymmetry in the world economy development²⁰⁷.

In the scientific literature there are three main conceptual approaches to the definition of the essence of the state budgetary security, but some scholars propose to consider this category comprehensively by combining existing approaches.

The definition of the state budget security within the framework of the first conceptual approach is set out in the Methodological Recommendations on the calculation of the level of Ukraine's economic security. Also, the vast majority of scholars hold the first position, according to which the essence of budget security is considered as a condition of solvency and financial sustainability of public finances, which enables state authorities to perform their functions as effectively as possible.

The system approach, as a general scientific methodological direction of research, involves revealing the phenomenon essence, object and process as independent systems and have an integral set of elements and sets of relations between them.

Budget security of the state is an integral part of Ukraine's financial security subsystem, which is to preserve the financial system balance, ordering of intersystem links and elements determined by the purpose of the system functioning as a whole and the development of each of the subsystems.

An element of the system is a system component, which is conventionally regarded as indivisible depending on the specific research tasks. The elements of the Ukrainian economic security system are industrial, macroeconomic, foreign economic, energy, investment and innovation, social, demographic and food components (Figure 1).

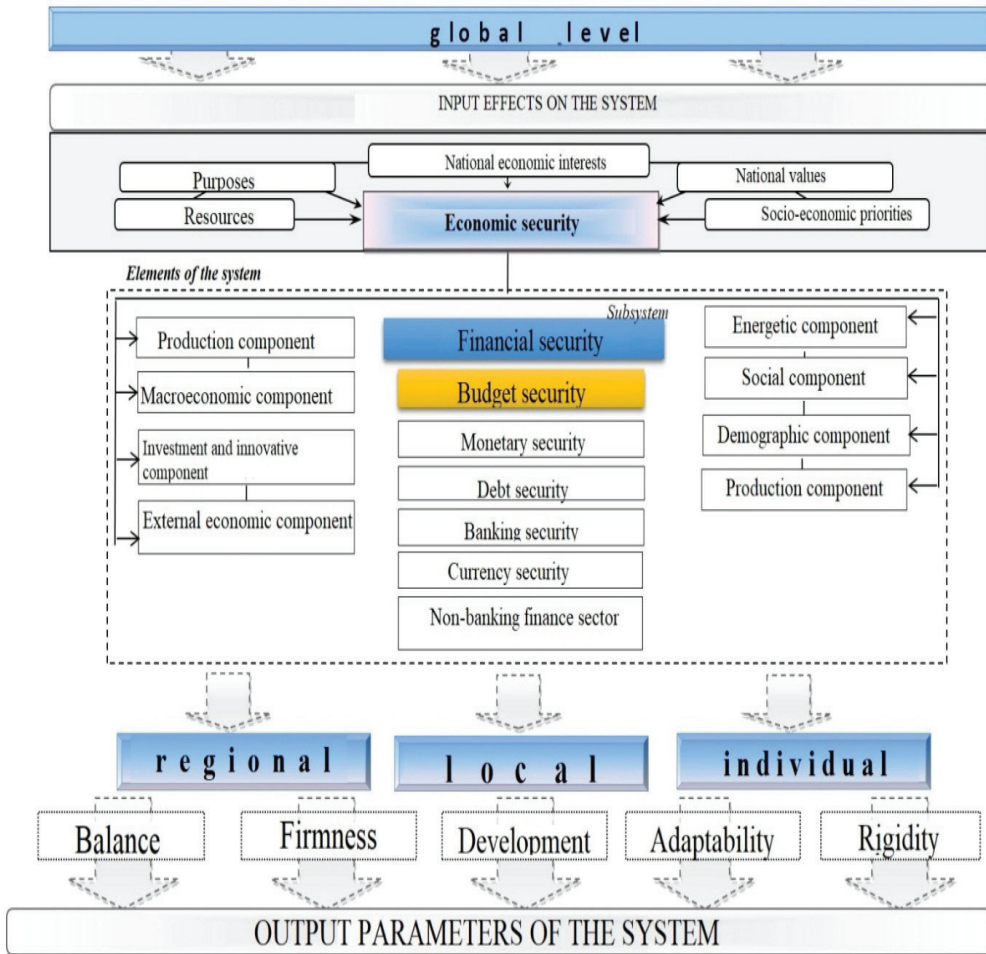
A subsystem is a part of a system where, unlike a system element, it is possible to distinguish other components. Such a subsystem of Ukraine's economic security is financial security, which, in its turn, has six components:

²⁰⁷ Budget Security of Ukraine: the essence, threats and ways of providing: a monograph / S.V. Onishchenko. – Kyiv: Knowledge of Ukraine, 2017. p. 59-60.

banking security, security of the non-bank financial market, debt, budget, currency and monetary security.

The elements and subsystems as a whole are components of the state economic security system. Such division of the system into separate elements and subsystems according to the system approach is ambiguous; it was carried out in order to study the integral level of the state economic security.

Figure 1. The place of budget security in the state economic security system



Source: compiled by the authors on the basis of research

The ratio between the components of the system is based on interdependence and interconditionality is determined by the notion of "relation". The main characteristics of the state budget security are public finances stability, the state budget balance, the effective use of budget funds, the balance of external and internal debt, which create the necessary financial conditions for a stable social and economic development in the country, show the decomposition of the Ukrainian budget security structure as a complex economic category.

It is expedient to consider the state budget security in two aspects of its manifestation: on the one hand, as a characteristic feature of the budget, which is its ability to function (security of the budget itself) at all levels of the budget system and at all stages of the budget process; and, on the other hand, as the basis for state funding through the budget by state authorities and local self-government as the basis for the achievement of national economic interests.

In view of the above mentioned, and based on the own ground work, we propose to regard the concepts within the functional and protective approach, namely, budget security as the level of the budget system ability, which provides for solvency and the state financial stability, effective use of budget funds, taking into account strategic priorities for budget relations development and the potential to confront and prevent internal and external threats.

The form of the budget security is embodied in the system of assessments that characterize its level in dynamics and the relatively optimal value of indicators and integral index. The object of budget security is the level of the state budget implementation, the efficiency of using budget resources, budget process, and budget system. The subject of budget security is the activity of state authorities, financial institutions, and budgetary policy instruments aimed at implementing a safe level of budgetary security.

Trends in the global community determine the dominant role of progressive public policy in budget security provision. The budget policy in Ukraine should be based on the implementation of best experience of developed countries in strengthening the financial framework of the state

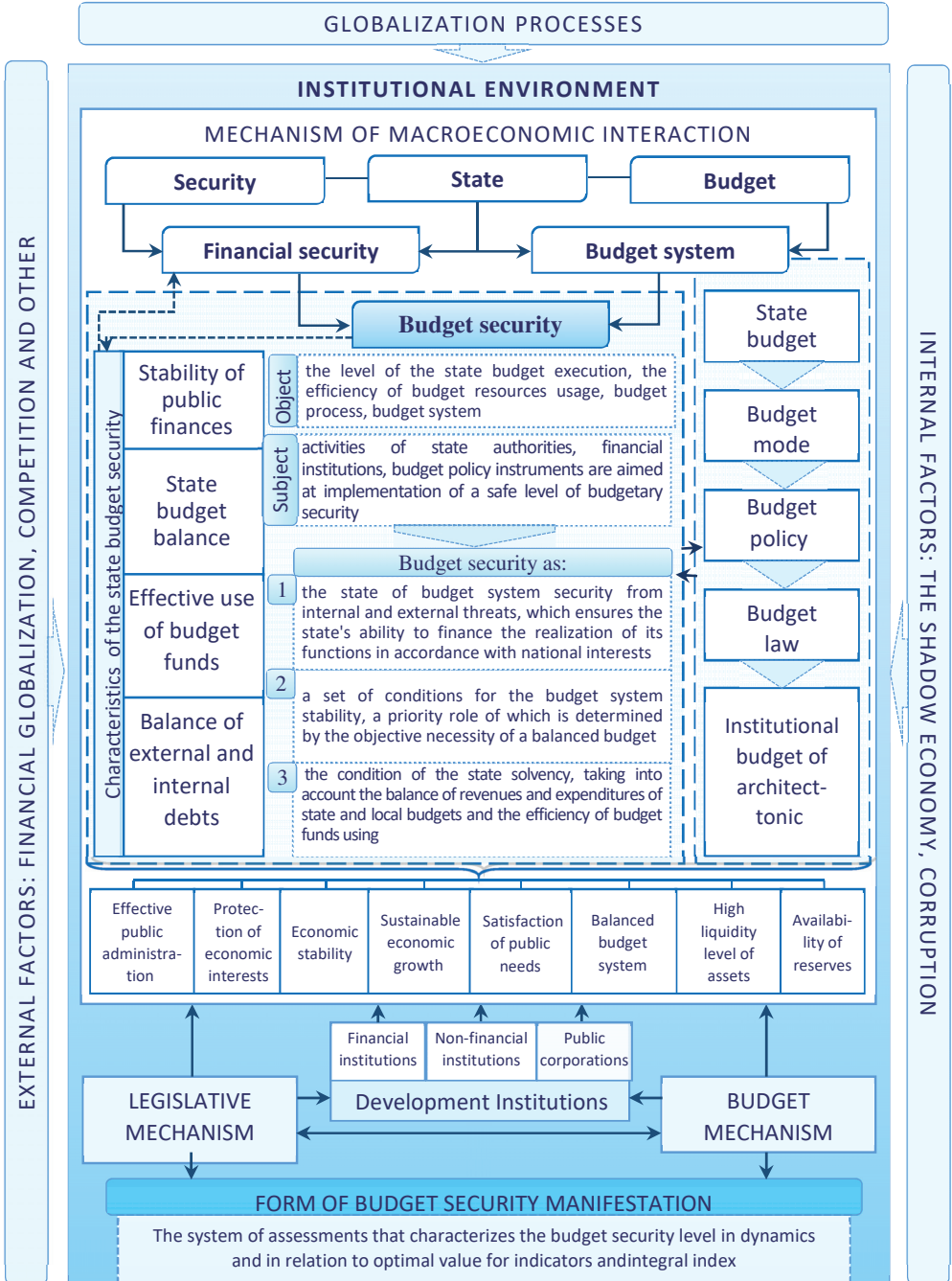
budget, increasing the responsibility of the budget process participants, increasing transparency at all stages of the budget process, developing medium-term budget planning and the program-target method, which can become an effective direction to increase the effectiveness of the participants of the budget process in Ukraine and contribute to raising the level of budget security of the state.

The provision of state budget security as an element of financial security subsystem and a complicated system of the state economic security has to take place grounded on detailed investigation on internal connections between other constituents and its components from positions of structural steadiness. In case of economic security system, internal environment functioning without controversy and conflicts to national economic interests, the economic security system gets adapted to external environment conditions without losing its steadiness and possible structural changes.

An important aspect of understanding the system properties of complex objects, considering the analysis of connections inside the system, is that on the one hand, it is possible to define and systematize the reasons of influence, on the other hand – correct its cause and effect connections. Aiming at this, it is necessary to monitor and predict the changes in indices of an object under research with the help of studying tendencies of strengthening or weakening of the defined cause and effect connection.

As far as an important property of the state economic security system is its directness, which is determined by adaptability of its functioning, the way of studying the mechanism of the system direct behavior lies in its model research. Grounded on the analysis of macroeconomic objects and processes modeling, there was offered a structural model of the state budget security as a complicated financial subsystem on the basis of identification of primary factors and conditions of occurring threats behind the spheres of financial activity, which makes it possible to neutralize the threats to the state budget security at the primary stage of their occurring, as well as minimize their influence viewing numerous changes in the financial system of Ukraine.

Figure 2. Decomposition of the Ukrainian budget security structure



Source: compiled by the authors on the basis of research

Using the tools of economics and mathematical modeling made it possible to quantify the parameters characterizing the process of the emergence and impact of threats to budget security. The structural model of the emergence and impact of threats to budget security state looks as:

$$M_B = V_B \cup W_B = (V_B((P \cap N \cap F) \leftrightarrow \{Q_i\}_{i=1}^n \leftrightarrow I)) \cup (f : W_B(\bigcup_{j,k} \alpha_{jk}) \rightarrow E) \quad (1)$$

where: MB - model of the emergence of threats to budget security and their impact on economic security in general;

V_B - areas of security budget threats;

W_B - impact of budget security on economic security in general;

P - current state of the real sector of the economy;

N - peculiarities of fiscal policy regulation;

F - globalization factors that affect the national economy;

Q_i - parameters that reflect the influence of factors on the budget state security;

I - Integral assessment of budget security;

α_{jk} - parameters that reflect the impact of budget security on other economic security types;

E - GDP of the country.

The spread of threats under the lack of effective mechanisms for their neutralization leads to the transformation of real threats to the system, which are the catalysts of additionally acquired threats. In turn, both systemic and extra acquired threats may act as factors and conditions for the emergence of others potential threats to the budget security of the state.

The proposed structural model of occurrence, distribution and influence of threats on budgetary security of the state are based on the following principles:

- 1) segmentation - the identification of threats is carried out according to their spheres of emergence within each of the economic security of the state components;

- 2) objectivity - the existence of a threat to economic security should be proven by means of economic and mathematical methods of statistical indicators analysis;
- 3) dynamics - detection and forecasting of threats is carried out according to the trends that shape the current state of the national economy;
- 4) completeness - all factors, phenomena, events and processes that are sources of threats, are subject to consideration, taking into account the negative consequences of their influence on the system of economic security;
- 5) significance - the simulation is subject to threats that objectively impede the realization of national economic interests and are the catalysts of destructive changes in the economic system.

In the absence of a timely and situational response to the existing threats, a gradual accumulation of them occurs, that prompts disruptive shifts both in budgetary security, as in the financial system of the state as a whole.

The system for assessing the level of fiscal security as a part of financial and economic should be clearly structured into organizational, informational, analytical and administrative sub-systems that, in turn, consist of separate elements.

The analytical subsystem of monitoring state budget security is based on collecting, processing and systematizing output macroeconomic indicators. The assessment of the state financial security is carried out by means of tools and methods for the consolidation of systemized information, regression, correlation, dispersion, discriminative, covariance and integral analysis. The organizational component is intended for the purpose, object and subjects of the financial security monitoring, and the informational component regulates a clear listing of statistical information, normative and procedural acts and instructive documents of diagnostics.

In this case, particular attention is paid to determining the level of the impact of threat on the integral level of the state budget security, in accordance with which a mechanism for prevention of threats is developed through their modeling and forecasting. From the practical point of view, the

level of threat has a direct correlation with the loss from it and the volume of resources necessary for its neutralization in the framework of a certain mechanism.

The trends in spreading threats in accordance with the modeling method are based on the dynamics of phenomena, events or processes that are sources of threats, since the emergence of contradictions in the realization process of national economic interests, the phase of their aggravation, regulation and liquidation of negative consequences. At the same time, it is fundamentally important to identify the moment of the threat transformation from a potential one to a real one in order to prevent such a phenomenon.

According to the developed model, the impact of threats on the level of budgetary security has been identified. In order to estimate the magnitude of such impacts, the coefficients of determination between indicators, reflecting the level of this threat, and integral indicators of budget security are determined.

The decomposition of sub-indexes of the budgetary security respective spheres and the calculation of the coefficients for determining the threat indicators and the integral index makes it possible to claim that in the present conditions, the maximal amount of the real threats to the state functioning is concentrated in the investment and innovation, production, demographic, energy and financial sectors of Ukraine's economic security.

There is a need for a more detailed study of the causes and factors of the impact on the level of budget security and its correlation with other components of economic security. In the course of the study, the correlation between the integrated estimate of budgetary security and the corresponding estimate of other types of security has been evaluated (Table 1).

The correlation relationship is a relationship between characteristics of socioeconomic phenomena, where the value of an effective characteristic,

apart from factor characteristic, is influenced by many other features that act in different directions simultaneously or sequentially ²⁰⁸.

The correlation relationship can only be found in the form of a general trend when comparing factors on a mass scale ²⁰⁹. When correlation is positive, the relationship between the values will be direct: if one value increases, the other one increases as well.

Table 1. Correlation relationship between budget security and other types of security

Security Type	Correlation Coefficient with Budget Security	Student's T-Test (Actual Value)	Student's T-Test (Table Value)	Conclusion on the Existence of Correlation
Industrial Security	0,324050803	1,28164506	2,144786681	Insignificant
Demographic Security	-0,06939584	-0,260282947	2,144786681	Insignificant
Energy Security	-0,30852344	-1,213591979	2,144786681	Insignificant
Foreign Economic Security	0,149021034	0,563881945	2,144786681	Insignificant
Investment and Innovation Security	0,794192997	4,890186458	2,144786681	Significant
Macroeconomic Security	0,233806979	0,899764348	2,144786681	Insignificant
Food Security	-0,455585348	-1,914917314	2,144786681	Insignificant
Social Security	-0,133418701	-0,503710357	2,144786681	Insignificant
Banking Security	0,537725262	2,386354735	2,144786681	Significant
Non-Bank Financial Market Security	0,587477823	2,716301731	2,144786681	Significant
Debt Security	0,717705867	3,856427652	2,144786681	Significant
Budget Security	1	x	x	X
Currency Security	0,542539186	2,416573881	2,144786681	Significant

²⁰⁸ Onyshchenko S.V. Systemic interrelations of fiscal security in the conditions of financial globalization // Bulletin of the University of Dnipropetrovsk. Series: Innovation Management. - 2016. - Vol. 24, Issue 7. - S. 250-258.

²⁰⁹ The general concept of the correlation-regression analysis method. Statistical terminology. [Electronic resource] – Available at: <http://credobooks.com/korelyacijnij-analiz-2>.

Monetary and Credit Security	-0,282834056	-1,103317865	2,144786681	Insignificant
Financial Security	0,775815952	4,600673282	2,144786681	Significant
Economic Security	0,528193908	2,32748238	2,144786681	Significant

Source: calculated and designed by the authors

When correlation is negative, the relationship is reverse: an increase in one value is associated with a decrease in the other. The degree of correlation is measured with different relationship indicators. Such indicators are correlation coefficient, correlation ratio, etc. The correlation coefficient acquires values from -1 to 1. The closer it is to 1 in the absolute value, the stronger the correlation. If the correlation coefficient equals 0, then there is no linear correlation between the variables. In order to test the significance of the correlation coefficients, the Student's t-test has been used according to the formula (2):

$$t = r \sqrt{\frac{n-2}{1-r^2}}, \quad (2),$$

where r is the correlation coefficient, and n is the number of initial data.

If this value in absolute magnitude exceeds the critical (table) value, then the correlation coefficient is significant and one can speak about the existence of the correlation relationship.

It has been established that the level of budget security is substantially related to other security components, such as: investment and innovation security, banking security, non-bank financial market security, debt security, budget security, currency security, financial security and economic security.

The equation of linear regression for estimating budget security by other types of security has been constructed. For these equations, determination coefficients R^2 have been established and graphs have been produced. The equation of pair linear regression takes the form $\bar{y} = ax + b$ where \bar{y} is the average value of the effective indicator (estimate of budget security); x is the factor affecting a and b , which are regression coefficients. If $a > 0$, then when

factor x increases, the estimate of budget security increases as well. If $a < 0$, then factor x increases, and it decreases. To verify the adequacy of the equation, we establish the determination coefficient by the formula (3).

$$R^2 = 1 - \frac{\sum (y_i - ax_i - b)^2}{\sum (y_i - \bar{y})^2} \quad (3),$$

Where y_i is an estimation of budget safety in a i -year, x_i is an estimation of factor in a i -year; \bar{y} is average meaning of the value of budget safety during these years. The nearer R^2 to 1, the stronger connection is there between x and y . For the adequacy verification the Fisher's criterion is used. Thus, its actual value is calculated with formula (4)

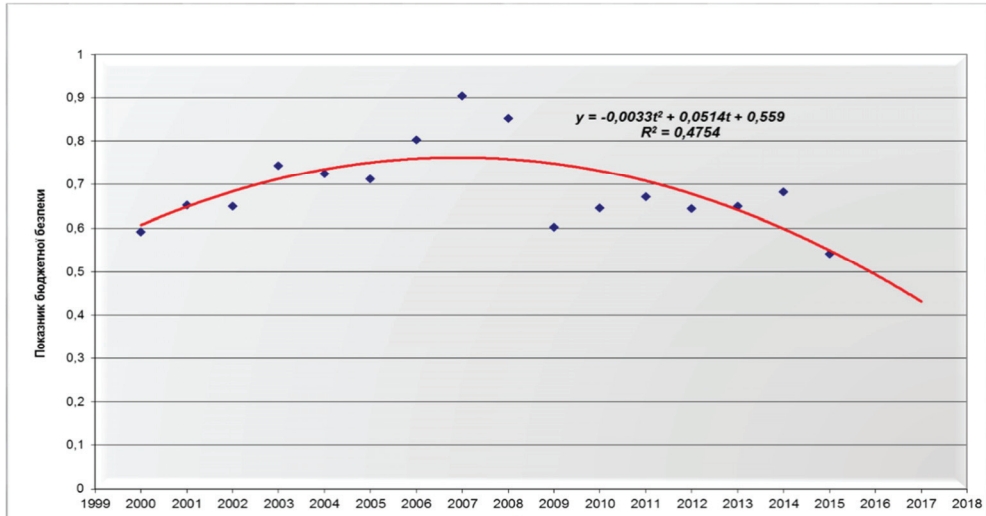
$$F = \frac{R^2}{1 - R^2} (n - 2) \quad (4),$$

Where R is a coefficient of determination; n is an amount of initial data. If this value according to absolute value exceeds critical (tabular) one, then equalization is adequate.

Equalizations that describe dependence of integral index of budget safety on the indicated factors are built. The dynamics of index of budgetary safety for 2000-2015 years are investigated and on the basis of these data the prognosis of this index for two years is done (pic. 3). A quadratic function ($y = -0,0033t^2 + 0,0514t + 0,559$) is used for a prognosis. A prognosis showed, in maintenance in the nearest years of present tendency in the dynamics of economic security indexes, budget strength security will be reduced.

It is determined that the integral index of the budget security strength has its fundamental connection with the estimations of investment and innovative, bank, safety of nonbanking financial market, money-and-credit, promissory, currency, financial and economic safety.

Figure 3. Dynamics and prognosis of integral index of budget safety of Ukraine



Source: calculated and built by authors

Direct dependence and the biggest influence on dissatisfaction budget strength security was entailed by fully dangerous currency and promissory strength securities, that in a complex with the increase of the external borrowing of government resulted with the increase of general national volume and assured by the state debt to the absolutely dangerous values, that strengthen default risks.

A digital economy, that opens new powerful possibilities for the state, society and citizens, has an important value in the system of providing of budget safety of Ukraine. The Cabinet of Ministers of Ukraine accepted Conception of Development of Digital Economy and Society of Ukraine for 2018-2020 and confirmed the plan of events in relation to its realization. The adoption of the digital economy of Ukraine will help to provide all constituents of national safety, including the budget safety of Ukraine, particularly through active and effective financial policy.

In the strategic planning, budget security is guaranteed only by a competitive economy, which can be built exclusively through the revival and accelerated development of promising sectors of the national economy under

sound budget policies. Instead, now there is a tendency to only take measures to stabilize the political and social and economic situation in Ukraine.

The major target strategic priorities while forming the directions for Ukraine budget security provision should be as follows: ensuring national security interests and implementation of national economic interests; ensuring credit worthiness, financial stability and keeping the balance of Ukrainian budget system; decreasing the state debt dependency; effective execution of the revenue and expenditure parts of the consolidated and state budget and public obligations; stimulating the development of budget-forming industries and strategically important enterprises.

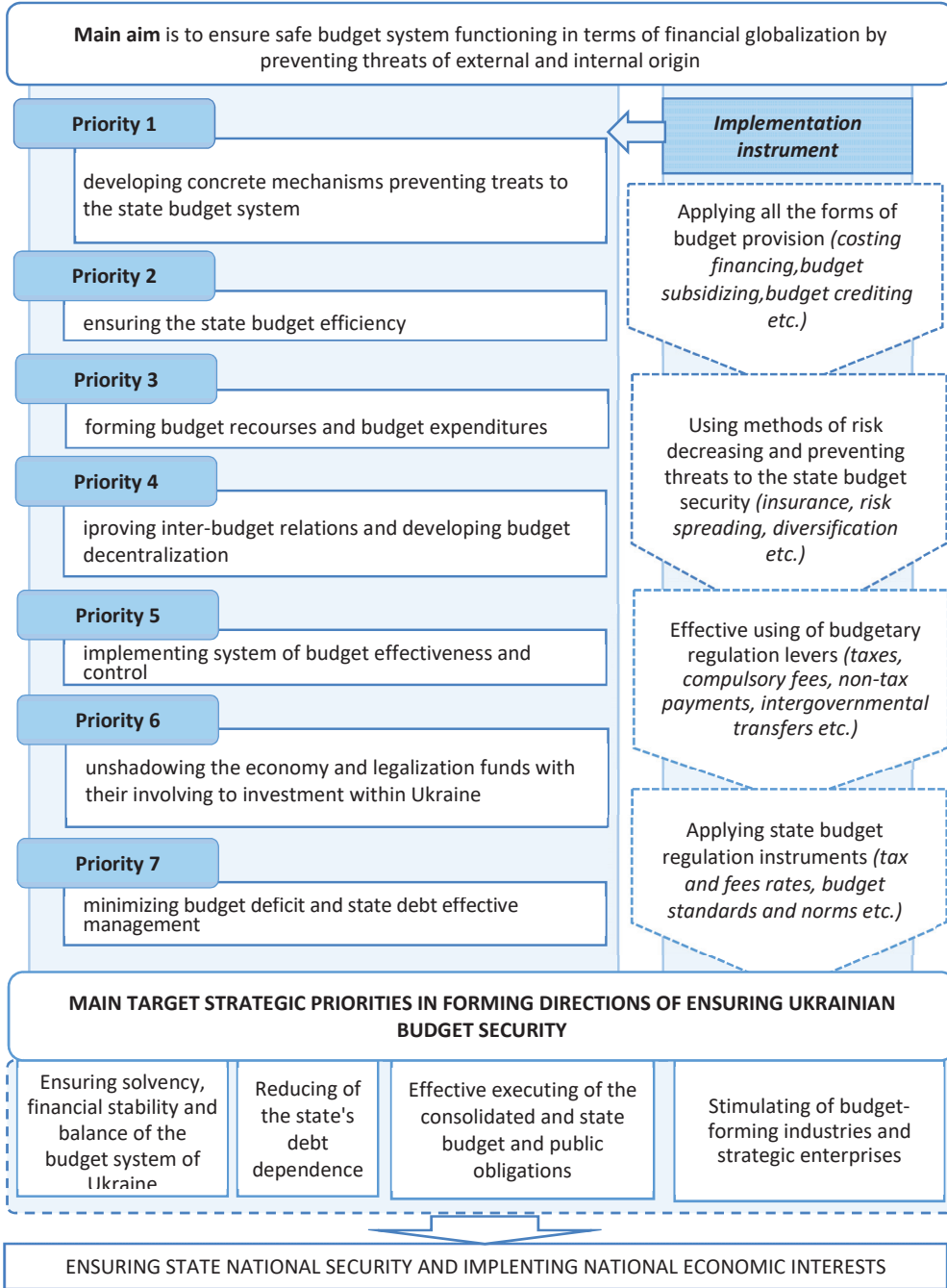
The main task of the state financial policy in the context of strengthening budget security is to create such an economic, social, political and legal environment, and institutional support that would stimulate the balancing of the budget and tax process (Figure 4).

This process has to be followed by the realization of appropriate priorities for budget security strengthening, the most actual among which are the following:

- developing concrete mechanisms to prevent threats to the state budget system;
- ensuring the state budget efficiency;
- forming budget reserves and structuring budget expenditures;
- improving inter-budget relations and developing budget decentralization;
- implementing the budget effectiveness and control system;
- unshadowing the economy and funds legalization with their involving into investment within Ukraine;
- minimizing the state deficit, and state debt effective management.

System disproportions in the real sector of the national economy of Ukraine, underestimation of the role and value of development of the digital economy influence directly on the level of its competitiveness and state of budget safety.

Figure 4. Strategic priorities for ensuring Ukrainian budget security



Source: compiled by the authors on the basis of research

Conclusions. The study made it possible to define a dominant role and place of budgetary security in the system of financial and economic security of the state. The modern paradigm of security science shows that security is the most important category and a prerequisite for a balanced functioning of the social relations system that provides protection from global challenges and threats.

At the present stage of security science development three basic conceptual approaches to the definition of budget security as an economic category have been formed. A system-forming element of budget security in the state is the state budget, which is a multi-dimensional concept. The budget as an instrument of state policy plays a key role in ensuring the socio-economic development of the state and the realization of its national interests, in particular, the volume and structure of the revenue and expenditure parts of the budget affect the functioning of all economic sectors.

The statement of the theory of economic security as a complex polysystem phenomenon in terms of the essence, structure, characteristics and place of budget security as a dominant component of the financial security of the state, allowed using comparative and correlation-regression analysis to establish cause and effect relationships and to identify the main functional dependencies with all the components of the state economic security.

The strategic priorities are proposed, and the criteria of budget policy for strengthening budget security are defined, which envisages forming a favorable macroeconomic environment, development of the real sector of the economy, stability of state finances and creditworthiness of the state, and financial security of Ukraine.

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DO IMPERFECT FISCAL POLICIES LEAD TO UNEVEN YEAR-END SPENDING? THE COMPARISON OF UKRAINE & CANADA

Abstract. Many organizations have budgets that expire at the end of the year and they may face incentives to rush to spend resources on projects at the year-end. We are testing this hypothesis using data from Ukraine's and Canada's state budgets for 2013-2017. Budget expenditures for the last quarter of the fiscal year exceed the average and for the first quarter they are lower than they should be on average.

Jel Classification System: E62, H30, H60

Keywords: fiscal policy, spending, revenues, budget, state budget, quarterly spending, quarterly revenues, monthly revenues, monthly spending, Canada, Ukraine, budget execution.

Introduction. It is known that in Ukraine a fiscal policy became a state policy only in the 90s. Until that it was a part of the centralized fiscal policy of the USSR.

After the declaration of independence, Ukraine started to introduce the scientific substantiation and practical implementation of decisions and measures aimed at improving the performance of a fiscal policy, so it is important to study the nature of this policy in order to use the positive experience of the developed countries.

In the researches on the functioning of the Ukrainian budget policy based on the example of foreign countries, the significant role is assigned to such scholars as Makarenko J.²¹⁰, Grady P.²¹¹, Liebman J., Mahoney N.²¹²,

²¹⁰Makarenko J. Federal fiscal policy in Canada: history, operations and trends of global recession [Electronic resource] / Jay Makarenko. - 2009. – Available at: <https://www.mapleleafweb.com/features/federal-fiscal-policy-canada-history-operation-and-trends-global-recession>

²¹¹Grady P. Budgetary Policy [Electronic Resource] / P. Grady, G. Mcintosh. - 2015. – Available at: <https://www.thecanadianencyclopedia.ca/en/article/fiscal-policy>.

McPherson M.²¹³, Maksimova O. I.²¹⁴, Dlugopolsky O.V.²¹⁵, Artus M.M.²¹⁶, Frolov S.M., Sklyar I. D.²¹⁷ et al.

However, the complexity and ever-growing importance of the fiscal policy implementation have determined the purpose of this article that is to produce the general comparative characteristics of the fiscal policy activities of the two countries concerning the state budget spending.

The important issue in the implementation of fiscal policy measures is the problem of the equal distribution of the budget spending during the budget year, including those at the end of the budget year.

The budget year in Ukraine coincides with the calendar year and lasts from January 1st to December 31th, in Canada the budget year lasts from April 1st to March 31th, in the United States the budget year lasts from October 1st to September 30th. Many factors in Ukraine and Canada, as well as in other countries, affect uneven distribution of the state budget spending during the year and the lower spending in the first quarter and the increased spending in the fourth quarter of the budget year and especially, in December, the last month of the budget year.

Various factors influence the situation of uneven distribution of the state budget spending throughout the year - the legal and regulatory framework for the execution of budget spending; connection with other parts of the budget system and other financial funds (local budgets, pension, insurance and other

²¹²Liebman J. Do expiring budgets lead to wasteful year-end spending? Evidence from federal procurement [Electronic resource] / J. Liebman, N. Mahoney. – 2018. – Available at: <https://www.nber.org/papers/w19481.pdf>.

²¹³McPherson, Michael. 2007. "An Analysis of Year-End Spending and the Feasibility of a Carryover Incentive for Federal Agencies." Master's diss. Naval Postgraduate School. – Available at: <https://apps.dtic.mil/dtic/tr/fulltext/u2/a475973.pdf>.

²¹⁴Maksimova O. I. The system of public administration in Canada: experience for Ukraine / O. I. Maksimova, Yu. V. Kovbasyuk. - Kyiv: NADU, 2010. - 60 p. - (Series of publications on international experience of public administration).

²¹⁵Dlugopolsky O. V. The Experience of the USA, Canada and Japan in the Application of the Fiscal Consolidation Mechanism / O. V. Dlugolsky. // ECONOMY: realities of time. Scientific Journal. - 2013. - №4. - P. 167-173.

²¹⁶Artus M. M. The Budget System of Ukraine / M. M. Artus, N. N. Hija. - Kyiv: European University, 2005. - 220 p.

²¹⁷Frolov S.M. Budget Management of the Border Territories / SM Frolov, I. D. Sklyar. - Sumy: Sumy State University, 2012. – 50 p.

funds); the capabilities and functions of budget execution agencies — banks, treasuries, etc.; budget planning; organization of accounting and reporting on the budget spending; public and departmental control over budget execution; transparency of the budget process for budget execution and the ability of the public to check and evaluate the quality of budget execution by spending; the organization of state, public and departmental control over budget execution; the requirements for compliance with budget discipline and the measures of responsibility for its observance, as well as, other factors and causes.

The even execution of budget spending within the budget year favors the quality execution of spending, the full and timely financing of institutions and events, the improvement of the quality of their work, increases the quality of state execution of its functions through the budget system and creates the basis for a positive solution of social and economic issues of the state and its citizens that depend on the state budget policy, etc.

On the other hand, uneven financing of the state budget spending within the budget year can lead to a decrease in the quality of expenditure execution, untimely and incomplete financing of institutions and activities, violate the quality of state execution of its functions through the budget system, create the basis for additional accumulation of social and economic problems of the state and its citizens, etc.

The fiscal policy is the organization of the state budget process and it consists of two parts. The first is the development of the budget execution program and the second is the practical implementation of the planned activities. As will be shown below, these two sides of the budget policy do not coincide. The state budget policy has its own levers (methods); incentives and sanctions; tools and other components.

We will make an assessment of the uniform distribution of expenses throughout the year by quarters and months based on the comparison of expenses with the highest level to total expenses for the year (high) with those with the lowest level (low). With a uniform distribution of expenses this indicator should be equal to one.

The analysis of quarterly execution of the state budgets of Ukraine and Canada for 2013-2017 is presented in Tables 1 and 2. Each quarter of the year accounts for 25 percent of annual spending. As can be seen, for Ukraine (Table 1) the equal financing of budgetary spending is not observed for the quarters – 21 percent in the 1st quarter, 23 percent in the 2nd, 24 percent in the 3rd, and 32 percent of total spending in the 4th quarter.

Table 1. The analysis of the quarterly spending of the revenues and spending of Ukraine for 2013-2017 as a percentage of the total

Quarter of the budget year	Revenues			Spending		
	Average	High	Low	Average	High	Low
1. (January - March)	22,34	24,87	20,96	20,65	22,07	18,35
2. (April- June)	24,77	27,75	22,14	23,05	24,00	21,51
3. (July -September)	24,44	26,11	23,03	24,06	25,04	22,18
4. (October-December)	28,45	33,87	26,07	32,24	35,84	29,58
Total	100,00			100,00		

Source: compiled by the author on the basis of²¹⁸

Thus, spending in the fourth quarter exceeded spending in the first quarter of the budget year by one and half times. The highest share of expenses in the fourth quarter was 36 percent in 2015, while the lowest share of expenses in the first quarter was 18 percent of total expenses. The same picture is observed in the execution of budget revenues, where revenues in the fourth quarter exceeded revenues in the first quarter of the fiscal year by one third.

On the other hand, in Canada (Table 2) the uniformity of financing of budget spending by quarters is observed at a higher level - in the 1st, 2nd and 3rd quarters - 24 percent and in the 4th quarter 27 percent of total expenses. Thus, spending in the fourth quarter was 10 percent more than spending in the first quarter of the budget year. The highest share in the fourth quarter

²¹⁸Implementation of the state budget of Ukraine [Electronic resource] – Available at: <https://index.minfin.com.ua/finance/budget/gov/>.

was 28 percent in 2014, while the lowest share of expenses in the 1st quarter was 24 percent of total expenses in 2015, 2016, 2017. When executing revenues, the revenues of the 4th quarter were more than the revenues of the 1st quarter of the fiscal year.

The analysis of the monthly execution of the state budgets of Ukraine and Canada for 2013-2017 is presented in Tables 3 and 4. Each month of the year accounts for approximately 8 1/3 percent. As can be seen, for Ukraine (Table 3) the equal financing of budget spending by months is not observed - in January, the share was 5.7 percent of total expenses, and in December - more than 14 percent.

Table 2. The analysis of the quarterly spending of the revenues and spending of Canada for 2013-2017 as a percentage of the total

Quarter of the budget year	Revenues			Spending		
	Average	High	Low	Average	High	Low
1. (April-June)	24,82	25,00	24,45	23,91	24,27	23,63
2. (July -September)	23,28	23,55	23,04	24,28	24,97	23,45
3. (October-December)	24,65	25,06	24,12	24,52	25,07	24,15
4. (January - March)	27,25	27,96	26,52	27,29	27,72	26,95
Total	100,00			100,00		

Source: compiled by the author on the basis of ²¹⁹

Thus, spending in the last month of the year exceeded spending in the first month of the budget year by two and half times. The highest share of expenses in December was 17 percent in 2015, and the lowest share of expenses in January was 5 percent. When spending is observed, a smoothed uniformity is observed - the revenues of the last month of the year exceeded the revenues in the first month of the budget year by 65 percent. It is not hard to imagine the burden which is placed on a staff of budget organizations who receive funds and on a staff of state budget bodies allocating and financing

²¹⁹Fiscal Monitor [Electronic resource] – Available at: <https://fin.gc.ca/pub/fm-rf-index-eng.asp>.

these expenses at the end of the budget year - and this is despite the fact that at the beginning of the budget year financing amounted to only 1/3 of the year-end amount, that is, at the end of the year, in December, there is a stress of overload in financing expenses, and at the very beginning of the budget year - in January, there comes a shock from underfunding of expenses.

Table 3. The analysis of the monthly revenues and spending of the state budget of Ukraine for 2013-2017 as a percentage of the total

Month	Revenues			Spending		
	Average	High	Low	Average	High	Low
January	6,06	7,49	4,18	5,70	6,22	5,20
February	7,19	9,23	6,63	6,65	8,07	4,36
March	9,09	10,21	7,91	8,30	9,68	6,69
April	8,76	10,72	6,58	7,54	8,42	6,64
May	8,14	8,62	7,67	7,55	7,95	7,03
June	7,87	8,71	7,08	7,96	8,15	7,72
July	6,89	8,08	5,79	7,35	8,48	6,51
August	9,43	10,07	8,24	7,77	8,17	6,87
September	8,12	9,72	7,33	8,94	9,83	7,79
October	8,23	9,09	7,78	8,67	9,93	7,70
November	10,19	12,96	8,29	9,33	10,47	8,66
December	10,03	11,82	8,67	14,24	16,70	12,16
Total	100,00			100,00		

Source: compiled by the author on the basis of ²²⁰

On the other hand, in Canada (Table 4), the uniformity of financing of budget spending by months is carried out at a much higher level - for 11 months of the budget year financing amounted to 7.8-8.4 percent of total expenses for the year and only in March - last month of the budget year, the share of spending amounted to more than 11 percent. Thus, spending in the last month of the year exceeded spending in the first month of the budget year by one third. The highest proportion of spending in March (11.3 percent)

²²⁰Implementation of the state budget of Ukraine [Electronic resource] – Available at: <https://index.minfin.com.ua/finance/budget/gov/>.

was in 2015, and the lowest in August was 7.1 percent of total spending for 2014. Even having much more organized, comparing to Ukraine, monthly allocation of budget funds, in 1987 the Chancellor of Canada's Treasury called this uneven allocation of budget funds at the end of the year "March Madness". American researchers note that at the end of the budget year, the desire to use the allocated budget funds as soon as possible is so tense that "merchants and contractors camped outside contracting offices in September, 30th (the close of the budget year) just in case money came through to fund their contracts". The suspension of the Government Shutdown 2019, 2018, and 2013²²¹ can be recalled.

Table 4. The analysis of the monthly revenues and spending of the state budget of Canada for 2013-2017 as a percentage of the total

Month	Revenues			Spending		
	Average	High	Low	Average	High	Low
April	8,41	8,65	7,86	8,06	8,36	7,83
May	7,99	8,33	7,41	7,81	7,87	7,78
June	8,42	8,71	8,25	8,04	8,13	7,84
July	8,08	8,63	7,59	8,17	8,35	7,85
August	7,51	7,96	7,05	7,96	8,57	7,15
September	7,69	8,09	7,37	8,16	8,93	7,83
October	7,87	8,51	7,21	8,21	8,47	8,01
November	8,01	8,33	7,66	8,15	8,30	8,04
December	8,77	9,10	8,38	8,16	8,29	7,93
January	9,14	9,50	8,67	8,37	8,62	8,11
February	9,29	9,91	8,70	7,81	8,03	7,64
March	8,81	9,92	8,32	11,10	11,37	10,85
Total	100,00			100,00		

Source: compiled by the author on the basis of²²²

Such an uneven distribution of budgetary funds at the end of the budget year leads to various factors - the severity of budget allocation within one budget year; the absence of multi-year budget planning and budget planning

²²¹Cocane E. End of Government Shutdown May Depend on the Definition of 'Wall' [Electronic resource] / E. Cocane, J. Medina. – 2018. – Available at: <https://www.nytimes.com/2018/12/26/us/politics/government-shutdown-wall.html>.

²²²Fiscal Monitor [Electronic resource] – Available at: <https://fin.gc.ca/pub/fm-rf-index-eng.asp>.

based on the principle of “planning from what has been achieved”, in which the principle of “use or lose forever” operates at the year-end ; the prohibition of the use of budget savings for other purposes of public institutions, etc.

In Canada, in contrast to Ukraine, there is a reporting cycle on public spending ²²³, which provides for 3 periods of parliamentary deliveries - 1 period from April 1st to June 23rd, 2 - from June 24th to December 10th, 3 - from December 11th to March 26th.

Such an uneven distribution of revenues and spendings of the state budget leads to the fact that the result of budget execution — a surplus or deficit accumulates and is recorded at the end of the budget year. The tables below show that for the analyzed period, with quarterly analysis, the deficit of the last quarter in Ukraine was 62 percent of the total annual budget deficit, and in Canada - 28 percent.

Table 5. The result of the quarterly execution of the state budget of Ukraine for 2013-2017 (mln. UAH)

Quarter of the budget year	Revenues	Spending	Result (surplus, - deficit)
1. (January - March)	589716	615169	-25453
2. (April- June)	654103	686447	-32344
3. (July -September)	645432	716460	-71028
4. (October-December)	751249	960148	-208899
Total	2640500	2978224	-337724

Source: compiled by the author on the basis of ²²⁴

Table 6. The result of the quarterly execution of the state budget of Canada for 2013-2017 (mln. USD)

Quarter of the budget year	Revenues	Spending	Result (surplus, - deficit)
1. (April-June)	352197	350226	1971

²²³The Reporting Cycle for Government Expenditures [Electronic resource]. – 2010. – Available at: <https://www.canada.ca/en/treasury-board-secretariat/services/planned-government-spending/expenditure-management-system/reporting-cycle.html>.

²²⁴Implementation of the state budget of Ukraine [Electronic resource] – Available at: <https://index.minfin.com.ua/finance/budget/gov/>.

2. (July -September)	330366	355594	-25228
3 . (October-December)	349873	359045	-9172
4. (January - March)	386655	399580	-12925
Total	1419091	1464445	-45354

Source: compiled by the author on the basis of ²²⁵

With a monthly analysis of budget execution, the budget deficit in the last month of the budget year in Ukraine was 47 percent, and in Canada 83 percent. Accounting for budgetary operations in Ukraine is carried out only on a cash basis, which provides for the reflection of operations at the time of movement of funds. The introduction of accounting for the budget deficit in accordance with the accrual method would make it possible to correctly determine the volume of the budget deficit.

Table 7. The result of the monthly execution of the state budget of Ukraine for 2013-2017 (mln. UAH)

Month	Revenues	Spending	Result (surplus, - deficit)
January	159929	169883	-9954
February	189882	198149	-8267
March	239905	247137	-7232
April	231337	224520	6817
May	214854	224771	-9917
June	207912	237156	-29244
July	182032	218999	-36967
August	248978	231274	17704
September	214422	266187	-51765
October	217374	258086	-40712
November	269008	278012	-9004
December	264867	424050	-159183
Total	2640500	2978224	-337724

Source: compiled by the author on the basis of ²²⁶

²²⁵Fiscal Monitor [Electronic resource] – Available at: <https://fin.gc.ca/pub/fm-rf-index-eng.asp>.

²²⁶Implementation of the state budget of Ukraine [Electronic resource] – Available at: <https://index.minfin.com.ua/finance/budget/gov/>.

Table 8. The result of the monthly execution of the state budget of Canada for 2013-2017 (mln.USD)

Month	Revenues	Spending	Result (surplus, - deficit)
April	119343	118099	1244
May	113435	114409	-974
June	119419	117718	1701
July	114609	119630	-5021
August	106559	116525	-9966
September	109198	119439	-10241
October	111689	120198	-8509
November	113715	119418	-5703
December	124469	119429	5040
January	129741	122578	7163
February	131903	114439	17464
March	125011	162563	-37552
Total	1419091	1464445	-45354

Source: compiled by the author on the basis of ²²⁷

As can be seen, from the comparative analysis of the GDP dynamics for 2013–2017, in both countries a certain decrease in GDP is observed during this period. However, in Canada, in which the level of budgetary discipline with financing expenses is much higher than in Ukraine, the decline in GDP is observed in a much smaller amount. On the other hand, in Ukraine, where in the last month of the fiscal year the spending was almost three times higher than the spending in the first month of the budget year, the loss in GDP was 40 percent. Thus, the state budget of Ukraine has lost its function of an instrument of economic development.

Table 9. The comparison Ukraine and Canada GDP (bill. USD) 2013-2017

Years	Ukraine	Canada
2013	183,31	1 842,63

²²⁷Fiscal Monitor [Electronic resource] – Available at: <https://fin.gc.ca/pub/fm-rf-index-eng.asp>.

2014	131,81	1 799,27
2015	90,62	1 559,62
2016	93,27	1 535,77
2017	112,15	1 653,04
2017 to 2013 (percent)	61,18	89,71

Source: compiled by the author on the basis of ²²⁸

From a comparative analysis of the index of democracy in 2018, it is clear that Ukraine is in 84th place, the index of political culture is approaching the indices of Canada and the United States, but the index of the functioning of the government is 3 times less than in Canada and 2 times less than in the USA, that is, to improve the work of the government, including in the fiscal area is very relevant to Ukraine.

Table 10. The democracy index 2018 in Ukraine, Canada and the USA

Indicators	Ukraine	United States of America	Canada
Rank	84	25	6
Political culture	6,25	7,5	8,75
Functioning of government	3,21	7,14	9,64

Source: compiled by the author on the basis of ²²⁹

Conclusions. A comparison of budget spending and revenues of Ukraine and Canada by quarters and months has been made. It was found that in Canada, the gap between the first and last quarter and the month of the budget year is much smaller than in Ukraine. The main factors influencing the content of state budget spending have been indicated. The advantages, disadvantages and threats from uneven financing of budget spending by quarters and months of the budget year have been presented. The comparison

²²⁸Canada - Gross Domestic Product [Electronic resource] – Available at: <https://knoema.ru/atlas/%D0%9A%D0%B0%D0%BD%D0%B0%D0%B4%D0%B0/%D0%92%D0%92%D0%9F>.

²²⁹Democracy index 2018 [Electronic resource] – Available at: http://www.eiu.com/Handlers/WhitepaperHandler.ashx?fi=Democracy_Index_2018.pdf&mode=wp&campaignid=Democracy2018

of the GDP change rates for the analyzed period shows that less uneven spending of the budget at the end of the year in Canada has led to the positive results.

It is necessary for Ukraine to determine legislatively and normatively the provision concerning the state fiscal policy, as well as, the requirements for state bodies regarding the high-quality and effective execution of budgets. They must report on them and make appropriate decisions. After the adoption of the Budget Code in 2010, it is necessary not only to reform the institutional organization of the fiscal policy and improve the mechanism of its internal work, but also to increase the role of the fiscal policy in the economic life of a society and the state.

PART 4

THE NATIONAL ECONOMY IN DIGITALIZATION'S PERSPECTIVES

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PROGNOSIS AND ANALYSIS OF DIGITALIZATION OF THE UKRAINIAN ECONOMY

Abstract. The article presents the results of the availability of information services for all social strata of the population and the current state of digitalization. The basic characteristics of digitalization of the Ukrainian economy are revealed. The object of research is the process of digitalization of the Ukrainian economy. The research into a digital economy is a bit new for Ukrainian economic thought. At the same time, new technologies penetrate into entrepreneurial activity, public life, and public administration very quickly. In the last decade, technological processes in production, consumption and sales have changed radically under the influence of an information society. The social and practical significance of these changes is of substantial scientific interest, which determines the relevance of the research.

In addition, the article investigates and generalizes characteristics of special trends of the digital economy. The content of digitalization is outlined. It has been established that the introduction of the digital economy in Ukraine at an initial stage should take place simultaneously in the following three directions, namely: technological, production and institutional and economic.

It is argued that the digital age changes the approach to doing business, as well as the requirements for information technologies that are being employed: marketing, sales and service management systems; telephony and messengers; systems of document circulation and personnel management; accounting systems and many other corporate applications. Therefore, the aforementioned proves that the institutional changes in the economy in the direction of its full digitalization are a long-wave transformational process of a socio-economic and avant-garde character of the development of structural units, which manifests itself in reaching the peak indicators of innovation development.

The essence of the latest digital products and services (BioTech, NanoTech, BlockChain, RetailTech, FinTech, LegalTech, Digital-marketing, Grid-technology, GovTech, e-ID, TeleHealth,

ePrescription, e-Democracy, Digital-insurance), produced by the digital economy has been revealed.

It is concluded that revolutionary changes are inherent in digital development, and the most important result of digitalization, in modern conditions, is the automation of services. This type of transformation is characterized by instability, "innovation and digital explosions", cutting-edge discoveries that operate on new principles.

Jel Classification System: O33

Key words: digital economy, digital services, digitalization, digital technologies, information and communication technologies (ICTs), information and network economy, informatization, digital transformation, information society, digital infrastructure, digital competences.

Introduction. Digital technologies open up unique opportunities for the development of the Ukrainian economy and improve the quality of life of the citizens of the country.

If the state wants a quick transition to "digital", "digital" transformation must become the basis for life of Ukrainian society, business and state institutions, and it should become a familiar and everyday phenomenon, the basis of the well-being of Ukraine.

The notion of a digital economy is complex and multifaceted, and now in the scientific environment there is no consensus on what should be meant by this phenomenon. According to the most widespread definition, a digital economy should be regarded as that part of the economic activity, which is based on the use of digital technologies. The scale and essence of such activities are changing quickly: the digital economy, its volume and complexity of the structure are growing rapidly. Its direct impact on economic processes is obvious in each country. In Ukraine, similar processes began to develop actively somewhat later than in economically developed countries, due to a number of circumstances.

Analysis of recent research and publications. The study is based on the methodological provisions of the generally accepted concept of the digital economy. The results of monographic studies and publications in the domain of the information and network economy served as a methodological basis for the creation of the hypothesis of scientific knowledge. They are the works of

such well-known scientists in the field of economic theory as the academicians of the National Academy of Sciences of Ukraine O.H. Bilorus and V.M. Heiets, the members of the NANU A.A Hrytsenko and V.R. Sidenko, the professors T.I. Artiomova and O.L. Yaremenko and others. Instructive and methodical materials of the executive authorities - the Cabinet of Ministers of Ukraine, official statistical and evaluation data on the state of the process of digitalization of the Ukrainian economy became an information base of this analytical research.

Scientific works, researches and development of such well-known scientists and inventors as V. Isaacson, S. Brand, J. Wales, E. Williams, B. Gates, B. Elbrecht, D. Engelbart J. Lyclider, J. von Neumann, E. Peters, and S. Huntington are of great value in the scientific sense because they provide insights into the problems of the digital economy formation.

Ukrainian economists are also actively involved in creating the conceptual framework of the institutional palette of systemic researches on the digital economy. Among them, there are the names of V. Hroisman, V. Heiets, A. Hrytsenko, Ju. Zaitsev, S. Kubiv, A. Moskalenko, T. Efimenko. However, at the same time, a significant number of problems regarding the vision of the concept of digital development, the types of products and services that the digital economy produces and provides remain insufficiently discovered.

Setting the task / formulation of the research objectives. The purpose of the study is to systematize, synthesize and develop the scientific views on digitalization of the economy within the framework of the basic concepts and gain an in-depth understanding of the economic changes taking place in Ukrainian society for the theoretical substantiation and interpretation of economic categories under conditions of modern socio-economic transformations. The aim is to predict the dynamics of digitalization of the Ukrainian economy.

Digital technologies open up unique opportunities for the development of the Ukrainian economy and improve the quality of life of the citizens of the country.

If the state wants a quick transition to "digital", "digital" transformation must become the basis for life of Ukrainian society, business and state institutions, and it should become a usual and everyday phenomenon, the basis of the well-being of Ukraine.

Global leaders in the digital market such as Cisco, IBM, Intel, Oracle, Deloitte, SAP, Ericsson, MasterCard, Vodafone, Kyivstar, Lifecell, International Data Corporation, domestic advisers and experts supported by the Ministry of Economic Development and Trade and NGO "High Tech Office", have developed «Digital Agenda for Ukraine 2020», a document that identifies key policies, priority areas, initiatives and projects for "digitalization" of Ukraine for the next 3 years²³⁰.

Ukrainian politicians, central and local authorities, non-governmental organizations and business must take on their responsibility for support and active promotion of the country's development in this direction.

The Ukrainian policy towards "digitalization" focuses on all people, their intelligence, their talent, their natural desire to create. Under the established conditions and the joint efforts of the public, the authorities and businesses, Ukraine's enormous human potential should become human capital of a global significance and influence.

Digital technology is both a huge market and industry as well as a platform for the efficiency and competitiveness of all other markets and industries. According to the United Nations statement, everyone has a fundamental right to access to the Internet – an open, secure and free space, a network that spreads thoughts, ideas, information, and knowledge and enables people to communicate and socially interact.

The initiative "Digital Agenda 2020" plays a key role in ensuring this transformation. The organizational and legal support of the initiative, as well as the transition to "digital" technologies and the subsequent globalization associated with it will be of great importance, because they will change the

²³⁰ "Digital agenda of Ukraine 2020 ("Digital agenda" – 2020). Conceptual basis (version 1.0). Priority areas, initiatives, projects of "digitalization" of Ukraine by 2020", available at: <https://uccci.org.ua/uploads/files/58e78ee3c3922.pdf> (Accessed 22 Nov 2017)

conditions of existence of everyone in our society. Ukraine should take advantage of this, be part of this process and become a world leader of "digital" transformations.

"Everything that can be digitized has to and will be digitized."

The main objectives of the Concept that have to be reached in 2020 are:

The 30th place in the Networked Readiness Index rating (WEF) (in 2016 – the 64th place);

The 40th place in the Global Innovation Index ranking (INSEAD, WIPO) (the 56th – in 2016, the 50th – in 2017, and the 43th – in 2018);

The 50th place in the ICT Development Index rating (ITU) (the 79th place in 2017);

The 60th place in the Global Competitiveness Index rating (WEF) (in 2016 – the 85th place, and in 2017 – the 81th place).

In the era of a digital economy, the main resource is inexhaustible, accurate, reliable, truthful and timely information.

The main platform for the digital economy development is a virtual network of boundless Internet. In the era of a market economy and in the time of Smith, it made sense to calculate the break-even point and the optimal size of firms and companies. For the digital economy, it does not matter: a company can be very small and at the same time develop successfully. The owner can be both a manager and a performer of all stages of work in the company. The main "value" in the digital economy is customers that become the main thing in the process of economic activity, because without them the digital economy itself makes no sense. The customer chooses a product relying on advice, personal experience and advertising, the seller is not able to personally contact the buyer. At the same time, advertising still has its weight, but here we speak about internet advertising, internet fashion, internet friends, internet hobbies etc²³¹.

²³¹Norets, N. K., and Stankevych, A. A. (2017), "Digital economy: state and prospects of development", Conference Proceedings of the International Economic Conference, Innovative clusters in digital economy: theory and practice, Polytechnic University, St. Petersburg, Russian, pp. 173–179; Kryvoruchko, O. S., and Kraus, N. M. (2017), "The imperatives of formation and dominant of the development of digital economy in modern paradigmatic

Digitization should be viewed as an instrument, not as an end in itself. With the systemic state approach, "digital" technologies will stimulate the development of an open information society as one of the essential factors for increasing productivity, economic growth, job creation, and improving the quality of life of Ukrainian citizens²³².

The requirements for digitalization of the Ukrainian economy in Figure 1.

The introduction of the digital economy in Ukraine at an initial stage should take place simultaneously in the following three directions:

- Technological one, where all decisions of a techno-technological character, should be standardized, that is to be safe and certified;
- Institutional and economic one, which provides for the organization of new models of management and business models using smart things, industrial Internet-things, block chain technology, its institutional support, and it must comply with the legal and regulatory framework of socio-economic relations of the society;
- Production one, which includes specific business applications that meet the requirements of the management models from the second direction, which is based on technical support and the infrastructure of the first direction²³³.

context", Conference Proceedings of the International Economic Conference, Paradigm shifts in economic theory of XIX century, KNU named by T. Shevchenko, Kyiv, Ukraine, pp. 681–685.

²³²"Digital agenda of Ukraine 2020 ("Digital agenda" – 2020). Conceptual basis (version 1.0). Priority areas, initiatives, projects of "digitalization" of Ukraine by 2020", available at: <https://ucci.org.ua/uploads/files/58e78ee3c3922.pdf> (Accessed 22 Nov 2017).

²³³Burkaltseva, D. D., Kosten, D. G. and Vorobyov, Yu. N. (2017), "Algorithm for the implementation of the program of "digital economy", Conference Proceedings of the International Economic Conference, Innovative clusters in digital economy: theory and practice, Polytechnic University, St. Petersburg, Russian, pp. 141–147.

Figure 1. The requirements for a “digital” workplace

Requirements for digitalization of the Ukrainian economy

- Equal possibilities of access to services, information and knowledge provided on the basis of information and communication technologies (ICTs).
- Create advantages (benefits) in different spheres of life.
- The mechanism (platform) of economic growth through the use of digital technologies.
- Promote the development and construction of an open information society, mass media, "creative" environment and "creative" market, etc.
- Maintain the principles of freedom of the press and freedom of information, as well as the principles of independence, pluralism and diversity of the mass media that are necessary for an information society.
- Ukraine's entry into the European and world market of e-commerce and services, banking and exchange activities, etc., cooperation and interaction in regional markets.
Integrate with European and global systems.
- Standardization is the basis of "digitalization" of Ukraine, one of the key factors for its successful implementation.
- Support a boost to confidence and security when using ICT by the object of focus and integrated public administration.

Source: compiled on the basis of ²³⁴

²³⁴“Digital agenda of Ukraine 2020 (“Digital agenda” – 2020). Conceptual basis (version 1.0). Priority areas, initiatives, projects of “digitalization” of Ukraine by 2020”, available at: <https://uccr.org.ua/uploads/files/58e78ee3c3922.pdf> (Accessed 22 Nov 2017)]

The digital era changes the approach to doing business, as well as the requirements for information technologies that are being used: marketing, sales and service management systems; telephony and messengers; systems of document circulation and personnel management; accounting systems and many other corporate applications.

Digitalization is spreading rapidly in the global economy and in society. The main goal of the digital infrastructure development is to provide new opportunities for citizens of all countries so that they can take advantage of digital possibilities without any limitations, regardless of their place of birth, location or residence.

The Law on the Approval of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020, when adopting a plan of its implementation, states that there is a "digital divide" or "digital inequality". Digital inequality is unequal access conditions to opportunities in the economic, social, cultural, educational sectors that exist or deepen as a result of incomplete, uneven or insufficient access to computer, telecommunication and digital technologies²³⁵.

There is also a gradual decrease in the "digital divide" that is in inequalities in the use of modern digital technologies (first of all, the Internet) by various social groups. The share of Internet users in villages and cities with a population up to 100 thousand increased from 51% three years ago (as of the end of the 2nd quarter of 2015) to about 56% today, and the Internet penetration in Ukrainian villages has reached 53%. The remaining 44% of Internet users live in cities with a population of more than 100 thousand; the penetration there reaches 75%.

The share of Internet users, who are over 55 years old, has increased in the last three years from 12% to 15%. The penetration of the Internet in the

²³⁵Cabinet of Ministers of Ukraine (2018), "About the approval of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 and the approval of the action plan for its implementation", available at: <http://zakon.rada.gov.ua/laws/show/67-2018-%D1%80> (Accessed 05 Nov 2018).

age group 55-64 reaches 44% today, 15% of Ukrainians who are over 65 years old use the Internet ²³⁶.

At the same time, the law on the approval of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 and the approval of the action plan for its implementation state that digital infrastructures are a set of technologies, products and processes that provide computing, telecommunication and network capabilities on digital basis. Digital infrastructures are the foundation of the digital economy ²³⁷.

In order to overcome the "digital divide", create the foundations of the digital economy, and provide new opportunities for business and citizens, the Government of Ukraine focuses on the development of national solid digital infrastructures: broadband fixed telecommunication infrastructure and mobile telecommunication infrastructure, digital television infrastructure, radio and technology infrastructure for the project "Internet of Things "(LoRaWan, etc.), computing infrastructure, virtualization and data storage (including cloud and fog storage), cyber security infrastructures, specialized infrastructures and others.

Soft digital infrastructures that should not be left out of focus are also important for the development of the digital economy. They are the identification and trust infrastructure, open source infrastructure, interoperability infrastructure, block chain infrastructure, online settlement of bills and transaction infrastructure, infrastructure of e-commerce and online interactions of business entities, (e-contracting, e-invoicing, online lending, smart logistics, etc.), public service infrastructure (e-government), life support infrastructure (medicine, education, public safety, transport, etc.), geoinformation infrastructure, industrial digital infrastructures and others.

²³⁶The Internet penetration in Ukraine Factum Group Ukraine [Electronic resource]. – Available at: http://www.inau.org.ua/sites/default/files/file/1806/ui_factum_group_ii_kvartal_2018.pdf.

²³⁷Cabinet of Ministers of Ukraine (2018), "About the approval of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 and the approval of the action plan for its implementation", available at: <http://zakon.rada.gov.ua/laws/show/67-2018-%D1%80> (Accessed 05 Nov 2018).

In line with the development of the digital economy, the issue that must be dealt with is how to increase the qualification level of staff. Human capital is the driving force behind the digital economy, namely: knowledge, talents, skills, experience and intelligence.

Due to the rapid introduction of digital technologies, the formation of digital skills of citizens becomes crucial. Today, digitalization and cross-platformity are the main trends in the general labour market. The ability to use digital technology in work is gradually becoming necessary for most specializations and professions, that is, it starts to be penetrating or cross-platform. With the help of online and other technologies, citizens can more effectively acquire knowledge, skills and abilities in many other areas (for example, to learn languages or subjects, master professions, etc.).

The number of jobs in Ukraine requiring employees that have at least a basic understanding of information and communication and digital technologies is rising sharply, and the ability to use technology is becoming a major requirement for staff.

Creating and implementing the national training programme for general and professional digital competences and knowledge is a priority task on the way to the accelerated development of the digital economy.

Creating favourable conditions and finding appropriate models of public-private partnerships with non-formal education operators, supporting their regional scaling, etc. will contribute to the growth of private investment in this field, the emergence of new operators and, in the short term, significantly increase the opportunities for citizens in cities and especially in regions to receive appropriate digital skills, professions, etc.

One of the most important tasks is to update the state classifier of occupations, that is, to develop and approve a list of digital professions based on the requirements of the labour market, digital trends, etc., and then devise a corresponding programme of their introduction in specialized educational institutions.

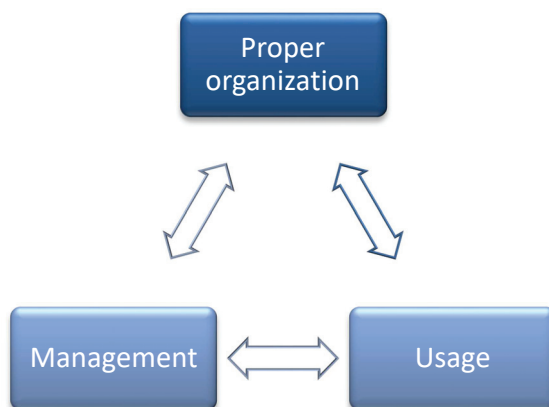
Digital skills and competences are the key to the full development of the digital economy, because it is being created by citizens. Digital literacy should

be one of the main competences. Most Ukrainian citizens already enjoy the benefits of digital technology. The next step is to make sure that through the benefits Ukrainians can become economically successful.

Another consequence of digitalization is the emergence of jobs that are not tied to a stable workplace. They become «digital», virtual, mobile, that is, the ones that do not require permanent placement of the worker in the workplace. The concept of «digital jobs» is spreading extremely fast in the business environment and it is positively perceived by the vast majority of workers who like flexible working practices, the ability to work at home or during holidays, that is, from anywhere.

A "digital" workplace is a virtual equivalent of the physical workplace, which requires proper organization, use and management, as it should be the key to increased efficiency of workers and the creation of a more favourable working environment for them. Figure 2 shows the requirements for a "digital" workplace, which effectively improve the performance of workers and which create favourable working conditions for them.

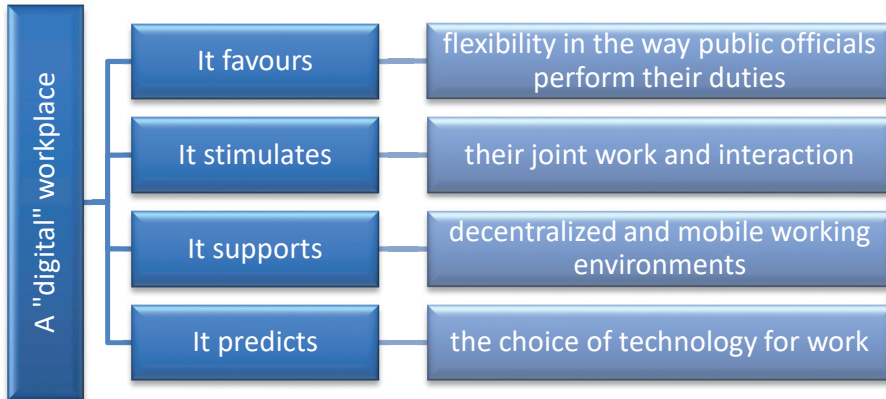
Figure 2. The requirements for a "digital" workplace



Source: compiled on the basis of ²³⁸

²³⁸"About the approval of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 and the approval of the action plan for its implementation", The Cabinet of Ministers of Ukraine (2018), available at: <http://zakon.rada.gov.ua/laws/show/67-2018-%D1%80> (Accessed 05 Nov 2018).

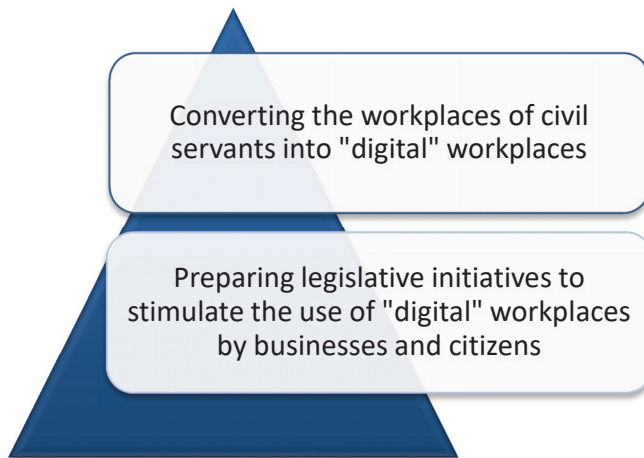
Figure 3. A "digital" workplace



Source: compiled by the authors on the basis of ²³⁹

A reduction in hardware costs, less spending on office space or business trips etc. are among the benefits of "digital" workplaces.

Figure 4. The introduction of the concept of "digital workplaces"



Source: compiled by the authors on the basis of ²⁴⁰

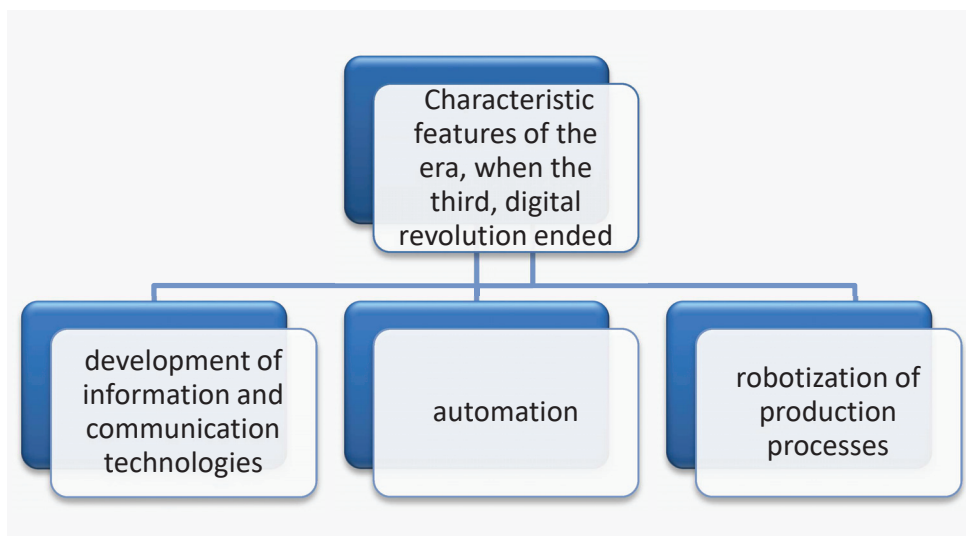
²³⁹ The same.

²⁴⁰"About the approval of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 and the approval of the action plan for its implementation",

In order to implement large-scale digital transformations, it is important for the Ukrainian industry, enterprises and small and medium-sized businesses to create conditions and appropriate incentives - from information and marketing, to fiscal ones etc.

Digital technologies in Ukraine should be accessible both from the point of view of organizational and technical access to necessary digital infrastructures, and from the financial and economic point of view, that is, through the creation of conditions and incentives that will encourage business to digitize. The result of this activity will be modernization of the economy, its recovery and competitiveness.

Figure 5. Characteristic features of the era, when the third, digital revolution ended



Source: compiled by the authors on the basis of ²⁴¹

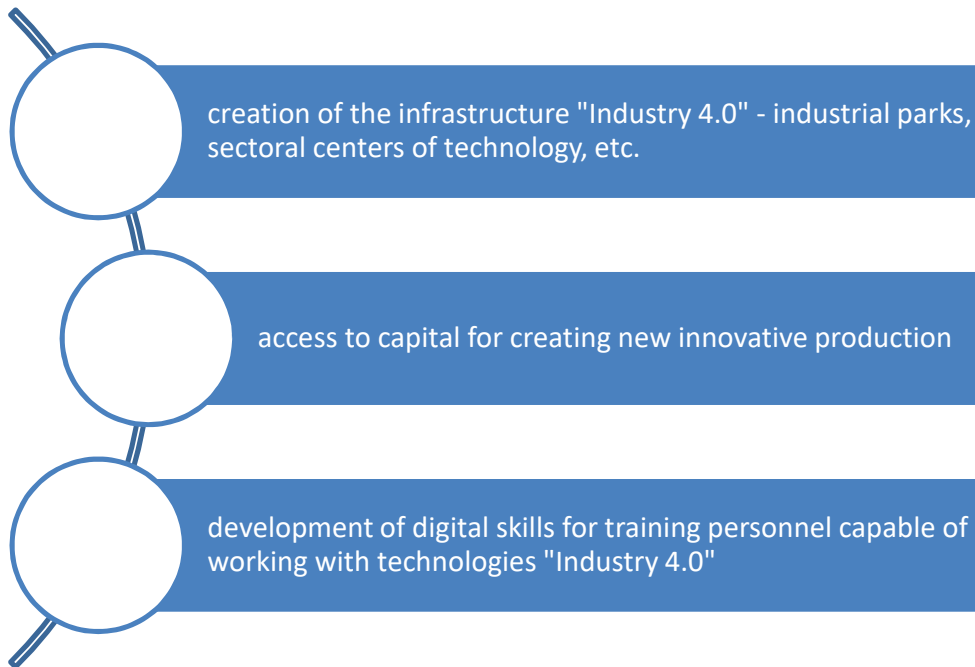
Industry 4.0 is the leading trend of the Fourth Industrial Revolution that is happening right in front of our eyes. The integration of digital technologies

The Cabinet of Ministers of Ukraine (2018), available at: <http://zakon.rada.gov.ua/laws/show/67-2018-%D1%80> (Accessed 05 Nov 2018).

²⁴¹Industry 4.0: technology, investments, expected dividends – Available at: <https://www.it.ua/knowledge-base/technology-innovation/industry-4>

into production processes, or digitalization of industry, is a priority of the state industrial policy.

Figure 6. Directions of the state policy on stimulating the development of "Industry 4.0"



Source: compiled by the author on the basis of ²⁴²

According to the forecasts of the World Economic Forum, most technologies of the Fourth Revolution will become routine in 2027. This means that there will be not only smart houses, but also smart cities, autonomous

²⁴²"About the approval of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 and the approval of the action plan for its implementation", The Cabinet of Ministers of Ukraine (2018), available at: <http://zakon.rada.gov.ua/laws/show/67-2018-%D1%80> (Accessed 05 Nov 2018)

cars on the streets, artificial intelligence in offices and supercomputers in pockets²⁴³.

Other important tasks are the official recognition of international standards, which constitute the generally accepted basis of "Industry 4.0" (about 100 standards), state support for the activity of technical committees involved in the work on standards relating to "Industry 4.0", the creation of a mechanism for encouraging the submission of applications for inventions in Ukraine; the creation of a mechanism of state support for patenting the domestic objects of intellectual property; the possibility of protecting patent rights and know-how through appeals to specialized ("patent") courts; the creation of mechanisms for technology transfer.

The advantage of Ukrainian industry and production in the global economy should rely on the creation of high added value of goods and services, quality management of production chains and efficient use of resources. It is important to introduce digital agriculture in order to develop the farming industry. Digital agriculture is a fundamentally new management strategy based on the use of digital technologies. It is a new stage in developing the agri-sphere associated with the use of geoinformation systems, global positioning, on-board computers and smart equipment. In addition, it employs management and implementation processes that are able to differentiate the ways of processing or fertilizing, chemical ameliorants and plant protection products.

The above-mentioned list should be supplemented by new areas, initiatives and projects. The implementation of projects in these spheres will require managerial, organizational and financial efforts on the part of the state, business and the public.

Given the scale of such projects, their technological complexity and the need for significant investments, on the one hand, and the necessity for their rapid deployment and coverage of large areas, on the other hand, it is

²⁴³Industry 4.0: technology, investments, expected dividends - IT-Enterprise", available at: <https://reed.media/ir4>

expedient to search, define and introduce concession and "service" models of the organization of financing, construction and management of these projects. Figure 7. The implementation of initiatives for using the potential of "Industry 4.0" in Ukraine

Targeting

- i.e. analysis and research of industrial sectors in order to assess competitiveness and development prospects
- Such work presupposes the involvement of research agencies, obtaining relevant insights, identifying drivers of growth, organizing communication, results, etc. Research results should be used for further planning and risk reduction for potential investors

«IT-fication» of industry

- or a programme of the education and transfer of best practices from the IT sector and digital industries to industrial sectors
- Today, the industrial sectors are lagging behind the trends, technologies and capabilities of the digital market. The lack of practices concerning the drivers of 'Industry 4.0', as well as inadequate knowledge of innovation and investment management, methods of administration (agile, scrum) are real obstacles on the way to 'Industry 4.0'. The result of the "IT-fication" of industry should become the creation of joint competent teams - representatives of the IT and digital industries on the one hand and industry on the other hand, which will be focused on cooperation and the development of new products and services

Engineering clusters

- Powerful developers in industrial engineering have the potential to influence industrial innovation, R&D, export marketing, and so on. The activities of industrial engineering companies are aimed at the search and development of new industrial products, the generation of ideas, industrial design, the creation of prototypes, etc. Such industries as the food and processing industry, metallurgical engineering, agriculture are the most promising for the creation and development of the industrial engineering industry

Sectoral road maps to digital transformations

- Creation of road maps to digital transformation is aimed at the search, development and implementation of appropriate actions and initiatives concerning digitization of industries. For many sectors, this is a plan to recover, increase competitiveness, and in some cases, to return to the economic environment.

Source: compiled by the author on the basis of ²⁴⁴

²⁴⁴The Cabinet of Ministers of Ukraine (2018), "About the approval of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 and the approval of the action plan for its implementation", available at: <http://zakon.rada.gov.ua/laws/show/67-2018-%D1%80> (Accessed 05 Nov 2018).

Along with the development of national digital infrastructures, it is vital to identify the priority projects of digital transformations at national level in areas such as public security, education, healthcare, e-democracy, etc.

The service model for implementing these projects is one of the modern mechanisms that will enable the state to carry out its functions without significant investment, and it will enable businesses to invest in new opportunities and earn profits.

The study carried out by companies We Are Social and Hootsuite reports that access to the Internet is unevenly distributed globally – there are the fewest Internet users in Central and South Asia. However, the countries of these regions of the world have been characterized by the highest growth rates over the last year.²⁴⁵

In addition, researchers say that a large number of elderly people are beginning to use the Internet. Only in Facebook, the number of people who are over 65 years old has increased by almost 20% in the past 12 months (Table 1, Figure 8).

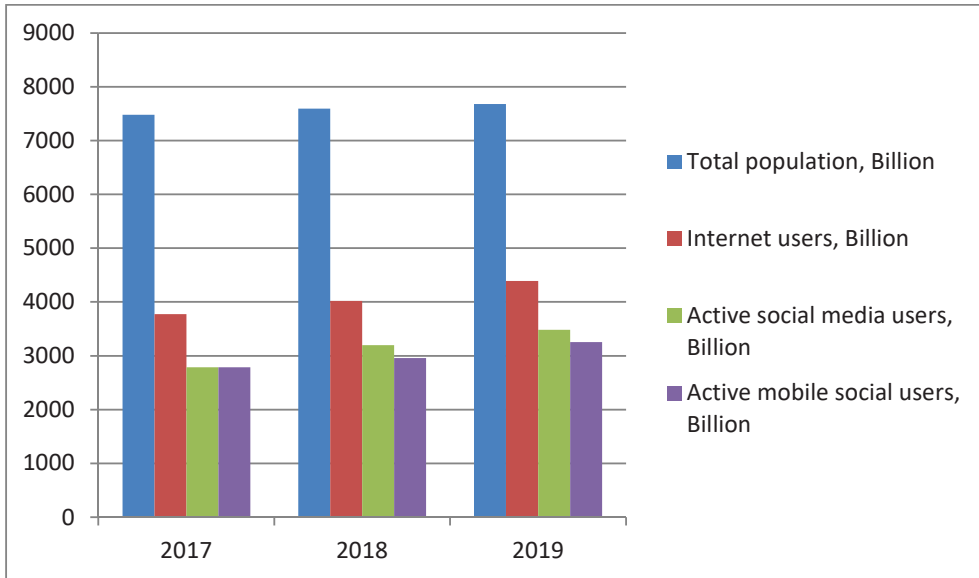
Table 1. The regression analysis of reaction of sales of metal products on uniform periodic placement of advertising messages of enterprises

Digital around the world in 2017-2019	Total population	Internet users	Active social media users	Active mobile social users	Total population	Internet users	Active social media users	Active mobile social users
	Billion	Billion	Billion	Billion	%	%	%	%
2017	7 476	3 773	2 789	2 789	54	50	37	34
2018	7 593	4 021	3 196	2 958	55	53	42	39
2019	7 676	4 388	3 484	3 256	56	57	45	42

Source: compiled by the authors on the basis of research

²⁴⁵In 2018, the number of Internet users has amounted to 4 billion, more than 3 billion of them use social networks - research | Hromadske television, available at: <https://humanresourcesmanagement.comadske.ua/posts/u-2018-internet-koristuvachiv-stalo-4-mlrd-z-nih-ponad-3-mlrd-koristuyutsya-socmerezhami-doslidzhennya>

Figure 8. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine



Source: compiled by the authors on the basis of research

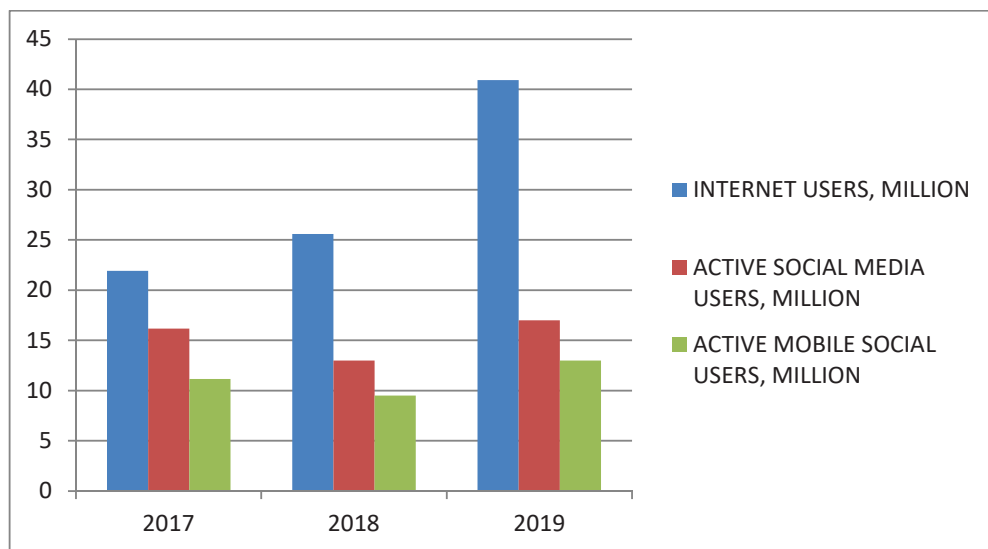
In Ukraine, according to the study, as of 2018, there are 25.6 million Internet users, accounting for 58% of the total population. Only 13 million of them use social networks, and 9.5 million people use mobile phones for communication on the Internet. 40.91 million people are using the Internet in 2019, so there is a 15 million increase (60 percent) compared with January 2018, accounting for 93% of the total population. There are 17 million social media users in 2019. 13 million people use social media on mobile devices as of January 2019, with a growth of 4 million new users, representing a rise of more than 37 per cent year-on-year. The number of internet users in January 2018 is more than 248 million, up to 7 percent year-on-year. The number of social media users in January 2018 is 362 million, up to 13 percent year-on-year. The number of mobile social users in January 2018 is 360 million, up to 14 percent year-on-year (Table 2, Figure 9).

Table 2. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine

Digital in Ukraine 2017-2019	Internet users	Active social media users	Active mobile social users	Internet users	Active social media users	Active mobile social users
	Million	Million	Million	%	%	%
2017	21,93	16,17	11,16	49	36	25
2018	25,59	13,00	9,50	58	29	22
2019	40,91	17,00	13,00	93	39	30

Source: compiled by the authors on the basis of research

Figure 9. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine



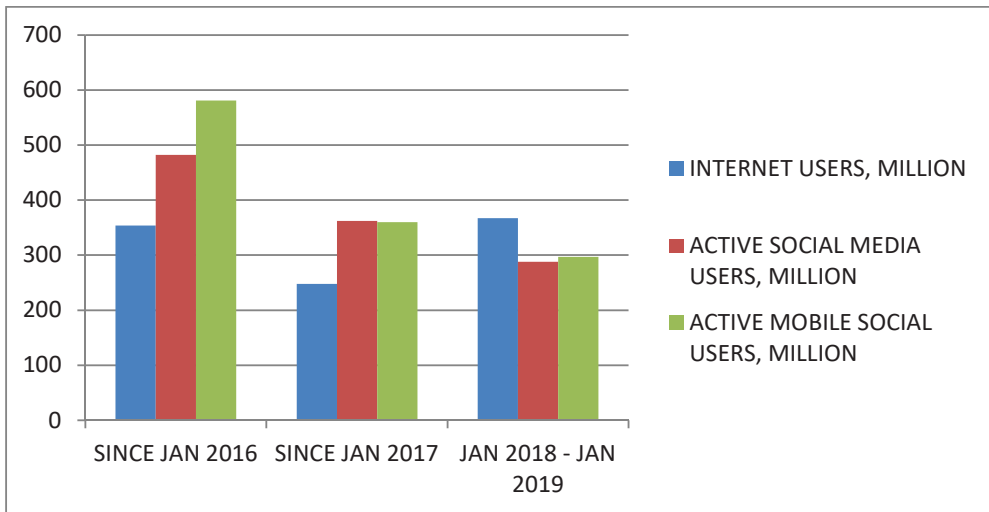
Source: compiled by the authors on the basis of research

Table 3. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine

Digital around the world in 2016-2019	Internet users	Active social media users	Active mobile social users	Internet users	Active social media users	Active mobile social users
	Million	Million	Million	%	%	%
Since Jan 2016	354	482	581	10	21	30
Since Jan 2017	248	362	360	7	13	14
Jan 2018 - Jan 2019	367	288	297	9,1	9	10

Source: compiled by the authors on the basis of research

Figure 10. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine



Source: compiled by the authors on the basis of research

The number of internet users in January 2019 is 367 million, up to 9.1 percent year-on-year. The number of social media users in January 2019 is 288 million, up to 9 percent year-on-year. The number of mobile social users

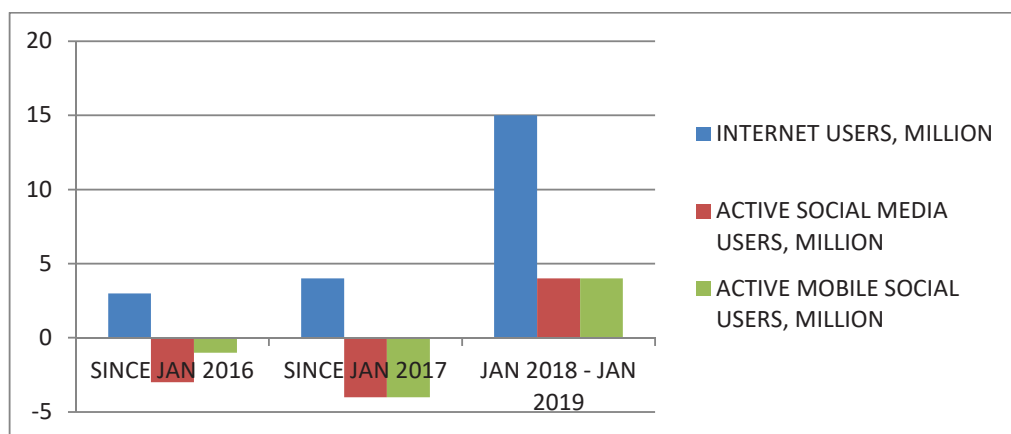
in January 2019 is 297 million, up to 10 percent year-on-year (Table 4, Figure 11).

Table 4. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine

Digital in ukraine 2016-2019	Internet users	Active social media users	Active mobile social users	Internet users	Active social media users	Active mobile social users
	Million	Million	Million	%	%	%
Since Jan 2016	3	-3	-1	13	-18	-8
Since Jan 2017	4	-4	-4	17	-24	-28
Jan 2018 - Jan 2019	15	4	4	60	31	37

Source: compiled by the authors on the basis of research

Figure 11. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine



Source: compiled by the authors on the basis of research

Since January 2016 and January 2017, the number of active social media users and active mobile social users had been falling; however, in January 2018, these indices started to go up and in January 2019 they amounted to 4 million (Table 5, Figure 12).

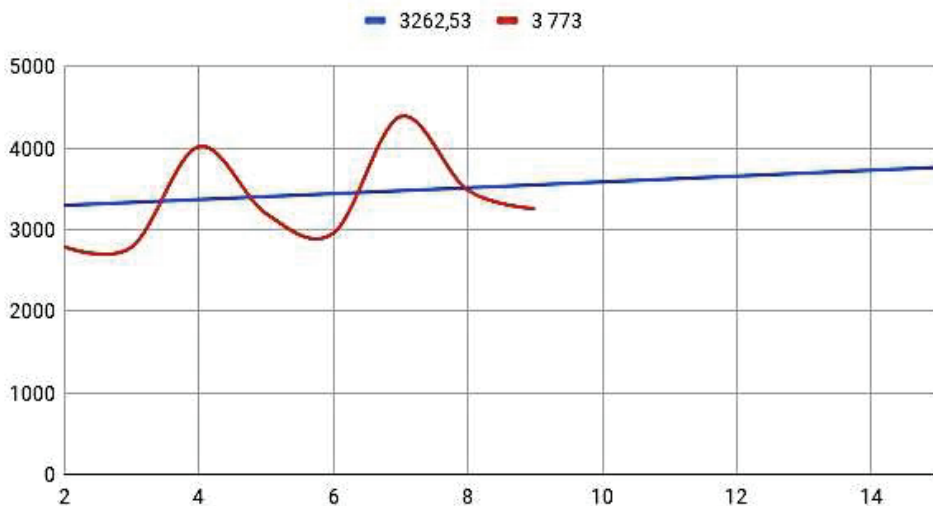
Table 5. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine

Year	Category of Users	X	Linear trend WORLD		Linear trend UKRAINE	
2017	Internet users	1	3 773	3262,53	21,93	18,02
2017	Active social media users	2	2 789	3298,40	16,17	18,19
2017	Active mobile social users	3	2 789	3334,27	11,16	18,36
2018	Internet users	4	4 021	3370,13	25,59	18,53
2018	Active social media users	5	3 196	3406,00	13,00	18,70
2018	Active mobile social users	6	2 958	3441,87	9,50	18,87
2019	Internet users	7	4 388	3477,73	40,91	19,03
2019	Active social media users	8	3 484	3513,60	17,00	19,20
2019	Active mobile social users	9	3 256	3549,47	13,00	19,37
2020	Internet users	10		3585,33		19,54
2020	Active social media users	11		3621,20		19,71
2020	Active mobile social users	12		3657,07		19,88
2021	Internet users	13		3692,93		20,05
2021	Active social media users	14		3728,80		20,22
2021	Active mobile social users	15		3764,67		20,39

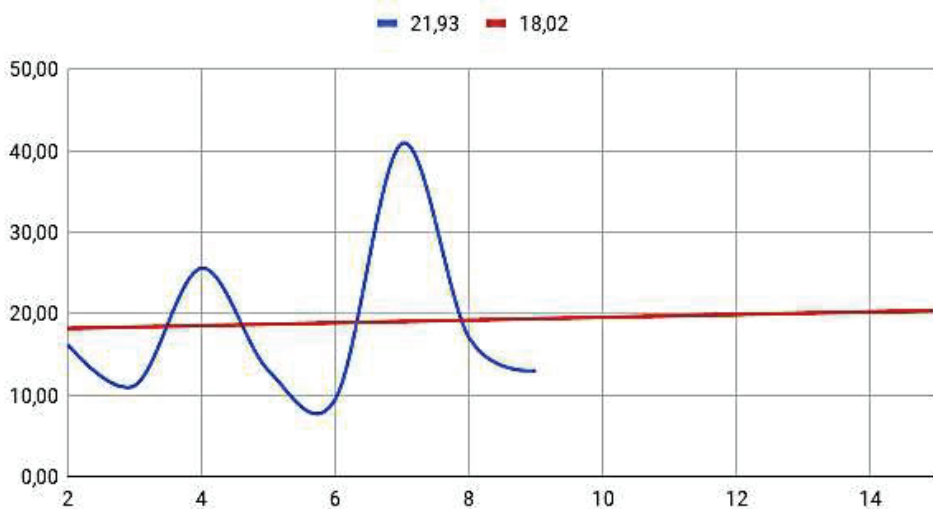
Source: compiled by the authors on the basis of research

Figure 12. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine

WORLD



UKRAINE



Source: compiled by the authors on the basis of research

With the help of a linear trend, we predicted data on internet users, active social media users and active mobile social users for the next two years. We can observe positive dynamics both in Ukraine and in the world.

Table 6. The implementation of initiatives for using the potential of “Industry 4.0” in Ukraine

FINANCIAL INCLUSION FACTORS		
Percentage of the population aged 15+ that reports owning or using each financial product or service		
	2018	2019
Has a bank account	53%	63%
Has a credit card	27%	27%
Makes online purchases and / or pays bills online	13%	29%
Percentage of women with a credit card	26%	27%
Percentage of men with a credit card	30%	27%
Percentage of women making internet payments	10%	28%
Percentage of men making internet payments	18%	32%

Source: compiled by the authors on the basis of research

The current number of payment terminals is clearly insufficient for Ukraine, and it does not correspond to the number of terminals in the EU countries that are commensurate with the territory and the number of citizens. If we take into account the number of payment terminals in the top countries, the results of Ukraine will be quite modest comparing with the number of terminals in China (1%), Brazil (5%), Turkey (12%), Italy (13%), Great Britain (13%) , Russia (17%), France (17%), Spain (19%), Canada (20%), India (23%), Indonesia (26%), Mexico (26%), Australia (27%). Moreover, the above indicators by countries are the data as of the beginning of 2016, however, in

Ukraine, the information is as of October 1, 2018, and, accordingly, the current ratio is even more negative²⁴⁶.

In November 2017, Google launched a new service for contactless payment - Google Pay. Ukraine has become the 15th country in the world, where Android PayPal is officially launched. Android Pay can only be installed on Android 4.4 or higher than that, and NFC support is required. One needs to download the app of same name from Google Play, and then go through the procedure of adding a card. Officially, several retail networks, where Android Pay is operating - Silpo, McDonalds, WOG, Kyiv Metro etc. have been shown during the presentation. In fact, Android Pay will work with all terminals that support contactless payment. According to Vera Platonova, the CEO of MasterCard in Ukraine, now about 65% of terminals can work with Android Pay; it is one of the highest rates in Europe.

Since the autumn 2017, several Ukrainian banks have joined this technology. In December, one of the largest private banks in the country – First Ukrainian International Bank (FUIB) joined it. Besides, Ukraine has become the 15th country, in which Google Pay started to work. This service appeared in the world in 2015 and is now available in 14 countries, including Singapore, Hong Kong, Japan, the USA, the United Kingdom and others. More and more Ukrainians prefer contactless methods of payment, as this saves time. According to the latest NBU data, in Ukraine the number of contactless transactions has increased to 38.6%.

In addition, 90% of Ukrainians call a smartphone their favourite gadget. According to recent statistics, the share of operating system Android in Ukraine is over 65%. Moreover, thanks to Google Pay app, it is much faster and safer to make payment and service purchases. Using cash is unsafe as it is almost impossible to return if someone steals it from you. However, when we speak about contactless payment, only the owner of the phone and the card

²⁴⁶Issues of development of financial inclusion in Ukraine. Part II. Available at: <https://ema.com.ua/news/pitannja-rozvitku-finansovoi-inkluzii-v-ukraini-chastina-druga>

himself can pay through Google Pay, which minimizes the risk of becoming a victim of fraudsters²⁴⁷.

The leader in the field of mobile payments is Apple Pay. This achievement is worthy of praise, given that the service has been introduced recently. According to Eurostat, in the European Union, the online trade segment accounts for more than 15% of all retail sales in the B2C segment. The Internet trade centre in Europe is Great Britain. The volume of online sales in the B2C area is three times higher than in the second biggest continental market in Germany. The leading platform here is Amazon, which accounts for 54% of all sales.

The average age of an online buyer in the world is 25. Shopping is an online activity that is growing the most rapidly among today's Internet users²⁴⁸. One of the market trends is the expansion of payment options. Many proprietors of leading online stores use traditional payment tools, but the demand for innovative payment methods is increasing. The step towards this demand contributes to the further expansion of online retailing, in particular through Apple Pay and other non-contact payment systems.

The main problems that, according to analysts, are able to limit market growth in the future include security and privacy issues. "E-commerce sales worldwide reached an estimated \$1.357 trillion in 2017, or 58.9% of e-commerce spending overall. By 2021, m-commerce will account for 72.9% of the e-commerce market (Table 7)²⁴⁹.

²⁴⁷Payment service Google Pay in Ukraine - How It Works, TODAY, available at: <https://www.segodnya.ua/ukraine/bystro-udobno-i-bezopasno-kak-v-ukraine-rabotaet-servis-beskontaktnoy-oplady-google-pay-1118787.html>: What should one know about the launch of Android Pay in Ukraine - AIN.UA, available at: <https://ain.ua/2017/11/01/o-zapuske-apple-pay-v-ukraine>

²⁴⁸Interesting facts about Internet trade in the world in 2019 — Lemarbet, available at: <https://lemarbet.com/ua/razvitie-internet-magazina/interesnye-fakty-ob-internet-torgovle>

²⁴⁹Worldwide Retail and Ecommerce Sales: eMarketer's Updated Forecast and New M-commerce Estimates for 2016—2021 - eMarketer, available at: <https://www.emarketer.com/Report/Worldwide-Retail-Ecommerce-Sales-eMarketers-Updated-Forecast-New-Mcommerce-Estimates-20162021/2002182>

Table 7. The regression analysis of reaction of sales of metal products on uniform periodic placement of advertising messages of enterprises

Global Innovation Index (2016-2018)						
	Score/Value 2016	Rank 2016	Score/Value 2017	Rank 2017	Score/Value 2018	Rank 2018
Government's online service	26,8	105	58,7	70	58,7	70
E-participation	43,1	74	74,6	32	74,6	32
Online creativity	13,8	51	25,8	47	16,9	43
1 Generic top-level domains (TLDs)/th pop. 15–69	4,6	57	4,4	59	4,3	57
2 Country-code TLDs/th pop. 15–69	6	48	5,1	50	4,9	50
3 Wikipedia edits/mn pop. 15–69	1472,1	64	6,1	39	31,1	38
4 Video uploads on YouTube/pop. 15–69 (Mobile app creation/bn PPP\$ GDP)	33,7	34	34,9	41	37,3	19

Source: compiled by the authors on the basis of research

On a global scale, the niche of e-commerce in 2017 showed an impressive growth of 16%, reaching 1.5 trillion dollars. And the Ukrainian market in the context of growth and prospects is one of the most attractive. Unlike many European countries, Uanet is still far from the level of saturation.

We have done a little research and gathered an interesting collection for you, which includes facts about e-commerce in Ukraine in 2018 that you probably have not known. It will surely be of interest for you.

The approximate turnover of goods and services on the e-commerce market is currently about 50 billion hryvnias. During 2017, its growth is predicted to reach 65 billion.

The largest group of sites in the online trading segment are projects of the EVO Company – Prom.ua, Bigl.ua, Crafta.ua, and Shafa.ua. All of the above sites are marketplaces. For the previous year, Ukrainians spent 14.2 billion hryvnias on them, which is almost 70% more than in the year before that 31% of Ukrainian Internet users made online purchases at least once²⁵⁰.

Conclusions. In conclusion, it is worth noting that one will not wait long for a positive effect of digitization of the economy. When business entities shift from paper processes and digitize components of their work, they will be able to reduce the number of steps previously needed to operate, improve the timing of work, significantly increase the efficiency of their activities and, ultimately, reduce operating costs. Digitalization of the economy will help our society create a reliable digital environment, optimize and scale up operations, make them consistent and safe.

Due to digitization, it is possible to accelerate the development of innovations, support start-ups, teach everyone the basics of programming, and implement digital technologies in the economy. The implementation of all the above-mentioned conditions will increase the productivity of functioning of the whole economic system of the state and bring additional competitive advantages in the globalized digital world.

Digitalization of the Ukrainian economy is a natural extension of the international trend towards spreading digital technology and a sharp increase in its impact on all sides of economic life. In Ukraine, such key indicators of the digital economy as its share in the GDP of the country are much higher than in most other countries. At the same time, our country is clearly lagging behind the largest countries-leaders according to a number of indicators. The effect of spreading digital technology on the country's economy is twofold. On the one

²⁵⁰Electronic commerce in Ukraine 2018: facts, figures and interesting statistics, available at: <https://ag.marketing/elektrona-komerciya-v-ukraini-2018>

hand, it contributes to the efficiency of public administration and the economic system, improves and accelerates social interaction. On the other hand, it entails a whole list of systemic problems: an increase in unemployment, the disappearance of entire industries.

In general, we can state that digitalization of the economy has already become an integral part of economic life.

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FUTURE OF HUMAN RESOURCES MANAGEMENT UNDER THE DIGITALIZATION CIRCUMSTANCES

Abstract. In the article, some of the most likely trends that will be inherent in changes of human resources management in the near future under the digitalization circumstances are projected. The need to look for and systematize effective methods of professional development of personnel in the human resources system under the conditions of society digitalization is emphasized. The necessity of using different methods of personnel motivation is proved. The implementation of these methods will lead to the efficiency growth in the enterprise's activities, to greater interest of workers in preserving their job and satisfaction of primary and secondary needs. It is shown that the combination of methods for motivating workers at enterprises can provide an effective increase in labour productivity. The results of the EU research on changes that will take place in different areas of employment for the period 2015-2025 are presented. The inevitability of transition from human resources management to management of a team and processes, due to shifting the focus of management from automation to productivity in the human resources management-processes, is substantiated.

Jel Classification System: F16, F66, J24, J49

Keywords: digital economy, human resources management, HR-managers, competences, staff, company growth, labour motivation system, effectiveness.

Introduction. In the digital economy, the main role of human resources management is the development of human resources, and the promotion of a diversified, professional contribution of staff to achieve the common goals of an organization. The external market that is a competitive market or a public services market is a real battlefield and not internal relations of personnel. This change in priorities also leads to a change in the role of HR- managers: from now on, they must focus on the constant desire to provide, develop, train and motivate staff in their actions to the benefit of a company²⁵¹.

Today, the main task of the department of human resources management is to monitor and increase the effectiveness of staff, while an HR-director plays an important part in managing the production processes of a company. Hence, HR-specialists will have to master financial, analytical, marketing skills, risk management skills to maximize the efficiency of the company's employees, as well as acquire skills to manage contracts and freelance workers, their payroll organization, and compliance with quality standards. Building new business models, which have social capital as its core, the creation of organizational structures based on the roles in a team, and the Profit & Loss model will require clear knowledge of the capabilities of employees – from performing narrow functions to cross-functional tasks.

In addition, if the company's directors understand the main principles of forming a system of motivation and can manage the competences of employees, it will enable them to use the abilities of each employee more effectively in accordance with the goals of an enterprise development and ensure the establishment of a mutual understanding and mutual assistance in a team.

An analysis of recent research and publications, which began to solve this problem, the outline of previously, unsolved parts of the general problem to which this article is devoted. The issue of changes in human resources management and personnel incentives is one of the topical issues in terms of digitization of the economy and the formation of a new human resources

²⁵¹ Rudenko O.M., Shturkhetyskyi S.V., Shershnova O.V., Filipova N.V. (2016), "HR - management in public administration", Tutorial, NTU, Chernigov, pp. -16.

management system. Now when professional qualities and skills become old rapidly, professional development of personnel is especially relevant in conditions of development of production and the latest technologies, in which each employee should increase their professional level and skills. The papers of such major scholars as S. Annand, D. Atkinson, B. Groysberg, T. Amabile, D. McClelland, S. Parker, M. Finney, and D. Hlop are devoted to the issues of human resources management, motivation and labour remuneration, and the formation of a new system of personnel competences. Also, the papers of many domestic scientists, among them: D. Bohynia, O. Hrishnov, L. Semiv, L. Basovskyi, I. Herchykov, M. Kabushkin, V. Dykan, V. Ilchenko, V. Chernenko and others focus on various aspects of the problem of human resources management. At the same time, today there is a growing need for research into new quality of personnel management that takes into account the fast development of technologies, rapid adaptation of personnel to current innovations, and the dynamic development of companies in times of uncertainty. Given that most businesses and organizations maintain the structure and principles of work of the twentieth century, scientists should pay considerable attention to the search and implementation of more modern approaches to motivating personnel that rely on human resources management.

Setting objectives. The purpose of this article is to study the likely trends that will be inherent in changes in human resources management, justify the transition from human resources management to management of a team and processes, look for and systematize effective methods for professional development of personnel in the system of human resources management and identify the most efficient methods of a direct influence on development and adaptation of personnel in conditions of digitalization of society.

Presentation of the main research material with the substantiation of the obtained scientific results. Of course, the efficiency of companies depends on a number of socio-economic factors, among which the human factor is the most important. Today, management of personnel in both public institutions and private companies does not meet the existing needs. In particular, a domestic

researcher A. Lipantsev notes, «there is no real government policy on personnel; the status of personnel departments in organizations is low, they are mainly in charge of accounting and administrative functions. Organizations are not really involved in forward planning of personnel; their staff are extremely limited; employees of the personnel departments are often not adequately trained.» It is clear that under such conditions one cannot talk about a professional approach to managing personnel²⁵².

In the digital economy, companies face the changing workplace context, as well as changing human capital management in the world of labour relations in general. For example, the Deloitte survey, conducted among more than 10,000 business leaders and human resources management executives from 140 countries, shows that businesses need to focus on directions of business development and they should target people at new principles of work in the era of a digital society. In the near future, we expect significant internal shifts in the field of new technologies. The main question is how to use the latest technologies for searching, uniting, attracting people and, even, replacing them, as for many years, technology has been a tool for everyday work, while in the near future the focus will be on technology as a way of life in the workplace.

We want to draw your attention to several of the most likely trends that will be inherent in changes in human resources management in the near future of the digital economy²⁵³.

1. *The internal human resources management system will decrease, and outsourcing will increase.* An industrial analyst Brian Sommer, the founder of TechVentive, says that the transition to smaller personnel departments will be caused by new technologies and increased

²⁵²Rudenko O.M. (1999), "System and strategy of the human resources management - management for public administration: educational and methodical materials", NADUPU, Kiev, pp.- 7, -15.

²⁵³Trends in the human resources management development in 2018, in which it is necessary to keep a hand on the pulse. The human resources management trends 2018", (2018), available at: <https://www.talent-management.com.ua/4524-4524-human-resources-management-trends-2018>.

participation of employees in human resources management processes: «A significant number of companies will try to get more opportunities through better technology and self-service.” Elizabeth Brashears, the chief executive of Human Capital Consulting at human resources management TriNet, as well as Barry Hall and Steve Coco from Buck Consultants, believe that the administration's impact will disappear as a result of increased regulation and globalization of the workforce. The experts at Buck Consultants point out that service companies while using the “benefits-in-a box” models will offer organizations cost-effective integrated programs of healthcare and welfare, well-being and retirement benefits. At the same time, the internal function of HR-departments will remain.

2. *Strategic thinking will become the main internal competence of human resources management.* The role of this strategy cannot be passed on to outside organizations. Presser argues, “Strategic planning requires its own experience.” In fact, E. Brashears predicts a tendency to strengthening the strategic human resources management -function and stimulation of the creation of new posts. At the same time, HR-professionals will obviously become HR-business professionals who not only understand human resources management's effects, but also are able to manage business operations and formulate a business development strategy
3. *The pendulum is aimed at a specialist (the general administration will disappear).* Luman claims that «the top management, in the role that we are accustomed to, will disappear», hence the specialized roles of professionals will arise.
4. *Human resources management will increasingly use analytics and large amounts of data to improve its value to a company.* Although human resources management already uses certain indicators, such as turnover rate and employee interaction levels, one can expect new indicators in the human resources management assessment, including the average

term of staff training for getting promotion or the percentage of highly skilled candidates that must be hired.

5. *Remote control of remote labour will become a new norm.* Working remotely – from home, from a cafe or anywhere, where Wi-Fi is available – is a growing trend in the United States. Thus, over the past two decades, the number of employees who at least partially worked remotely has increased by four times and amounted to 37%. In addition, Louman points out that, HR-departments will increasingly have to tackle the problem of remote workforce management and use workers most efficiently and effectively outside their workplace.
6. *Human resources management will be more like marketing.* In particular, Sommer believes that hiring employees will be similar to marketing. Thus, experts from Buck Consultants state that human resources management aims to develop internal marketing, including coordination of social marketing and brand ownership, that is, the purchase of “talents in a brand-company”.
7. *Flexibility.* In all aspects of business, flexibility is an important quality for a company in 2018. That is why most companies are beginning to implement Agile, create innovative digitalization centres for human resources management, and provide greater flexibility and speed of decision-making.
8. *Employees of the future.* We want to note that in many cases, artificial intelligence can replace people in repetitive tasks, while intellectual analysis replaces certain levels of management and influences decision-making. Therefore, companies should ensure identification of their personnel and determine the best way of employment for them, taking into account the changes that will take place in employment by 2025 (Table 1).

Table 1. Changes that will take place in employment by 2025, the EU forecast during the period of digitalization

Types of economic activity	Reduction of employment (-)				Growth of employment (+)				
Real estate, science and technology								4,5%	
Administrative activities, support services							15,8%		
Education							9,6%		
Information and communication							9,2%		
Health care and social work							8,6%		
Finance and insurance							6,5%		
Provision of housing and food							5,9%		
Trade							4,5%		
Public administration and defence							1,42%		
Transportation and storage							0,52%		
Construction			-2,27%						
Art, recreation			-4,72%						
Industry			-5,12%						
Supply of water, sewage, waste management			-6,4%						
Electricity, gas, air conditioning		-10,90%							
Agriculture, forestry and fishing									
Coal mining and quarrying									
	-20	-15	-10	-5	0	10	15	20	25

Source: compiled on the basis of ²⁵⁴

The data given in Table 1 indicate that various areas of employment of the population will undergo certain changes during 2015-2025. Therefore,

²⁵⁴Onufryk M., "Professions of the future: how the labour market will change in the near future", available at: <http://iser.org.ua/analitika/analiz-derzhavnoyi-politiki/profesiyni-maibutnogo-iak-zminitsia-naiblizhchim-chasom-rinok-pratsi>.

according to the EU studies, employment is projected to decline by 18% in areas such as coal mining and agriculture, and employment in the energy and gas sectors will decrease by 10%. At the same time, employment in such areas as real estate, science and technology will rise by 20%; it will increase by 10% in administrative activities and support services and in the education sector – by 15%. In construction and logistics, changes are practically absent²⁵⁵.

9. *Shifting the focus of management from automation to productivity.* It is common knowledge that over decades companies have been attempting to automate HR-processes such as salary calculation, accounting and audit of personnel, training, selection of resumes, interviews, recruitment and staff assessment. In today's society, a company that wants to be successful should increase employees' productivity. In the age of Agile and the formation of leader-centric structures, professional burnout, defocusing, a significant amount of commitments, an uncontrolled flow of messages from e-mail and instant messengers, it is important to choose an HR-solution that will increase the productivity of staff and help to establish internal communication (Figure 1).

No doubt, in order to manage human resources successfully, HR-managers should create comfortable working conditions for staff and directors must demonstrate a clear strategy of business development and create measures to achieve it. At the same time, staff should be in comfortable conditions, be engaged in joint activities, which unite people and establish friendly relations.

It is worth noting that the motivation of employees is an essential condition and an important direction of the company's activity through the system of internal and external incentives, which encourage activities and direct them at achieving the stated goals. In management, this psychological phenomenon is used to identify the levers of influence on workers' behaviour, in order to motivate them. In addition, the system of motivation is a combination of the main elements of motivation (needs, motives, values) that an employee receives under the influence of external and internal factors as

²⁵⁵The same.

well as certain incentives and impacts of an enterprise. When the above-mentioned needs are met, it creates a desire for and interest in the work and the degree of labour activity, and characterizes the motivational potential of an enterprise. Therefore, in order to successfully manage the behaviour of people in the process of their work, it is important to determine the motives of workers and the system of needs in the labour process.

Figure. 1. The transition from human resources management to management of a team and processes under the digitalization circumstances

AUTOMATED HUMAN RESOURCES MANAGEMENT	INTEGRATED HUMAN RESOURCES MANAGEMENT	INVOLVEMENT, CORPORATE CULTURE, ANALYTICS	PRODUCTIVITY, EFFICIENCY OF A TEAM
SYSTEMS OF AUTOMATION (practical solutions)		SYSTEMS OF INVOLVEMENT (delegation of authority)	SYSTEMS OF PRODUCTIVITY (decisions on increasing productivity of work)
AUTOMATION	INTEGRATION	INVOLVEMENT	PRODUCTIVITY
1990 - 2000	2004 – 2012	2012 - 2017	2018 +

Source: compiled by the authors on the basis of research

Thus, the needs of consumers and external markets – competitive markets or public services markets – and not internal relations of personnel have become the main factors of managerial influence on staff. The relationship between managers and their subordinates is based on a sense of respect for professional knowledge. The role of HR-managers becomes more important, when they aim to focus on the constant desire to provide, develop, educate and motivate staff to the benefit of their company.

Undeniably, working with staff is a crucial part of the effective work of any company, and the coordinated actions of a team of like-minded professionals is the driving force behind business development. In addition, skills and creativity of each member of a team, involvement in the common goal, interest and enthusiasm, faith in themselves and the ultimate outcome are the key to successful business development. Hence, to ensure productivity HR-managers must be fully aware, understand the company's development strategy, possess competence, professional knowledge and skills, and look for an individual approach to each employee²⁵⁶.

It should also be mentioned that the role of human resources management consists not only in finding ambitious candidates and forming an effective team, but also in adapting new employees and creating conditions for their self-actualization through the introduction of a number of professional development methods (Table 2).

Thus, summarizing the work of an HR-manager according to D. Ulrich, the concept of business partnership should be presented as a formula: business partner = strategic partner + administrative expert staff leader + agent of change. Accordingly, an HR-manager acts as a business partner and combines in their work a significant amount of skills that are reflected beyond the functions of a personnel specialist²⁵⁷.

As an alternative to D. Ulrich's «four-sector» model, D. Sallivan offers the «Five Levels of HR- Contribution» model, which includes a description of the core HR-management functions: information flow management and performing basic operations; fulfilment of the main functions; coordination of efforts aimed at increasing productivity; provision of competitive advantages through talents; making strategic decisions²⁵⁸.

²⁵⁶Kostiuchenko O. and E. Poliakova, "The role of an HR -manager in constructing effective work", available at: <http://jur-gazeta.com/publications/legal-business/rol-menedzhera-v-pobudovi-efektivnoyi-roboti.html>.

²⁵⁷Ulrich D. (2007), "Effective personnel management. New role of managers in the organization" Williams Publishing House. – 303 p.

²⁵⁸Salliven D., "Strategic role of human resources management service, understanding of the role of human resources management in the context of the model "Five levels of the contribution of human resources management", available at:

Table 2. Methods of professional development of personnel in the system of human resources management in the digital economy conditions

Group of managers	Methods of professional development
Managers of the highest level	E-learning, external conferences, seminars.
Middle-ranking managers	E-learning, external conferences, seminars, external trainings; coaching with outside specialists;
Junior managers	E-learning, external conferences, seminars, external trainings; coaching with outside specialists, courses;
The main staff	Training in the workplace, learning in action, e-learning, coaching with a line manager, coaching with outside specialists, rotation, advanced training courses.

Source: compiled by the authors on the basis of the research

We would like to note that effective activity requires new organizational thinking, team culture and new standards of conducting business. Besides, collaboration among staff should be based on the principles of creative interaction, mutual respect and mutual understanding. Thus, according to a famous expert, Stephen Kovy, in an era of intellectual work, someone who has the courage to say «We» will achieve success. A team of professionals is capable of a greater achievement in comparison with a single individual, and the results of joint efforts are always better than individual's potential.

The primary obligation of an HR-manager is to ensure the optimal organization of the work of staff by creating favourable conditions for fruitful cooperation, the effective interaction of all members of a team, the involvement of staff in making managerial decisions, ensuring synchronization of work and the systematic exchange of information ²⁵⁹. In practice of personnel management, the interaction of different models is observed:

http://www.management.com.ua/human_resources_management_m/human_resources_management_ml25.html.

²⁵⁹Kostiuchenko O. and E. Poliakova, "The role of an HR--manager in constructing effective work", available at: <http://yur-gazeta.com/publications/legal-business/rol-menedzhera-v-pobudovi-efektivnoyi-roboti.html>.

Japanese, American and Western European models. For instance, the Japanese management style is based not on forcing employees, but on persuading them. A manager does not manage the work of employees, but promotes their interaction, provides the necessary assistance, builds a harmonious relationship. It is also worth noting that American companies are selecting employees according to the following criteria: education, experience, psychological compatibility and the ability to work in a team. In addition, to identify the level of professional training future employees undergo complicated testing procedures. For example, in Belgium and France, the questions concerning trade union affiliation, religion, political views and marital status were prohibited in questionnaires. Also, candidates have the right to privacy of their life, the right to a decent attitude, the return of costs associated with the interview, the protection from inappropriate questions during the interview process.

As we see, more and more Ukrainian companies use the experience of foreign colleagues. Thus, for the sake of productive human resources management, managers try to combine the best features and peculiarities of different nations (for the Japanese, they are hard work and accuracy, for Americans – confidence and a desire for individuality), taking into account the mentality of compatriots. Learning, experimenting, training is the way we must live and work. The problem is that many employees are not able to participate in these activities, since the system is set up in such a manner that work in a company prevents them from doing so. For leaders, the most important is to find ways to activate search engines of employees. It is often impossible to ignore performance indicators, overcome politics and bureaucracy. Despite these difficulties, leaders must find ways to activate search engines for employees: to encourage them to use their strengths, creating opportunities for experimentation and helping them to personalize the purpose of work²⁶⁰.

Conclusions. The conducted research has shown that HR-management in modern conditions of digitalization of economy is a labour-intensive

²⁶⁰Why People Lose Motivation — and What Managers Can Do to Help, available at: <https://hbr.org/2018/03/why-people-lose-motivation-and-what-managers-can-do-to-help>.

technological process, and it is unknown how the search process and the system of managerial decisions will change. At present, social networks (LinkedIn, Facebook and Google) play a significant role in working with staff. At the same time, HR-managers with the introduction of human resources management is system will increase the speed of collection and processing of information, frequency and speed of decision-making. Requirements for technical competencies of HR-managers will rise and new specialties in the field of human resources management, such as an analyst of «large data», visualizer, statistics operator and others will emerge. At the same time, any human resources management requires the setup of basic and auxiliary processes not only on the part of math, but also on the part of description and programming of the main work processes. This is the main direction of developing HR-management of TECH in general and HR-professionals in particular. They have to improve processes, create and customize tools, and carry out existing and future business tasks ²⁶¹. Undoubtedly, the technology era changes hr-technology into digital format and automates most of HR-functions (we mean the construction of cloud-based HR -platforms with mobile applications (Human Resource Information System)).

It should be mentioned that the introduction of the system of HR-management in companies should include long-term staffing (careful selection of skilled workers of the appropriate age, length of service, professional skills), the development of an effective system of incentives and motivation of employees, direct involvement of employees in the enterprise's activities, the sequence of actions of HR-managers in managing personnel; provision of proper working conditions, establishment of appropriate wages for employees and high quality of a personnel policy at the enterprise ²⁶².

We want to note that an HR-specialist In the digital economy will have to focus on promoting corporate values and adhering to high internal ethical

²⁶¹Kozlov D. (2017), "Human resources management -professional in the era of artificial intelligence", available at: <https://business.ua/biznes/item/2017-profesional-v-epokhu-shtuchnoho-intelektu>.

²⁶²Ulrich D. (2007), "Effective personnel management. New role of managers in the organization". Williams Publishing House. - p.98.

standards, creating conditions for effective collaboration and joint decision-making²⁶³. They have to meet such challenges of the labour market trends as the diversity of forms of employment and forms of entrepreneurship financing, robotics, artificial intelligence, the growth of population migration and labour mobility, as well as be more educated and experienced on a global scale. The challenge for human resources management today consists in the ability to understand, seek and motivate staff, as well as teach directors to manage teams that will form the core of staff. Management of talents will be built on new advances in human resources science and intelligent management as well as on the creation of a community and behaviour management. At the same time, the motivation of labour will be part of the process of organizational interaction, eliminating the contradiction between the social and individual needs of workers.

²⁶³Be in Trend. Future of Human resources management (2015), available at: <http://www.management.com.ua/tend/tend697.html>.

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