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ECONOMICS

HIGHER EDUCATION AS A STRATEGIC FACTOR IN THE DEVELOPMENT OF THE CREATIVE ECONOMY

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Annotation. The article considers the essence and significance of the creative economy and the creative class. It determines the significant influence of higher education on the formation of the creative class and highlights the experience of the National University "Kyiv-Mohyla Academy" in the formation of creative thinking of students.

Key words. Creative economy, creative class, higher education, techniques of creativity development.

According to the UN, the creative economy accounts for 3.4% of world GDP, its share has reached 25% of the world's population, and growth rates are twice the growth rate of services and four times industrial production.

This concept was first introduced in Business Week in 2000, and in 2001 John Hawkins published Creative Economics [1], in which the author described new economic systems where value is determined by non-traditional resources such as land or capital, and depends on originality and creativity.

It is freedom and the free market that provide a unique opportunity to turn your own ideas into goods or services. And this is the essence of the creative economy, - Hawkins wrote.

Creative economy is a set of people and businesses that create cultural, artistic, innovative products and services, as well as spaces where creators can present their work, exchange ideas, work together on projects. That is, its basis is the use of creative imagination by people to increase the value of an idea. The creative economy gives new life to production, services, trade and entertainment. It changes the environment in which people want to live, work and study, where they think, invent and create.

The creative economy is already a rapidly developing branch of the world economy. It is dynamic in terms of revenue generation, job creation and export development, as it is less tied to material resources. Hundreds of programs of various scales have been introduced in the world to strengthen the creative sector: from the level of UNESCO or state programs to municipal ones.

For example, the United Kingdom, which has set up a government development program, set up support agencies, provided preferential accommodation, grants and

affordable credit, and has achieved tangible results in this area - \pounds 77 billion a year and 1.7 million jobs. And one of Europe's largest creative industry clusters, according to PwC in Barcelona (The Catalan Institute of Cultural Enterprises), which coordinates 140,000 creative entrepreneurs, creates added value of 5.7 billion euros a year.

Has anything been done in Ukraine, apart from defining the concept of "creative industries" and introducing it into the Law of Ukraine "On Culture". Creative economy is about freedom, ideas, possibilities of bringing them to fruition, about networking, interaction and cooperation.

According to research, in recent years, hubs, coworking spaces, activity centers, business incubators have been set up in various cities of Ukraine, and not only for IT projects. Moreover, social entrepreneurship is developing.

Business incubators train ATO participants or other beginners who would like to start their own business for free. In Kyiv, 21-year-old Vladyslav Malashchenko opened the Good Bread From Good People bakery, which employs eight people with various forms of intellectual disabilities. He won a grant to study how to start his own business at the Startup Ukraine educational center. Such ideas lead to social change. It should be noted that social entrepreneurship and creative industries are developing in Ukraine. Large-scale forums, festivals, lectures, workshops and training courses are being held on the topic of creative economy and creative industries. We have a lot of active talented people with a cultural background, who are emotional and sincere, who want to change the world and their cities for the better, who want to be beneficial and are socially responsible. The Ministry of Culture is holding an international forum "Creative Ukraine", but this is not enough. Thanks to the development of the creative economy, Ukraine can reach a new level instead of supplying personnel for export.

It is the unique human capital, talent, knowledge that can be the impetus for the development of Ukraine's creative economy. And this is where it is extremely important to promote the development of the creative class.

The concept of "creative class" was introduced by the American-Canadian economist and sociologist Richard Florida, a professor at the School of Management named after Joseph Rothman at the University of Toronto. In 2002, he published the book "Rise of the creative class" (translated into Ukrainian as "Homo creativus. How a new class is conquering the world" [2]), in which he set out the theory of success of urban development.

Florida understands the concept of "creativity" as the creation of important forms that are the most valuable product in the economy of the late twentieth century, although not a commodity as such. Therefore, the author builds his theory around a person who produces creativity. It is the employee of the creative sector, in his opinion, who is the embodiment of the spirit of the time and shapes the economy of the modern city.

"Creative people are different, they do not live like the classic working class of the previous century," he wrote.

According to Florida, the future belongs to the creative class, so from now on cities must become comfortable for the lives of these people and adapt to their lifestyle. The

work schedule is irregular, they can go for a run at lunch after the meeting, and work at night. The offices are transformed for the convenience of such people respectively.

The secret of economic growth, according to Florida, is hidden in a complex of three Ts - tolerance, technology and talent. "The economic development of the region is ensured by creative people who prefer places that are diverse, tolerant and open to new ideas."

According to Florida, the "gay index" is also important. He conducted a study in which he analyzed a map of gay settlement. According to it, the author concludes that gays are a "litmus test" of creativity, because the creative class feels safe in cities where there is tolerance. Following this idea, Western European cities began to pass laws on tolerance, believing that it would increase their economic capacity.

The author of the "creative class" category emphasizes that money has never been a sufficient motivation for creative people. They need internal incentives associated with the creative component of the activity. Interesting and responsible work is an opportunity to make a contribution and influence the process; this is confidence that your activities matter. Unlike the traditional working class, the creative class expects an individual approach. Therefore, to direct their abilities and skills in the direction of productive work is sometimes very difficult. There are many theories on how to get different creative individuals to perform the tasks set by the company. In 1998, McKinzie Quarterly published a review entitled The War for the Best Personnel, which, based on a survey of more than six leading experts from 77 major US companies, concluded that, although culture is equally important to all respondents, values and independence ", they can be divided into four separate groups.

- "Follow the winner": for this group, career growth and advancement in the hierarchy of a successful company are important, while the company's mission does not play a special role.

- "The greater the risk, the greater the reward": the representatives of the second group prefer to receive various forms of reward and feel the active role of the company in improving their professional skills.

- "Save the world": The third group needs an inspiring goal or creative tasks, but pay and training are not important to them.

- "Lifestyle": members of this group value flexibility, good relationships with the management and location of the company, rather than development of the organization or job satisfaction.

Nevertheless, there is no consensus on how to motivate and manage employees' creativity.

Thus, the representatives of the creative class in their socio-status, worldview and psychological characteristics act as a social force interested in social, economic and technological innovation, steady improvement of quality of life and the priority of individual rights and freedoms. It is quite natural that this forms an appropriate order on the part of the representatives of this specific social group for the quality and format of education (both formal and informal). Attention to the education system is preconditioned by the following circumstances.

Firstly, the most important strategic resource in the modern world is human intelligence, and the intellectual potential of society directly determines the economic and social development of the country.

Secondly, the quality of higher education largely determines the pace and direction of development of the country, so the urgent task is to take into account the education system of revolutionary changes not only in science and technology, but also in economics and culture to transform them into appropriate educational programs and standards.

And thirdly, universities and other higher education institutions are the institutional actors that are designed to actualize the innovative paradigm of social genesis through the development and integration of all three components of the "knowledge triangle" (education, research, innovation), large-scale investment in human resources, support for the modernization of the education system "[3].

The above means that in the context of the formation of the creative economy it is necessary to change approaches to the education system, as well as to strengthen the role of creative and natural sciences.

In view of this, in 2015 at the Department of Economic Theory, Faculty of Economics, National University "Kyiv-Mohyla Academy" the discipline "Creative Thinking" (for undergraduate students) and the discipline "Open Innovation and Creative Thinking" (for master's students) were introduced.

Five years of experience in teaching these disciplines allowed us to draw the following conclusions:

- every student is a creative person;

- the level of development of creative thinking really depends, according to A. Maslow, on the system of upbringing and education, which were applied to a particular individual [4];

- personal development of each individual depends on his/her desire to get out of the comfort zone and apply some efforts to make full use of creative development techniques;

- The personality of the mentor is essential, he/she has the ability to see the creative abilities of each student, to support and develop these creative abilities.

An important factor in the development of creative thinking in students is a systematic approach to the use of techniques for its development. As practical experience has shown, each technique of creativity development is aimed at its specific aspects. This allowed us to develop our own classification of techniques for the development of creative thinking. The traditional classification involves the presence of two groups of techniques: team and personal development of creativity. The proposed classification contains 6 groups of techniques for the development of creative thinking [5].

The first group includes techniques that allow you to identify and systematize the factors necessary for successful project implementation (eg, mind maps).

The second group includes techniques that can identify the root causes of problems (technique "Why?" And its modifications).

As for the third group, this includes techniques for generating ideas (primarily

brainstorming, 3 Walt Disney chairs, 6 hats of thinking E. de Bono, SCAMPER).

The fourth group includes techniques for choosing the most creative and, at the same time, the most realistic idea for implementation (for example: pros, potential, remarks; the gist of a crazy idea; is this idea so crazy indeed?).

The fifth group includes techniques that allow you to identify problems, threats and risks that may arise during the implementation of the idea (this technique comprises open questions, contradictions, as well as, 3 chairs and 6 hats).

Finally, the sixth group is a group of techniques that avoid the constraints hindering the successful implementation of the project, problem solving, task execution (subtraction; mission not completed; break the rules).

Experience has shown that the consistent use of these techniques in the implementation of projects by student teams, allows not only to generate a large number of creative ideas, but also to make reasonable creative decisions, take into account possible threats and risks and ensure successful project implementation.

The conducted research, and also the analysis of practical experience allow to assert that management of development of creative thinking trained at university can be carried out at three levels.

Firstly, at the level of the individual, because when communicating with teachers, other students, as well as when participating in various student organizations and activities, personal changes occur.

Secondly, at the level of the process, because students appreciate the use in the educational process of a large number of practical forms of training.

Thirdly, the development of creativity is facilitated by the educational environment itself: psychological climate, motivation, a certain level of freedom, the ability to freely choose additional disciplines and occupations.

It is education that performs a large number of exceptional functions, among which the most significant is the achievement of such a level and quality of education that allows a person to become a competitive specialist in the transition to a creative economy.

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ASSESSMENT OF THE IMPACT OF THE LEARNING SERVICES QUALITY ON THE ECONOMIC AND NATIONAL SECURITY OF THE COUNTRY

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Annotation. The paper establishes a connection between the learning services quality and the economic and national security of the country. Threats related to the learning services quality have been identified in the political, military, technical, technological, economic, financial, political, environmental, informational, demographic, social and spiritual fields. The threads of improving the learning services quality in order to strengthen the national security of the country are considered.

Key words: learning services, learning services quality, security, economic security, national security.

Education is one of the key criteria for assessing the living standards of the population, a determining factor in shaping the intellectual potential of the individual, ensuring its economic and personal security, stimulating economic growth, improving the welfare and prestige of the country on the global stage, which undoubtedly affects all aspects of social development. Education should also be considered as a weapon in strengthening the country's national security. In addition, education is a guarantee of mannerlinnes, spirituality, patriotism, national identity, conscious behavior in a world where informational, hybrid wars are taking place.

In the field of educational security as of today, a number of problems have crystallized: the need to form in the population values and socio-patriotic guidelines that would help strengthen national security and effectively overcome hybrid threats; development of safety competencies in schoolchildren and students in the process of teaching social, economic, legal and other disciplines; to achieve the orientation of specialists to search, prevent and solve future problems; the need to abandon the concept of training specialists "for life" to the concept of "lifelong learning"; improving the quality of education and expanding teaching methods; development of the defenseindustrial complex and strengthening of the country's defense capability; improving media education.

Thus, education should be seen as a weapon in strengthening national security. Because, as stated in the Analytical Report of the National Institute for Strategic Studies «Safety Dimensions of Educational Policy: World Experience and Ukrainian Realities»: «Military power is no longer a sufficient condition for ensuring the security of the state. National security is now closely aligned with human capital, and the strength or weakness of the country's human capital is determined by the state of the education system» [1, p. 7].

Analysis of Recent Research and Publications. D. Dzvinchuk, H. Dmytrenko, K. Korsak, V. Luhovyi, S. Nikolaienko, V. Ogneviuk, M. Stepko, S. Proleiev, Z.Zhyvko and others studied the aspects of essence and applicability of educational security to strengthen national security. However, the essence of educational security, its threat and the degree of impact on national security have not been fully clarified.

The aim of the study is to study the existence and nature of the relationship between population's scholarship and the level of national security of the country and its components.

Research Results. Education, educational security is one of the key factors in strengthening the national security of the country. As noted by M. Mykhalchenko and N. Skotna: «Education plays the role of a kind of buffer between the individual and society, forms the personality under the "social order", in other words as it is necessary for successful functioning in a particular society. The system of social roles, norms, and values, transmitted by education, is characterized by those features that are in demand and welcomed in a particular society today» [2, p. 267].

The provision of high-quality learning services strengthens the economic security of higher education institutions, which should be understood as a stable state of higher education institutions and their ability to withstand both internal and external threats, herewith providing learning services, to develop human talents and creativity, to promote the competitiveness of domestic specialists according to European and international standards.

The primary task of higher education institutions is to train highly professional specialists for the national economy, able to increase the wealth of society, ensure the growth of the welfare of citizens and its competitiveness at the international level. As shown in Fig. 1. data, GDP growth per capita is only partially supported by increasing the level of education of the population and the development of education. Therefore, in order to further study the relationship between the level of educational security and national security, first of all it is necessary to improve the methodology of their assessment, including both quantitative and qualitative indicators.

Due to the escalation of internal contradictions, the development of conflict situations inland, there is a need to focus on internal threats in finding ways to strengthen national security. Not the least role is played by the level of education of the population, as there is an opinion that a person with a higher level of education is not only more literate but also more tolerant, less conflictive, ready to solve problems in question and answer form, not from a position of strength. Such people are more resistant to information aggression. At the same time, people with a lower level of education are driven by material needs, and social, political, and national problems are not so important to them. It is assumed that such people are easier to manage, manipulate, and substitute values and historical facts. Such individuals can create conflict situations in everyday life and society, and can also be the object of influence in a hybrid war. At the same time, an unstable internal situation in one country can become an external threat to the national security of another country, especially in neighboring countries. And its manifestations can be various: from mass migration to armed attack or terrorism.



Fig. 1. Development of Education and GDP Production in Ukraine, 2010-2018 * *Calculated by the author by source [3]

—= share of the population with higher education, %

-a-share of employees of the innovation sector in the total number of employees, %

--- GDP production per capita, adjusted for price index, thousand \$

The general security of the country can be ensured only by simultaneous solving this issue in a number of different areas, namely: military, technical, technological, economic, financial, political, environmental, information, and so on. The educational sphere cannot be an exception from the above list, at least due to the fact that the priority task of its functioning is training of highly skilled experts for all without exception of the listed branches. And in this sense, aspects of educational security are crucial for all other spheres of socio-economic life [4, p. 13].

In the political sphere, education contributes to strengthening of the country's sovereignty, influences its domestic and foreign policies, stability, prevents conflicts in the country; in the economic sphere it provides increase of intellectual potential of the country, growth of its competitiveness in the international market; in the social sphere it promotes the well-being of the country's citizens and the protection of socially vulnerable segments of the population; in the demographic field it provides overcoming the problem of early and infant mortality, external migration, preservation of ethnocultural heritage; in the field of information it provides training of highly qualified personnel who are able to find, assimilate, analyze and apply the necessary information quickly, increase computer literacy of the population and media education, prevention of cyberattacks; in the environmental sphere, education provides for the increase of ecological literacy of

the population, the development of environmental awareness of the population of the country and the ecological culture of behavior; in the military sphere, it contributes to strengthening defense capabilities, obtaining scientific results in such areas as protection against chemical, bacteriological and nuclear substances, telemedicine, information technology, etc.; in the spiritual sphere, education should ensure the development of national values, patriotism, culture of behavior, and so on.

The impact of the level of educational development on the national security of the country, including its components, is confirmed by statistical groupings (Table 1), which show that with increasing coverage of higher education from group to group increases the country's potential, GDP and welfare of the population (income), improving the physical and moral health of citizens (reducing the incidence of tuberculosis), culture of behavior and crime situation in the country (reducing crime), spiritual development (increasing museum attendance), the population is more involved in the production process (reduced unemployment rate) and a careful attitude to nature is formed (decreases emissions of harmful substances into the atmosphere).

Table 1

			security	og a i	umber o	1 marca	015		
Regions grouped by the level of higher education of population, %	Number of regions in the group	Share of students of III-IV level of accreditation in the population structure,%	Production of GDP per capita, thousand UAH	Income per capita, thousand UAH	Unemployment rate (according to ILO methodology),%	Visiting museums per 100 people, cases	Incidence of active tuberculosis per 100 thousand population	Proportion of convicts in the population structure, ppm	Emissions of pollutants into the atmosphere from stationary sources of pollution, thousand tons
I (by 2,0)	9	1,3	38,3	36,4	11,8	16	74,5	1,9	108,9
II (2,0-3,0)	10	2,4	47,5	43,0	9,8	25	63,3	2,0	118,4
III (3,0 and higher)	5	4,1	48,3	45,5	8,7	29	64,8	1,7	75,0
Average	24	2,4	44,3	41,0	10,3	23	67,8	1,9	105,8

The impact of educational security on national security by a number of indicators*

* Calculated by the author according to the State Statistics Service of Ukraine [3]

In the field of education, a number of areas of its development can be identified to strengthen national security. Among others it is necessary to allocate: preservation of high indicators of coverage of education at improvement of a level of its quality; improving the state of study of priority groups of academic disciplines, first of all, natural sciences, social sciences, information technology, as well as foreign languages; updating the forms and content of education in order to better prepare young citizens for effective work and protection of Ukraine; active introduction of media education as a tool of increasing the level of preparation for independent living and at the same time counteracting information aggression; adjusting the structure of training in order to ensure its compliance with the needs of the national economy; expanding participation in international scientific and educational programs, primarily NATO's Science for Peace and Security program; development of education during life [5, p. 91].

With the expansion of international cooperation, including in the field of education, young people have the opportunity to go into higher education abroad, and scientists and educators can replenish the arsenal of their skills with the latest techniques. Access to education is expanding and simplifying due to the wider use of distance learning and the introduction of virtual universities.

However, the expansion of international cooperation in the field of education brings both positive changes and hides certain threats to both educational and national security. First of all, a necessary condition for improving the quality of education is the creation of a safe environment in educational institutions; respect for human rights; protection and prevention of violence against students by peers, senior students and adults; prevention of corruption in educational institutions; creating a comfortable educational environment.

In the conditions of rapid development of society there is a threat of aging of the acquired knowledge, therefore there is a need for transition to the concept of "lifelong learning". Although such a trend has not yet developed in Ukraine. Almost everyone gets an education through initial training, and it can be confirmed that Ukraine only begins to develop the concept of lifelong education. In reality, as the analysis shows, the population stops improving their educational training at the age of 35 [6, p. 129].

The solution of this problem will be facilitated by the creation of educational activities at industrial enterprises: training of new employees; exchange of best practices; training with the involvement of teachers from vocational and higher education institutions. According to the experience of developed countries and leading domestic enterprises, the optimal cost of vocational training is 3-4% of the salary fund. The experience of successful domestic and foreign companies shows that investing in staff, creating conditions for professional growth of employees and increasing their willingness to solve problems give a high return in ensuring the national interests of the country [6, p. 129].

In order to strengthen the national security of the country, education should ensure the formation of critical thinking, national consciousness, strengthening of spiritual security, and training of information security. Thus, the occurrence of information threats will be overcome and prevented. This will make it impossible to conduct hybrid wars, which are based on demoralization and the spread of false, beneficial to the aggressor, opinions among the population.

The nature of information wars is as "humanized" as possible, because their main object and purpose of information aggression, which destroys the foundations of national security, are citizens, especially young people. Already at the time of independence it was possible to observe how the enemy tried to influence the content of Ukrainian education, educational work with youth, forming first of all falsified historical, literary ideologies and concepts, foreign to Ukrainians linguistic-cultural, aesthetic, spiritual space, binding someone else's ideals. At the same time, educational, cultural and informational space was used, including domestic (mostly occupied by the oligarchs), space [7, p. 77].

Effective use of higher education resources in the system of spiritual security will allow Ukraine (along with other measures) to strengthen the unity of society, establish itself as a self-sufficient national and cultural world community and successfully solve traditional geopolitical tasks: achieve stability and irreversibility of economic and political reforms in building a new system of international relations, to effectively counteract the strengthening of the influence of great powers on the Ukrainian national space [8, p. 220; 9].

An important threat to the country's educational and national security is the limited territorial access to educational institutions, which includes transport costs, accommodation and food costs, and, in general, the physical and economic availability of educational services.

Among the threats to educational and national security are insufficient funding for education, which reduces the quality of educational services, the level of proper technical support of the educational process, prevents the creation of programs to support gifted students, and reduces youth interest in higher education, especially its highest levels - postgraduate and doctoral studies [9; 10].

Declining quality of education, corruption in education, high tuition fees, the unstable situation in the country create conditions for young people to go abroad to study, and often to permanent residence. As a result, Ukraine is losing its able-bodied competitive population, against the background of a growing surplus of places, including public ones, in higher education institutions.

Conclusions. Thus, the importance of education, its quality and security for strengthening the economic and national security of the country was established and the connection between them was traced using the graphical method, the method of time series and statistical groupings. Threats related to the quality of educational services have been identified in the political, military, technical, technological, economic, financial, political, environmental, informational, demographic, social and spiritual fields.

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MODERNIZATION OF RESOURCES MANAGEMENT OF AGRICULTURAL ENTERPRISES

Iryna Markina, Doctor of Economics, Professor, Head of the Management Department, Oleg Fedirets, Candidate of Economic Sciences, Associate Professor, Bohdan Korniienko, Ph.D. student of the Management Department, Poltava State Agrarian Academy

Annotation. The article is devoted to the complex analysis of theoretical and practical aspects of resources management in agricultural enterprises. The research topics are revealed on the basis of the conducted researches on the main conditions and trends related to the use of production resources in agricultural enterprises of Ukraine. The relevance of the study is determined by the fact that production resources play a key role in ensuring the successful operation of enterprises.

Key words: agricultural enterprise, production resources, efficiency, resource potential, resource management.

Formulation of the problem. One of the most important problems of market development of agricultural enterprises is the efficient use of production resources. Without this, it is impossible to achieve a high level of labour productivity, low costs production. The vast majority of agricultural enterprises do not have a limited number of production resources. The consequence of this is a violation of production technologies in agriculture.

Therefore, the technical renewal and material support of agriculture in the context of its enterprises and individual farms should be considered as one of the priorities of the national agrarian policy. After all, the reliable provision of the agricultural sector of Ukraine with production resources in modern conditions has reached the crucial moment, where even providing the current dynamics and failure to take drastic measures to improve it, in the near future there will be a problem concerning violations of technological processes in livestock and crop production of an enterprise, significant extensiveness of production in agriculture in general. Therefore, the search for ways to ensure enterprises and efficient use of their production resources is a very important issue today.

Analysis of recent research and publications. A large number of agrarian economists is engaged in the study of the organizational and economic problems associated with the resources management of agricultural enterprises, the process of their development and the study of the current state: S. P. Azizov, V. H. Andriichuk, Bilousko, A. M. Holovko, M. I. Hrytsyshyn, V. V. Ivanyshyn, P. M. Makarenko, K. M. Melnyk,

H. M. Pidlisetskyi, P. T. Sabluk, V. B. Shkliar and others. Despite the wide range of issues studied by Ukrainian and foreign economists, some of them need to be improved and developed due to the deepening of market relations in rural areas. In particular, it is necessary to systematize the principles of relations between the subjects of consumption of production resources, to study the current state of the provision and use of agricultural machinery in various forms of rural management, to evaluate the efficiency of production resources usage. All of these things determine the relevance of the topic, direction and structure of the research.

Research results. Agro-industrial production in our country is a very resourceintensive sphere of the national economy, where more than a third of all production resources of the country is concentrated. However, due to the acute and extremely protracted financial and economic crisis, the agro-industrial complex has lost the ability to even simply reproduce the resource potential, and its structural imbalance and shortage of some production resources, especially material and technical and energy ones, lead to their inefficient use.

Production resources are a component of any economic cycle and, accordingly, an integral part of any economic unit. The main task of production resources is to maximize the needs of business structures for their smooth operation and development [6, p. 32]. Thus, we can speak about the satisfactory organization of production resources of any economic unit only when the organization of production resources is complex, taking into account the production technology and composition and the size of production resources [3, p. 32].

The resource management system provides for the need for complex organization of the formation and use of production resources, which should be highlighted, because this principle is not always maintained not only in practice but also in theory (Fig. 1).



Fig. 1. The main directions of the interaction of subsystems of an enterprise

At the enterprise with the modrn organization of production, the corresponding kinds of economic activity which are carried out by separate production units of the enterprise at corresponding supply of resources are realized. Thus, the formation and use of production resources in close connection with other activities of an enterprise form the efficiency of its operation [3, p. 55].

The main task of the subsystems of an enterprise is to meet the needs of production resources of economic units of an enterprise and create appropriate conditions for their effective use within an enterprise. It is found out that the needs and means of their satisfaction differ depending on the production and other tasks of an enterprise. Activities related to the development or modification of the organization of the formation and use of production resources of an enterprise should be carried out in the form of appropriate measures, which can be qualified by the degree of coverage:

- complex, covering all types of production resources of an enterprise;

- partial, which belong to the relevant type of production resources;

- organizational and technical measures, which are related to the modernization of the organization of formation and use of production resources.

In the process of production different types of production resources interact with each other, and the relationship between them establishes an appropriate equilibrium in a certain period of time. Growth, equilibrium and interaction are the main characteristics of the production system. In this case, equilibrium is the main condition for its effective functioning.

Production planning is closely linked to product sales and production stock control. Product sales planning and related production resources are the basis for managing the production activities of an enterprise. Schematically, this relationship can be represented as follows (Table 1).

Table 1

Methods	Parameters	Norms	
Costs volume management	Detailed cost sharing	Cost standards	
Management of operation and maintenance of equipment	Equipment loading; work schedule	Deadlines of operations	
Stock management	Stock level for each type of resources	Norms of resources consumption	
Production management – a general assessment of the operation of an enterprise	Sales volumes, the amount of working capital	Profit level, profitability	

The main relationship between production resources and production effectiveness

Practical experience of agricultural enterprises and its theoretical generalization show that improving the use of production resources provides appropriate economic efficiency only if partial measures to improve the formation and use of resources ensure their rational functioning as a whole.

The resource potential of an enterprise is a system-generalizing concept that includes a certain number of structured elements and is constantly or periodically influenced by internal and external factors. The resource potential of an agricultural enterprise should be understood as a set of land, material and technical, labour, financial and information resources of an agricultural enterprise acquired by it in the course of economic activity, contributions of participants and rent and intended for production, commercial and financial activities [2, p. 62].

All components of the resource potential of agricultural enterprises in a market economy must function as a commodity. And this necessitates the organization of land, labour, material and technical resources, capital. Speaking about the land market, it should be noted that its main features in the agricultural sector are: the use of land for agricultural production, its limited space and eternity (subject to rational use). The functioning of land as a capital is possible only in the conditions of a full-fledged market of agricultural lands, when there is a possibility of transition of the latter from inefficient users to more efficient ones. Without this, it is almost impossible to count on the building of sufficiently effective land relations.

Today, the plowing of the land fund in Ukraine exceeds the analogic indicator in the vast majority of countries. The share of arable land in the current structure of the land fund of Ukraine reaches 54.4%, while in developed countries it is much smaller. For example, in the United States this figure is 19.8%, France – 32.1%, Great Britain – 24.8%, Poland – 44.2% [1]. In EU countries, land is not cultivated if one hectare of land does not make a profit of 500 euros. Only having such profitability, it is possible to provide innovative and investment attractiveness of a branch, to ensure people's return to villages, to create comfortable living conditions for them [55, p. 41]. Therefore, the urgent problem is the optimization of the country's land fund, reducing its agricultural reclamation and plowing, which will improve the ecological condition of cultivated lands, intensify production by concentrating funds on a smaller land area. The development of the land market will help attract long-term loans to the agrarian sector.

The obligatory material element of any production process is means of production. They create the production and technical potential of the agarian sector, which is determined by the set of material elements of production, which provide the ability to perform the entire cycle of technological operations in the production of finished agricultural products [9].

The effective functioning of any agricultural enterprise requires the availability of appropriate material and technical base and the best possible use of all its components. First of all, it is subject to technical means, the current level of security of which for most agricultural producers is quite low.

The problem of a village is the quicker rate of reduction of the number of working women (compared to men), which deprives rural settlements of prospects for further development. Studies show that for men an important motive is compliance of their job with the acquired specialty, and for women – a convenient work schedule, proper living conditions and a favourable moral and psychological climate in the team. In order to improve the sexual condition of village residents, first of all, it is necessary to create or restore jobs for rural women. 500,000 jobs were lost in Ukraine alone due to the reduction of livestock farming. In addition, according to official statistics, within 11

years, 30% of the total number of preschool institutions, 16% of clubs and libraries, 42% of eating establishments, 44% of hospitals, 45% of shops, 93% of consumer services centres decreased. And these are another 200 thousand women's jobs [7, p. 130].

The primary task of heads of agricultural enterprises is to support their existing employees who are of the most productive age, have sufficient levels of qualifications and practical experience. They should look after the improvement of the sectoral structure of an enterprise, which would ensure a fuller workload during a year. The development of labour-intensive industries (vegeculture, vine growing, horticulture, cattle farming, pig breeding, etc.) contributes to the employment of rural population [1, p. 23].

Among the measures of state regulation of the labour market, the most important are the following: the implementation of priority funding for the development of the social sphere in rural areas; the development of regional complex bailout packages; the promotion of entrepreneurship, private initiative; the improvement of the efficiency of labour resources; enterprises, institutions and organizations that create new jobs in regions with a high level of unemployment of the local population must have income tax benefits and other financial assistance in accordance with the legislation. An important factor in achieving the proper efficiency of the reformed enterprises is high competence and business qualities of managers and specialists who are able to determine the future development strategy [8, p. 20].

Effective management of resources of agricultural enterprises will ensure a stable position in the market in the case of the implementation of innovative tools of strategic management, namely the successful combination of knowledge, experience, technology (key competencies) under the following conditions:

1) an enterprise, having a variety of resources, must combine them in its production activities. This combination mutually reinforces and complements resources, making them unique and inaccessible to competitors;

2) market success of an enterprise is guaranteed if an enterprise chooses and combines resources more intensively than its competitors;

3) as a result of an effective and successful combination, resources take on a form of key competencies that are inaccessible and unchanged for competitors;

4) the source of formation of key competence is innovation, technical and technological capabilities of an enterprise;

5) key competencies form tangible and intangible assets (unique knowledge, information technology, technological and organizational know-how, goodwill), which over time only intensify, the quality and efficiency of their use increase;

6) any agricultural enterprise can acquire key competencies through the formation of unique databases, the creation of an appropriate working climate in the team, the creative use of innovative ideas [10, p. 40].

The success of strategic development of an enterprise, the effective implementation of its strategic plans depend on a number of subjective and objective factors, such as the willingness of management to implement large-scale projects, the knowledge, skills and qualifications of managers or the availability of resource potential. In other words, managers of an enterprise should focus on the successful operation of an enterprise through the formation of strategically oriented resource potential of an enterprise. The requirements of the external environment determine the main directions of transformation of the resource potential of an enterprise, its strategic behaviour pattern [5, p. 67].

Resources (depending on the origin) are divided into two groups: primary resources – those that are created by nature, regardless of the will and desire of man, but are used in social production (land and labour resources); secondary – products of the production process, which are directly or indirectly used in the production of material goods (fixed and current assets, financial and information resources). In this case, resource potential is defined as a complex integrated economic category, which means a set of primary and secondary resources capable of providing social production to meet material and spiritual needs of people. The set of technologically, economically and ecologically balanced production resources that provide highly efficient and environmentally friendly agricultural production, processing, storage, transportation and sale is defined as production potential [4, p. 99].

In the literature on strategic management, the term "strategic potential of an enterprise" is used, which means a combination of available resources and opportunities for the development and implementation of business strategy. In this case, the focus is on the resources of an enterprise used to develop and implement the strategy. However, a strategic potential is formed not only by available resources, but also by the resources that an enterprise can acquire by changing their characteristics in the process of implementing strategic decisions. Therefore, the composition of the resources that form the potential of an enterprise should be added by both existing and potential resources [10].

Strategic management of resource potential is implemented with the help of the strategy chosen by an enterprise, because it is the one, under the conditions of successful implementation, ensures the achievement of the goal. The development of strategic priorities is impossible without the formation of elements of strategic management of resource potential of an enterprise.

Conclusions. Strategically oriented resource potential of an agricultural enterprise is the correspondence and sufficiency of resources and competencies of an enterprise for the development and implementation of the strategy in order to obtain a stable competitive position in the market. This position is fully consistent with the resource theory and assumes that the strategic development of an enterprise is determined by the available quality resources that correspond to a particular agricultural enterprise, its strategic goals. The availability and quality of resources and competencies determine the configuration of possible areas of strategic development of an enterprise.

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STRATEGIC GUIDELINES OF IMPORT SUBSTITUTION POLICY IN UKRAINE AND SECURITY OF THE INTERNAL MARKET DEVELOPMENT

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Annotation. The key aspects and features of the implementation of import substitution policy are substantiated in the article. New strategic guidelines and operational tasks for the implementation of modern import substitution policy in Ukraine are suggested. The importance of using active import substitution tools and the priority of export-oriented development of the national economy for strengthening the security of internal market development are emphasized.

Key words: import substitution policy, tools of import substitution policy, strategic priorities, innovative vector of internal market development, digitalization processes, smart technologies.

Formulation of the problem. Today, humanity is experiencing constant changes in economic processes due to the turbulence of the world order and various challenges and stresses. This year's COVID-19 pandemic has caused inevitable changes in the globalization format of political, trade, migration, and social relations. The deep decline in economic activity around the world in 2020, the prolongation of quarantine measures and the absence of a clear anti-crisis plan to support the economy and protect domestic producers are real threats to economic recovery both worldwide and in Ukraine in particular.

The vulnerability of the national economy to changes in the world market poses a number of tasks for the government to make decisions towards choosing the vector of external trade relations with Ukraine's partner countries. Adopted in 2017, the Export Strategy of Ukraine (the "road map" of strategic development of trade) should be adjusted and, probably, the key emphases in the reorientation of the Ukrainian economy to new economic lines are to be changed.

In our opinion, today the issue of reviewing the declared strategic goals of Ukraine's trade development for the medium term and elaborating the conceptual foundations of import substitution policy for the longer term, considering potential and real threats to the country's economic security, is becoming relevant.

According to experts [1, p. 14], all elements of aggregate demand in 2020 will have a negative trend, while the largest will be the investment drop - up to 14.8%, the growth of state budget deficit - up to 5.6%, increase of poverty - up to 10-20%, and the most vulnerable sectors of economic development will be retail and wholesale trade, transport, metallurgy and mechanical engineering.

Considering the declared trends, the issues of specifying strategic guidelines,

operational objectives and means of counteracting threats to the development of foreign trade relations and strengthening the economic security of the state in general are becoming extremely important. Equally important are the issues of national competitiveness, which is largely determined by the interaction of an individual state and its economic and legal system with international institutions. This publication will be devoted to these aspects.

Analysis of recent research and publications. In Economics, the problem of reducing the import dependence of the national economy is one of the key issues. A significant contribution to its research was made by such foreign and domestic scientists as O. Amosha, I. Babets, L. Baltserovych, T. Vasyltsiv, D. Ventskovsky, R. Lupak, A. Mazaraki, T. Melnyk, T. Ostashko, O. Rudkovsky, M. Yakubovsky and others.

At the same time, further research is needed on strengthening the innovative vector of domestic market development and strengthening Ukraine's economic security in general. The problem of reducing the import dependence of the Ukrainian economy and its reorientation to export-oriented development using a package of active tools needs special approach.

The purpose of the study is to substantiate the strategic priorities of modern import substitution policy with an emphasis on the processes of innovation and digitalization of the national economy.

Methods of research. The methodological grounds of the survey are general and special methods, namely: logical, scientific abstraction, induction and deduction - to generalize the conceptual and theoretical foundations of the development of import substitution policy; system approach - in substantiating the tools for implementing the policy of import substitution and determining strategic priorities and operational objectives for the export-oriented vector of development of the national economy.

The scientific novelty is to improve the conceptual and applied approach to defining strategic guidelines and operational objectives of import substitution policy in Ukraine, which will reduce the import dependence of the domestic economy and ensure the transition to export-oriented development, balanced with means to stimulate competitiveness of Ukrainian enterprises.

The presentation of research results. The current state of Ukraine's foreign trade relations is characterized by excessive import dependence on both high-tech products and consumer goods, the production of which can be established within the country. The structure of exports is dominated by raw materials, which is completely unjustified considering the available in Ukraine powerful resource potential, quality labor, favorable climate conditions, geographical location, a developed industry of information technologies. Another feature of the domestic economy is the significant volume of shadow trade and smuggling, which indicates a corruption component, as well as excessively liberal foreign trade policy, while for most countries the priority remains national economic interests. Thus, according to [2] the level of protectionism in the world, Ukraine ranks 50th, implementing 99 protectionist measures, while 1247 protectionist measures are applied to Ukraine by 81 countries.

Under such conditions, the issues of growth of domestic production potential,

the increasing of competitiveness of Ukrainian products, reducing import dependence and the transition to export-oriented development become especially relevant. Import substitution as one of the types of economic strategy and industrial policy of the state in the period of crisis and post-crisis exit of the world economy from the "clutch" of the pandemic 2019-2020 can be considered as a transitional stage for accelerated modernization of domestic production.

The state should improve the investment climate in order to attract first domestic and then foreign direct investments to priority or strategic branches (sectors) of the national economy.

World practice has proved that the policy of import substitution should be applied in several important industries, characterized by a sufficient level of technological readiness and developed infrastructure. Import substitution projects should be selected taking into account the global trend of increasing international specialization of production and the criterion of compliance of import-substituting goods to the world level of similar goods in terms of basic technical and economic parameters.

A. Mazaraki and T. Melnyk propose to use not the classical model of import substitution, focused on own resources, but the model of industrial import substitution with foreign capital and opportunities of transnational corporations [3, p. 14].

We can agree with such ideas in the conditions of intensification of the investment climate in Ukraine, the formation of institutional terms to support domestic producers, the introduction of transparent business rules, protection of the domestic market from unfair competition, protection of intellectual property, simplification of patenting and getting copyright and related rights.

Regarding the participation of foreign investment, it is worth mentioning the example of Malaysia, whose government has chosen a strategy of export diversification. The peculiarity of this model is the emphasis on the development of light industry, agriculture and mining with the gradual redirection of revenues from the export of raw materials and attracting investment in sectors of the national economy such as engineering, automotive and electronics, computer technologies. Foreign investments in this country were primarily used for agricultural development, and only then aimed at modernizing the manufacturing industry and the development of high technologies.

We can state that the application of such a model of import substitution policy is a very promising direction for the domestic economy considering the available unrealized intellectual potential, innovative developments of domestic scientists, the success of IT companies, the active development of the creative technologies industry. The state should play an important role, in particular in developing the legal basis for such processes, carrying out radical economic and social reforms, displacing the shadow business, illegal employment, revising salaries growth, and so on.

We are convinced that the most stimulating factors for the mass and uncontrollable outflow of the employable part of the population are the inability to receive a decent (adequate) salary for the work performed (services provided) in the homeland. Solving this problem, in our opinion, will partially balance the issue of labor emigration and ensure the development of internal production involving the domestic experts.

R. Lupak focuses a scientific approach on the issue of state regulation of import substitution, and thus the implementation of tasks in the field of economic security of the state [4, p. 18]. At the same time, he considers state regulation in regional and sectoral aspects. Noteworthy are the author's suggestions to increase the use of rural potential in import substitution, the establishment of additional taxes on critical imports, development and implementation of a program of systematic de-shadowing of import of resources and goods in segments of the internal market.

Within the framework of the state policy of import substitution Y. Zhalilo outlines the perspective areas and measures of economic protectionism, emphasizing that the balanced use of a set of measures of institutional, legal, monetary, fiscal, price, social and foreign economic character will significantly strengthen the process of forming an institutional environment to counteract import dependence of Ukraine's economy [5, p. 108].

In our opinion, the main background for an effective import substitution policy are: simplification of business start-up procedures and preferential taxation (for those businesses that will produce products that are analogous to those imported, especially from the group of critical imports); increasing the production potential of domestic enterprises; ensuring the protection of intellectual property rights; preventing the monopolization of markets and resources; establishment of investment barriers to limit the participation of foreign capital in activities identified as strategic; actively promote the slogan "Support the national producer", etc.

The current situation of the spread of modified viral diseases, which forces the governments of the world's leading countries to reconsider the architecture of the world economic order, gives signals to domestic government officials, businessmen and concerned citizens to use this period to reformat domestic production and economic ties and develop new legible national guidelines for strengthening national economy both at the level of individual industries and in the regional context. The history of the development of human civilization has repeatedly confirmed the cases when crises became the impulse for the development of new activities, and thus the transition to higher technological levels.

Breakthrough sectors of the national economy include information and communication technologies, creative industries, aerospace, which in the Export Strategy of Ukraine [6] are defined as promising export-oriented sectors of the economy.

It is worth pointing out that the information technology sector is represented by domestic software outsourcing companies for a number of global companies and is one of the few sectors where Ukraine remains competitive in the global economy. The share of the IT industry in Ukraine's GDP is about 3.4%. Over the last 10 years, exports of IT services have grown significantly (by an average of 20.7% per year). In 2018, Ukraine's revenues from exports of IT products amounted to \$ 4.5 billion. USA according to the Association "Information Technology of Ukraine" [7], which is about 7.9% of total exports of goods and services in 2018.

The advantages of this sector include the ability of Ukrainian IT companies to create

complex software products. This situation is due to the high level of training of such specialists and competitive conditions for organizing and conducting business.

The domestic sector of the creative industries is developing rapidly, including graphic, industrial and interior design, audiovisual services, fine and performing arts.

The rich Ukrainian cultural heritage and the uniqueness and originality of the Ukrainian nation have given impetus to the development of various areas of traditional culture – creative crafts, arts and crafts, organization and holding of festivals.

This strategic sector of the domestic economy, despite the limited measures caused by this year's pandemic, has the potential for active development. This is confirmed by Ukraine's participation in the World Exhibition "Expo-2020", which presents exhibits from the category of smart technologies. All the exhibits of the pavilion are united around the idea of forming a new innovative and mobile society that exists in harmony with nature. The presented innovative technologies testify to the deep understanding of Ukrainian innovators of the need to move to the philosophy of smart life throughout the planet and the implementation of the concepts of smart and rational consumption.

The Ukrainian aerospace industry has a competitive advantage, which is a consolidated sector that produces unique aviation and space equipment, and the main customers are the United States, India, China and Turkey.

To implement the policy of import substitution, the state has a large number of active and passive tools in its arsenal. Active instruments include the purchase of licenses, patents, the application of a special investment contract, the passive - budget subsidies, tax benefits, price, credit and other preferences. It should be emphasized that in a permanent crisis situation, passive tools are most often used. Given the fact that each of these tools has its advantages and disadvantages, the effectiveness of their use depends on the institutional environment in which they are used.

We completely agree with M. Odnorog's thesis about the urgent need for institutionalization of import substitution, is the establishment of formal and informal norms, rules for the application of instruments of state support for self-sufficiency in domestically produced goods, works, services and bringing these norms into a system capable of import substitution [8, p. 15].

Despite the dominance of passive instruments of state policy of import substitution, we consider it appropriate to focus on the use of active tools. It is, first of all, about the priority role of the state in ensuring the relevant legal norms for maintaining fair rules of the game in the domestic market and establishing favorable conditions to support the innovative activity of domestic businesses. By giving preference to the active form of support for the national producer, the state reduces the burden on the state budget and state funds to support business. Given the chronic reduction of budgetary resources and significant shortcomings of price and credit regulators, in our opinion, it is worth expanding the use of innovative instruments, including tax, which are characterized by versatility and flexibility.

The consequences of such innovative incentives can be: transfer of advanced production technologies (in the absence of such domestic origin); providing the population with goods

of both general use and long-term use (these are products of food, industry, mechanical engineering); formation of an organic incubation environment (due to the selection of institutions capable of becoming incubators for business entities for the production of goods, provision of services, performance of works); introduction of "smart technologies" focused on the rational use of resources and territory, preservation of the natural environment on the basis of environmental friendliness, harmony and high technology.

Taking into account the outlined directions of import substitution policy in Ukraine, we propose to focus on several strategic guidelines and operational tasks that can be used when adjusting this type of national policy in the near future (Fig. 1).





Successful implementation of the import substitution strategy (compliance with strategic guidelines and performance of operational tasks) is possible under the conditions of compliance with the principles of innovation, environmental friendliness, energy intensity, rationality, manufacturability, and its consequences may be:

for the state: creation of a competitive environment and development of the consumer market; stimulating the demand for innovation, in particular by expanding the state order for innovative products; growing demand for domestic goods, which will lead to more intensive development of the national economy; positive dynamics of the domestic market, its filling with imported goods; strengthening such key types of economic security of the state as production, macroeconomic, food, innovation, investment, intellectual; suspension of the mass outflow of the able-bodied population for temporary (seasonal) work abroad, slowing down the emigration of highly qualified specialists and creative youth;

for business entities: expansion of production capacities of domestic business entities; awareness of social responsibility; technological update; product positioning in different segments of the national market;

for the population: increase in employment and, as a consequence, reduction of unemployment and increase of living standards and solvency of the population; increasing the income of citizens and forming the basis for increasing the share of the middle class in the structure of the population of Ukraine.

Conclusions. The conducted survey led to the conclusions of theoretical, methodological and applied character:

- protectionist policy is a state policy aimed at reforming those sectors of the national economy that are characterized by a sufficient level of technological readiness and developed infrastructure. In Ukraine, such industries include light and food industries, agriculture, chemical and metallurgical industries, mechanical engineering;

- security of the internal market is a complex multifunctional system that ensures economic independence, stability and sustainability of the internal market, the ability to support the functioning of other internal systems, to defend national interests and promote the advanced development of the national economy;

- it is proved that the implementation of import substitution policy should be carried out within the framework of adequate institutional support, while the priority role of the state is to establish the appropriate legal framework and support the innovative activity of domestic businesses;

- it is substantiated that the use of active tools of import substitution policy will reduce the burden on the state budget, and the consequences of such innovative incentives will be the active introduction of smart technologies;

- considering the inevitable processes of digitalization of social and economic processes, strategic guidelines and relevant operational objectives are suggested to achieve them in the framework of adjustment (or correction) of the state policy of import substitution in Ukraine.

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THE IMPACT OF AGRI-INDUSTRIAL ASSOCIATIONS SYNERGISTIC INTEGRATION AND DIVERSIFICATION ON THE FOOD CHAIN FORMATION EFFICIENCY

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Annotation. The article focuses on the issues of the identifying the features of integration processes in the agricultural sector under the economic globalization conditional. The main types of diversification and integration, as manifested in the agri-industrial complex, have been considered. A classification model of economic diversification has been proposed. The essence of synergistic diversification has been substantiated and the main factors and determinants that affect synergistic diversification have been identified. The scheme of synergistic integration and diversification in agri-industrial formations has been constructed. The integrated enterprises creation tendencies in the agrarian sphere and their role in the formation of food chains have been revealed. The rating of the largest integrated associations of agri-industrial enterprises of the world has been formed. The diagnostics of the largest associations of agri-industrial enterprises activity in Ukraine has been carried out.

Key words: synergetic integration, agri-industrial integration, diversification, food chain formation efficiency, efficiency.

Introduction. Production efficiency is a major issue that needs to be decided by businesses. This issue is also important for the national and international level, as the solution of this issue is important for ensuring the competitiveness of the state and determining its status in world positions. The law of production scale explains that production of consumer goods is more efficient, the larger its volume. The essence of this low has been manifested, firstly, in the fixed costs distribution for more products, and secondly, increasing production helps to increase the resources involved productivity in the manufacture of final products, and also creates a synergistic effect of their combination. However, in practice, a lot of factors, that limit these effects, influence to economic systems. Of particular importance is the research of the production systems consolidation in the agro-industrial sphere. The number of business entities that exceed the size of medium-sized agricultural formations is constantly increasing. Moreover, this trend is typical not only for Ukraine, but also for a number of countries with significant agricultural potential. These facts emphasize the relevance of the study in this area.

Analysis of recent research and publications. The agri-industrial integration is manifested in three main directions: horizontal, direct and reverse vertical integration. In practice, one of these vectors or all three simultaneously may be used. The latter option is the most common for modern integrated agro-industrial associations. To explain this type of integration, it is advisable to use the category of "synergistic integration". This definition has been found only in research works by [12-14]. However, none of the authors reveals its essence. Fadeeva I. G. research a synergistic approach in the coordination of oil and gas companies corporate structures subsystems [13], while using the category of organizational-synergistic integration, but does not give it a definition. However, based on this model, it can conclude that the main components of organizational and synergistic integration are the mechanisms of vertical and horizontal integration. Khytra O.V., considering the synergistic orientation of the international corporation strategies [14-15], proposes a scheme of multilevel strategic synergy, in which synergistic integration together with synergistic diversification has been considered as a factor in achieving market, production and management compliance. Thus, given the lack of scientific works devoted to the research of the synergistic integration phenomenon in general and in the agricultural sector in particular, there is a need to clarify the conceptual essence of this definition. For formulate an objective definition of the category "synergistic diversification", it is advisable to study the genesis and modern approaches to the definition of "diversification". The economic essence of diversification has been studied by various scientists, in particular such as Andriychuk V.G. [1], Dzholdybaeva S. [2], Zakharin S.V. [4], Nitsenko V.S. [8], Fadeeva I.G. [13], Khytra O.V. [14-15], Tsimbal S.V. [15], Shkvarchuk L.O., Kovalenko K.S. [17]. Most of the scientists consider diversification from the standpoint of product, industry expansion or financial and investment formation of the business portfolio of an economic entity from various sources. In addition, scholars consider diversification in terms of integration as one of the mechanisms for achievement a synergistic effect. In our view, diversification has broader boundaries and deeper significance. This category can be considered from different points of view, but from the point of view of market relations the most important is economic diversification, as its effectiveness depends on the balanced development of national and world economy, which determines the relevance of this study.

Purpose of the research is to identify the features of integration processes in the agricultural under the economic globalization conditional; substantiation of the essence of synergistic diversification, identification of the main factors and determinants that affect synergistic diversification; scheme construction of a synergistic integration and diversification of agri-industrial formations; identification of trends in integrated enterprises in agriculture and their role in food chains.

Result of the research. The synergistic integration of agri-industrial formations is their union simultaneously in three directions (vertical direct and inverse and horizontal), which leads to synergistic diversification (Fig. 1).

The effective functioning of a market economy has been based on the diversification of all areas of the economic system. Diversification can occur at different levels, both at the state level and at the level of individual businesses. Substantiation of the diversification development from different conceptual positions taking into account the role, mechanisms and significance of this process in the system of market relations development is very important. The variety of economic activities, sources of business activities financing, the variety of management methods affects the main principle of a market economy, that is freedom of choice, which is manifested, firstly, in free access to production resources, and secondly, to finished goods and economic goods for producers and consumers.



diversification of agri-industrial formations Source: created by authors

For the effective development of the economic system in market conditions it is necessary to respond flexibly to the permanence of the external environment, while it is important to minimize economic risks, which can be achieved through their distribution or diversification. In addition, the topical issue is the justification of the optimal industry (production), organizational and management structures of the business entity, which, in turn, involves the formation of a synergistic business portfolio.

Thus, various aspects of diversification have been manifested in the market relations system (Table 1). As can be seen from the analysis of scientists' views on the essence of diversification, its importance has been reduced mainly to product policy, in particular the expansion of the range and assortment of products, as well as the development of various activities and industry diversity. However, the importance of this category allows its use in much broader aspects.

Based on the exact translation of the word "diversification" ("Diversificatio" is a change, diversity; or "diversus" is a different and "facere" is to do [9]), it is worth noting that this category can be used in various socio-economic spheres.

Table 1

Conceptual approaches	to the inter	pretation of the	category "	diversification'
		preterion or ene		

Authors	The essence of the concept
Mocherny S.V. [7, p. 164]	The diversification is a process of expanding the products range of individual firms and associations, exists in two main forms: expanding the range of goods, organizing the production of new products within "own" industry and going beyond the main activity, penetration into new industries and sectors.
Reisberg B.A., Lozovsky L.Sh., Starodubtseva E.B. [9, p. 128]	The diversification is a general business practice aimed at expanding the range of goods and services and (or) geographical area to reduce risk and reduce dependence on business cycle.
Dzholdybaeva S. [2, p. 390]	The production diversification is one of the most difficult forms of concentration, which means the simultaneous development of production and services unrelated types, expanding the products range within one company, concern, company. The roduction diversification expresses the expanding the activity process of the enterprise, which uses its own savings not only to support and develop the core business, but also to direct them to develop new products, create new industries and provide various services. As a result of diversification of production enterprises turn into complex multi-purpose complexes, including production, often produce products and provide services for completely different purposes and nature.
Shkvarchuk L.O., Kovalenko K.S. [17, p. 3]	The diversification of goods flows is the expansion and diversification of the movement of goods at all stages of the supply chain network structure, including the final consumer in order to increase the economic benefits of the activity.
Kruglov M.I. [5, p. 325]	The activity diversification of is achieved by: inclusion in the company of enterprises (organizations) of various subject and technological specialization; combining specialized industries within enterprises-plants; providing flexibility to technological systems and organizational structures, as well as specialists and managers (which creates the possibility of maneuvering activities); development of various activities based on advanced technology owned by the company.
Andriychuk V.G. [1, p. 580]	Diversification is variation of activities of the enterprise in the production, financial and marketing areas.

Source: summarized by authors by [1, 2, 5, 7, 9, 17]

The economic dictionary states the following: "diversification is the distribution of capital between different objects of investment in order to reduce economic risks, there are: a) diversification of bank assets; b) diversification of foreign exchange reserves of banks and the state; c) diversification of investments; d) diversification of investments in securities; e) product diversification; f) diversification of production; g) diversification of economic activity; h) diversification of imports" [3].

In the scientific literature such phrases as "the production diversification", "the activity diversification", "the economy diversification", "the investment portfolio diversification"

are most often used. In our opinion, in the context of forming a strategy for the enterprise's or the state as a whole development, it is appropriate to use the category of "economic diversification", because it aims, first, to maximize profits, and secondly, to minimize risks [16]. However, in the classical and modern scientific literature, the phrase "economic diversification" occurs only in S.V. Zakharina [4], but the scientist in his works does not give it a definition. Identifying the essence of this category is very important because it allows generalizing the conceptual approaches to the meaning, mechanism and strategy of diversification in different aspects of management at different levels.

Thus, in our opinion, in a broad sense, the category of "economic diversification" can be given the following interpretation: it is a strategic mechanism for structuring economic activity, involving the expansion, distribution and development of related or unrelated elements of the economic system to share risks, maximizing economic benefits, achieving goals and synergies. The economic diversification should be considered at the macro (state), meso (regional) and micro (enterprise level), each of which has certain features. At the same time, economic diversification manifests itself in various forms (Table 2).

The classification of the economic diversification types on various grounds is quite conditional. For example, sectoral diversification is impossible without financialinvestment and organizational economic diversification, as the development of industries at the enterprise level requires first of all the development of marketing, which includes market research, product range and product range within the industry. In addition, the efficiency of the industry depends on the areas of investment and funding, as well as the economic justification for the effectiveness of its development. Given the study of the essence of economic diversification, it is possible to formulate a definition of the category "synergistic diversification of an integrated association of agri-industrial enterprises". This is the development of an optimally justified maximum number of the integrated association activities, as well as sources of resources for production and commercial activities and distribution of the source product, which provides additional effects from combining and increasing productivity of all components of the production and commercial chain of the integrated association. Synergistic diversification depends on a number of determinants: the economic potential of the entity; market conditions; socio-economic infrastructure; the level of corporate strategy aggressiveness; subject size, level of development and market capture; organizational and economic management mechanism. The main determinants of synergistic diversification have been determined by the management system, organization of the economic entity, as well as the market environment of its operation.

Regarding the global trends of integration of agri-industrial enterprises, the leaders in the scale of unification are such countries as Australia, China, Argentina, Russia, Kazakhstan, Ukraine. The largest integrated agri-industrial associations are concentrated in Australia; it is the top three agricultural landlords. It is worth paying attention to the history of the consolidated enterprises creation. Most of them were created more than 100 years ago, so the process of their integration was carried out on the basis of evolutionary development.
Table 2

Classification	Diversification	Characteristics of diversification			
feature	types	at the state level	at the regional level	at the enterprise level	
	Financial and investment	Formation of the budget system, distribution of funds between different industries and regions, coordination of credit institutions, currency regulation	Formation of regional and local budgets, distribution of funds between economic spheres at the regional level	Distribution of financial resources (profits, investments, loans, credits, statutory or share contributions) between enterprises divisions	
	Industries	Deve	lopment of various activ	vity sphere	
By functional sphere of influence		Development, support, restructuring of industries, industry complexes, product subcomplexes, clusters and other vertical and horizontal integrated industry structures, selection of priority industries			
	Organiza- tional	Formation of integrated complexes, development of the system of alternative deliveries, distribution and sale of products, price differentiation			
		Determining the optimal size and scope of industry complexes and individual industries activities, building an extensive organizational structure of management	Branching of market infrastructure in accordance with regional needs	Search for optimal methods of organization of production, labor, management	
	Centered	based on the use of the main economic direction additional opportunities. That is, the existing economic direction (production, financial, organizational activities) remains at the center of the economic system, and a new direction arises based on those opportunities that are potentially in the main area			
By level of kinship	Horizontal	involves finding opportunities for growth in the existing market through a new direction of economic activity that requires a new, different from the existing, resource provision, new technology other than the one used, while the new direction should focus on existing capabilities of the economic system and be associated with the main line of business or be consumer-oriented of the main product			
	Conglomerate	expansion through the development of unrelated activity areas that require different strategies, technologies, resources, etc.			

Characteristics of the economic diversification types

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By form of integration	Vertically integrated	Construction of food complexes, formation of interregional and regional clusters	Association of enterprises of different levels: "production – processing – sale", creation of agricultural firms, complexes		
		Creation of associations, holdings, financial-industrial groups, conglomerates, consortiums, corporations			
	Horizontally integrated	Association and consolidation of one-level areas of activity	Associations of enterprises that produce homogeneous or single- level products		
ExternalBy type of(geographical)		Expansion of the geographic market, increasing the scale of operation, which is achieved through quantitative indicators			
economic development	Intense	Expanding the internal range of activities, finding additional opportunities without changing the geographical boundaries and scale of operation, which is achieved through quantitative indicators			
Ву	Internal	Creating internal conditions for the effective development of several activities, increasing the level of use of economic potential			
environment	External	Acquisition of new technologies, integration with other related or unrelated			
By	Constant	Provides long-term, strategic development of newly created areas of activity			
period	Temporary	Provides for reorganization after achieving the goal in the short term or under the influence of the environment permanence			

Source: created by authors

Australian associations specialize in meat production. Russian and Kazakh agricultural associations prefer crop production; their dominant activity is grain or oilseeds. The TOP-20 largest integrated associations of agri-industrial enterprises in the world include two Ukrainian formations: UkrLandFarming, which is diversified, and PJSC "Kernal", whose main activity is oil production.

In general, integrated associations of agri-industrial enterprises are diversified and develop different areas of activity, while highlighting the dominant industry (Table 3).

According to the rating of sales revenue, the leading position is occupied by the company "Kernel Group" with an indicator of 2329.5 million dollars. USA, in second place is the JV "Nibulon" with an indicator 1946.4 million dollars USA, on the third is the company "Myronivsky bread product", PLC Ukrlandfarming is in fourth place (937.5 million dollars US).

PLC Ukrlandfarming is registered in Cyprus, the legal form is a public joint stock company with limited liability, ie the company's capital is divided into shares. Its main activities are the cultivation of cereals, which provide 38 % of revenue, production of eggs and egg products (33 % of revenue), sugar production (7 %), livestock and meat production (6 %), distribution of agricultural machinery and other goods (16 %).

Table 3

Ranking of the largest integrated associations of agri-industrial enterprises in the world

The name of the integrated association	The main country	Area, million hectares	Characteristics of activity
S. Kidman & Co Ltd	Australia	10,1	Specialization is a beef production, the history of activity covers 117 years. Land resources occupy 1.3 % of the country's area and 2.5 % of agricultural land. Cattle is more than 185 thousand heads, the value of the company is more than 266 million dollars USA. Beef is exported to Japan, the United States, and Southeast Asia.
Australian Agricultural Company	Australia	6,4	Specialization is beef production, in 2016, 48.3 thousand tons of products were produced and exported. Founded in 1824, the Land Bank makes up 1 % of the territory.
The North Aus- tralian Pastoral Company	Australia	5,8	Specialization is beef production. Founded in 1877, it includes 14 farm stations and has a reserve with an area of 200000 hectares.
Beidahuang Group	China	5,62	Specialization is grain, founded in 1998, the lands are located in China, South America and Australia. The annual volume of grain production is 10 million tons. It has 9 branches, which unite 104 farms, 1136 enterprises for processing, trade, transportation, construction, and services. Authorized capital is about 1 billion dollars USA, cooperates with 60 countries on 5 continents.
Consolidated Pastoral Company (CPC)	Australia	5,6	Specialization is beef production, founded in 1860, the consolidation took place in 1983. The company cost 850 million dollars. Cattle population 367.5 thousand heads. The main shareholder is Terra Firma (UK), land in Australia and Indonesia.
Cresud	Argentina, Brazil, Bolivia	1	Specialization is cereals, sugar cane, dairy and beef cattle; has 33 farms
Холдинг "Каз- ЕкспортАстик" (КЕА)	Kazakh- stan	1	Specialization is cereals, oilseeds, including rapeseed and oilseed flax, established in 1999, 13 % of the capital belongs to the EBRD.
NCH Capital	Russia (250 thousand hectares), Ukraine (450 thousand hectares)	0,82	Specialization is grain, founded in 1993, the total capital is 3 billion dollars USA. The head office is located in New York. At present, the company has harvested about 820 thousand hectares in Ukraine, Russia, Moldova, Bulgaria, Kazakhstan and Romania, forming one of the largest network of elevators in Eastern Europe. NCH controls land in 14 regions of Ukraine, and also owns 12 elevators with a capacity of 536 thousand tons of single storage.

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Prodimex Group of Companies	Russia	0,79	Specialization is production of white sugar. Founded in 1992, it controls 15 sugar factories and has a staff of 15000. 3.5 million tons of sugar beet and 0.5 million tons of grain are grown annually, covering 23 % of the Russian sugar market. Productivity of plants is 70 thousand tons of sugar beet per day
Turkish General Directorate of Agricultural Enterprises (TIGEM)	Turkey	0,78	Specialization is grain and oilseeds, cattle breeding. In 2014, Sudan leased 780000 hectares to the Turkish General Directorate of Agricultural Enterprises for a 99-year lease.

Source: summarized by authors by [6, 10, 12]

Kernel Group is one of the world and Ukrainian leaders in the export of sunflower oil and other agricultural products to more than 60 countries. Since November 2007, the company's shares have been traded on the Warsaw Stock Exchange (WSE).

Conclusions. Consequently, in the agricultural sector of the economy, diversified enterprises dominate. Diversification in the agricultural sector is effective from the point of view of agricultural technologies and from the economic point of view. The agri-industrial integration is manifested in three main directions: horizontal, direct and reverse vertical integration. In practice, one of these vectors or all three simultaneously may be used. The latter option is the most common for modern integrated agro-industrial associations. To explain this type of integration, it is advisable to use the category of "synergistic integration". Synergistic diversification depends on a number of determinants: the economic potential of the entity; market conditions; socio-economic infrastructure; the level of corporate strategy aggressiveness; subject size, level of development and market capture; organizational and economic management mechanism.

In the world, the leaders in the scale of unification are such countries as Australia, China, Argentina, Russia, Kazakhstan, Ukraine. On the one hand, the formation of integrated associations in this area contributes to the creation of a synergistic production effect. However, on the other hand, it has a number of negative socio-economic consequences.

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PRELIMINARY ASSESSMENT OF ECONOMIC EFFICIENCY AND RISK OF EXECUTION OF ROAD MAINTENANCE CONTRACT

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Annotation. The work introduces a method of preliminary assessment of the feasibility, risks and economic efficiency of a long-term road maintenance contract, the subject of which is the support of regulatory performance of roads (Performance Based Contract, PBC).

Key words: road maintenance, long-term contract, performance indicators, maintenance level, risk, economic efficiency.

Problem statement. Over the past three decades, road agencies in many countries around the world have begun to use a new type of contract based on achieving and maintaining road performance - Performance Based Contract (PBC) or Output- and Performance-based Road Contracts (OPRC). A PBC is a type of contract in which payments to the contractor for the maintenance of road assets are explicitly linked to how the contractor maintains or exceeds certain clearly defined minimum road performance indicators. Failure to comply with these indicators or untimely elimination of identified deficiencies has a negative impact on the contractor's payment through clearly defined penalties. In the case of compliance with the performance indicators specified in the contract, payment is made on a regular basis, usually in equal monthly installments, Stankevich N. [1].

The perspective of widespread implementation of PBC in Ukraine required changes in regulations and technical documents. The Law of Ukraine "On Motor Roads" [2] stipulates that the maintenance of public roads and other types of roads may be carried out on the basis of long-term (up to seven years) contracts on the maintenance of public roads according to the principle of ensuring their operational condition in pursuance of the acting regulations, norms and standards.

Two national standards of Ukraine have been developed, which contain guidelines for the development of Levels of Service (LOS) [3] and a table of minimum LOS standards [4]. These national standards will come into force on July 1, 2021. LOS contain more than three hundred items of requirements for the elimination of road defects, each of which is divided into three target levels of road maintenance, and each of the latter into four groups of requirements for response times, depending on road type and average daily traffic intensity.

The implementation of PBC raises many issues that are still to be resolved. One of them, already at the stage of tendering and concluding a contract - in the "ex ante" phase, is the problem of preliminary assessment by a potential contractor of the risk of the contract proposed by the road administration, possible losses or profits, depending on

the complexity, duration of the contract, length and structure network of contract roads, perspective daily traffic intensity, etc.

Analysis of recent research and publications. The world experience of PBC implementation is generalized, for instance, in the works of Stankevich N. [1], Zietlow G. [5] and many others. The central concept of PBC is the minimum levels of performance of road elements, Zietlow G. [5, p. 23]. The purpose of their application is: to satisfy road users with accessibility, comfort, speed and traffic safety; reduce the total costs for road users and the road agency, therefore, reduce the value of the life cycle of assets; reduce the negative impact on the environment.

The theoretical basis for determining the parameters of PBC is the theory of contracts: agency theory and the theory of incomplete contracts, which were developed in the works of Hart O.[6], Holmstrom B.[7], Laffont J.-J. and Tirole J. [8], Laffont J.-J. [9], Martimort D. and Pouyet J.[10], Eisenhardt K.M. [11] and other researchers.

In the works of Solino A.[12, 13, 14,15] a mathematical model based on agency theory was proposed for the analysis of road infrastructure management systems, based on the Laffont J.-J. and Tirole J. model [8], which uses road quality indicators to establish payment to the contractor. The main assumption of the model is the asymmetry of information between the principal (road administration) and the agent (contractor) and the risk aversion of the latter. It is assumed that the principal can measure the performance of the agent only indirectly - by checking the achievement and maintenance of the contractor's LOS. It is also assumed that there is a relationship between the efforts of the agent and the levels of performance, although there may be variances between these variables, which causes a certain degree of randomness in the contract. The analysis of the optimal incentive mechanism was made by Solino A. on the basis of this model, according to a series of parameters that characterize the economic environment and specific conditions of road infrastructure [15].

In the Solino A. model, the principal's objective is the social welfare function, which the principal tries to maximize by choosing the parameters that determine the contractual reward mechanism of the contractor. The social benefits derived from road operation, depending on the proposed levels of road quality, can be measured by a number of indicators, which in the Solino A. model are accepted independently of each other and increase linearly with the increase in quality.

The achieved level of each performance indicator of the road element is associated with certain efforts of the contractor, which have a random component (statistical noise). Such a formulation can be found, for example, in the work of Martimort D. and Pouyet J.[10, p. 7]. It is assumed that each random noise variable has a normal distribution, with a mean of zero and a certain standard deviation. Noise values depend not only on the contractor's efforts, but also on the other, including unpredictable factors. Thus, the contractor operates at risk. In addition, it is assumed that the contractor is not risk-neutral. This reasoning arises from the general assumptions made in the theory of agency, Eisenhardt K.M. [11, p. 62]. The customer's risk is sufficiently diversified due to the large number of projects and services for which he is responsible, which makes him risk-neutral. The solution of the problem of

optimizing the function of social welfare taking into account the limitations is to solve a system of differential equations in partial derivatives. There must be first, second and even third derivatives of the contractor's effort functions.

Solino A. [15] concluded that the incentive mechanism should include a fixed component and payment according to the obtained quality level. The higher the degree of risk aversion by the agent and the higher the marginal cost of public funds, the smaller the impact of this performance-based payment. Solino A. concluded that the system of performance indicators should be as broad as possible, but should avoid those indicators that suggest greater randomness of their results.

Analysis of the possibility of using the analytical optimization model Solino A. allows to conclude that it is static, because the model does not contain a time variable.

In Ukraine, PBC substantiation problems studies have been conducted over the last decade. Based on these studies, the Information and Analytical System for Long-Term Contracts Management (IAMS-OPRC), based on LOS Kanin O. [16] was created. A simulation model of PBC parameters substantiation was also proposed, Sokolova N. and Makovska Y. [17, 18].

The purpose of the research is to develop a method of preliminary assessment of economic efficiency and risk of a long-term contract for the maintenance of roads using a simulation model, in the process of preparation and signing of the contract ("ex ante" phase).

Research results. The risks and economic efficiency of the contract for the contractor depend on the parameters of LOS of the defects of the road elements. The definition of "defect" is given in the National Standard [3] – it stands for the non-compliance of an element of the road or part of it with the requirements of regulatory or design documentation, which is caused by: destruction (loss of integrity, material); deformation (change of actual size or shape); inadequate quality of applied materials and quality of elimination; the influence of external factors that prevent the normative use of the element (pollution, snow, winter slipperiness, the impact of obstacles on the visibility of the sign, etc.). There are cumulative defects (potholes, cracks, siltation, etc.) or sudden defects (snow, ice, damage to the safety barriers as a result of a collision of a vehicle, damaging a road sign, cargo falling on the roadway, etc.).

Unfortunately, under the current state of the theory of routine road maintenance, the road administration cannot link the target function of social welfare with the parameters of the LOS contract specification. Therefore, the National Standard [3] introduced the concept of the level of maintenance (Level of Maintenance, LOM) - a qualitative category of generalization of the results of the process of maintenance for a certain period of time (month or year). Three normative levels have been introduced: "satisfactory", "medium", "high" and one non-normative – "unsatisfactory". A quantitative LOM, titled a Level Maintenance Indicator (LMI), can be calculated for a single element, a number of elements, a single road section, a number of road sections in contracts. The LMI is determined by the quality, timeliness and completeness of the troubleshooting process. For the i-th level of service LMIi is calculated by formula 1, the variables of which are explained in table 1:

$$LMI_{i} = (1.00 \cdot \frac{\sum_{j=2}^{j=5} (n_{ij} \cdot q_{ij})}{\sum_{j=5}^{j=5} (n_{ij} \cdot q_{ij})}) \cdot 100\%.$$

Table 1

Indicator name	Value				
Interval of the actual time <i>t</i> of defect elimination	t≤t _c	$t_c < t \le 2t_c$	$2t_c \le t \le 3t_c$	$3t_c \le t \le 4t_c$	t>4t _c
n_j – the number of penalty points per time unit delay in the <i>i</i> -th interval	0	0,25	0,5	1,0	2,0
Number of defects, pcs	q ₁	q ₂	q ₃	q ₄	q ₅

Intervals of time, days or hours, elimination of defect (example)

Assigning different values to penalty points allows to take into account the relative importance of eliminating certain defects.

The road administration at the stage of preliminary bidding should set target LMI values, possibly different for individual sections of the contract road network. The LMI for the entire contract road network must be set by weighing: by the length of the road sections, by the value of the roads and by the average daily traffic intensity, etc.

The study assumes that the "ex ante" phase includes the stage of preliminary bidding and the stage of signing the contract, and the phase "ex post" is the stage of contract execution. However, the contractor and the road administration need to assess the possible economic efficiency of LOM already at the "ex ante" phase, thus, to simulate the "ex post" phase. It is proposed to make such an assessment using a simulation model with expert judgments, which follows from the following considerations:

- the presence of a large number of types of defects, which requires the use of a significant number of levels of service in the contract specification;

random occurrence and progress of defects over time and randomness of their number;
randomness of the duration of defect elimination;

- the presence of small values of the ratio "signal – noise" of cumulative damage (less than 15) – the inverse of the coefficient of variation, which does not allow the use of classical Newtonian mechanics to predict the accumulation of damage;

- lack of historical data on the actual time of elimination of defects (damage) and, therefore, statistical models for predicting such time, which necessitates the use of expert judgments on the parameters of probabilistic distributions of actual time of elimination of defects, actual cost and actual random number of defects in certain time intervals.

It should be noted that the attempt to model the explicit sequence of works and services (based on creating their schedule), in our opinion, looks unlikely because of

the unpredictability of the exact moments of the need to eliminate many defects. Such a model will be excessively complex, the adequacy of its reality cannot be verified.

LOS specification	Initial data
from National	maintenance, 1
Standard of	monthly payme
Ukraine [4]	point, annual d
	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

Initial data about: road section, target level of maintenance, level of requirements, length of the section, monthly payment, duration of the contract, cost of penalty point, annual discount rate

Creating a table of initial data with a list of service levels with normative values of response time, according to the target service level, level of requirements, and also parameters of triangular laws of distribution of random coefficients: a) time of eliminating defects; b) the cost of eliminating defects; c) the possible number defects during the season of year. Calculation of the risk of exceeding the response time (automatically).

Creating a table of growth rates of the number of defects depending on the time that has elapsed since the last periodic repair, construction or reconstruction (in vears).



Fig. 1. Layout of preliminary evaluation of the contract

The proposed assessment method is based on the presentation of data in twodimensional tables with their sequential transformation by introducing expert estimates of the parameters of triangular distribution laws in relation to to time, cost and volume parameters of defect maintenance levels, followed by simulation, Sokolova N.and Makovska Y. [17, 18], shown in Fig. 1.

Modeling of random variables is carried out by the Monte Carlo method using known formulas of the triangular distribution law. In probability theory and statistics, a triangular distribution is a continuous distribution of probabilities with a lower limit a, an upper limit b, and a mode c, where a < b and $a \le c \le b$. The triangular distribution is an approximate model and is used when there is insufficient data or it is missing. It is based on knowledge of minimum and maximum and "inspired conjecture" about modal meaning. For these reasons, the triangular distribution is called the "lack of knowledge" distribution. Therefore, the triangular distribution is often used in business decisions, especially in simulation [19].



Fig. 2. Example of loss / profit chart



Fig. 3. Estimation of NPV loss / profit distribution





Fig. 4. LMI graph

The method is conducted in MS Excel using Visual Basic for Applications. With its help, for example, you can get a graph of losses/profits (Fig. 2), an estimate of their distribution law (Fig. 3) and a graph of LMI (Fig. 4).

A summary table of the initial data and the corresponding simulation results for their generalization is also created for the whole network of roads under contract. In addition, it is possible to justify the parameters of PBC: price, duration, risk, and so on.

Conclusions. In Ukraine, only one PBC (more specifically, OPRC) pilot project is currently being implemented with loans from international financial institutions, but its results are still insufficiently known to a wide range of scientists. The possibility of implementing such long-term contracts in Ukraine has become more real with the creation of the Road Fund, which creates conditions for stable long-term financing of the contract.

The theoretical basis of PBC research is the theory of complete and incomplete contracts, in particular the theory of agency together with the theory of routine road maintenance, taking into account the asymmetry of information between road administration (principal) and contractor (agent) and their relationship to risk.

The problem of pre-assessing the risk and cost-effectiveness of PBC is a complex multidimensional task with many uncertainties. The lack of appropriate statistics leads to the use of expert estimates of the parameters of the laws of distribution of the required random variables – the actual time to eliminate defects, the actual cost of work, losses or profits with a small number of parameters. Therefore, it is advisable to use a triangular distribution of random variables.

The most appropriate tool for predicting the future implementation of PBC, in my opinion, is a simulation model of the "ex post" phase, proposed in this article. Such a model is needed by both the road administration (principal) and the potential contractor (agent) in the preparation phase of the PBC "ex ante".

The implementation of the proposed method in the Excel environment, widely known in practice in business planning and the economic feasibility of projects facilitates the understanding of the method to decision makers. However, this implementation can only be considered a prototype of industrial versions of the relevant software. However, it can be useful for practice right now.

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PUBLIC ADMINISTRATION

CURRENT STATE AND PROSPECTS OF TRANSFORMATIONOF STATE REGULATION OF INTELLECTUAL PROPERTY IN UKRAINE

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Annotation. The article examines the current state and prospects of transformation of state regulation of intellectual property in Ukraine. It was determined that the institution of intellectual property in Ukraine has come a long way since its proclamation of independence and continues to this day. The article analyzes four stages of state regulation of intellectual property in Ukraine. Particular attention is paid to the establishment of the National Intellectual Property Authority, which is provided for in accordance with the Draft Law «On the Amendments to Certain Legislative Acts of Ukraine Concerning the Establishment of a National Intellectual Property Authority authority» of October 10, 2019.

It also examined the annual Special Report 301 on the adequacy and effectiveness of the protection of intellectual property rights of trading partners and the results of a review of notorious counterfeiting and piracy markets, which highlights online and physical markets reportedly involved in trademark counterfeiting and copyright piracy. rights and contribute to this.

Key words: intellectual property, state regulation of intellectual property, special report 301, National Intellectual Property Authority of Ukraine.

The Institute of Intellectual Property in Ukraine has come a long way since its proclamation of Ukraine's independence and continues to this day.

This institute has undergone certain transformational changes, which primarily concerned the state regulation of intellectual property from the establishment of the State Committee of Ukraine for Science and Intellectual Property to a three- or two-tier institutional structure of state regulation of intellectual property.

It should be noted that at present, unfortunately, no single central body of executive power has been identified and created that would fully ensure state regulation of intellectual property in Ukraine. However, it should be noted that in February 2020 the Resolution of the Verkhovna Rada of Ukraine "On Adoption of the Draft Law of Ukraine on Amendments to Certain Legislative Acts of Ukraine Concerning the Establishment of a National Intellectual Property Body -" National Intellectual Property Body of Ukraine (NIPO) "was issued as legal entity of public law (state organization).

Thus, there is an objective need to study the current state of state regulation of intellectual property, as well as possible prospects for its operation after the adoption of the above regulations.

Analysis of recent research and publications. Scientists and researchers who

have studied topical issues of state regulation of intellectual property in Ukraine in their works: E.I Khodakivsky, I.E. Yakubivsky, NS Fesenko, Yu. L. Boshytsky, I.I. Dakhno, Y. M. Kapitsa, P.P. Krainev, I.O. Mikulyonok, E.M. Gelever and others.

The purpose of the article is a comprehensive analysis of the current state and prospects for the transformation of state regulation of intellectual property in Ukraine.

Presentation of the main material. The history of the development of state regulation of the intellectual property system in Ukraine can be rightly determined at the stage of Ukraine's declaration of independence. After all, it was then (to be precise, a few months before the proclamation of Ukraine's independence), when on February 7, 1991, a section entitled «The right to intellectual property» was added to the then Law of Ukraine «On Property» [1].

This period can be defined as the first stage (1991-1994) of the formation of state regulation of intellectual property in Ukraine, because it was here that the first necessary legislative foundations were laid and basic organizational structures were created. In addition, the laws «On Restriction of Monopoly and Prevention of Unfair Competition in Entrepreneurial Activity», «On Foreign Economic Activity» were issued (April 16, 1991); Customs Code of Ukraine (December 12, 1991); Fundamentals of Ukrainian legislation on culture (February 14, 1992), which also in some way influenced the further development of state regulation of intellectual property in Ukraine [2, p. 143].

The second stage of state regulation of intellectual property (1995-1999) was due to two factors in Ukraine

- First, the introduction of a course to radicalize socio-economic reforms in the country (October 1994).

- Secondly, Ukraine's adoption of a number of important international obligations, which directly included measures to implement international standards of intellectual property protection by the Decree of the President of Ukraine «On Changes in the System of Central Executive Bodies of Ukraine» № 250 of March 13, 1999 Committee of Ukraine for Science and Intellectual Property on the basis of the Ministry of Science and Technology of Ukraine, the State Patent Office of Ukraine and the State Agency of Ukraine for Copyright and liquidated rights. The Decree of the President of Ukraine (№ 987 of August 13, 1999) approved the Regulations on the State Committee of Ukraine for Science and Intellectual Property [3].

The third stage of formation of the State system of protection of intellectual property rights began in 2000 in Ukraine. It is connected with the end of the crisis period of economic development of Ukraine and the announced strategic plans for the transition to an innovative model of development. The State Committee of Ukraine for Science and Intellectual Property was liquidated and initially the State Department of Intellectual Property was established, and in 2010 the State Intellectual Property Service as the central executive body was liquidated and established on its basis, as well as with the corresponding transfer of all powers and functions [4].

Thus, it is possible to determine that Ukraine from the beginning of its establishment acted in three stages, for the development of the system of state regulation of intellectual

property:

- On the first - the basis for intellectual property is made;

- In the second - adopted international standards, as well as at this stage have repeatedly been various agreements on intellectual property and laws;

- On the third - Ukraine emerges from the crisis and builds its strategy. The first bodies to ensure state regulation of intellectual property in Ukraine were established.

The fourth stage of development of the system of state regulation

intellectual property can be determined at the level of 2016, when the State Intellectual Property Service was liquidated and its functions transferred to the Ministry of Economic Development and Trade (hereinafter - the Ministry of Economic Development) is the main body in the central executive system intellectual property policy [5]

It should be noted that in accordance with this Resolution of 2016, state regulation of intellectual property should be carried out within a two-tier structure:

- creation of the National Intellectual Property Authority (hereinafter - NOIP) as a state organization on the basis of Ukrpatent and SIPO. A new body of the Ministry of Economic Development will be subordinated, which will continue to perform the functions of forming and implementing state policy in the field of IP. Funding for the activities of such a body will be provided through fees and other proceeds for actions related to the protection of rights to IP objects, as well as payment for services provided in accordance with the law.

- Level 2 is represented by state institutions related to the management of SIPS - state enterprises «Ukrainian Institute of Intellectual Property» (hereinafter - Ukrpatent), «Intelzahist», the state organization «Ukrainian Agency for Copyright and Related Rights» (hereinafter - UAASP).

However, it should be noted that at present and so far no such thing has been created national intellectual property body, as well as liquidated SE «Intelzahist».

In addition, in 2016 the Order of the Cabinet of Ministers of Ukraine «On approval of the Concept of reforming the state system of legal protection of intellectual property in Ukraine» was issued, which also aimed to further reform the system of state regulation of intellectual property in Ukraine [6].

The Ministry of Economic Development issued Order №718 in May 2018 «On the establishment of the State Organization National Intellectual Property Office» and approval of the charter of the State Organization «National Intellectual Property Office» (hereinafter - the Office). The office belongs to the sphere of management of the Ministry of Economic Development and is an institution that is part of the system of legal protection of intellectual property [7].

Currently, the system of state regulation of intellectual property consists of the following bodies:

- Department of Intellectual Property Development of the Ministry of Economy;
- State organization «National Intellectual Property Office»;

- State Enterprise «Ukrainian Institute of Intellectual Property» (Ukrpatent);

- State Innovative Financial and Credit Institution;

- State Organization «Ukrainian Agency for Copyright and Related Rights».

The Verkhovna Rada of Ukraine adopted as a basis the draft Laws «On Amendments to Certain Legislative Acts of Ukraine Concerning the Establishment of a National Intellectual Property Body» (№ 2255) The Draft Law on Amendments to Certain Legislative Acts of Ukraine Concerning the Establishment of a National Intellectual Property Registration Authority № 2255 of 10.10. 2019 and «On Amendments to Certain Legislative Acts of Ukraine on Strengthening the Protection and Protection of Rights to Trademarks and Industrial Designs and Combating Patent Trolling» on February 4, 2020 (№ 2258) [8].

Thus, the Draft Law «On Amendments to Certain Legislative Acts of Ukraine Concerning the Establishment of a National Intellectual Property Authority» (N 2255) provides for the establishment of the National Intellectual Property Authority of Ukraine (NIPO) as a legal entity under public law (state organization). development of economy, trade and agriculture (Ministry of Economy). The Ministry of Economy will ensure the formation and implementation of state policy in the field of intellectual property, and NIPO will perform certain public functions (powers) to implement state policy (issuance of security documents (patents, certificates) for intellectual property rights). In particular, it is proposed that the functions of NIPO will be performed by a state organization, which will be created on the basis of the state enterprise «Ukrainian Institute of Intellectual Property».

According to the project, NIPO will perform the functions of:

- acceptance of applications, their examination, decision-making on them;

- issuance of security documents, their state registration;

- publication of official information on objects of intellectual property rights (OIPR), maintenance of Registers;

- certification and registration of representatives in intellectual property matters;

- informing and providing explanations on the implementation of the relevant state policy;

- information and publishing activities in this area;

- development of proposals for improving the legislation and submitting them to the Ministry of Economy;

- approval of methodical recommendations on the examination of applications and state registration of OIPR;

- advanced training of personnel of the state system of legal protection of intellectual property [9].

Draft the Law № 2258 aims to ensure Ukraine's European integration obligations to harmonize the current legislation of Ukraine on the protection of trademarks and industrial designs with European Union law.

The bill proposes a number of short stories:

on the legal protection of trademarks, namely:

- submission of applications in electronic form;

- clarification of the grounds for refusal of registration or invalidation of the relevant registration;

- clarification of the procedure for granting legal protection under international

registration, strengthening sanctions for violations of rights;

for industrial designs:

- additional criterion of security (individual character);

- legal protection of unregistered industrial designs;

- submission of the application in electronic form;

- validity of rights - 25 years;

- changed the type of security document (from the patent to the certificate);

- there is a pre-trial procedure for invalidation of the certificate in the Appeals Chamber [10].

Such efforts of the legislator to change the existing system of state regulation of intellectual property can be explained by the fact that not the first year, international world organizations and leading countries of the world point to a rather low and sometimes critical state of intellectual property protection.

Thus, the United States of America (hereinafter - the United States) published its annual Special Report 301 on the adequacy and effectiveness of intellectual property protection of trading partners and the results of the review of infamous counterfeiting and piracy markets, which covers online markets and physical markets, who reportedly engage in and contribute to trademark counterfeiting and copyright piracy on April 29, 2020.

Special Report 301 identifies trading partners that do not provide adequate or effective protection for intellectual property rights (IP) or otherwise deny market access to innovators and creators in the United States who rely on the protection of their IP rights. Trading partners that currently have the most serious concerns about intellectual property rights are on the Priority Checklist or Checklist.

The USTR identified 33 countries for these lists in Special Report 301:

- Algeria, Argentina, Chile, China, India, Indonesia, Russia, Saudi Arabia, Ukraine and Venezuela are on the list of priority observers;

The United States again named Ukraine among the most pirated countries in the world. Ukraine has also been noted for remaining a "home" for many sites that contain pirated content. Although the US government acknowledges that our country has taken some steps in the fight against piracy, for example, it has created a special unit in the Ministry of Internal Affairs, and the Government's work in this direction has become more transparent. At the same time, the use of pirated software in government agencies remains at 60-80%. We will remind, in October of last year in Ukraine announced creation of cyberpolice. This unit was created to fight hackers, online fraudsters and Internet piracy.

The United States will continue to monitor recent legislative and operational efforts to improve the protection of intellectual property and law enforcement in Ukraine and to review the infamous piracy and counterfeiting markets [10].

Thus, it is possible to conclude that Ukraine really needs to review the existing system of state regulation of intellectual property in the form of a specialized intellectual property body that can address piracy and raise Ukraine's prestige in the international space.

In the context of this study, it is also worth mentioning the Resolution of the Cabinet

of Ministers of Ukraine of February 7, 2018 № 90 the Council on Intellectual Property (hereinafter - the Council) chaired by the First Deputy Prime Minister of Ukraine - Minister of Economic Development and Trade temporary advisory body of the Cabinet of Ministers of Ukraine [11].

The main tasks of the Council are:

1) assistance in ensuring the coordination of actions of executive bodies in the field of intellectual property;

2) determination of ways and mechanism for solving problematic issues that arise during the formation and implementation of state policy in the field of intellectual property;

3) preparation of proposals and recommendations on: development of the sphere of intellectual property of Ukraine taking into account the strategic objectives of innovative development of the state; priority directions, programs of development and functioning of the state system of intellectual property; ensuring the integration of Ukraine into the international and European intellectual space, taking into account national interests; development and reform of the state system of legal protection of intellectual property.

Conclusions. As we can see, Ukraine is currently at the final stage of forming the institutional support for the management and protection of intellectual property at the national level. The main emphasis is on compliance with international norms and standards, which is reflected in the organization of institutions that regulate the process of intellectualization and scientific and technological development at both national and global levels, and thus are factors in creating an effective institutional environment in this area.

Thus, it is possible to conclude that currently Ukraine needs to review the existing two-tier system of state regulation of intellectual property. The creation of an appropriate national intellectual property body will be able to solve the problems that lead to critical conclusions of the world's leading international states on the state of protection of intellectual property of Ukraine as a whole.

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FORMAL AND INFORMAL CRITERIA INFLUENCE TO EU MEMBERSHIP

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Annotation. The paper aims to show that European Union enlargement is a complicated multilevel process. It includes political, legislative and economic factors. EU enlargement depends not only on the scenario of future development and legislative rules as a formal criteria of integration but also involves informal criteria. The author finds several informal criteria, which influence EU development. In the article you can find examples of informal criteria influence in EU-members decision making about new state's integration. The author argues, that informal criteria are forming a framework for new formal rules and other needs. Also author analyzes influence of Europen Union problems and challenges to the future integration development. The article is based on academic publications, think-tank papers, and poll data researches, as well as on documents of EU institutions, analysts and officials points.

Kew words: European Union, Eurointegration, EU enlargement, formal criteria of EU membership, informal criteria of EU membership.

Introduction. The European Union consists of states with a high level of socioeconomic development. EU is the second-largest economy in the world in nominal terms (after the USA) and according to purchasing power parity as it calls PPP (after China). The Union has developed democracy and high rates of political culture. The main goal of EU integration is a better quality of life for applicants. The history of Europe is multi-layered and complicated. The European continent overcame a lot of challenges, which included wars for dominance and the creation of numerous temporary alliances. However, the political and economic reality of the late 20th century made all for the preconditions for Europe integration. During the cooperation in different organizations and unions (The European Coal and Steel Community and The European Economic Community), Europe evolved into an entity of a different kind - the European Union. The EU initially consisted of six members. It was Belgium, France, Italy, Luxembourg, Netherlands and German.

Moreover, the majority of geopolitical leaders did not believe that this project is going to succeed. Even Great Britain, which is a significant international actor, started to trust the EU project after several years. Great Britain became a member of the EU only in 1973. Now the Foggy Albion is the only case in the history of the member leaving the association.

The word leaders consider the European Union as the most successful and influential association. The EU becomes not only an association, but also a real brand in the international arena. Such "brendness" requires from EU a lot of responsibility and constant development. To understand the nature of the EU, we should specify that EU-members and states, which only pretend to be EU members, have a different level of economic development, political culture, and political influence on the international arena. After all, the EU's membership perception as a "lucky ticket to the future" remains unchanged among contenders.

There a lot of views of the European Union future. This case was researched by Stefano Silvestri, Pierre Hassner, Joseph-Patrick Kennedy, Michel Foucher, etc. We assume that all options of the EU's future can be materialized. The outcome depends on scenario leaders will choose.

The article is structured into two key parts. The first part is about the perspectives of the future development in the European Union integration. The author analyze the alternatives to integration process which were presented officially in the EU. The second part is about differences between formal and informal criteria of EU membership. The author propose several informal criteria, which can influence to EU integration process. Also the author tries to answer the question about the EU future functioning.

1. Perspectives of the future development in the European Union integration.

Nowadays we have a situation, when the European Union members are mowing from globalization to a local focus. The main reason for this is the tendency for a number of problems to grow not only in the all-European level but in the development level of each country. Quite often the European Union tries to solve the state's problems by intervening in internal policy, which provokes new conflicts. For example, judicial reform in Poland is still a stumbling block between the EU and Poland. Also, the EU faces outer issues related to its enlargement and relations with signatory states (migration crisis, Brexit, terrorism, economic development, and even coronavirus, etc.).

The future of Europe remains indefinite, and serious academic research proves it. A lot of states demonstrate a low level of support for the EU. The sociological research, which was organized by The Bertelsmann Stiftung (2016), shows us dependence on the attitude to the EU to the duration of state membership in the Union. For example, in Poland 77% of respondents support the EU. In German - 69%, in France - 51%. Spain was the only case with a high level of anti-EU perceptions. In 2019 the situation with EU supporting changed (Hoffmann, 2016)

Not only sociological researchers show the level of EU supporting. The results of elections to the European Parliament in 2019 can be an indicator. These results indicate that Eurosceptic representation in the European Union is increasing every election. May 2019 European Parliament elections showed significant omissions. In essence, the Macron's party lost to the Le Pen's party, the Brexit party won in Britain, and far-right Salvinini set new records in Italy. However, not everything is as pessimistic for joint EU future as it may seem. Despite unexpected results, the Le Pen's party had a slightly lower result compared to last elections, the Brexit Party received less than party expected itself, and the Italian "5 Star Movement" missed the pro-European Democratic Party. Even though the representation of Eurosceptics is increasing every year, they remain the smallest force in the European Parliament.

On the one hand, it is enough to influence the agenda of the EU. On the other hand, pro-European forces still have a chance to turn the situation around in their favor by

reviewing policy in some areas and developing a new format for cooperation. Concessions to opponents of a common Europe (eurosceptics) may be necessary. However, the sooner pro-European forces resort to change, the more they can benefit from the situation.

Some time ago, five scenarios of EU were presented officially in the EU. Jean-Claude Juncker, who was a president of the European Commission, presented his project to the 60th anniversary of the European Union founding. The "White book" identifies significant challenges and opportunities for Europe over the next ten years to describe the EU development to 2025.

The first scenario is "Carrying on". It is about the embodiment of current reforms. According to the plane for Europe it means "focus on jobs, growth and investment by strengthening the single market and by stepping up investment in digital, transport and energy infrastructure", "progress on improving the functioning of the single currency", "the fight against terrorism is stepped up" and "defence cooperation is deepened in terms of research, industry and joint procurement" (European Commission, 2017).

The second scenario is "Nothing but the single market". It is about cutting a number of the EU's political integration projects and continuing the cooperation within the European free market. As it mentioned in a document "the EU's re-centred priorities mean that differences of views between Member States on new emerging issues often need to be solved bilaterally, on a caseby-case basis. Citizens' rights derived from EU law may become restricted over time. Decision-making may be simpler to understand but the capacity to act collectively is limited. This may widen the gap between expectations and delivery at all levels" (European Commission, 2017).

The third one is for "those who want to do more." The EU members, who want to be more integrated into different spheres, can join to all initiatives they want. But we need to remember all of the imbalance threats like a forming of "Union in Union."

The fourth scenario is about to do less but do it more in a more effective way. This scenario brings to EU its results "to act much quicker and more decisively in its chosen priority areas. For these policies, stronger tools are given to the EU27 to directly implement and enforce collective decisions, as it does today in competition policy or for banking supervision. Elsewhere, the EU27 stops acting or does less" (European Commission, 2017)..

Finally, the fifth scenario is about "to do more, but together." It is similar to the Unites States systems that were suggested for Europe. It means the deepening of further integration between participants in all fields and the transfer of powers to the organizational level, forming a federation (European Commission, 2017).

The "White book" of EU future has a lot of alturnatives for Europe. But according to the post-coronavirus crisice it should be change. European Union will have a new reality and a new challenges and the "White book" should be in time.

2. Formal and informal criteria of EU membership.

Among the questions, which can undoubtedly influence the EU's future, the least discussed is a question of the EU's enlargement. This problem can be one of the principal aliens for the European Union. The admissions of new members is also a criterion for

"healthy" functioning of the EU. Bosnia and Herzegovina, Serbia, Montenegro, Northern Macedonia, Albania, and Kosovo are still trying to become a part of the EU. Membership failure of North Macedonia and Albania in Fall 2019 has shown that the EU is not ready to accept new members.

The process of integration is written in certain documents. First of all, the future EU's states must complete the "homework" to meet requirements for the membership. This process is known as a "formal criteria" of the EU integration. The "formal criteria" mention in EU legislation and includes the stability of institutions, the rule of law, protection of minority rights, "healthy" market economy, etc (Phedon N., Boean S. R., 1996).

The EU integration is usually based on the Copenhagen Criteria. States, which pretend to be a part of EU must satisfy to become a member state. "The Copenhagen criteria also required that the capacity to absorb new member states should not jeopardize the momentum of European integration" (Staab, 2011, p. 37).

According to EU legislative there are three groupe of it. Political criteria – stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities. Economic criteria – functioning market economy and the capacity to cope with competition and market forces. Administrative criteria – administrative and institutional capacity to effectively implement the acquis and ability to take on the obligations of membership.

The EU enlargement is a diffical process. To become a EU member state applicants can spend tens of years. According to European Commission (2016) "candidate's adoption, implementation and enforcement of all current EU rules (the "acquis"). These rules are divided into 35 different policy fields (chapters), such as transport, energy, environment, etc., each of which is negotiated separately" (European Commission, 2016).

On the ground, the reality of integration for new members is different from what is "in the book." In addition to the formal criteria, many "informal criteria" are applied to an applicant. Usually, they are based on political judgments and are aimed at the use of formal justification for "securing" informal criteria for refusal. One important fact is that an "informal criteria" may be used because of pragmatic reasons. The informal criteria include aspects that can be a reason for refusal: territorial aspects – the state has to be located in Europe; political expediency - integration can be completed once all members of European community have a political will for it; a new member shouldn't be a new problem for EU - the number of internal problems that the EU is facing keeps getting bigger. Some states, which pretend to be a part of the EU, have lower economic development than the EU members. The informal criteria are used to assess such states.

Below is a short list of examples of informal criteria, which can influence the EU's enlargement.

- "Europe is not ready to integrate with new members."

The EU has a lot of inner issues that influence its development. The EU enlargement is a process that requires a certain period of adaptation. This "adaptation" means not only the state's political and legislation corrections according to EU standards but also the EU rerun. EU should adopt legislation, political, and economic sphere function for more state members. The number of problems within the EU was increasing with the expansion of the Union. There are both political and economic reasons for the above-mentioned statusquo. Firstly, the political expediency of new members integration almost contradicts the economic benefits of this union. As a result, the EU has a misbalance. It means that the level of new members' development sometimes was lower than the level of the most developed regions of Europe.

The European Union still demonstrates quite a big economic disproportion between regions. GDP per capita varies from 343% average in EU (external London) to 28% average in the EU (region Northwest Bulgaria). The Eurostat data shows that most prosperous regions in the EU are Grand Duchy of Luxembourg (279%), Brussels (216%), Groningen (198%), Prague (172%) (Eurostat, 2019).

From the 40 regions, which have GDP per capita more than 125% above the average in the EU, ten located in Germany, five in the Netherlands, four in Austria, three in Spain and Italy, and two in Belgium and Finland. The poorest regions (28-29% belove the average in the EU) are located in Bulgaria and Romania. Among 64 regions, where the GDP per capita is 75% average in EU overwhelming majority are situated in new EU members. By the way, these regions include four Italian and Portuguese ones and tree Greek and French (Eurostat, 2019).

The integration to the EU of less developed Eastern European states automatically lowered the Union's average. That is why 16 "problematic" regions from the "old" EUmembers leave the category of the poorest ones solely because of this statistical effect. It applies to West Germany and some of Greece regions.

Secondly, the fact that the bigger the union becomes, the more difficult for states to negotiate with each other. It affects the EU's future integration and internal problem solving (migration issues, terrorism, EU budget, etc.).

Bosnia and Herzegovina, Serbia, Montenegro, Northern Macedonia, Albania, and Kosovo still have the status of candidates of the EU. Every state has its internal problems, and it's important to ascertain that the economic level of this country a little bit lower than the level of member states. For these states, this is a way to boost development and not add strength to Europe. And as academics consider, "The EU has in the aftermath invested a lot financially in the area assisting the states with building infrastructure and carrying out several military operations to keep peace and stability in the region." Academics approve the thesis that the integration of weak states can potentially harm the EU. If Europe does not want to solve the issues of the Balkans, this can trigger destabilization in the Union. Croatia Factor somewhat pacified the region, emphasizing that others could potentially meet the criteria and join the European family (Jónsson, 2017).

- "Excessive influence on the sovereignty of an applicant at the moment of becoming a member."

EU membership requires a state to meet a lot of criteria. Sometimes a state can be a hostage of these requirements. On the one hand, we can talk about mutually responsible states that have signed the Association Agreement or have a candidate or member status. On the other hand, a situation when one country blocks the way to the EU because of

its own economic, political, or territorial claims is possible. The same situation was in North Macedonia about a month ago.

The same situation was in North Macedonia several months ago. The state began the way to EU integration in early 2000. In 2005 it had had a status of the candidate to EU integration. In 2008 European Council adopted a new, updated Partnership Plan for EU integration. Negotiation on North Macedonia entering began in 2009. In 2015-2016 leaders of the EU argued about the the refusal of integration because of reforms (the judiciary, intelligence and security services reform, and public administration reform) (Council of the European Union, 2019) Appropriate reforms and solutions to these issues should open the way for North Macedonia to the European Union. If in 2008 96% of citizens of North Macedonia saw the states' future in the EU, in 2014, this number decreased to 76%, and only in 2016 positive dynamics began to reoccur, and the percentage increased from 72% to 83% (Macedonia National Public Opinion Poll, 2018).

One of the key questions, which blocked the way for North Macedonia to the EU was a territorial claim from Greece. Athens argued that the state like Macedonia could not be on the map of Europe because "Macedonia" is the name of the historical region in Greece. The dispute between Greece and Macedonia has lasted more than 25 years. Finally, the Prespa's agreement ended the "name conflict" and opened the way to integration. The treaty was signed despite protests in both countries. If in North Macedonia protests were because of renaming, in Greece, a lot of citizens were dissatisfied with the fact that the name would still contain a share of "Macedonia." Macedonia National Public Opinion Poll indicated that the issue of membership of the Macedonians was "in time." 44% of citizens said that the matter had to be resolved earlier, 25% right now, and only 17% would like to move to a settlement with Greece later (Macedonia National Public Opinion Poll, 2018). However, 56% of respondents believe that renaming will bring a positive impact on economic development and access to European funds, as well as open the way to the EU and NATO.

The problem with the name of "Macedonia" was solved at the referendum, which in North Macedonia has an only consulting function. The only question was: "Are you in favor of the European Union and NATO membership by accepting the agreement between the Republic of Macedonia and the Republic of Greece?" 91% of citizens agreed with the renaming of the country, and only 5% was against. The matter is that attendance was about 37%, so that the government couldn't consider the results of the referendum reliable. Furthermore, the poll did not take place. The percentage of pros and cons gave parliament the mandate to put the decision into action.

The same political maneuver should unblock the way for integration to North Macedonia. Moreover, the European way of development of North Macedonia is considered the best future for their state. The results of sociological polls (Macedonia National Public Opinion Poll, 2018) show that 57% of citizens think the renaming a justified step to be a member of the EU and NATO. Macedonian citizens' confidence in the EU (62%) and NATO (62%) is almost equal to the level of confidence in their army (66%). However, the level of confidence in the EU (28%) and NATO (25%) is more than

the level of confidence in the army (24%).

North Macedonia is an example of a state that fell excessive influence on the internal policy from the EU even when the membership was under question. If the argument for reform can be justified by specific standards and rules of functioning of the EU, then the name change is a direct interference with public affairs. From the other side, a territory conflict between Greece and North Macedonia can be a convincing argument for the EU. It is the foreign affairs issue between the two countries, and the EU policy cannot be involved. However, the fact is that Greece, as the EU state, can utilize the EU membership to indirectly influencing EU decisions as a union. According to EU legislation, the member of the association can block a lot of decisions from the economic sphere to new state ascension.

In sum, Greece is not to decide the fate of the North Macedonia's membership. France, Netherlands, and Denmark blocked the North Macedonia's integration as well. The President of France Emmanuel Macron stated: "the EU in its current shape was not able to face today's challenges or handle another financial crisis, let alone allow in two more states from the Balkans, a region scarred by wars in the 1990s and struggling with crime and corruption" (Emmott, Guarascio, Pennetier, 2018). However, not everyone in the EU agrees with it. In the end, Juncker called it a "major historic mistake."

The European Council decided to return to the enlargement issue ahead of the EU-Western Balkans summit in Zagreb in May 2020. However, the consideration may be affected not only by pan-European outrage but also by the statement that no EU enlargement is planned by 2025. After all, this break is not the longest in the history of the EU enlargement.

- "Europe not only politically, but also geographically."

This criterion is based not only on political, but also geographic reasons. Article 1 of the Treaty on European Union says: "This Treaty marks a new stage in the process of creating a closer union among the peoples of Europe," so the European Union is a union only of European states (EUR-Lex, 2012).

This problem partially influences Turkey. Turkey's integration seems not realistic, and the informal criteria are not the only reason. The formal reasons are important here too. The negotiation between EU and Turkey is too long and exhausting. Formally Turkey is a candidate of a Helsinki Council since the 1999. Only two years later the European Union adopted the "Accession Partnership" with Turkey. Turkey should solve all problems and adopted all spheres to European Union legislation and standards.

It is very important to mention, that Turkey has lots of reasons, which have negative influence to EU integration. The main idea of this part is to show, that geographical reason can be one of it. There are a lot on non-European countries, which cooperatite with Europe. Relationship with EU not always needs to be a part of EU. According to European Union legislative relations between EU and non-European Union members based on a two types of international treats Partnership and cooperation agreements (PCA) and Association Agreements.

Turkey has number of reasons of unsuccessful Eupopean integration. It includes

both cultural, regional, geographic and legislative reasons. Turkey as an example of the informal criteria of geographic influence to EU membership first of all can show us the impotance of Eupean mentality and political principles of EU function.

Almost whole territory of Turkey geographically lies in Asia, only western part of it lies in Europe. Kanbur and Bernat argue, that "It is important to remember the more than 3 million Turks that already live within the borders of the EU. In the same way that the EU elite is helping to influence Europeans attitudes towards a European identity that this Turkish minority highlights the 'social fact of an ongoing process linking Turkish and European identities that signifi cantly pre-dates the formal process of Turkey's accession to the EU" (Kanbur, Bernat, 2013). Besides, Turkey's Islamic cultural traditions are significantly different from the cultures of Christian Europe. The same situation is in Albania, where approximately 64% of citizens are Muslims. But, if Albania territorially is Europe, the borders of Turkey are beyond the European continent, and this state has fewer arguments to be in the EU family. So sometimes, one criterion can be used despite the contradiction with others.

Also Turkey continues to demonstrate non-compliance with the basics criteria of membership. An annual Amnesty International report points to the problems of democracy development: torture, violation of freedom of speech, denial of minority rights, etc (Amnesty International, Turkey, 2019). Moreover, Turkey tries to return a death penalty (it was after the so-called coup in 2016), which can close the way the EU forever.

One of another the problem of Turkey's EU integration is non-recognition of Cyprys, which is European Union member since 2004. The "Cyprys probleme" block near eight points of the 35 points Turkey should realise to move to the next step of European Union integration.

"Due to internal developments in the EU and Turkey after the July 2016 coup attempt, there are few chances for progress under the current enlargement logic. Paradoxically, the importance of Turkey for the EU and EU's refusal to consider alternatives to full membership (later coupled with condemnation of the political situation in Turkey), initially made the discussion about flexible integration largely moot" (Cianciara, Szymański, 2019) Both for EU and Turkey economic treats are a necessary part of development. Such a model for the EU is standard. Schengen agreement and agreement of Eurozone use not only members of the EU, bet other states od EU continent. So Turkey can find a way of cooperation with the EU, but both sides have a problem with the political will for it. Tukey joined only for several EU project as a European Gendarmerie Force as an observer, it has an agreement with Europol and Frontex readmission agreement and was included into the Civil Protection Committee of the Commission's Directorate-General ECHO.

2.1 What will be with Europe?

The answer to this question is complicated. In this case, we should talk about scenarios of integration development. Ultimately, the EU's future depends not only on the influence of the chosen scenario. A lot of external and internal factors can influence

the way of development. The interior changes include particular changes in every state: for instance, the Great Britain, which decided to leave the Union, or Poland, which pursuing reforms that in the EU's view contradict its legislation. Among the external ones, for instance, the migration crisis caused by the crisis in the Middle East that caused the flow of refugees to Europe. The coronavirus pandemic and postpandemic period of economic and politic crisis are a new challenge to European Union.

On the one hand, the process of the EU reforming and engagement with Central and Eastern Europian states promoted the European Union's international role as a representative of 27 countries. On the other hand, there are not any destroyed disproportions in the economic development of the EU members or differences in foreign policy interests, which has a significant influence on crisis cases.

EU leaders for a long times talked about European Union reforming. The reform should includes not only way of EU enlargement, but also a way of communication and cooperation between EU members. E. Macron is one of the leaders who has the strong belief to EU reforming. He supports the strengthening of national governments and the weakening of EU pressure and control. E.Macron argue: "Whatever the outcome of Brexit, it is essential that we continue to think about our sovereignty with Britain. At military and strategic level, on all issues. There is obviously the defense of our shortterm interests, the rules that must be complied with, the sovereignty and unity of Europe. But there too, history and geography have their realities. A form of determinism. And so we must include it in this consideration. But it is essential to think about European sovereignty" (Francija Latvija, 2019). Macron points out that not only Europe is changing, the world as a whole is changing. The West's hegemony is slowly giving up its position. If Europe does not change, it risks disappearing with Western civilization. The future of European Union depends on whether the EU leaders have the power to reach a consensus on the future of the Union.

After the problem of North Macedonia's and Albania's integration France preposed a new system of EU enlargement. France "calls for replacing the current accession process, which divides the EU acquis – the body of rights and obligations that includes the EU treaties, as well other rules and laws – into 35 chapters" (Barigazzi, 2019).

As a result, now, Europe has two main tasks. The first one is to save the functioning of the European Union, even if it will be with new rules, and protect the sovereignty of each EU member. The second is not to lose Europe as a union and a dominant geopolitical player. Furthermore, we need to add a forming of a new long term budget (2021-2027). Great Britain left the Union, and the budget is estimated to cost around \in 12 billion annually.

Logically, the individual rules of the EU will be revised. The Lisbon Treaty was signed in 2007, and sooner or later the European leaders should rewrite it. One more fact we need to remember, the so-called struggle for supremacy in the Union between Germany and France. France tries to be central to Europe's reformatory and prepares a lot of initiatives, which can change Europe. We can leave a lot of details, it can be the topic of another research, but France was aside, who initiate the changes to the rules

for the accession of new states to the EU. The reasoning of this step was next "the profound political, economic and social transformations required for future accession to the European Union continue to be too slow, and the concrete benefits for citizens in candidate countries remain insufficient" (Politico, 2019) France considers "A renewed approach should be based on four principles: gradual association; stringent conditions; tangible benefits; reversibility, Stronger political governance," which should include seven blocs with 35 points (Politico, 2019).

Conclusions. This article aimed to provide that EU integration is a challenging process, and not only legislation determines the European Union's future. The law shows us only the formal criteria of EU enlargement. Author tryes to argue that there is a list of informal rules, which influence the new member's integration. The author attempts to explain, in examples, that informal criteria change in European Union nature, and it is one of the components of legislation improvement and a trigger for creating new rules in the EU. Besides, they are forming a framework for new formal rules and other needs. Finally, only effective changes can solve all issues at all. The author explains that such informal criteria as unreadiness for integration with new members, influence on the sovereignty of an applicant at the moment of becoming a member, and territorial location can destroy all state's justice and legislative changes to EU membership.

Author also argue that the future of the EU depends on the scenario, which EUleaders choose. Transformation is a question of time. Every cooperation, sooner or later, needs it. Europe, as a brand, has already become authority all over the world. Nevertheless, the time goes on, the reality changes, and every brand at least needs rebranding. So, Europe needs a new scenario of development and a new framework of cooperation. The European Union integrates the states with different levels of economic and political development. So, Europe needs a model, which will include all the best, when the power state should not work for weak and weak should not be a "providers" of resources for the strong one. Europe should integrate new members not to improve its authority or be a lifeline for it. It must be a mutually beneficial partnership of equals.

EU future is a complicated question even for politicians and scientists. In this case, it will be inappropriate to propose a specific scenario or recipe for EU development. We can talk only about "red flags" or the pros and cons of all vectors of the EU future. It is essential not to forget the fault of informal or foreign factors influence. In this way, the EU can minimalize the risks related to the issues that are mentioned above.

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PRESERVATION OF NATIONAL SECURITY OF UKRAINE: VALUE ORIENTATION ON THE HEALTH OF PERSONALITY AND SOCIETY

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Annotation. Socio-philosophical approach to the problem of health possible to analyze the various social and political factors that affect the preservation and development of physical and mental health of human and society, to determine in this perspective the necessary conditions for national security. The article presents the essence of human health and society as one of the basic parameters of national security. Based on the analysis of the pandemic situation, the authors reveal the types of impact that affect the state of human health and society. The scope of the problem of social determination of the health of human and society is justified. It is shown that globalization, together with global risks, has identified opportunities to effectively address threats through the combined efforts of professionals and resources. The authors of the article emphasize the subject-object nature of the perception of a significant flow of information and the need to counter the spread of misinformation about COVID-19. The authors emphasize that that the main activity of national security structures should be preventive measures that will prevent a recurrence of the pandemic situation.

Key words: health, pandemic, national security, national interests, panic, threats, infodemia, COVID-19, national security strategy.

Introduction and setting of the problem. Today, there is an unprecedented situation when, according to the World Health Organization, countries must work together, learn from each other and coordinate their efforts to defeat the virus. Therefore, communities must show a high level of solidarity, and citizens - to maintain psychological stability, the study of the triad of health acquires a special meaning: physical, spiritual and social. Socio-philosophical approach to the problem of health allows us to consider the health of human and society in a wide range of social and personal life: industrial, labor, socio-economic, political, cultural, family and household. Thus, it is possible to analyze the various social and political factors that affect the preservation and development of physical and mental health of human and society, to determine in this perspective the necessary conditions for national security.

Analysis of recent research and publications. Some aspects of the problem field of the proposed topic and the definition of mechanisms for overcoming socio-political contradictions are studied in the works of S. Datsyuk, G. Rickert, P. Saukh and other domestic and foreign researchers and practitioners. The general tendency of the practical

reorientation of the theory of national security to the challenges of today is clearly defined. But a consistent analysis of the problems already accumulated requires our society to find its own way to avoid risks.

The purpose of the article is to prove the value of human health, society as one of the basic parameters of national security.

Main results of the study. Analysts believe that in the process of "taming" the coronavirus, humanity has every chance to learn the lessons important for their survival. The COVID-19 coronavirus pandemic, which spread to almost every continent in two and a half months and affected 80% of the world, is a test of humanity's ability to counter threats to civilization, organize to address pressing issues, and protect human health and society. They can also be divided into global external (international, political and social relations, the system of rights and guarantees, the level of development of production, living conditions); personal (gender, age, education, status, lifestyle).

A distinction should be made between objective and subjective factors. Objective are related to the action of the fundamental laws of nature, human physiology, social development, globalization and civilization. Subjective factors are related to the life of an individual. They are based on a wide range of reasons: from elementary illiteracy and ignorance to the inertia of the mechanisms of society, the state and human to develop appropriate organizational, legislative and spiritual and moral norms and criteria.

This methodological approach is partly the basis of the Law of Ukraine "On Fundamentals of National Security of Ukraine" and the Decree of the President of Ukraine "On Decisions of the National Security and Defense Council of Ukraine" of May 6, 2015 "On National Security Strategy of Ukraine". In addition to the general provisions, strategic goals and objectives for state bodies, institutions and society, Article 7 of the Law and Section 3 of the Decree define threats to Ukraine's national security and national interests.

National security, as the term uses in its meaning, including the protection of "... health, education and science, science and technology and innovation policy, cultural development, freedom of speech and information security, social policy and pensions... » [1, p.1].

National interests as "... vital material, intellectual and spiritual values of the Ukrainian people as a bearer of sovereignty and the only source of power in Ukraine, determining the needs of society and the state, the implementation of which guarantees the state sovereignty of Ukraine and its progressive development." [1, p.3].

Among the priorities of national interests "... development of spirituality, moral principles, intellectual potential of the Ukrainian people, strengthening the physical health of the nation, creating conditions for expanded reproduction of the population" (Article 6) [1, p.3].

Among the threats in the social and humanitarian spheres: "... inefficiency of the state policy on increasing the labor incomes of citizens, overcoming poverty and balancing the productive employment of the able-bodied population; the crisis of the health and social protection system and, as a consequence, the dangerous deterioration of public health; spread of drug addiction, alcoholism, social diseases [1, p.3].

In recent decades, there have been a sufficient number of publications in the philosophical literature that reflect the urgency of the problem of social determination of human health and society. This is entirely due to the urgency of improving health in order to strengthen the socio-economic potential of society. Almost all the conceptual approaches associated with the life of people in work, life, consumption, leisure time, etc. under the influence of certain social living conditions.

It should also be noted that from the point of view of socio-philosophical methodology, the absolutization of individual responsibility goes beyond the "self" of the individual, and the approach to determining health at an exclusively individual level can lead to dehumanization of the individual as a person when the goals and objectives of society and the responsibility of the state for public health are replaced by obligations of an individual nature. Introspective (individual) approach inevitably ignores the leading role of social, economic, and environmental living conditions and, in the end, leads not to the welfare of society, but to the well-being of individuals.

At the same time, the analysis of the current situation in society shows that the binary interpretation of health exhausts itself, and true integrativeness is formed with the inclusion in the characteristics of health of the third component - the social health of human and society. Moreover, the social and spiritual components of health today significantly outweigh the physical component.

We can talk about the health of society in various aspects: economic, political, spiritual. It will be reasonable to judge the health of society by the quality of life, the attitude of the weak to the elderly and children. It is advisable to assess public health in terms of the freedoms granted to members of society. An unhealthy society is dangerous for its citizens. For example, corruption in government is not only a characteristic of social disease. Corruption is dangerous for both the individual and his health, because the cost of public funds is determined not by the needs of taxpayers, but by the interests of those who have access to financial flows. Such an anti-moral factor in the system of normative legal acts is characterized as a threat to the national security of Ukraine.

An important indicator of the health of society is its "stress", which is especially associated with the transformation of basic values and moral guidelines. Since the beginning of the pandemic, the WHO has stated that it is fighting not only the virus, but also the fakes around it - infodemia (word game infodemic = information + pandemic). This is not just a transformation of basic values and moral guidelines, but a certain shock. In a very short period of time there has been a significant reassessment of values. If, for example, misinformation during the election could have influenced our political choices, then in a pandemic, false information is a matter of life or death. Coronavirus is the first pandemic in human history to have social media - a place where anyone can spread any information. And misinformation spreads faster than the virus itself. During self-isolation and quarantine, people around the world began to spend more time online. Ukraine is no exception, during the quarantine Internet traffic increased by 25%. In March, Ukrainians were most interested in the news. But our news perception habits are marked by the fact that in the news we are accustomed to the perception of negative content. Thus,
in their study, Stuart Soroka and Stephen McAdams concluded that the human brain prioritizes negative news. They studied people's psychophysiological reactions and found that people were more responsive to negative news than positive. This phenomenon is likely to be related to evolutionary mechanisms, as knowledge of danger provides an opportunity for behavior change to increase the chances of survival [8].

The World Health Organization has identified three indicators that form the index of human development: life expectancy, education and quality of life. The relationship between the health of the individual and the health of society is expressed in the fact that only healthy individuals can form a healthy society, and a healthy society is obliged to ensure the livelihood of individuals [7]. That is why a large number of academics, public figures and governments have called on social media, such as Facebook, Google, Twitter, to oppose the spread of misinformation about COVID-19 on their platforms. Governments in many countries have agreed to cooperate or even set up their own antidisinformation units. But in the fight against infodemia, as with pandemics, much of the success of all mankind depends on each individual.

A characteristic feature of today is the deepening of globalization. Despite borders, climatic, religious and cultural differences, over the past few decades, humanity has begun to grow into a single whole. The world has become interpenetrating. This provides unlimited opportunities and at the same time increases the risks. If a danger arises in one place, it can potentially threaten everyone. No country, even the most developed or closed country in the world, can feel safe if there are wars somewhere, someone is starving, or infections like coronavirus break out. There is a need to build a collective security system and ensure the recovery of the health of the world's population. As soon as it became clear that humanity was facing a serious threat and the coronavirus gene had been isolated, the world's leading laboratories set about developing a vaccine. In less than two months, China, the United States, Israel and Canada have said they have already received vaccines against COVID-19, but now it takes time to test them. Globalization, along with global risks, has created unprecedented opportunities. It turns out that there is no threat that humanity cannot effectively overcome by combining efforts, professionals and resources.

Today, in the context of globalization, the relationship between man, society, state and world capital acquires complex features of cognitive dissonance. On the one hand, scientific and technological progress contributes to the growth of human well-being. But on the other hand, it poses great threats. Unemployment growth, environmental pollution, demographic degradation, pandemics. Instead of increasing the most valuable human capital - health, material and spiritual well-being, there is an increase in morbidity.

Analysts believe that the WHO and national health systems are not ready to respond effectively to such a threat as coronavirus. The situation when people come to places of potential infection for a long time - to China itself, the historic centers of Italy or to Austrian ski resorts - and then thousands return home, transporting COVID-19 to their countries of residence, shows a big problem in the collective response to the pandemic. If necessary, all countries should provide the necessary means and resources to the country where the outbreak of the infectious disease occurred, and in the event of a pandemic, continue to work together to meet the necessary needs in each of them. Untimely, ill-considered, or ineffectively implemented quarantine causes economic damage to business and the country as a whole, but does not give the necessary effect of reducing the spread of infectious diseases.

A critical look at Ukraine's national security strategy raises many conceptual issues. Should the strategy be state or civic? Will the state continue to be an entity that guarantees the security of society?

Unfortunately, the National Strategy for Promoting the Development of Civil Society in Ukraine for 2016-2020 did not fully expand the notion of civil security, which could strengthen the existing National Security Strategy. The public does not have an effective mechanism to prevent the risks of illegal actions of the authorities. Thus, the rule of law can exist only if the government itself does not break the law. This is a characteristic of the state of moral health of the modern political elite and the maturity of civil society, capable of avoiding the risks of national security [4].

A healthy civil society is impossible without the recognition of freedom and universal values, moral norms as an absolute value in human life. Only a free state is able to ensure the well-being, security of its citizens and the prospect of dynamic development. Physical, spiritual and moral health cannot be maintained in a society that does not seek freedom. Such a society is doomed to a rift between those whose freedom is backed by material prosperity and those for whom it is synonymous with poverty. A healthy society requires the desire not only for equal rights, but also for equal opportunities for citizens to realize their abilities, as well as to guarantee a dignified existence for all individuals. It turned out that the effectiveness of quarantine restrictions during a pandemic depends on the level of trust in the government and the level of consciousness of each person. Awareness of the need to restrict one's freedom of movement and communication is a test, but love for one's loved ones, unwillingness to get sick or infect someone else are strong incentives. Even democracies apply administrative leverage to citizens who violate quarantine rules, but this should only be seen as an exceptional temporary measure. Human rights and freedoms are temporarily restricted in the face of the threat of an epidemic, but they must be fully restored as soon as the danger is overcome. The coronavirus pandemic clearly shows which countries' authorities are acting deliberately and effectively, and which are simulating active activities, without providing the population with even the most necessary means of personal protection and diagnosis. "Marauding", speculation on means of protection and testing is immoral. The time of the pandemic is a time of testing of political and national elites, it is a test of how much they have given the opportunity to develop their society and how much they are ready to "lend a shoulder" to their country. Accordingly, in the agenda of the dialogue between human and society, the words "pandemic, inflation, restrictions on freedoms, corruption" should come first, but the words: life expectancy and standard of living, moral values, physical and moral health of the individual and society. These concepts must fall into the category of goals, removing the spiritually and morally imperfect political elite to the category of means. Given that the interests of national security require a set of medical and health measures

in the country, politicians will be forced to learn some concepts such as: diagnosis, risk factors, pandemic, infodemia, group psychotherapy, social prevention. This requires the political will of the domestic political elite, a change in decision-making mechanisms, and the development of clear algorithms for dealing with emergencies that threaten the global security system.

Conclusions. Thus, it is possible to agree with the concept of applying the achievements of our international partners in ensuring national security, to adapt them for implementation in Ukraine, but a consistent analysis of the already accumulated problems requires our society to find its own way. The problem of human health, society in the moral and physical aspects on a global scale remains and remains relevant, as health is one of the basic parameters determining the quality of life and security of the state. Most people consider health to be one of their priorities. This topic is universal, its relevance can never be exhausted. The main activity of security structures should be preventive measures that will prevent the recurrence of the current situation. The COVID-19 pandemic has shown us that global threats are not virtual, but real, that populist governments are not able to adequately respond to the threat (they act either too passively or too hysterically - and always without a clear plan), which is for the world economy, which is built on trust and confidence in the future panic - a much greater threat than the disease itself. We will really need this lesson in the face of other global challenges: climate change and migration.

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RECONSTRUCTION OF UKRAINIAN HIGHER MILITARY EDUCATION IN THE CONTEXT OF NATIONAL SECURITY

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Annotation. This study examines the important issue of restructuring higher military education to realize the national interests of Ukraine. Education is the guarantor of the independence of the state, a condition for its sustainable development and growth of the welfare of citizens. Therefore, its role in the context of national security was investigated. The criteria of national security in the educational sphere are defined, such as: technology, mathematics, computer literacy; cooperation and international competition in higher education; foreign languages and global awareness; national identity. Particular attention is paid to the implementation of distance learning.

Key words: restructuring of education, educational services, military education, national security, educational security.

Problem statement and its relevance. Ukraine will soon celebrate the 29th anniversary of independence. Over the years the education system of our country has undergone radical changes that have affected all levels - from preschool education to adult education. The educational process performs different functions at different stages of personality development: in school - the formation and development of the ability to learn; in institutions of higher education - the formation and development of learning, which turns into self-study and self-education; in adult education - awareness of the need for professional development. In the conditions of total self-isolation for a long period, the extremely important question of the role of educational security in the political and legal conceptualization of the national interests of Ukraine is exacerbated. Education is the foundation of knowledge formation, innovative approaches and intellectual capital of the nation. Therefore, ensuring educational security at the appropriate level is a guarantee of Ukraine's independence, a condition for its sustainable development and increasing the welfare of citizens. In reality, it turns out that, for example, that modern higher education in Ukraine, including the military, does not respond adequately enough to short-term needs. The problem of training highly qualified personnel for various structures of the state, the formation of education, culture, professionalism has been relevant at all times.

In Ukraine, a special place is played by overcoming the difficulties associated with the need to train highly qualified personnel in higher education institutions on the basis of distance learning, along with the problems that arise in any other country in connection with the transformation of its education system.

Analysis of recent research and publications. The problem of restructuring the field of education, ensuring educational security has found a solution and philosophical understanding in the works of D. Dzvinchuk, G. Dmitrenko, K. Korsak, V. Lugovoi, V. Sychenko and others. There is currently no theoretically sound program for the implementation of national education in the context of national security, and especially in emergencies. That is why the purpose of this study was to identify the factors of development of the educational system of Ukraine in unique specific conditions in the context of national security.

Explanation of the main material of the research. With the formation and development of Ukraine's independence, the task arose in the development of state educational policy. During this period, its principles and main mechanisms are outlined, the subjects that form and implement state policy in the field of education are identified.

Researchers of the state educational policy of the period of independence of Ukraine distinguish the following stages of its development in the field of education:

- the first stage (May 1991 - March 1996) – the adoption of the Law of the Ukrainian SSR "On Education" and approval of the State National Program "Education" ("Ukraine of the XXI century"). During this period, reforming education with its depoliticization and acquiring a national orientation was identified as a priority. Also, the foundations of continuing education were laid. Thus, this program defines the national orientation of education, training and upbringing, the most important principles of reforming secondary, vocational and higher education;

- second (March 1996 - December 1998) - the improvement of basic legislation on education, adoption of the Law of Ukraine "On Amendments to the Law of the Ukrainian SSR" On Education ", which in essence, content and directions became in fact a new version of the Law" On Education ";

- third (December 1998 - January 2002) – the adoption of laws that define the strategy for the development of national education, establish its norms, requirements, standards, legislate the relations of all structural units of education;

- fourth (January 2002 - October 2002) – the implementation of certain provisions of the law through the formation of the regulatory framework of education; development of a strategic document on the development of education, preparation for approval of targeted state programs;

- fifth (October 2002 - July 2010) - the approval of the strategic action plan - the National Doctrine of Education Development, the formation of an appropriate regulatory framework aimed at its implementation;

- sixth (July 2010 - October 2011) – the ensuring the improvement of the functioning and innovative development of education, improving its quality and accessibility, adjusting tasks and activities in accordance with modern needs (implementation of an

11-year term of education and compulsory preschool education for children from 5 years of age), integration into the European educational space;

- seventh (October 2011 - present) – the adoption of the National Strategy for the Development of Education of Ukraine for 2012-2021, determining its main directions [2].

During the years of independence, the following changes have taken place in the field of education:

1. External independent assessment of knowledge. Attempts at such an assessment have been made since 1993. And only in 2006 EIT was implemented at the official level. For the first time, the State Budget of Ukraine has provided funds for its implementation. The Ukrainian Center for Educational Quality has started its activity. In 2007, all educational institutions subordinated to the Ministry of Education enrolled entrants on the basis of external evaluation certificates. Testing gave a chance to all Ukrainians to get a diploma, regardless of wealth and acquaintances. Every year testing is supplemented with new elements.

2. Bologna system of education. Ukraine joined the Bologna Process in 2005. Prior to that, in Ukraine were used: the only higher education with the title of specialist; 5-point assessment and narrow specialization of universities and faculties. We have adopted the philosophy of the Bologna system, which can be described as preparation for competition. One of the most understandable innovations of the Bologna system was the division of higher education into bachelor's and master's degrees. The first is general higher education lasting from three years. The second is higher specialized education.

3. Changing the rating scale from 5 to 12 points. In 1993, the range of evaluation of educational work was narrowed to a 4-point scale. Since 2000, Ukrainian schools have had a 12-point grading system. In the first class there is a verbal description of the knowledge, skills and abilities of students. Educational institutions, in agreement with local education authorities, may also use other systems to assess student achievement.

4. 12-year school. A 12-year school is being implementated in Ukraine. The new law provides for the division of secondary education into three levels: primary education lasting four years; basic secondary education lasting five years; specialized secondary education lasting three years. The profile level will have two directions. The first - academic - involves continuing education in higher education. The second is a specialized, market-oriented, that is specialized training based on a combination of educational content and a professionally oriented approach to education. Another innovation is that from now on, after the completion of each level of education, there will be a state certification, which will take place in the form of an external independent evaluation.

The rapid development of mankind in the late twentieth century, the processes of globalization, new technologies have led to significant adjustments to the purpose, content and strategy of education in most countries. Achieving equal opportunities in education, providing all citizens with the basic knowledge, abilities and skills they need for social and professional integration into the society in which they live, has remained a priority. For the vast majority of countries, one of the main goals is to provide the entire population with compulsory basic education.

In economically developed countries, education has become a determining factor in social stability, national and economic security of the state, as the education of the nation in a broad context - is a source of self-development, the basis for consolidation of society and national stability. The paradigm of education is formed, which is characterized by the dominance of the function of usefulness of knowledge, training of specialists to service production, understanding the patterns of processes occurring in nature and society and reproduction of effective practices that have developed in the past. That is, a paradigm adequate to modern requirements of human development has been formed. Ukraine has not stayed away from these processes either. We are beginning to form a specialist who is able to work consciously and responsibly in the future. At the end of the XX century. The concept of "lifelong learning" was replaced by the concept of "lifelong learning", which allows a person to maintain their competitiveness throughout life, considering it as a mechanism of survival of man and society in the information age.

World Bank experts believe that the task of different countries in the field of education should be to guarantee the right of the poor to access education, disseminate information about educational opportunities, ensure the quality of education through the implementation of standards and monitoring compliance, in the transition to a knowledge economy [1].

Such recommendations can not yet be fully implemented by Ukraine. Our state provides socio-cultural and mental principles of the educational process, determines the basic principles, strategy and directions of state policy in the field of education, creating an appropriate system of educational institutions and their management, forms the legal field of educational activities. At the same time, the state educational policy has not yet become the core around which a single system of interests is formed, which can unite educational and scientific activities with entrepreneurship, law enforcement agencies, and public administration. Many domestic scholars ask a reasonable question - "Will the education system of Ukraine in general, and higher in particular in this century of prosperity?" [9].

In the National Security Strategy of Ukraine, the issue of defining national security criteria in the field of education becomes relevant. The experience of the analysis of security measurements of the educational sphere shows that today the following criteria are:

1. Technology, mathematics, computer literacy. The latest military and defenseindustrial technologies require qualified personnel capable of high-quality and rapid development of new knowledge and skills. The penetration of information technology and new media into the economy, social life and defense determines the importance of computer literacy and media education as part of the curriculum. The destructive potential of cyberattacks is growing, so the urgent task is to train specialists who can adequately protect information systems, especially critical infrastructure and government agencies.

2. Cooperation and international competition in higher education. Active participation of Ukrainian universities in global national security programs will contribute to the direct strengthening of defense capabilities (obtaining scientific results

in such areas as protection against chemical, bacteriological and nuclear substances, telemedicine, information technology, etc.) and establishing scientific partnerships and training of Ukrainian scientific employees. Foreign languages and global awareness. For Ukraine, the relevance of this moment is determined by the need for European and Euro-Atlantic integration, including their defense and political aspects. In the domestic reality, the main problem of learning foreign languages in educational institutions today is a significant gap between quantitative indicators and the quality of knowledge and competencies.

3. National identity. As an important area of education for national security, along with international awareness and mastery of foreign languages, we highlight the "knowledge of the history and values of their country", emphasizing that understanding the history, politics, culture and traditions is important for citizenship and critical to understanding who are allies and who are opponents of Ukraine [10].

According to the results of the study of the educational system, guaranteeing and ensuring the national interests of countries are due to the action of such main factors as:

expanding the sphere of influence of organizations striving for global manifestation;
maintaining the gap in the level of socio-economic development between industrialized and developing countries;

- the urgency of solving global problems at the supranational level.

Let's pay attention to the last factor. Today, humanity has faced the problem of a pandemic, total self-isolation for a long time. The COVID-19 pandemic will cause changes that will make the world talk "before" and "after" - researchers of economics, society and politics predict, comparing the epidemic with the terrorist attacks in the United States on September 11, 2001 and the global financial crisis of 2008. It will be possible to learn about certain consequences only then, some phenomena already - the obvious reality: infodemia, ie, an avalanche of misinformation, incitement and intimidation, pseudo-scientific advice and interpretation, which seriously complicates stopping and overcoming the disease; economic downturn, in a situation of external self-isolation of states and the implementation of internal quarantine regimes, which can increase inequality and increase vulnerability for many countries; suspension for an indefinite period of time of a wide range of traditional freedoms; using the state of emergency as a normal practice for governments; a state of fear that becomes a real need in situations of collective panic for people for whom the epidemic creates an ideal excuse. Along with these negative consequences, the positive case is the unique case of total practice of work and study at home, that is remotely.

Of course, we have not yet fully assessed the implications of distance learning, but it is clear that we were not ready for its implementation. This is especially true of military education because of its specifics. First of all, it is an integral part of public education. Represents the process of formation of personality. However, military education forms a special personality - a military specialist. He must be able to engage in military activities. It is obvious that military education has components of both civilian education and specific, characteristic only of military education. The system of military education consists of an organized set of educational institutions that implement military education according to educational levels. These levels are set by the state. Military authorities manage the activities of these institutions on the basis of laws, decrees, resolutions, orders, guidelines and regulations of public authorities.

The basis of the military education system are two important provisions:

1. Military specialists are designed to manage highly organized formations of people who have weapons that embody the latest advances in modern science and technology. The composition of such formations must be well versed in the techniques of armed struggle and the most effective methods of combat use of weapons and military equipment. There is no other specialty that would set such specific goals in the training of specialists.

2. Management of military teams in combat conditions that require the use of weapons and military equipment in the interests of protecting the independence of the country, the integrity and inviolability of its borders, protection of constitutional rights and freedoms, is constantly associated with risk to the commander and subordinate personnel. This leads to the need to create a special relationship in the team, determined by the requirements of the oath and military statutes, which are based on the relationship between commander and subordinates, which (relationship) is created in the process of appropriate education and training.

In view of this, future officers, who are fully responsible for subordinate personnel and their actions in combat, must pass the "appropriate school", which is formed only in military schools [7].

A characteristic feature of the restructuring of the military education system at the present stage is that it should provide training for military professionals with a high level of professionalism, competencies capable of performing with high efficiency the tasks of Ukraine's defense, national security, self-knowledge, optimal decision-making, non-standard conditions. The training of highly qualified military specialists, capable of organizing military service, commanding troops during relevant combat operations, and conducting exercises in peacetime, is carried out in military training units under the training program for officers, reserve officers, adjuncts, doctoral students and interns according to the Order № 910/412 of 15.08.2018 "On approval of the Regulations on military training units of higher education institutions", in accordance with the Laws of Ukraine "On Education", "On Higher Education", "On Military Duty and Military Service". Military training units have the right to provide educational services in accordance with the legislation of Ukraine. Training of military specialists is carried out with the involvement of scientific and pedagogical (pedagogical) workers and the use of material and technical base of the Free Economic Zone, the Ministry of Defense and other military formations.

The main types of training in a military educational institution are: lecture, seminar, group, practical, laboratory, group exercise, training, individual, tactical (tactical-special, tactical-military) classes and training, military special game, consultation, in addition to

the above, other types of training sessions may also be established.

Lecture - a type of training session, which is conducted by the method of oral teaching of new theoretical material in combination with the method of demonstration (demonstration).

A seminar is a type of training session that is conducted by the method of discussion (discussion, survey) of a predetermined problem (topic, question).

A group lesson is a type of study that is conducted by the method of oral presentation of the material in combination with the method of demonstration (demonstration) and subsequent oral (written, express control) questioning or testing the results of cadets, students, adjuncts.

A practical lesson is a type of educational lesson that is conducted by the method of performing specially formulated practical tasks and promotes the formation of skills and abilities of practical application of theoretical provisions.

Laboratory lesson is a type of educational lesson, which is carried out by the method of independent performance by cadets, students, students, adjuncts of experimental (simulation) tasks with the use of educational-laboratory (clinical) base.

A group exercise is a type of training session that is conducted by the method of performing by students the functional responsibilities of certain officials of military administration bodies, military units and subdivisions.

Training is a specific type of training sessions, which is carried out by the method of repeating actions, exercises, techniques, standards. By type, they are divided into individual and group.

Tactical (tactical-special, tactical-combat) classes are a form of tactical training of cadets, listeners, students, which is carried out by the method of exercises in performing techniques and methods of individual (collective) actions, training and combat standards. The purpose of tactical (tactical-special, tactical-combat) classes is to work out practical issues of combat organization (combat operations), management of units in combat and their comprehensive support.

Command and staff training and military (military-special, military-historical) games are held with students and cadets on the most important complex topics of academic disciplines.

Consultation is a type of training session during which a cadet, listener, student, associate professor receives from a research and pedagogical worker answers to specific questions or explanations of certain theoretical provisions or aspects of their practical application.

Independent work of cadets, students, students, associate professors is carried out in order to practice and master the educational material, consolidation and deepening of knowledge, skills and abilities; performance of individual tasks in academic disciplines (course works (projects), calculation and graphic works, abstracts, etc.), militaryscientific and qualification works; preparation for future classes and control measures; formation of cadets, students, students, adjuncts of independence and initiative in the search and acquisition of knowledge. This brief overview of the organization of training in military education institutions provides grounds for arguing that the system of military education requires the faceto-face presence of cadets (students), but requires adjustment in view of the current situation in the world. First of all, it is the implementation of distance learning in Ukrainian universities. Thus, a number of educational components that are part of the cycle of general training of educational (professional) training programs for military professionals can be taught to applicants for higher education remotely, including disciplines of humanities and socio-economic training, science and some basic training. Today, the introduction of distance learning is accompanied by a number of difficulties associated with a certain unpreparedness for this scientific, pedagogical, engineering and other employees of educational institutions. Perhaps this is due to the problem of low level of technologicalization of design processes, development of distance learning courses and the introduction of distance learning in the military education system of Ukraine. And perhaps until recently, the irrelevance of this type of training.

The technology of developing a distance course is problematic, because this is the part of the creation process that takes place on the basis of the definition:

- draft course (its program and set of tasks for users);

- procedures for administration, creation, selection and placement on the electronic platform of educational materials, means of control of its assimilation, certification of distance learning course.

The purpose of the technology of its development in higher education is to ensure an orderly set of all technical, organizational and administrative-permitting procedures during the creation and acquisition of educational product readiness for use in the educational process. In general, the structure and content of the technology of distance learning courses can be represented as follows. In the second stage, the course developer must create its structure. The third stage is the preparation of educational and methodological materials for use in the distance course. At the fourth stage its modules are filled with educational and methodical materials. The fifth stage of the technology should be the certification of the distance course by the administration of the educational institution, permit department, educational department, experts from among the pedagogical staff. The sixth step is to create user accounts. After that, the distance course is completely ready for use. Thus, the technology of developing distance learning courses is not a quick procedure. But given the situation in the world, there is no other way out.

Conclusions. Higher education, including military education, has always been seen as a historically formed social institution responsible for the succession, production, accumulation and reproduction of scientific knowledge. Therefore, the preservation and innovative development of educational and scientific potential is given a special role. Among the tasks to be solved by scientists is the creation of new educational technologies that will enable the training of specialists in all conditions, especially in areas that are closely related to the national security of our country. It is impossible to completely transfer military education to a distance platform. This is due to the specifics of this education and its extreme importance for national security. Since the main requirements for military education are and will remain for a long time: training of highly qualified military specialists capable of leading troops (forces) during the organization of military service, the implementation of appropriate combat operations and exercises in peacetime; creation, operation and application of the most complex weapons systems and military equipment; implementation and support of basic and applied research; conducting innovative work to create new generations of weapons and military equipment. Further development of the military education system must be carried out focusing on general educational trends and challenges of the time.

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PHILOSOPHY AND THEOLOGY

HISTORICAL AND PHILOSOPHICAL SOURCES OF THE EMERGENCE AND DEVELOPMENT OF THE CONCEPT OF "ENERGY"

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Annotation. In the article, the author explores the historical and theoretical sources of the emergence and development of the concept of "energy". Particular attention is paid to the Aristotelian interpretation, which is crucial in the formation of non-classical ontology. An analysis of this approach allows us to refute the established opinion that Neoplatonism was the source of energy ontology, and hence the philosophical and theological teaching of Eastern Christianity is Christianized Neoplatonism.

Key words: energy; *Entelechy; essence; activity; reality, Synergy, Ontology, non-classical paradigm.*

Introduction. In the famous lectures collection "Energy" V. Bibikhin points to the "energy" concept as a key value in the modern history. From basic to applied sciences in Natural science to technical, economic and humanitarian spheres the "Energy" concept is refracted, but not diminished. "Energy is like that God who is to give the world the first impetus, upon which something begins to happen in the world" (4, p. 24).

In the XIX -XX centuries, many thinkers of different spheres made this concept the basis for modern science. Nevertheless, V. Bibikhin states definitely: "We have not defined the Energy". Moreover, the researcher further attacks one of the most fundamental achievements of dogmatic Christianity: "The most unworked dogma in Orthodoxy remains the 14th-century Palamite definition of Divinity and divine Energies. This is the most recent of all the dogmatic definitions of the Orthodox Church, rejected by the Western Church. We cannot at all claim that we have fully clarified the Aristotelian Energy; in fact, we did not even really approach it. Therefore, it is not at all the case that, as if armed with the philosophical concept of Energy, we now want to clarify the Energy of Christian dogmatic. All the same, nothing would have happened, because Dogmatics is a different element than Philosophy. It would be easier, of course, to state that "and the concept of Energy has also been broken in Orthodox dogmatic, but we are busy with our philosophical studying, and it doesn't matter"; but it does matter, for two reasons: the theme of Energies already exists in Russian thought and has taken a noticeable place in it; and Orthodox theology has left us the dogma of Divine energies for comprehension, because it itself does not seem to undertake this work" (4, p. 95).

V. Bibikhin's opponent S. Horujy, who considers the "Energy" in the context of the Philosophical and Religious paradigm not only of historical Christianity, but also

of modernity, is also unambiguous in his definition: "The Energy discourse has not yet received a developed Philosophical expression, nor in the Western tradition (where the Essential philosophy prevailed), nor in the Eastern tradition (where the Theological form of expression prevailed, and often non-verbal forms)" (19, p. 17).

Here we are faced with a paradox. The degree of this concept elaboration has a wide range almost in all spheres of modern science, but on the other hand, the Ontological status of "Energy" in modern Fundamental philosophy remains not comprehended, which itself defines the border, boundary, the "fold" between the Classical and Nonclassical philosophical paradigm.

The proceeding to attempt to develop a Post-non-classical paradigm, as if overcoming the Non-classical one, is a Historical and Philosophical underestimation of Energy ontology, which today has taken a central place not only in the Scientific and theoretical or Scientific and practical, but also in social existence.

To find the historical and philosophical sources for the formation and development of the Ontological non-classical paradigm and the reasons for underestimating the concept of the energetic ontology of the Western European classical tradition.

Methods. For this purpose we will use the historical and genetically constructive method, which would allow us to investigate the sources for the "Energy" concept formation. Among the modern studies that differ in the systematic of detailed elaboration of this concept, we will rely on the work of D. Bradshaw "Aristotle East and West: Metaphysics and the Division of Christendom".

As the author notes, the origin of the "Energy" term itself is hidden by history. Nevertheless, D. Bradshaw claims that in the Greek literature that has come down to us, this term was not used before Aristotle. And after his death, for several decades, this term was used only among philosophers who belonged to the school of Aristotle himself. In the Stagirite's works, the "Energy" term is used 671 times. "... The simplest sense of the Energeia term lies in the Aristotelian corpus, that is, activity, turns out to be the earliest. The earliest meaning is activity, considered specifically as the realization of the ability in contrast to simple possession" (5, p. 26). Aristotle used the term Entelecheia as a synonym for Energeia. In this case, drawing attention to various hypotheses for the meaning of this concept, the author claims that it is quite obvious that at the root of this word lie "the state of accomplishment" and "being in the fullness" of reality". Hence it follows that Aristotle created this neologism to indicate the relevance. Apparently it is no coincidence that he has used the word "Dynamis" to denote potentiality. According to D. Bradshaw, the key point here is that Aristotle's Metaphysics is aimed at upholding the priority of reality in relation to possibility. Moreover, reality precedes possibility. For things that exist in reality can exist without those that exist in possibility, but not vice versa. Therefore, reality has priority in essence and precedes the possibility.

The Chapter IX.9 of Metaphysics begins with the assertion that Energeia is "better and more valuable" than even the good potency (1051a4-5). This is an important addition because this is the first time it is said that "Energy" as such possesses value. This argument is simple: every capacity is the capacity for contraries, and in this sense one must be good and the other evil. As a result, good reality is better than capacity, since the latter includes both good and evil (1051a5-15)" (5, p. 49). Further, Aristotle states that the eternal can't be evil, the eternal must be free from evil. Consequently, the Aristotle's "energy" is the reality, the beginning that exists by itself, the Unmoved mover. This is a very important remark because it became important for the later Neoplatonism thinkers, who had already conceptually developed the "energy" concept.

At the same time, in the process of forming the Unmoved mover theory, Aristotle relies not only on philosophical, but also on unspoken theological premises. "And life is truly inherent in him, for the activity of the mind is life, and God is activity; and his activity, as it is in itself, is the best and eternal life. Therefore, we say that God is an eternal, best living being, so that life and continuous and eternal existence are inherent in him, and this is precisely what God is" (1, p. 276).

D. Bradshaw makes an interesting conclusion that distinguishes his thought from the classical understanding: "Aristotle's God is simultaneously transcendent and immanent: transcendental as existing eternally in complete reality, but immanent as a constituent for the formal and target causes - and therefore also the acting cause - of natural changes" (5, p. 74). Thus, it was Aristotle who laid the broadest possibility of various theoretical connotations, which to this day have a fan of uncertainties.

"We have not defined Energy," writes V. Bibikhin, "Energy is power: this is not a definition yet, because we will then imperceptibly define power as Energy. ... The fact that we do not define energy, we unexpectedly coincide with Aristotle: he does not define it either" (4, p. 26).

Now it is very important to pay attention to how both the contemporaries of Aristotle and the philosophers of the next generation understood "energy". And then it turns out that this term is not found either in Speusipus, or in Xenocrates, or in representatives of the Hellenistic schools. "It is not found in any of the most significant authors of the III - early II centuries BC. - Menander, Kallimachus, Apolonius of Rhodes; it is not found in the Septugian, as well as in many less noticeable figures, including the nephew of Aristotle himself - the historian Callisthenes of Olinthus" (5, p. 85).

The first use of the term "Energy" is found in the Democritus's - in Nevsifan of Theos, the fragment of which is apparently taken from the popular work of Aristotle "Protrepticus ". Nevsifan's disciple Epicurus also uses this source. To say the true, he, using Aristotelian terminology, comes to the opposite conclusions in relation to Aristotle.

But according to Diogenes Laertius and Sextus Empiricus, the Stoics quite often used the term "Energy". However, the Hellenistic schools do not provide enough deep material for the history of "energy". Strabo and Plutarch left us information that after the death of Aristotle, his books passed to Theophrastus, a disciple and second head of Lyceum. Among the peripatetics themselves, the term "energy" fell into oblivion already after the death of Theophrastus. Theophrastus gave these books to Neleus of Skepsis. Then in the II century BC they are found and published in the damaged form in Athens by a certain Apellikon. And only in the middle of the 1st century BC the first revised edition of Andronicus of Rhodes appears. But even the published edition did not arouse much interest in the term "energy".

Among the historical writings "Historical Library" by Diodorus Siculus should be noted, which was written ca. 60-30 years BC. The word Energy is used not only in the sense of activity and the power associated with it, but in the sense of the nature of the person activity, society over a long period of time. In relation to a person, this word is translated as "power", "energy", and in relation to society as "practice", "custom", in relation to a thing – "influence", "operation".

As D. Bradshaw states, "the first scientific use" belongs to Thessalus, who lived in the 1st century BC. In the treatise "De Virtutibus Herbarum" the author writes about the healing power of plants. It was at this time that the "energy" concept became recognized in the scientific community.

Among the philosophers of the first two centuries AD the use and interest to the "energy" concept arose among the middle Platonists. The innovation in the scientific context belongs to Galen, who wrote in the II century. First, Galen distinguishes between "energies" of capacities of body and soul that lend themselves to knowledge and their essence (ousiai), which is impossible to know. But most importantly, Galen says about the triad that makes up dynamys with its knowable energeia and unknowable ousia. The theological application of this triad became widespread among the Neoplatonists and the Church Fathers.

Philo of Alexandria (c. 30 BC - 45 AD) is attributed to a number of middle Platonists. And, although Philo himself really points to the influence of Plato, he explains this by the fact that Plato is more successful than anyone from the Greeks expressed what was said by Moses. Philo often uses the term "Energy" in the sense of "activity". Especially when it concerns the activity of the mind, feeling, part of the body. But Philo's important innovations with regard to the term "Energy" concern theology. With all the influence of Aristotelian thought, it is necessary to pay attention to the fact that if for Aristotle the eternal activity of the beginning is, in fact, thinking that thinks about itself, then for Philo the God's activity is creation, constructing. "God eternally creates through eternal thinking directed at Ideas that give the form to matter. And although in the work "De Providentia" the eternal creative thinking of God is not actually called His "energy", there are all the components that allow one to come to such an identification" (5, p. 98).

Given that, like Aristotle, Philo claims that eternal activity is not work, but peace, nevertheless, for Philo, Energy, in fact, belongs only to God. In addition, Philo does not restrict the God's activity to thinking that thinks about itself, but considers God as the activity in a personal aspect. At the same time, he clearly distinguishes between the divine essence, which man is not able to know and the fact of the existence of God through divine powers. Thus, Philo opposes the energy of divine powers and their unknowable ousia. Therefore, in the strict sense of the word, Philo cannot be called a Platonist. But, although Philo distinguishes between the divine essence and powers, and in this sense he pursues the same goal as the Church Fathers, but, nevertheless, the knowledge obtained through powers, for Philo, is the result of inferences. And this is far from what the Greek Fathers had in mind when they spoke about knowledge through divine "Energies".

So, Aristotle was the first to state that it is God who discovers Energy. "The difference is that Aristotle meant mainly "energy as reality, while Philo"-"energy" as activity" (5, p. 100). It is this approach that makes it possible to interpret "energy" as a way of knowing God.

The idea of divine activity can be traced further with the Middle Platonists Numenius and Alcinoy. But unlike them, it is the peripatetic of the early empire, Alexander Aphrodis, who expresses his views in terms of "energy" and thus places this concept at the center of philosophical reflection. While holding the post of professor of Aristotelian philosophy (198 - 209 A.D.), he could be exactly the one to whom Plotinus listened to. In any case, Alexander influenced on the Plotinus formation.

Of course, Plotinus is the founder of Neoplatonism, and thus Plato had the greatest influence on him. However, Plotinus's creative talent was not prevented by precisely the Aristotelian "energy" concept from using not at all in an Aristotelian sense. This concerns the theory of two acts in his famous Enneads. The problem posed by Plotinus concerned how the Mind comes from the One, if we consider that the One itself is perfect, and therefore does not need anything. Plotinus begins with the fact that perfection within oneself has the ability to create, to born. "But we can see that here, in the sublunary world, as soon as a Being reaches maturity and fullness of strength, it does not remain sterile, but gives birth and produces something else; and this is observed not only in Beings endowed with the ability of conscious will-determination, but also in things lacking this ability, even in soulless things, which also often spread the actions of their powers outside themselves, as, for example, fire warms other things, snow or ice - cool, medicinal herbs and juices also have this or that effect. In this case, all things, as it were, imitate, to the best of their ability, the First Principle, as if striving to manifest in themselves its eternity and goodness" (13, V.4.1.26 - 36). Plotinus speaks quite definitely about the Good's creative nature, but this was not the main challenge for Platonism. In middle Platonism, the first Good is the Divine Mind. Plotinus is trying to say that Mind cannot be the source of all things. If the Mind is identical to mental activity, then mental activity is determined by the contemplated object, which determines the very mental activity. That is why Mind, "nous", cannot in any way be the source of all things, but, on the contrary, its object must precede it in the order of existence" (5, p. 115). Therefore, in relation to the Divine Mind, this subject is the One.

And here the most important question arises: how can something come from the One if the One is perfect and unchanging? "Here we have to distinguish the energy of the essence from the energy that flows from the essence. The energy of essence does not differ from the essence to which it belongs, it is always this essence itself. But the energy emanating from the essence differs from it, as from its cause. Each thing possesses both one and the other energy. So, for example, in fire - one is that warmth that constitutes its essence, and quite another - that which spreads from it in all directions; this second energy is generated by the first precisely because it constitutes the very substance of fire and that it is in it that fire itself preserves its nature, that is, it remains like fire" (13, p. (V.4.2.27-39). Here Plotinus introduces two different modes of "energy"- internal and

external, which made up the theory of two actions. Here external action is a way of manifesting the internal structure of a thing. Like heat, which is a manifestation of fire, or cold, as a way of manifesting snow or incense, as a manifestation of a potion. That is, all essences perform external actions. That is, the One, like everything else, possesses both energeia tes ousias and energeia ek tes ousias. To say the true, later Plotinus tries to assert that the One is higher than essence (ousia). But then the question arises - how the One can have two types of energy in itself?

Nevertheless, it is important for Plotinus to explain the other - how the Mind comes from the One. "The mind, which is born from the One, is like the light emanating from it, while the source itself does not change at all from this and remains at rest. In the same way, other things, remaining motionless, produce from their own being outwardly different phenomena, which can be considered as images of the power that produces them, which is their prototype. So, for example, fire spreads around itself heat, ice and snow - cold; the best example can be various aromatic substances that spread around themselves the smell, felt by everyone who is nearby, and with which everything lying nearby is soaked (13, (V.1.6.31 - 48). Plotinus introduces the concept of hypostasis, prototypes, which ontologically, but hierarchically interconnected. Thus, the Soul refers to the Mind as an image to the prototype, where the inner "energy" of the Soul becomes the contemplation of the Mind. In turn, the inner "energy" of the Mind becomes the essence of the One. The One itself cannot be the inner generating energy. The One has only external action. Therefore, from the point of view of the theory of two actions, One is the exception to the rule.

It is interesting that this ontological hierarchy of internal and external "energies" does not apply to Matter for Matter is "absolute uncertainty", which means that it cannot have "Energy". The only reality of it is the passive perception of the form that is given by the Soul.

"Starting from the I century AD and in the following centuries, the term Energeia has taken a special place and interesting evolution. By the IV century, both Pagans and Christians comprehend their religious life as a way of participating in divine "Energy" (5, p. 169). Moreover, this applies in the sense of practical activity.

At the same time, religious authors start to interpret "energy" not as a characteristic of action, which is inherent in Hellenistic authors, but in the sense of the source of power "to which one can join". Initially, this interpretation does not arise from the depths of metaphysics, but at the mass level. But then through Iamblichus and Proclus it penetrates into the philosophical space.

The Jewish text of the II century AD "The Letter of Aristeus to Philocrates" is perhaps the first text where the action of divine "energy" affects not only the universe as a whole, but also a specific human soul.

From amongst the Christian authors, special attention should be paid to the Apostle Paul - the only New Testament author "who speaks about "Energy" and speaks quite often" (5, p. 170). Paul speaks of the cosmic level of divine "energy" (Eph 1: 19-20) through which God raised Christ from the dead. On personal level, divine "Energy" acts through each member of the Church, which is primarily the body of Christ. In another case, Paul says "It is no longer I who live, but Christ lives in me". Here the divine "energy" acts in a person transforming the whole person. On the other hand, God himself acts through man. In this case, the actions of God remain the own actions of man. So the divine "Energy" is also a person's own "Energy". Here, the concept of "Synergy", central in the future Orthodox ontology, arises - the interaction of God and man, as a result, even calling Jesus Lord is possible only through the assistance of the Spirit.

Then Paul takes another very important step, which in the Late antiquity epochwill become the cornerstone for both Christians and Pagans. The most important goal he defines the communion of divine "energies". Indeed, defining the meaning of spiritual life, Paul is very far from being theoretical, and therefore does not build metaphysical constructions in relation to the divine ousia.

Subsequent generations of Christian authors thought of the divine presence in the sense of the combination of divine and human "Energy". Nevertheless, they deliberately tried to limit the understanding of this term in the sense of miracles and prophecies and admitted that they could also occur under the influence of demons. For example, Shepherd of Hermas, written between 100 and 150 years, represents the features of human character as the energeiai of the angel of righteousness and the angel of depravity, which accompany every person" (5, p. 173). St. Justin Martyr, Athenagoras also speaks of the "energy" of demons. Clement of Alexandria in "Stromates" speaks of the energies of devil and unclean spirits, which are sown like seeds in the soul of sinner. Origen in the work Against Celsus speaks directly about attracting demonic "energy" with the help of magic. And in the essay "On the First Principles" Origen writes: "The human soul, while in body, can perceive different influences (energias), i.e. the impact of various spirits, evil and good" (17, p. 101).

The cautious attitude of Christian thinkers to Energy can be explained by the great attention of the Hermetic literature. According to Hermeticism, the cosmos is full of Gods and demons who act through "energy", which is, in fact, one energy. Hermeticism reinterprets Plato's language into Emanational and Pantheistic.

Porfiry (232-305) became the heir to Plotinus and the leader of Neoplatonism. But with regard to the theme of "Energy," his main works were either lost or used in Plotin's meanings. In the East, the leader of Neoplatonism became Iamblichus (c. 240 -325), whom Proclus called "divine" after Plato and Pythagoras. His treatise "On the Mysteries of the Egyptians" was aimed at defending the religious practices of late paganism. Iamblichus has developed a hierarchy of supernatural beings. A major distinction is made between Gods, who are good in their nature, and human souls, who are good in involvement. Between them are heroes, demigods, who are closer to human souls, but exceeding in strength and virtue, and demons, who are closer to the gods, but they are at the lowest level and are servants of the Gods. Describing theurgy, Iamblichus points to a number of ways to achieve participation in divine 'Energies', a kind of magic synthesis and self-knowledge of the true divine being in man is formed.

The followers of Iamblichus in the epoch of Julian (361 - 364), who tried to revive

paganism, had great success and popularity for the Neoplatonic School of Athens. This is especially true of Proclus (412 - 485) and his most famous work "The elements of Theology". In general, systematically and deductively presented Proclus's neoplatonism has its own peculiarity. And namely, within each "level" (Nature, Soul, Mind, One) Proclus places a certain generative principle, a monad, from which other members emanate and to which they return. That is, the Unity divides into a series of lesser unities – "genads". So if the Unity is the Good, then each "genad" is a particular mode, "particular goodness". But genada is not just a property, it is a kind of agent. And since "there is nothing further Beyond The One that toward which all things aspire" (14, p. 84), it can justly be called God. And since the genads have the same transcendental nature, it means they, in fact, also Gods. Thus, the goal of theoretical substantiation of the pantheism of pagan gods is achieved.

The detailed Proclus's hierarchy is formed on the inner striving to become a partaker of the divine "Energy", which returns, folds into the One, in which Proclus denies "Energy". However, this involvement demonstrates synergy between the One and the subordinate causes.

But here the question arises - how exactly can the lower undivine souls participate? It turns out that the soul can participate not substantively, but by the involvement of its cause. "The knowledge of the Gods available to him will not be in accordance with the nature of the lower, but corresponding to the exclusive superiority of the Gods beyond him. Therefore, the knowledge [by the Gods] of the plural and enduring is one in appearance and is free of enduring. Therefore, although the knowable is separate, nevertheless the divine knowledge of the separate is inseparable, and although it refers to the changeable, nevertheless it is unchangeable, and although it refers to the accidental, it is nevertheless necessary, and although it refers to the indefinite, nevertheless it is definite. For the divine perceives knowledge not from the lowest, otherwise knowledge would not be what is known by its nature. (14, p. 92-93).

This is a very important moment. For "for Plotinus, all the lower levels of being ascend to Mind, so that, surpassing Mind, you also surpass all other levels of being. In Proclus, Mind no longer occupies the privileged position of the intermediary between the One and other beings. Everything comes directly from the One, and therefore everything must be included in the process of returning to the One in order for the union to be completed in full" (5, p. 206).

Results. In the Middle Ages, most of the texts were unknown in the West. "It is not surprising that the magical papyri, hermetic writings and works of Iamblichus and Proclus were not translated; it is much more surprising that this also applies to the works of Justin Martyr, Athenagoras, Clement of Alexandria, Origen and Athanasius the Great (with the exception of Origen's "On the First Principles" and some exceptical treatises)" (5, p. 209]. It is with this that D. Bradshaw explains negative attitude of the Western European tradition to the theme of "Energy." The author draws attention to the fact that of all the texts that were analyzed only one, the New Testament, was beyond, which was translated by Jerome. But in it Energeia was translated as Operatio, and Energein - as

Operari. The specific nature of the Latin language did not allow perceiving operationes in the sense of active powers to which a person can join. But what is important is that operatio does not contribute to the association of "energy" with activity, and even more so to the merging of activity with reality. And therefore, when in XII - XIII centuries texts of Aristotle were translated, the term "Energy" in different contexts was conveyed by three different terms: operatio, actus and actualitas. With all variations, these terms did not lead to an awareness of the unity of the concept that underlies these terms.

This was the important reason why the idea of the involvement of divine "Energy" did not take root in the paradigm of Western European thought. In the culture of thinking of the Greek-speaking world, the term "Energy" acquired a metaphysical meaning. The interweaving of metaphysical and religious concepts in hermetic texts, as well as in Iamblichus and Proclus, took place in parallel with Christian authors. And in the IV century, during the period of Trinitarian Controversy, the concept of "Energy" takes a key place and meaning. But it determines the peculiarity of not only the Eastern Christian worldview. Energy ontology becomes the paradigm core of Post-classical modern thinking.

Conclusions. Thus, the Non-classical Energy ontology in the Christian era was formed as a completely independent philosophical paradigm, which was theologically assimilated by Eastern Christianity. And therefore it is quite logical to consider it not a product of Neoplatonism, but an independent discourse completely rooted in antiquity.

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MEDICINE AND PHYSIOLOGY

ANALYSIS OF OXIDATIVE STRESS MARKERS IN THE TREATMENT OF GENERALIZED PARODONTITIS WITH PLASMOGEL AND HYALURONIC ACID IN EXPERIMENT

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Annotation. The search and improvement of the treatment methods of generalized parodontitis today is by far one of the most pressing problems of dentistry. To assess the dynamics of changes in biochemical markers of oxidative stress and antioxidant-prooxidant index in the combined treatment of parodontitis with plasma gel from platelet autoplasma and a preparation with hyaluronic acid – «Hyadent BG» in the experiment in rats. For the experiment, 50 white Wistar rats of herd breeding, of both sexes, were used, the age of the animals was 2.5-3 months, and the weight was 250-300 g.

The first group served as a control to assess the healthy parameters of animals. All animals of the remaining 4 groups were modeled with parodontitis using a ligature model, by imposing a ligature on the incisor of the upper jaw in the gingival groove for 14 days. After 14 days, all animals were removed from the ligatures and treated. In the second group, after removing the ligatures, the gums were treated with a gauze swab moistened with 0.9% NaCl solution, 2 times with an interval of 7 days. In the third group, treatment was carried out by applying plasmogel from platelet autoplasm to the gums, 2 times with an interval of 7 days. In the form of 0.2 g applications, 2 times with an interval of 7 days. In the fifth group, after removal of the ligatures, treatment was performed using a combination of a plasmogel from platelet autoplasma and a preparation with hyaluronic acid.

The most pronounced antioxidant-prooxidant effect was obtained with the combined use of a plasmogel from platelet autoplasma and a preparation with hyaluronic acid – «Hyadent BG», which is indicated by a significant increase in the API.

Key words: generalized parodontitis, plasmogel, hyaluronic acid, catalase, malondialdehyde, antioxidant-prooxidant index.

Generalized parodontitis is a serious public health problem that leads to tooth loss, which affects patients of different age groups, as well as different regions of residence. According to statistics, it ranks second in the world among dental diseases.

The search and improvement of the treatment methods of generalized parodontitis today is by far one of the most pressing problems of dentistry. [1]. Existing methods of treatment are mainly focused on biofilm control. However, the search for new conservative methods aimed at relieving inflammation in tissues and maintaining metabolic balance in the parodontium continues. [2].

Purpose of the study. To assess the dynamics of changes in biochemical markers of oxidative stress and antioxidant-prooxidant index in the combined treatment of parodontitis with plasma gel from platelet autoplasma and a preparation with hyaluronic acid – «Hyadent BG» in the experiment in rats.

Materials and methods. For the experiment, 50 white Wistar rats of herd breeding, of both sexes, were used, the age of the animals was 2.5-3 months, and the weight was 250-300 g. All animals were kept on a standard vivarium diet. The animals were divided into 5 groups of 10 animals each.

The first group (n = 10, 5 males and 5 females) served as a control for evaluating the health parameters of animals.

All animals of the remaining 4 groups were modeled with parodontitis using a ligature model, by applying a ligature to the incisor of the upper jaw in the gingival sulcus for 14 days. After 14 days, all animals ligatures was removed and then treatment was carried out [3].

In the second group (n = 10, 5 males and 5 females), after removing the ligatures, the gums were treated with a gauze swab moistened with 0.9 % NaCl solution, 2 times with an interval of 7 days.

In the third group (n = 10, 5 males and 5 females), treatment was carried out by applying plasmogel from platelet autoplasma to the gums, 2 times with an interval of 7 days. Plasmogel was obtained according to the following scheme: blood was taken from each rat from the tail vein in an amount of 2 ml. Blood was collected in a test tube with 0.2 ml of heparin solution, centrifuged at a speed of 1000 rpm for 5 minutes. The obtained plasma fraction from the test tube was taken with a syringe, which was placed in a TDB-120 thermostat for the preparation of a plasmogel, at a temperature of + 80° C for 7 minutes. Cooled at room temperature for 10 minutes and applied to the area of pathologically altered tissues. Closed with a Reso-Pac parodontal bandage for 6 hours until the parodontal bandage self-absorbed.

In the fourth group (n = 10,5 males and 5 females), a preparation of hyaluronic acid (HA) was applied to the gums for therapeutic purposes in the form of 0.2 g applications, 2 times with an interval of 7 days. The used preparation "Hyadent BG" is a viscoelastic gel based on HA. It contains: hyaluronic acid - 2 mg, cross-linked hyaluronic acid - 16 mg, sodium chloride - 6.9 mg and water for injection up to 1.0 mg. Manufacturer: BioScience GmbH, Germany. Certificate of Conformity No. UA.TR.039.343, date of issue - 18.04.2018

In the fifth group (n = 10, 5 males and 5 females), after removal of the ligatures, treatment was carried out using a combination of a plasma gel from platelet autoplasma and a preparation with hyaluronic acid. From the beginning, plasmogel was used according to the method described in the third group of animals, and one day after the plasmogel, the preparation of HA was used in the form of applications as described in the fourth group of animals. The intervals between injections of both drugs were 7 days.

To study the dynamics of markers of oxidative stress and antioxidant-prooxidant index after the combined method of treatment with plasmogel and a drug with HA,

experimental animals were withdrawn from the experiment in 2 terms. Rats of 1a, 2a, 3a, 4a and 5a subgroups were withdrawn from the experiment the next day after the second injection. Rats of 1b, 2b, 3b, 4b and 5b subgroups were euthanized 3 weeks after the second injection.

The animals were taken out of the experiment under thiopental anesthesia (20 mg/kg) and biopsies of the gums were taken for further biochemical studies.

The level of inflammation markers was determined by biochemical methods in the supernatant fluid of gingival homogenates [4]: malondialdehyde content (MDA), catalase activity [4]. The antioxidant-prooxidant index (API) was calculated from the ratio of catalase activity and MDA content [4].

The results were processed by variational statistical methods of analysis on an IBM PC in SPSS SigmaStat 3.0 and StatSoft Statistica 6.0. [5]

Results and discussion. The results of biochemical studies of rat gingival homogenates are presented in tables 1, 2 and 3.

Now MDA is considered as a signal of the presence of processes associated with the occurrence of oxidative stress situations in tissues.

Catalase is an enzyme that provides the decomposition of hydrogen peroxide into water and molecular oxygen, and in that, its antioxidant properties are.

Table 1 shows the results of MDA content in rat gingival homogenates after treatment with plasmogel, HA and a complex of drugs.

The data obtained show a significant increase in the MDA content in the group with a pathology model without treatment - in the first period in females $8.94 \pm 0.22 \text{ mmol} / \text{L}$ and $9.0 \pm 0.28 \text{ mmol} / \text{L}$ in males, in the second period the indicator increased $9.1 \pm 0.30 \text{ mmol} / \text{L}$ in females and $9.5 \pm 0.26 \text{ mmol} / \text{L}$ in males. This is 2 times higher than the normal values (first group) $4.45 \pm 0.32 \text{ mmol} / \text{L}$ in females, $4.96 \pm 0.26 \text{ mmol} / \text{L}$ in males in the first term and $4.21 \pm 0.28 \text{ mmol} / \text{L}$ in females and $4.60 \pm 0.21 \text{ mmol} / 1$ in males in the second term.

In the third group, we see a significant decrease in the MDA content in males by $6.28 \pm 0.32 \text{ mmol} / \text{L}$ in the first term and $5.32 \pm 0.34 \text{ mmol} / \text{L}$ in the second term. In females, $6.04 \pm 0.26 \text{ mmol} / 1$ in the first period and $5.10 \pm 0.30 \text{ mmol} / 1$ in the second period.

In the group where HA was used for treatment, the indices also decreased in females $7.0 \pm 0.28 \text{ mmol} / 1$ in the first term and $6.05 \pm 0.32 \text{ mmol} / 1$ in the second term and in males $7.2 \pm 0.31 \text{ mmol} / 1$ in the first term and $6.24 \pm 0.28 \text{ mmol} / 1$ in the second term.

In the fifth group, the MDA values significantly decreased. The indices in females in the first term were $5.20 \pm 0.22 \text{ mmol} / 1$, and in the second term, $4.60 \pm 0.20 \text{ mmol} / 1$. In males in the 1st term, $5.52 \pm 0.18 \text{ mmol} / 1$, in the second term, $5.0 \pm 0.28 \text{ mmol} / 1$. The obtained indicators suggest that a decrease in oxidative stress occurs in the parodontal tissues.

Table 1

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Indicators	Conton	MDA content, mmol / kg		
Groups	Gender	1 term	2 term	
Group 1	female	4,45±0,32	4,21±0,28	
(control)	male	4,96±0,26	4,60±0,21	
Group 2 Model (control	female	8,94±0,22 p< 0,001	9,1±0,30 p< 0,001 $p_4^> 0,7$	
	male	9,0±0,28 p< 0,001	9,5±0,26 p< 0,001 p ₄ > 0,5	
Group 3 Model + plasmogel	female	6,04±0,26 p< 0,001 p ₁ < 0,001	$5,10\pm0,30 \\ p<0,05 \\ p_1<0,001 \\ p_4<0,05$	
	male	$\begin{array}{c} 6,28{\pm}0,32\\ p{<}0,001\\ p_1{<}0,001 \end{array}$	$5,32\pm0,34 \\ p>0,1 \\ p_1 < 0,001 \\ p_4 < 0,05$	
Group 4 Model + HA	female	7,0±0,28 p<0,001 $p_1 < 0,001$ $p_2 < 0,02$	$\begin{array}{c} 6,05{\pm}0,32\\ p{<}0,001\\ p_1{<}0,001\\ p_2{>}0,1\\ p_4{<}0,02 \end{array}$	
	male	7,2±0,31 p< 0,001 $p_1 < 0,001$ $p_2 < 0,05$	$\begin{array}{c} 6,24{\pm}0,28\\ p{<}0,001\\ p_1{<}0,001\\ p_2{<}0,05\\ p_4{<}0,05\\ \end{array}$	
Group 5 Model + (plasmogel + HA)	female	5,20 \pm 0,22 p> 0,5 p ₁ < 0,001 p ₂ < 0,05 p ₃ < 0,02	$\begin{array}{c} 4,60{\pm}0,20\\ p{>}0,25\\ p_1{<}0,001\\ p_2{>}0,2\\ p_3{<}0,002\\ p_4{>}0,1 \end{array}$	
	male	$\begin{array}{c} 5,52{\pm}0,18\\ p{>}~0,5\\ p_1{<}~0,001\\ p_2{<}~0,05\\ p_3{<}~0,02 \end{array}$	$5,0\pm0,28p>0,3p_1<0,001p_2>0,6p_3<0,002p_>0,1$	

Effect of plasmogel and hyaluronic acid preparation «Hyadent BG» on MDA content in rat gingival homogenates (M±m), (n=5)

Note: p – reliability index of differences from the group 1 (control); p_1 – reliability index of differences from the group 2; p_2 – reliability index of differences from the group 3; p_3 – reliability index of differences between terms 1 and 2.

Table 2

Effect of plasmogel and hyaluronic acid preparation «Hyadent BG» on catalase activity in rat gingival homogenates (M±m), (n=5)

Indicators	Gandar	Catalase activity, µat / kg		
Groups	Gender	1 term	2 term	
Group 1	female	9,0±0,30	9,15±0,42	
(control)	male	8,74±0,28	8,85±0,36	
Group 2 Model (control	female	5,16±0,34 p< 0,001	$5,0\pm0,24$ p< 0,001 p ₄ > 0,7	
	male	5,42±0,28 p< 0,001	$\begin{array}{c} 4,90{\pm}0,22\\ p{<}0,001\\ p_4{>}0,2 \end{array}$	
Group 3 Model + plasmogel	female	$\begin{array}{c} 6,82{\pm}0,2\\ p{<}0,001\\ p_{1}{<}0,002 \end{array}$	$\begin{array}{c} 7,40{\pm}0,34\\ p{<}0,002\\ p_{_{1}}{<}0,001\\ p_{_{4}}{>}0,25 \end{array}$	
	male	$6,40\pm0,32$ p< 0,001 p ₁ < 0,02	$7,0\pm0,36 \\ p<0,002 \\ p_1<0,001 \\ p_4>0,2$	
Group 4 Model + HA	female	$\begin{array}{c} 6,23{\pm}0,20\\ p{<}0,001\\ p_{1}{<}0,002\\ p_{2}{>}0,1 \end{array}$	$\begin{array}{c} 7,20{\pm}0,42\\ p{<}0,002\\ p_{1}{<}0,001\\ p_{2}{>}0,7\\ p_{4}{<}0,05 \end{array}$	
	male	$\begin{array}{c} 6,15\pm 0,32\\ p<0,001\\ p_1>0,1\\ p_2>0,3 \end{array}$	$\begin{array}{c} 7,12{\pm}0,40\\ p{<}0,002\\ p_{1}{<}0,001\\ p_{2}{>}0,7\\ p_{4}{<}0,05 \end{array}$	
Group 5 Model + (plasmogel + HA)	female	$\begin{array}{c} 8,10{\pm}0,24\\ p{<}0,01\\ p_1{<}0,001\\ p_2{<}0,002\\ p_3{<}0,001 \end{array}$	$\begin{array}{c} 8,96{\pm}0,18\\ p{>}0,6\\ p_1{<}0,001\\ p_2{<}0,002\\ p_3{<}0,01\\ p_4{<}0,01\\ \end{array}$	
	male	$\begin{array}{c} 7,80{\pm}0,21\\ p{<}0,02\\ p_{1}{<}0,001\\ p_{2}{<}0,002\\ p_{3}{<}0,001 \end{array}$	$\begin{array}{c} 8,36{\pm}0,34\\ p{>}0,2\\ p_1{<}0,001\\ p_2{<}0,05\\ p_3{<}0,05\\ p_4{<}0,02\\ \end{array}$	

Note: p – reliability index of differences from the group 1 (control); p_1 – reliability index of differences from the group 2; p_2 – reliability index of differences from the group 3; p_3 – reliability index of differences between terms 1 and 2.

Table 3

Indicators	Conton	Catalase activity, µat / kg		
Groups	Gender	1 term	2 term	
Group 1	female	20,22±0,56	21,73±0,62	
(control)	male	17,62±0,64	19,23±0,58	
Group 2 Model (control	female	5,77±0,32 p< 0,001	5,49±0,30 p< 0,001 p4> 0,1	
	male	6,02±0,44 p< 0,001	$5,15\pm0,28 \\ p<0,001 \\ p4>0,2$	
Group 3 Model + plasmogel	female	$\begin{array}{c} 11,29{\pm}0,38\\ p{<}0,001\\ p_{1}{<}0,001 \end{array}$	$\begin{array}{c} 14,50{\pm}0,40\\ p{<}\ 0,001\\ p_{_{1}}{<}\ 0,001\\ p_{_{4}}{<}\ 0,001\\ \end{array}$	
	male	$\begin{array}{c} 10,19{\pm}0,46\\ p{<}0,001\\ p_{1}{<}0,001 \end{array}$	$\begin{array}{c} 13,15{\pm}0,41\\ p{<}0,001\\ p_{_{1}}{<}0,001\\ p_{_{4}}{<}0,001\\ \end{array}$	
Group 4 Model + HA	female	$\begin{array}{c} 8,90{\pm}0,52\\ p{<}0,001\\ p_{1}{<}0,001\\ p_{2}{<}0,002 \end{array}$	$\begin{array}{c} 11,90{\pm}0,38\\ p{<}0,001\\ p_{1}{<}0,001\\ p_{2}{<}0,001\\ p_{4}{<}0,001\\ \end{array}$	
	male	$\begin{array}{c} 8,54{\pm}0,34\\ p{<}0,001\\ p_{_1}{<}0,001\\ p_{_2}{<}0,002 \end{array}$	$\begin{array}{c} 11,41{\pm}0,36\\ p{<}0,001\\ p_{1}{<}0,001\\ p_{2}{<}0,001\\ p_{4}{<}0,001\\ \end{array}$	
Group 5 Model + (plasmogel + HA)	female	$\begin{array}{c} 15,\!57{\pm}0,\!56\\ p{<}0,\!001\\ p_1{<}0,\!001\\ p_2{<}0,\!001\\ p_3{<}0,\!001\\ \end{array}$	$\begin{array}{c} 19,47{\pm}0,47\\ p{<}0,002\\ p_{1}{<}0,001\\ p_{2}{<}0,001\\ p_{3}{<}0,001\\ p_{4}{<}0,001\\ \end{array}$	
	male	$\begin{array}{c} 14,13{\pm}0,61\\ p{<}0,001\\ p_{1}{<}0,001\\ p_{2}{<}0,001\\ p_{3}{<}0,001 \end{array}$	$\begin{array}{c} \hline 16,72\pm0,44\\ p<0,002\\ p_1<0,001\\ p_2<0,001\\ p_3<0,001\\ p_4<0,002\\ \end{array}$	

Effect of plasmogel and hyaluronic acid preparation «Hyadent BG» on the dynamics of the API index in rat gingival homogenates (M±m), (n=5)

Note: p – reliability index of differences from the group 1 (control); p_1 – reliability index of differences from the group 2; p_2 – reliability index of differences from the group 3; p_3 – reliability index of differences between terms 1 and 2.

Table 2 presents the results of a study of catalase activity in homogenates of the gums of rats treated with plasmogel, a gel with HA and a complex of these drugs for the treatment of parodontitis.

In the second group, catalase activity was sharply reduced both in the first term in females $5.16 \pm 0.34 \mu at / 1$ and in males $-5.42 \pm 0.28 \mu at / 1$, and in the second term in females $5.0 \pm 0.24 \mu at / 1$ and in males $-4.90 \pm 0.22 \mu at / 1$.

In the third group, the indicator of catalase activity also increased in the first term, in females $6.82 \pm 0.2 \mu at / 1$ and in males $-6.40 \pm 0.32 \mu at / 1$, and in the second, in females $-7.40 \pm 0.34 \mu at / 1$, in males $-7.0 \pm 0.36 \mu at / 1$.

In group 4, the activity of catalase, as in the third group, increased and was $6.23 \pm 0.20 \mu at / 1$ in females in the first term, $6.15 \pm 0.32 \mu at / 1$ in males, and in the second term in females $-7.20 \pm 0.42 \mu at / 1$ and in males $-7.12 \pm 0.40 \mu at / 1$.

In the fifth group of the studied animals, the catalase activity significantly increased in the first and second terms. Moreover, when compared with the indicators of group 1, in the second period it reached the values of the norm. In females in the first group, in the first term $9.0 \pm 0.30 \mu at / 1$, in males $-8.74 \pm 0.28 \mu at / 1$, in the second term in females $-9.15 \pm 0.42 \mu at / 1$, in males $-8.85 \pm 0.36 \mu at / 1$. In the fifth group, in females $-8.10 \pm 0.24 \mu at / 1$, in males $-7.80 \pm 0.21 \mu at / 1$ in the first term and in the second term the indicators increased even more and amounted to $8.96 \pm 0.18 \mu at / 1$, in males $-8.36 \pm 0.34 \mu at / 1$.

When assessing the API index in the group with the parodontitis model, the indicators in females in the first term were 5.77 ± 0.32 in the second, 5.49 ± 0.30 , in males 6.02 ± 0.44 in the first term and 5.15 ± 0.28 in the second term.

In the group where treatment was carried out with plasmogel, the API index increased, in females in the first term 11.29 ± 0.38 , in the second term 14.50 ± 0.40 , and in males 10.19 ± 0.46 in the first term and 13.15 ± 0.41 in the second term.

In the group where the drug was used for treatment with HA, the indicators also increased, in the first term in females -8.90 ± 0.52 , in males -8.54 ± 0.34 , in the second term, in females -11.90 ± 0.38 , in males -11.41 ± 0.36 . Which is significantly less compared to the third group.

In the group with combined treatment with plasmogel and HA, indicators of a significant increase in the API were obtained. Therefore, in the first period in females the indicator was 15.57 ± 0.56 , in males 14.13 ± 0.61 . In the second term, the API index in females practically corresponded to those in the group of intact animals 19.47 ± 0.47 , in males it was lower than in females 16.72 ± 0.44 .

There were no significant differences between the groups of males and females according to the results of the study, but there was a tendency towards a more rapid restoration of the antioxidant-prooxidant balance in females as compared with males.

Conclusions. Inflammation and oxidative stress play an important role in the development of generalized parodontitis. Inflammation may be a link between antioxidant-prooxidant disorders, as indicated by a sharp increase in the content of MDA $p \le 0.001$ in modeling of parodontitis and a decrease in catalase activity $p \le 0.001$.

The most pronounced antioxidant-prooxidant effect was obtained with the combined

use of a plasmogel from platelet autoplasma and a preparation with hyaluronic acid – «Hyadent BG», this is indicated by a significant increase in the API.

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PREDICTION OF STRENGTH AND DURABILITY OF THE FEMORAL COMPONENTS OF THE ORTEN ENDOPROSTHESIS BASIC SYSTEM USING THE FINITE ELEMENT METHOD

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Annotation. This article addresses the issue of longevity of the femoral components of the ORTEN endoprosthesis basic system. In the process of computer modeling using the finite element method, the localization of the alleged destruction was revealed, the relationships between the load that occurs during operation and the estimated life of the endoprosthesis were established. To create the boundary conditions and loading conditions of the mechanical system, the international standard ISO7206-4 was used [1].

Key words: total hip replacement, endoprosthesis, femoral component, stress-strain state, finite-element analysis.

Introduction. Over an estimated 800,000 total hip replacements are being performed worldwide annually [2]. Fracture of femoral prostheses in total hip replacement is a relatively rare but challenging complication in total hip arthroplasty [2-5]. According to Swedish registry data [2] and retrospective data in the USA [2] the percentages of revision total hip surgeries done for implant fracture were 1.5 and 1%, respectively. Reports in the literature have identified multiple risk factors for prosthetic stem fracture, including increasing patient weight, higher levels of activity, relatively younger age, male gender, valgus stem positioning, and relatively undersized stem relative to the patient's anatomy [3–7]. Fatigue behavior of hip joint prostheses represents a crucial aspect to be investigated before introducing the devices on the market. Moreover, the potential for maintaining better bone stock provides the primary rationale and sparked the initial interest in exploring materials for hip prosthesis applications [4-6]. Hip prostheses have been evaluated by experimental testing, finite element (FE) analysis, and animal trials [5-7]. Being mechanical fatigue tests destructive, simulation of loading conditions by means of proper computational modeling seems to be extremely attractive: the implementation of static analyses under varied conditions may thus help to identify the most critical configurations to focus the mechanical tests on.

Research purpose. Determination of the value of critical loads affecting the longevity of various types of femoral components of the ORTEN endoprosthesis basic system. The main objective of these studies is to determine the results of calculations of the stems

for fatigue. The finite element analysis of the hip stems was performed with the aim of mathematically calculating the stresses arising in the volume of the material of the femoral component. The ISO 7206-4 standard was adopted as the basis for creating boundary conditions and loading conditions for the mechanical endoprosthesis-cement system.

Research methodology. Several specific examples of the application of mathematical modeling are given for the following types of femoral components:



Fig. 1. a) The femoral component of the ORTEN endoprosthesis basic system with an ordinary stem; b) The revision femoral component of the ORTEN endoprosthesis basic system with a conical stem; c) The femoral component of the ORTEN endoprosthesis basic system with a conical stem for a cement insertion; d) The dysplastic femoral component of the ORTEN endoprosthesis basic system.

According to ISO 7206-4 [6], the distal part of the stem of the endoprosthesis is placed in the implantation medium at a certain depth "D" depending on the size of "ST" which characterizes the distance between the center of the head of the endoprosthesis "C" and the most distal point of the stem "T". The main axis of the leg is tilted by an angle α in the medial-lateral direction and by an angle β in the anterior-posterior direction (Fig. 2).



Fig. 2. The location of the sample during testing P is the load application point; C is the center of the head; D is the level of immersion; T is the most distant point of the stem; α, β are the tilt angles of the stems in the respective planes.

Table 1.

ST, mm	D, mm	Angle α	Angle β
Till 200	0.4xST	10°	9∘
C plus 200	ST minus 100	0	4

Parameters for the introduction of the test sample

Using a cyclic load, an axial load is applied to the head of the test specimen until the specimen is destroyed or a certain number of cycles have been worked out. The magnitude of this load varied during the fatigue calculation, to determine the working range of loads using prosthetic implants.

The materials used as initial data for finite element modeling were set isotropic with the following properties:

Table 2

	Elastic modulus (E) (MPa)	Poisson's ratio v	Tensil strength (σв), MPa	Yield strength (σ0,2), MPa
Steel 316L	210000	0.3	520	220
Titanium BT6	115000	0.32	1050	800
Titanium BT1-0	112000	0.32	550	450
Implementation environment [6]	3000	0.33	-	-

Material properties

Results. The stress-strain state of the stem is formed by a combination of bending moment in the frontal plane and compression force in the axial direction. On the lateral side of the stem (and neck of the cone) tensile stresses are formed, and on the medial side, compressive stresses are formed.

The maximum stresses in the implant are localized on the medial side in the contact zone of the diaphyseal part of the endoprosthesis stem and seal (fig. 3 - b). This is due to the fact that in the considered design there is a contact of bodies with significantly different material properties (termination – leg of the endoprosthesis). This leads to a significant concentration of stresses in local zones.

The results of various experiments confirm the presence of the most probable destruction in these zones [7].



Fig.3. Typical sites of destruction of the stems: a - the contact area of the endoprosthesis head with the neck; b - the contact area of the seal with the bottom of the stem

For fatigue calculation, we used the maximum values of stresses in the endoprosthesis localize in the "seal – stem" region.



Fig. 4. The geometric model of the installation of a standard stem of the 1 standard size for testing according to ISO 7206-4



Fig. 5. Geometric models of standard stems of size 1-5 for testing according to ISO 7206-4



Fig. 6. Dependence of the service life on the weight of a person for ORTEN standard stems of 1-5 standard sizes as a result of durability tests according to ISO 7206-4



Fig. 7. Dependence of the service life on the weight of a person for ORTEN standard stems of 1-5 standard sizes as a result of durability tests according to ISO 7206-4



Fig. 8. The geometric model of the installation of the revision conical stem of 1 standard size for testing according to ISO 7206-4



Fig. 10. The dependence of the service life on the weight of a person for ORTEN conical stems of 1-5 sizes as a result of durability tests according to ISO 7206-4



Fig. 11. Dependence of the service life on the weight of a person for ORTEN conical stems of size 1-5 as a result of durability tests according to ISO 7206-4


Fig. 12. The geometric model of the insertion of a cement conical stem of 1 standard size for testing in accordance with ISO 7206-4



Fig. 13. Geometric models of cement stems of 1-5 sizes for testing according to ISO 7206-4



Fig. 14. The dependence of the service life on the weight of a person for ORTEN cement stems of 1-5 sizes as a result of durability tests according to ISO 7206-4



Fig. 15. The dependence of the service life on the weight of a person for ORTEN cement stems of 1-5 standard sizes as a result of durability tests according to ISO 7206-4



Fig. 16. Dependence of the service life on the weight of a person for ORTEN cement stems of 1-5 sizes made of steel alloy (316L) as a result of durability tests according to ISO 7206-4



Fig. 17. The geometric model of the installation of a dysplastic stem of 1 standard size for testing in accordance with ISO 7206-4



Fig. 18. Geometric models of dysplastic stems of 1-5 sizes for testing according to ISO 7206-4



Fig. 19. The dependence of the service life on the weight of a person for ORTEN dysplastic stems of 1-5 sizes made of titanium alloy (BT 1-0) as a result of durability tests according to ISO 7206-4.



Fig. 20. The dependence of the service life on the weight of a person for ORTEN dysplastic stems of 1-5 sizes made of titanium alloy (BT 6) as a result of durability tests according to ISO 7206-4

Discussion. Research has shown that appropriate stem design, insertion technique and good initial stability seem to be the crucial aspects for achieving longevity of the hip stem [12]. Various studies about femoral stem fractures after THA have previously been reported, and multiple risk factors for such fractures have been reported. The risk factors for femoral stem fractures are divided into three categories. The first category involves patient-associated risk factors, such as obesity, high activity level, and adjacent osteoarthritis [5-12, 15]. The second category of risk factors involves the surgical technique, for example, using an undersized stem or a long neck [2–6]. Malposition of the implant, use of an outdated poor cementing technique, or performing extended trochanteric osteotomy were also reported as risk factors for stem fracture [5-6]. The third category of risk factors involves the implants themselves. Regarding fracture of the femoral stem, many articles have reported negative results when using modular type stems [10-12.] A thinner stem (neck and body) can cause stress concentration. A size of 9-10 mm taper trunnion may be too thin for obese individuals. The stem production method is also considered a risk factor. Laser etching at the neck or neck-shoulder junction of the stem causes stress risers, which may lead to a fatigue fracture [8-10, 13-15].

Several experiments have been performed to simulate the responses of the materials in hip prosthesis systems, including the effects of creep, moisture, impact, and fatigue loading [4,6,13–21]. Results of experimental and modeling studies lighted up stress shielding among metallic (titanium, cobalt-chromium) prostheses [6,8,15]. 316 L stainless steel stems were associated with high incidence of stem fractures, and expenimental studies on the fatigue strength of this alloy have indicated a direct relationship to grain size [11]. Animal models of total hip replacement have shown that cortical bone loss is reduced following the use of reduced stiffness stems [10]. Another important aspect of femoral component's survivorship is matching of stem design to the patient's femoral canal anatomy. Sotereanos et al. [12] suggest that a primary reason for femoral component failure in primary THA is inadequate stem diameter due to undersizing. Prior reports of non-modular revision stem failures most commonly describe fractures through stems with small diameters ranging from 12 to 14 mm [14] Busch et al. [14] recommended avoiding stems with diameters less than 13.5 mm. The most common cause of stem failure is considered to be loss of support by cement and bone in the proximal third, with the stem subject to cantilever forces that fatigue the metal. These cantilever forces are considered to be increased in varus position of the stem. The antero-lateral side of the stem is considered to be site with maximum tensile stress and thus most of the times the fracture line initiates on the antero-lateral surface of the stem. The transfer of load more proximally in the femur as provided by femoral component designs with low flexural stiffness will inherently lead to more challenging problems related to femoral component fixation and wear debris generation compared to higher stiffness stems. Obviously, these issues are extremely important and must be satisfactorily resolved before any low stiffness femoral component designs for hip joint replacement are considered. Another aspect, which has not been addressed adequately, is the strength and durability of prosthesis stems in hip replacement applications. Research

has pointed out that higher strains are generated inside the flexible implants compared with those inside stiffer devices at equal loads. Implants that are more flexible thus require superior fatigue properties to avoid stem fatigue fractures [15].

So the results conducted in current research are reaffirmed by numerous previous investigations.

Conclusions. The use of FEM allows one to evaluate in advance the mechanical behavior of the components and reduce the likelihood of an unsuccessful outcome of fatigue tests, as well as prevent postoperative complications caused by a fracture of the femoral stem.

Particular attention was paid to the nature of changes in stress fields in the contact zones of various materials on free surfaces. The highest stress concentration was found in the contact area of the termination with the distal part of the femoral stem. Observations [7] confirm the presence of the most probable destruction in this zone.

In the course of the studies, threshold loads for the installation of various types and numbers of femoral stems were identified. Subject to these recommendations on the amount of loading, a sufficient margin of strength and durability of these structures is provided.

It is worth paying attention to the fact that the results obtained above are a consequence of calculating of the femoral stems in the worst case of installation in the medullary canal of the femur (ISO7206-4). In fact, the stem can have significantly better conditions for installation, and, therefore, will have a longer service life.

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CLINICAL AND PATHOGENETIC FEATURES OF THE CHRONIC PANCREATITIS COURSE IN COMBINATION WITH ARTERIAL HYPERTENSION (LITERATURE REVIEW)

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Annotation. Epidemiological indicators of the chronic pancreatitis morbidity in Ukraine are worse than in Europe, and the morbidity and prevalence continue to rise at that. The early complications (purulent-septic ones, bleeding from ulcers of the gastroduodenal zone, thrombosis in the portal vein system, stenosis of the common bile duct, etc.) are developing in patients with chronic pancreatitis in 30% of cases, herewith a mortality makes up to 6%. In addition, the situation is complicated by the frequent combination of chronic pancreatitis not only with diseases of the digestive system, but also the cardiovascular system disorders, especially arterial hypertension. That's why the determination of the pathogenetic components of chronic pancreatitis against the background of arterial hypertension is an urgent problem, and its solution will allow to optimize the pharmacotherapeutic profile of the patients' treatment.

Key words: chronic pancreatitis, arterial hypertension, pathogenesis, comorbidity.

The high urgency of the problem of chronic pancreatitis (CP) is due to the constant increase in the prevalence of the disease over the past decades [1, 2, 3]. This situation is primarily due to the preservation of the importance of the main etiological factors of CP, such as alcohol abuse, frequent detection of gallbladder and duodenal diseases, etc. [4, 5].

According to modern concepts, the chronic pancreatitis is a progressive inflammatory disease characterized by focal and degenerative changes of acinar tissue and ductal system with the development of functional organ failure accompanied by microcirculatory disorders, inflammatory process and fibrosis, to a greater or lesser extent. Morphological changes of pancreas tissue are stable ones, persists and progresses even after cessation of etiological factors and lead to exocrine and endocrine insufficiency [6]. So, with all etiological forms of pancreatitis, a syndrome of exocrine pancreatic insufficiency is developed over time which is caused by a mass decrease of the functioning exocrine parenchyma as a result of its atrophy and fibrosis, or the outflow violation of pancreatic secretion into the duodenum due to the blockage of the pancreas excretory ducts by a concrement, glandular tumor and a viscous secret [7].

The prevalence of CP in Europe is 25-26.4 cases per 100 thousand adults. Twofold rise of acute and CP patients in the world are demonstrated over the last 30 years, and primary disability of such patients reaches 15% [8]. In Ukraine epidemiological indicators of CP morbidity are worse than in Europe, and the morbidity and prevalence

continue to rise. The morbidity rate of pancreatic pathology in Ukraine was 226 cases per 100 thousand of population, the prevalence was 2471 per 100 thousand of population. Patients with CP make up 25% of all those who go to outpatient clinics in Ukraine, and in specialized gastroenterological hospitals, these patients occupy 9-12% of hospital beds [9]. This trend is due firstly to an increase in alcohol consumption and, accordingly, the increase in the number of patients with alcoholic CP; secondly, an irrational unbalanced diet and, as a result a high frequency of cholelithiasis.

The early complications (purulent-septic ones, bleeding from ulcers of the gastroduodenal zone, thrombosis in the portal vein system, the common bile duct (CBD) stenosis, etc.) are developing in patients with chronic pancreatitis in 30% of cases, herewith a mortality makes up to 6% [10]. With the further CP development, especially with ineffective treatment the functional pancreatic insufficiency progresses, and abdominal ischemic syndrome develops.

In addition, the situation is complicated by the frequent combination of CP not only with diseases of the digestive organs but also cardiovascular diseases. Among the latter ones, arterial hypertension (AH) is known to be occupied one of the leading positions in the structure of the able-bodied people diseases as a cause of disqualification, disability and mortality.

AH is the world's top prevalence among non-communicable diseases. AH has been diagnosed in 32.2% of the adult population in Ukraine and the AH prevalence value in the urban population is 29.6% for both men and women. The presence of AH increases the risk of total mortality by 4.5 times in men and 2.0 times in women.

The combination of AH and CP is not only widespread, but also pathogenetically justified and unfavourable case. This is primarily due to systemic lesion of the vascular bed which leads to ischemic effects of diseases and activation of the inflammatory component in endothelial dysfunction, as well as to metabolic components damage.

At the same time, it should be recognized that the peculiarities of clinical and pathogenetic CP manifestations in its combination with AH have been insufficiently studied. It is necessary to continue the researches aimed at studying of various features and estimation of quality of life of CP patients in combination with AH. It is necessary to perform a detailed study of the metabolic changes nature, first of all the state of lipid and carbohydrate metabolism in CP patients within the framework of this comorbid pathology type.

It has been stated that the main links of CP pathogenesis are associated with obstruction of the pancreas secretion efflux pathways, increase of intra duodenal pressure, activation of pancreatic enzymes in the ducts and gland parenchyma, microcirculation disorder, as a result the ischemia, edema, violation of cell membrane permeability, destruction of acinar cells are developed [11, 12]. Herewith the pancreatic enzymes and other biologically active substances, particularly vasoactive amines enter the systemic bloodstream which leads to microcirculation disorders outside the gland and causes damage to other organs and systems. The accumulation of lipid peroxidation products is taking place in acinar cells, and the free radicals as well causing the cell damage,

inflammation, synthesis of acute phase proteins; lithostatin synthesis is disturbed which leads to protein and calcium precipitation and obstruction of small ducts with subsequent periductal inflammation and fibrosis [13].

Activation of the sympathetic nervous system with an increase in the noradrenaline concentration in plasma plays an important role in AH pathogenesis. At the same time baroreceptors are rearranged which is accompanied by an imbalance of the pressor and depressor systems [14].

One of the links in AH pathogenesis is the disorders in renin-angiotensin-aldosterone system. Increased synthesis of angiotensin II leads to vasoconstriction with increasing of peripheral resistance of blood vessels. The increased aldosterone production is accompanied by a salt retention and increased volume of circulating blood. Prolonged rise in the arterial pressure (AP) and hyperproduction of angiotensin II causes hypertrophy with gradual development of myocardial sclerosis [15].

Endothelium has an important role in the regulation of vascular tone regulation, it participates in the transformation of angiotensin I to angiotensin II, inactivation of kinins, nitrogen oxide synthesis, and in the support of hemostasis. Endothelium synthesizes the vascular restrictive substance endotheline which is involved in the development of vascular complications. The domination of vasoconstrictive reactions in response to endogenous effects is observed in AH patients [16].

Despite the differences in the key elements of CP and AH pathogenesis these diseases may aggravate each other's course. Reduced plasticity of arterioles due to AH progression leads to disturbance of microcirculation in pancreatic tissues and damage of exocrine pancreatic (acinar) cells. Digestive disorders, pancreas inflammation leads to systemic intoxication, oxidative stress with cytokines release and disturbance of blood pressure regulation. Besides, an activation of sympathetic nervous system proceeds at the early stages of considered pathologies. In CP it is accompanied by blood pressure increase through an additional activation of sympathetic adrenal system. In AH the excessive activation of sympathetic nervous system at early stages leads to the disturbance of vegetative regulation of digestive organs, namely to the development of biliary dyskinesia which is a significant pathogenetic factor of CP formation [16].

It was revealed in clinical and experimental studies that the realization of many vascular disorders in CP is mediated by the synthesis disturbance, or production of a number of biologically active substrates regulating the balance between orectic and anorectic effects which along with the effect on food behavior have both direct and indirect effects on the vascular system.

Despite significant advances in the study of isolated pathogenesis of both CP and AH, there are many gaps in this comorbid pathology, including the role and etiopathogenetic significance of adipokinins and homocysteine [15, 16]. In recent years, preadipocytes have been found to secrete polypeptide resistin which affects the formation of insulin resistance and the function of microvasculature [17]. The formation of atherosclerotic damage of various levels of the vascular bed including microvessels is facilitated by various factors among which is homocysteine.

Much attention has been paid to lipid levels change which are caused by proteins loss in urine that regulate lipid metabolism. As a result, the blood accumulates low and very low density cholesterol and lipoproteins, saturated fatty acids. A noticeable increase in triglyceride levels can also lead to pancreatitis. Hypertriglyceridemia or chilomycronemia is the cause of 1-7% of all cases of pancreatitis [18].

Recently, there has been a significant increase in the morbidity of acute pancreatitis associated with hyperlipidemia, the morbidity rate reaches 12-38% [19]. With hereditary hyperlipidemia (type I and II according to Frederiksen), the CP symptoms occur already in childhood and adolescence. One of the pathogenetic mechanisms is fatty infiltration of acinar cells, microembolia of pancreatic vessels with fat particles, microvascular thrombosis with slow progression of degenerative changes in the organ. In addition, cases of pancreatitis in type IV hyperlipidemia have been described in the literature [20]. It is believed that the mechanism leading to severe forms of pancreatitis is the toxic effect of extremely high concentrations of the free fatty acids on the pancreatic tissue which cannot be fully associated with serum albumins in blood plasma [21].

It is now clearly defined that the level of blood pressure is largely influenced by the kidneys functional state [22]. Nephrogenic arterial hypertension accounts for 70% of the total number of symptomatic hypertension cases and can be manifested both in the onset of renal disease and during of its further course or in the final [23]. Both cellular and humoral mechanisms, as well as disorders of the vascular system function participate in the pathogenesis of the target organ affection at arterial hypertension. Arterial hypertension is accompanied by specific vascular lesions, in particular by microcirculation disorders [24] The main functions of microcirculation are the optimal delivery of nutrients and oxygen, prevention of excessive rise of hydrostatic pressure in capillaries (which may lead to edema), optimization of vascular resistance [25]. Vascular spasm, disorders at the microvasculature level can lead to ischemia of organs and tissues. Thus, pancreatic ischemia (ischemic pancreatitis) is a frequent pathological phenomenon.

The development of ischemic pancreatitis is often due to the peculiarities of blood supply to the pancreas, in particular the absence of its own large arteries. The pancreas is supplied with blood from numerous branches of the celiac, superior mesenteric and splenic arteries. Herewith the source of blood supply to the head, body and tail of the pancreas are different vessels due to different embryogenesis of these parts [26]. The arterial circle of the pancreas and internal arterial anastomoses carry out intra-systemic (ventral trunk basin) and inter-systemic (basins of celiac and superior mesenteric arteries) arterial connections, provides extreme plasticity of the pancreatic arterial bed under conditions of affected blood flow due to rapid blood redistribution [27].

The aim of the work by I.N. Grigoriev et al. (2020) was to determine the incidence rate of AH in patients with acute pancreatitis, chronic pancreatitis, pancreatic cancer and to identify possible associations of AH with other risk factors (obesity, dyslipidemia (DP), plasma glucose content \geq 7.0 mmole/L, smoking, alcohol consumption). It was shown that arterial hypertension is more common in patients with pancreatic cancer than in patients with acute pancreatitis; in patients with chronic pancreatitis the AH incidence rate did not differ from that of acute pancreatitis or pancreatic cancer. P.e., arterial hypertension was a cofactor of other metabolic risk factors in patients with acute pancreatitis or CP or behavioural risk factors, in contrast, it was less common in patients with acute pancreatitis or CP with arterial hypertension. There is also a direct association between AH and dyslipidemia or body mass index in patients with chronic pancreatitis; between AH and body mass index or age of patients with pancreatic cancer .

In clinical practice the comorbidity of CP and AH is accompanied by a more pronounced painful abdominal syndrome which tends to long-term exacerbations (3-4 weeks vs. 10-12 days with isolated CP), and dyspeptic syndrome. The analgesic treatment has also been shown to be less effective. Clinical effect is achieved after 9-10 days in combination of CP and AG against 6-7 days in isolated CP. The cause of exacerbations are usually dieting errors, alcohol consumption. Among the reasons provoking exacerbation in this group, psycho-emotional stress and physical overstrain are prevailed. With combination of CP and AH, full remission was achieved less often than in isolated CP [28].

Analysis of mentioned clinical and pathogenetic provisions, in turn, is a prerequisite for the further development of adequate pharmacotherapy tactics for CP associated with AH, which along with high clinical efficacy should provide a correction of the main links of metabolic disorders, to have a positive effect on the state of exocrine pancreatic function, as well as on the psychoemotional sphere and eventually to improve the quality of patients' life [29].

Thus, the damage of the pancreas in AH patients is a serious and poorly studied problem which determines the relevance of further scientific research in this area. Obtaining the new knowledge about clinical and pathogenetic aspects of pancreatic lesion in AH will allow to verify its pathology at early formation stages, and also to develop differentiated tactics of science-based therapy and system of primary and secondary prevention of pancreatic diseases in AH. This will certainly have a positive impact on the course of the underlying disease and quality of patients' life.

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PREVALENCE, EXTENT, SEVERITY AND INTRAORAL DISTRIBUTION OF GINGIVAL RECESSION IN PATIENTS WITH PERIODONTITIS IN UKRAINIAN POPULATION

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Annotation. Gingival recession has a high prevalence among patients with periodontitis and remains one of the most common problems associated with periodontal tissues. The aim of this study was to analyse the prevalence, extent, severity and intraoral distribution of gingival recession in patients with periodontitis in Ukrainian population. 133 patients with periodontitis were enrolled in a cross-sectional study. Participants were interviewed about demographic data, smoking status, and oral hygiene skills. The clinical examination was performed using computerized pressure-sensitive Florida Probe system.

The prevalence of gingival recession in patients with periodontitis was 100 %. The extent of affected teeth by gingival recession was 65.78%. Statistically higher (p = 0.035) numbers of gingival recession were recorded on mandibular teeth (69.47%) than on the maxillary (62.16%). The mandibular incisors were most frequently affected by root surface exposure. Additionally, the right central incisor and right first molar frequently had gingival recession on maxilla. Gingival recession with vertical width up to 2 mm was apparent for 44.01 (40.8-47.2)% of teeth, recession with level vertical width between 3 and 4 mm was apparent for 17.41 (14.3-20.5)%, and with level vertical width of \geq 5 mm at about 4.42 (2.7-6.2)% of teeth. According to the Miller's classification, class IV was most prevalent (93.98%) followed by class III (75.94%) among patients with periodontitis.

Key words: Gingival recession, mandible, maxilla, periodontitis, prevalence.

Introduction. Gingival recession is a clinical condition of periodontal tissues around the teeth characterized by the root surface exposure due to the apical displacement of the marginal gingival tissues [1,2]. This can occur either around one tooth or around all teeth in the oral cavity. Gingival recession may affect not only buccal/lingual surfaces but also interproximal areas [3]. Depending on the extent and severity of the gingival recession, patients may suffer from dentine hypersensitivity, root caries, non-carious cervical lesions of the teeth hard tissues as well as fear of losing their teeth [1,4].

Many investigations have been conducted to determine the development of gingival recession [5-7]. However, the exact mechanism of its development is unknown [3], and it is assumed that this condition has multifactorial etiology [8,9]. Among factors that can contribute to gingival recession, distinguish precipitating and predisposing factors [10]. Usually, gingival recession occurs as a result of these factors acting in conjunction with one another[1]. Factors that can precipitate the development of gingival recession are orthodontic treatment, oral piercing, smoking, inadequate, traumatic teeth brushing, and plaque-induced inflammation [10]. Thin gingival phenotype, a narrow

band of keratinized/attached mucosa, bone dehiscence and fenestrations defects, tooth malposition, and frenum pull are all factors that can predispose to the development of gingival recession [7,10]. Gingival recession can occur as an independent disease or as a result of periodontitis. In this patients, the inflammatory reaction that occurs in the presence of a supragingival and subgingival biofilm causes alveolar bone loss. Consequently, apical migration of junctional epithelium and gingival recession can occur on all surfaces of the teeth [3,11]. A primary periodontal treatment, which aims to scaling and root planning, can considerably increase the severity of gingival recessions as a result of tissue shrinkage that occurs after the elimination of the inflammatory factor.

Gingival recession is frequently encountered in general dental practice and has a wide variety of clinical features. It remains an important problem among patients due to the fact that the consequences of gingival recession affect not only the health of the oral cavity but also the general condition of the patients. Root-surface exposure can cause the development of aesthetic disadvantage (especially when gingival recession occurs in the anterior area) as well as psychological problems [12]. However, many patients may not have any complaints [7]. Gingival recession is often associated with aging because it is commonly seen in elderly people [13]. Despite this, other age categories are also prone to the development of gingival recession [6,14]. Epidemiological studies show that the incidence of gingival recession around the world ranges from 22 to 100 % [10,14-17]. This data varies depending on the population and methods of analysis. The purpose of this study was to determine the prevalence, extent, severity and intraoral distribution of gingival recession in patients with periodontitis in Ukrainian population. Analysis of the data obtained in this study can be used to understand a more complete state of oral health and shows areas where the manifestations of periodontitis are the most difficult, and as a consequence, - recessions too. To our knowledge, this is the first report of prevalence, extent, severity and intraoral distribution of gingival recession in patients with periodontitis.

Methods. The examined group consisted of 133 patients aged from 20 to 59 years old. All participants fully met the selection criteria (age from 20 years, periodontitis) in this cross-sectional study. Exclusion criteria were absence of periodontitis, presence of severe systemic diseases, less than 20 teeth in the oral cavity (excluded third molars), pregnancy, and periodontal treatment during the previous six months.

The study was approved by the Institutional Ethical Committee and was carried out in accordance with the World Medical Association Declaration of Helsinki, as revised in 2008. Informed consent was obtained from all participants prior to their enrolment.

Before beginning the clinical examination, all patients completed standard questionnaire. Questions they received were about their age, gender, smoking, type of toothbrush they use (manual or electric), and any previous orthodontic treatment.

All patients underwent periodontal examination using a computerized pressuresensitive Florida Probe system (Florida Probe Corp, Gainesville, FL). Periodontal pocket depth was measured in six sites around all existing teeth (except third molars) in mm as a distance from the gingival margin to the epithelial attachment of the sulcular base, which forms the bottom of the periodontal pocket. Prevalence, extent, intraoral distribution and severity of the gingival recession in Ukrainian population with periodontitis were measured. The prevalence of gingival recession was measured as a percentage of patients with gingival recession. The extent of gingival recession was determined as a percentage of teeth with gingival recession. Intraoral distribution was evaluated as a mean percentage of gingival recession frequency near every tooth. Also, the site of the tooth with gingival recession was assessed. The severity of the gingival recession was estimated using Miller classification (1985) of the gingival recession [18] and the level of vertical width of the gingival recession [10,19]. The vertical width of the gingival recession was a distance between cemento-enamel junction (CEJ) and gingival margin. In cases, when CEJ was covered with tooth decay, calculus or restorations the CEJ was estimated according to CEJ of adjacent teeth.

Statistical analysis. Statistical analysis was performed using the R programming language (R version 3.5.1 (2018-07-02) – "Feather Spray" Copyright (C) 2018). Descriptive statistics was conducted for all indicators studied. Descriptive statistics was presented as a number of patients (n) and percentage of patients (%) or as a mean and confidance interval (M(CI)). Age was presented as a mean and standard diviation (M \pm SD). Variables were tested using Two Sample t-test. The difference of parameters at a significance level of p < 0.05 was considered statistically significant.

Results. In all, 133 patients were examined, including 63 (47.37 %) males and 60 (52.63 %) females with a mean age of 42.02 ± 10.47 years. The total number of teeth was 3442, 282 teeth were absent because of various reasons. The mean periodontal pocket depths were 3.15 ± 0.48 mm. Statistics data of the standard questionnaire are shown in Table 1.

Table 1

Statistics data of the participants						
	Factors	n (%)				
Smokin	g					
	smoker	23 (17.29)				
	non-smoker	110 (82.71)				
Toothbrush						
	electric	5 (3.76)				
manual		128 (96.24)				
Previous orthodontic treatment						
yes		16 (12.03)				
no		117 (87.97)				

Statistics data of the participants

The present study demonstrated that all participants (100 %) had gingival recessions. In patients with periodontitis, gingival recession was observed around 65.78 (61.2-70.3)

percent (%) of teeth. Results showed that there was statistically significant difference (p = 0.035) between the extension of gingival recession on the mandible (69.47 %) and on the maxilla (62.16 %). At the mandibular teeth, gingival recession more often was observed from the buccal side (57.15 %) than from the lingual side (56.00 %), but the difference was no significantly (P = 0.784). However, there was statistically significant difference on the maxillary teeth (p < 0.001; 54.47 % and 38.90% respectively).

The frequency of gingival recession varied depends on the tooth (Fig. 1). Among all examined teeth the highest frequency of gingival recession was observed in the left mandibular central incisors (78.20 %), right mandibular central incisors (72.93 %), and in the left and right mandibular lateral incisors (72.93 % and 74.44 % respectively). The frequency of gingival recession around other teeth on mandible was more than 50.00 %, but the lowest frequency was observed around molars. The highest frequency of gingival recession on maxilla was observed in the right central incisor (63.91 %), right first molar (63.16 %), and right lateral incisor (62.41 %). The lowest frequency of gingival recession in maxilla was observed around the left first and second premolar (45.86 % and 46.62 % respectively) and around right second premolar (49.62 %).



Fig. 1. The intraoral distribution of gingival recession in patients with generalized periodontitis

Fig. 2. The intraoral distribution of gingival recession on mandible

Results of the intraoral distribution of gingival recession according to the tooth surface have demonstrated that the highest frequency of gingival recession on the mandible was observed at the lingual surface of four incisors (Fig. 2). The lowest frequency was detected at the lingual surface near the left and right first premolars (38.35 % and 39.10 % respectively), lingual and buccal surface of the right first molar (38.35 %).

According to the tooth surface, the highest frequency of gingival recession on the maxilla was defined on the buccal surface of the left and right first molars (54.14 % and 52.63 %), and right lateral incisor (53.38 %) (Fig. 3). The lowest frequency of gingival recession at the lingual surface on the maxilla was observed near the left and right first premolars (21.0 % and 27.82 %), left and right second premolars (25.56 % and 27.82 %).



Fig. 3. The intraoral distribution of gingival recession on maxilla

The prevalence of gingival recession depending on the vertical width demonstrated in Table 2. Gingival recession with vertical width up to 2 mm were determined at 44.01 (40.8-47.2) % of teeth, recessions with level vertical width of 3-4 mm at 17.41 (14.3-20.5) %, and with level vertical width of \geq 5 mm at about 4.42 (2.7-6.2) % of teeth.

Statistical analysis showed that according to the Millers's classification, Class III and Class IV of the gingival recession were most prevalent among patients with periodontitis (93.98 % and 75.94 % respectively). Class I of gingival recession was observed in 64.66 % of subjects and Class II – in 47.37 % of subjects. Among the 3442 examined teeth, 318 (9.24%) had Miller Class I, 136 (3.95 %) Miller Class II, 894 (26.00 %) Miller Class III and 872 (25.33 %) had Miller Class IV. About 1229 (35.71 %) teeth had no recession.

Table 2

Vertical width	Dependir	ng on the number n (%)	er of teeth	Depending on the number of available R n (%)			
	Maxilla	Mandible	Total	Maxilla	Mandible	Total	
1-2 mm	792 (45.56)	732 (42.05)	1524 (44.28)	792 (76.30)	732 (61.26)	1524 (68.25)	
3-4 mm	201 (11.82)	368 (21.14)	569 (16.53)	201 (19.36)	368 (31.00)	569 (25.48)	
≥5 mm	45 (2.65)	95 (5.46)	140 (4.07)	45 (4.34)	95 (7.95)	140 (6.27)	

Severity of the gingival recession in patients with generalized periodontitis

Discussion. The results of this study have shown that all patients with periodontitis aged from 20 to 59 years had gingival recession. High prevalence of these lesions is observed among the general population too. Similar result in general Brazilian population was obtained by Marini et al [10]. They found that the gingival recession was observed in 89 % of the examined patients. Data from epidemiological studies showed a wide range of prevalence of gingival recession. It is explained by the fact that the methodology used in these studies was different (sample size and gender of the study population). The prevalence of these lesions among US population is 63 % [20]. Among European countries, the highest incidence of gingival recession was observed in France – 84.6%, [21] Italy – 64 %, [22] and Greece – 63.9 % [12]. However, in Poland, this figure was 29.4 % [14]. Among the Vietnamese population, recession occurs in 72.5 % of patients, [23] in Nepal – 65.4 %, [24] in Iraq – 39.7 %, [19] and in Nigeria – 22 % [17] of cases.

According to our study, the mandibular teeth demonstrate a higher prevalence of gingival recession as compared to maxillary teeth, which is supported by data of previous studies [17, 24]. According to Tenenbaum, the high prevalence of the gingival recession on the mandibular teeth is explained by the characteristics of keratinized mucosa, which are narrow and thinner [25]. Opposite to these findings, Gorman has shown that on the maxilla gingival recession occurs more often, which is associated with thin or absent buccal plates.[6] In patients with periodontitis, the buccal site of the teeth showed more amount of gingival recession than the lingual site. As reported by Serino and Checchi this can be affected by several factors: traumatic tooth brushing, the hardness of toothbrush bristles, bone dehiscence and fenestrations defects [6, 26].

The higher prevalence of gingival recession was observed near four incisors on the mandible. This results in an agreement to findings of other epidemiological studies in which both the buccal and lingual surfaces were examined [10,16,19]. However, studies that evaluated only the buccal surface showed that the most frequent recessions occur in the area of premolars and maxillary first molars [8,22,23,26]. In the present study mandible premolars and maxillary first molars are also frequently affected teeth by gingival recession. The pattern of the intraoral distribution of gingival recession depends on different etiologic factors. As noted by van Palenstein Helderman and Susin, the gingival recession in the anterior area depends on poor oral hygiene.[11,16] In the study of Joshipura, the gingival recession on premolars is the result of mechanical trauma (tooth brushing) and on molars may be due to the accumulative of dental plaque.[27]

According to the results, gingival recession most often occurs in the area of four incisors on the mandible and in the area of right and left molars, and right lateral incisor on the maxilla. Gingival recession near the mandibular incisors and near first maxillary molars are most often associated with the lack of hygiene in these areas, and as a result, the accumulation of soft dental plaque occurs there [16]. Anatomically, the excretory ducts of the salivary glands open near the aforementioned teeth and their secretions lead to rapid crystallization of soft plaque, which has a destructive effect on periodontal tissues. Recession near the right lateral incisor is associated with traumatic teeth brushing and tooth malposition [7,11]. Gingival recession is more often observed around each tooth on the right side of the jaw compared with the corresponding tooth on the left side. This is due to the unequal brushing of teeth on the right and left sides (on the left side, patients brush better than on the right, resulting in dental deposits being more significant on the right side).

The results showed that Miller class III and IV of the gingival recession was most prevalent in patients with periodontitis. But in common population Miller class I of gingival recession occurs most often.[8,10] As observed in the study by Marini, [10] Susin,[16] Hamed, [19] the severity of the gingival recession increased with the increasing age of the patients.

Article limitations: patients with periodontitis, the vast majority of patients do not smoke and use a manual toothbrush. In this work, no comparison was made of the severity of periodontitis, and no alveolar bone loss and clinical attachment loss were determined.

Conclusions. Gingival recession has a high prevalence among patients with periodontitis and remains one of the most common problems associated with periodontal tissues. Mandibular incisors were the teeth most frequently affected by gingival recession. More researches is planned in the future, which will be focused on the relationship between gingival recession, severity of periodontitis, alveolar bone loss, and clinical attachment loss.

Conflict of Interest. The authors have no potential conflicts of interest.

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PHARMACOECONOMIC EVALUATION OF THE USE OF A NEW DETOXICANT IN PATIENTS WITH ACUTE PANCREATITIS

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Annotation. In a clinical study, a new combination of sodium hypochlorite and taurine for detoxifying activity was evaluated in patients with acute pancreatitis. Thus, the efficiency in the main group of subjects who received the drug Neoreodes was 91.67%, which is significantly higher than the efficiency in the control group - 60.4%. Therefore, the hypothesis about the advantages of treatment effectiveness in the main group of subjects in comparison with the control was confirmed. Calculations of pharmacoeconomic evaluation according to the methodology of "cost-effectiveness" showed that the use of "Neoreodesis" in the pharmacotherapeutic treatment regimen is inferior to the combination of Sodium chloride 0.9% + glucose solution 5% in economic terms: CERneoreodesis 22.2 UAH / ef and CERstand. ter. 14.5 UAH / ef. However, it is important to note that in the group using Neoreodesis, a shorter stay of patients in the intensive care unit was registered compared to the group receiving standard therapy.

Key words: fixed combination of sodium and taurine hypochlorite, Neoreodesis, acute pancreatitis, "decision tree", cost-effectiveness of treatment.

One of the problems of the modern clinics is chronic endotoxicosis, the manifestated by typical pathological process, are determined by organ and systemic reactions in the patient's body. The mechanisms of cytotoxic damage as a result of exposure to toxic products of lipid peroxidation (LPO) and due to the imbalance of the chains of immunological reactivity are closely related, which causes changes in the resulting cellular reactions that form the pathological process [1].

It is known that modern methods of extracorporeal detoxification, namely, hemodialysis and hemosorption, are insufficiently effective in removing hydrophobic toxins. It is known that the use of sodium hypochlorite is accompanied by a simultaneous decrease in both components of toxemia, and the severity of the effect increases as the syndrome of endogenous intoxication progresses. We first evaluated the detoxifying properties of a fixed combination of low-concentration sodium hypochlorite solution and taurine under conditions of endotoxicosis on the background of acute pancreatitis [2, 3].

It is known that acute pancreatitis is one of the most serious urgent diseases of the abdominal cavity. In terms of the share of treatment, it ranks third, second is acute appendicitis and cholecystitis. It accounts for up to 5-10% of urgent pathology of the abdominal cavity. At the same time, every fourth patient develops aseptic necrotic

pancreatitis, the overall mortality of which even in specialized clinics around the world remains consistently high (level of evidence A, B), ranging from 2.1% to 15% [4]. In the infected form of pancreatic necrosis, mortality reaches 30-70%. In Ukraine, the incidence of acute pancreatitis is 102 per 100,000 population, the overall mortality ranges from 4 to 15% reaching 24-60% in the necrotic form, and postoperative mortality is 70%. Pathogenetic changes in acute pancreatitis are very diverse, covering many body systems. This explains the severity of the clinical course of the pathological process and in many cases - the emergence of severe multiorgan failure on the background of endotoxicosis [5, 6].

Therefore, the search for a new detoxifier today is an urgent problem for modern surgery.

The aim of the study was to determine the clinical and cost effectiveness of the new detoxifying agent "Neoreodesis" in patients with acute pancreatitis.

Research methods. Research design - open, randomized comparative, parallel.

The clinical study included 96 patients with acute pancreatitis. Patients based on the method of randomization in a ratio of 1: 1 were divided into the main group - 48 patients and control - 48 patients. All patients received basic therapy (antispasmodics, proton pump inhibitors, protease inhibitors, somatostatin drugs, antibiotics). In addition, patients in the main group were prescribed an experimental infusion solution with the working name "Neoreodesis" for 3 days.

The effectiveness of treatment was evaluated by changes in the level of total bilirubin, blood amylase, urine diastase after 3 days of treatment compared with baseline. Treatment was considered successful if the level of at least two of the three evaluated indicators decreased by 35% from baseline or more. The safety of the drug was assessed on the basis of monitoring data on the patient's condition, frequency and nature of adverse reactions, laboratory data, assessment of the patient's subjective condition.

Pharmacoeconomic evaluation was performed using the "decision tree" model based on the cost-effectiveness indicator.

When performing the study, known clinical and statistical methods were used: quantitative analysis, variation statistics, comparison of efficiency between groups, determination of the efficiency unit [7].

Research results. Among the patients included in the clinical study there were 44 female and 52 male patients. The distribution of patients by sex are presented in table. 1. To assess the homogeneity on the basis of gender the chi-square Person criterion was used, taking into account the correction for continuity.

The diagnosis of acute pancreatitis was confirmed by assessment of blood amylase and urine diastase. Data from the initial assessment of the of blood amylase and urine diastase levels by methods of descriptive statistics are presented in table 2.

Table 1

Gender	Main Group		Cor gro	ntrol oup	Total				
	n %		n	%	n	%			
Male	27	56,25	25	52,08	52	54,17			
Female	21	43,75	23	47,92	44	45,83			
Total	48	100,0	48	100,0	96	100,0			

Distribution of patients by sex

Table 2

Analysis of the initial homogeneity of groups according to th	e
assessment of blood amylase and urine diastase	

Index	Group	Ν	Arithmetic mean	Median	Standard deviation	Min	Max
blood	Main	48	90,48	85,0	28,00	42	192
amylase, mg/(g*ml)	Control	48	94,48	86,0	25,29	70	189
urine	Main	48	230,85	207,0	104,73	126	800
diastase, g/g*l	Control	48	237,08	219,0	67,86	119	410

Baseline levels of blood amylase and urine diastase were significantly elevated. Based on the results of statistical analysis, we can conclude that the groups did not differ significantly according to the initial data of the assessment of blood amylase and urine diastase.

To assess the degree of endogenous intoxication the method of molecules of the medium weight (MMW) determining was used. The evaluation was performed by spectrometry in different modes X = 254 nm and X = 280 nm. In addition, the level of malonic dialdehyde (MDA) was determined at the screening stage, which is a clinical and laboratory marker of oxidative stress and blood pH. Data estimates of the level of molecules of medium weight, and blood pH at the stage of screening by methods of descriptive statistics are given in table. 3.

Thus, in most subjects of the main group the level of total bilirubin, blood amylase and urine diastase by 35% or more was managed to reduce compared to the baseline.

During the clinical study, no adverse reactions that could be associated with the administration of the studied drug were reported. During the clinical study, a daily examination and interview of patients was performed to identify possible adverse reactions. Examination and interview of patients of the main group did not reveal any complaints, unexpected side effects, complications or intolerances of the drug Neoreodesis when prescribed for 3 days. Patients did not complain and did not experience any unpleasant sensations that could be associated with the action of the study drug. It did not have a negative effect on blood pressure, heart rate and body temperature: at the

end of the clinical study there were no negative changes in these indicators compared to baseline before treatment in patients of the main group.

Table 3

Index	Group	Ν	Arithmetic mean	Median	Standard deviation	Min	Max
MMW in	Main	48	0,04	0,04	0,02	0,01	0,10
X = 254 nm	Control	48	0,05	0,05	0,04	0,01	0,24
MMW in X = 280 nm	Main	48	0,08	0,07	0,13	0,01	0,98
	Control	48	0,10	0,07	0,36	0,01	2,59
	Main	48	3,02	2,87	0,94	1,24	5,92
MDA	Control	48	3,27	3,04	0,95	1,28	6,48
Blood PH	Main	48	7,38	7,38	0,04	7,31	7,47
	Control	48	7,39	7,38	0,04	7,32	7,48

Analysis of the initial homogeneity of groups according to the assessment of the medium molecular weight peptides level, MMW and PH blood

Laboratory parameters did not change negatively in any case, in most number of patients the level of leukocytes in the blood and the rate of erythrocyte sedimentation decreased, which indicates a decrease in the severity of the inflammatory reaction. Tolerability of treatment with the study drug in all cases was regarded as good.

Thus, the use of the drug "Neoreodes" as part of basic therapy significantly increases the effectiveness of treatment in patients with acute pancreatitis compared with the administration of basic therapy alone.

Thus, the efficiency in the main group of patients who received the drug Neoreodes was 91.67%, which is significantly higher than the efficiency in the control group - 60.4%. The hypothesis about the advantages of treatment effectiveness in the main group of subjects in comparison with the control was confirmed [8].

In assessing the economic component of the use of "Neoreodesis" in patients with endotoxicosis on the background of acute pancreatitis, a model of the "decision tree" was used.

Cost analysis was performed from the perspective of a patient who pays for a course of intoxication therapy. The modeling horizon is equal to the duration of the course of pharmacotherapy of peritonitis.

Calculations of pharmacoeconomic evaluation according to the methodology of "cost-effectiveness" showed that the use of "Neoreodesis" in the pharmacotherapeutic treatment regimen is inferior to the combination of Sodium chloride 0.9% + glucose solution 5% in economic terms: CERneoreodesis 22.2 UAH / ef and CERstand. ter. 14.5 UAH / ef. However, it is important to note that in the group using Neoreodesis, a shorter stay of patients in the intensive care unit (ICU) was registered compared to the group receiving standard therapy (Fig. 1).



Fig. 1. Model "decision tree" for pharmacoeconomic evaluation of the course of detoxification therapy of acute pancreatitis.

If the cost of the patient's stay in the ICU was taken into account when constructing the "decision tree" model, the financial burden was more significant for patients receiving standard therapy.

Conclusions. When analyzing the indexes of clinical efficacy and total costs in monetary terms for the course of detoxification therapy, namely, infusion solutions, the advantages of using a new combination of sodium hypochlorite in combination with taurine ("Neoreodesis") were determined.

Prospects for further research. In future, we plan further studies of the use of "Neoreodesis" in clinical practice under different conditions of endotoxicosis, such as peritonitis.

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IMMUNOGISTOCHEMICAL RESEARCH OF THE HEART AFTER THE ACTION OF ELECTROMAGNETIC RADIATION INDEPENDENTLY AND IN CONDITIONS OF HYPOTHYROIDISM

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Annotation. In order to establish changes in circulatory disorders used immunohistochemical markers, which allows at the cellular and tissue levels to quantify the processes of cell proliferation, differentiation and features of blood circulation. Circulatory disturbances after the 11th day experiment increased the number of blood vessels because the accumulation of this marker decreased in the hearts of rats after exposure to electromagnetic radiation for 45 and 120 independently and in experimental hypothyroidism. The proliferation index (Ki-67) indicates the highest activity of morphogenetic transformations in the walls of hearts after the experiment after exposure to electromagnetic radiation and differ significantly in different experimental groups. Early correction of circulatory disorders has a positive effect on the morphology and reparative properties of hearts.

Key words: heart, electromagnetic radiation, experimental hypothyroidism, immunohistochemical markers.

The work is a fragment of scientific developments of the Department of Clinical Anatomy, Anatomy and Operative Surgery of the State Institution "Dniropetrovsk State Medical Academy on the topic": "Morphogenesis of organs and systems of the human body and experimental animals in ontogenesis in normal conditions and under the influence of external factors" (state registration number: 0IIIV009598).

Introduction. Microwave waves cause disorders of neurohumoral regulation, changes in the function of some endocrine glands, act on DNA and RNA, disrupting their functions. The effect of such radiation on living systems can be significant, because the considered factor is characterized by a very high value of energy, which at a pulse duration of the order of ten nanoseconds can have a power flux density of the order of millijoules per square centimeter. This effect may be specific due to the very high electric field strength, which reaches megavolts per meter, but the biological effect of this type of radiation has been studied very insufficiently. Microwave - EMF affect the cardiovascular, immune system, digestive organs, visual organs, blood, nervous system.

To establish microscopic changes in immunohistochemical markers of the heart in rats using proliferating antigens, vascular endothelium with specific markers Ki-67, CD34. The use of immunohistochemical markers and imaging systems due to their high sensitivity and informativeness allows at the cellular and tissue levels to quantify the processes of cell proliferation, differentiation and circulatory characteristics. We analyzed the accumulation of immunohistochemical markers both before and after the experiment, which allowed us to compare the results to determine the effects of the greatest effects of electromagnetic radiation under compensation and decompensation with different exposure times and experimental hypothyroidism.

The following markers were used in the work: CD-34 is a cytospecific endothelial marker. The use of this marker made it possible to identify the vessels of the heart wall; nuclear marker Ki-67 - a marker of proliferation, it allows you to mark all the cells at different stages of mitosis. All immunohistochemical reactions were performed on paraffin sections of the rat heart wall, after exposure to ultrahigh frequencies of electromagnetic radiation with different exposure times - 45 and 120 minutes, starting from the 11th day after the experiment. These methods were used only in the hearts of rats to determine such important histogenetic mechanisms as proliferation, angiogenesis, tissue differentiation, and normal parameters, and changes after exposure to ultrahigh frequencies of the heart.

All immunohistochemical reactions were performed on paraffin sections of rat hearts using appropriate primary antibodies (DACO) and the LSAB imaging system (Laballed Streptavidin - Biotin). Immunohistochemical studies Immunohistochemical studies were performed at the diagnostic center of DDMA in the Department of Immunomorphology of tumors.

Material and methods. The object of the study were the hearts of laboratory adult rats. The study involved 126 animals. In working with experimental animals followed the principles of the Declaration of Helsinki, adopted by the General Assembly of the World Medical Association (1964 - 2000), the Council of Europe Convention on Human Rights and Biomedicine (1997), in accordance with WHO, International Council of Medical and Scientific Societies, International Council of Medical and Scientific Societies, International Council of Medical and Scientific Societies, the International Code of Medical Ethics (1983) and the laws of Ukraine, "General ethical principles of ethical principles of animal experiments", approved by the First National Congress of Bioethics (Kiev, 2001) in accordance with the European Convention on the protection of vertebrates used for experimental and other scientific purposes "(Strasbourg, 1987). The distribution of the material of the control and experimental groups are presented in table 1.

This distribution of control and experimental groups allowed to determine the effect of experimental hypothyroidism and electromagnetic radiation on the heart wall and its structures, independent physical factor, and separately pathological condition, as well as to determine the effects of electromagnetic radiation with different exposure time and its possible correction in experimental hypothyroidism.

Table 1

Name experimental groups	After thyroidectomy	After exposure to microwave exposure for 45 minutes.	After exposure to microwave exposure for 120 minutes	After thyroidectomy and after microwave 45 min.	After thyroidectomy and after microwave 120 min.	Control group
Number of objects in groups :	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>
Total objects: 126 (100 %)	16,67 %	16,67 %	16,67 %	16,67 %	16,67 %	16,67 %

Distribution of material of control and experimental groups

Rats were operated for the period 2017 - 2019. The method of modeling circulatory disorders was carried out as follows. Rats are the subject of morphological studies, which were operated on for the period 2016 - 2018. The method of modeling hypothyroidism was carried out as follows. Premedication was given - atropine 0.25 mg / kg intramuscularly (intravenously), diphenhydramine 0.5 mg / kg. The experimental animal was anesthetized with sodium thiopental - a means for non-inhalation anesthesia - 40 mg / kg (4 mg per 100 grams), intraperitoneally. The method of modeling hypothyroidism in rats includes access to the thyroid gland, its removal, thermocoagulation of the isthmus, cranial and caudal thyroid arteries and separation of recurrent nerves, according to the utility model of 2007, No54; (19) UA (11) 27821 (13) U; and the parathyroid glands and the recurrent nerve are separated from the parenchyma of the thyroid gland. On first shaved a front surface of a neck. The operation began with a longitudinal incision in the neck, in the midline, up to 3 cm in length. Spread the fascia of the neck and midline of the sternum - sublingual muscles, blunt way, imposed holders - two nodal skin - muscle sutures, behind which dilated the edges of the surgical wound. Under the capsule of the thyroid gland was injected 0.2 ml of 0.5% solution of novocaine with an insulin syringe. Thermocoagulant burned the isthmus of the gland, coagulated cranial and caudal vessels of both lobes of the gland. From the corresponding part of the is three with two anatomical tweezers separated each lobe of the thyroid gland in the caudo - cranial direction, separating the recurrent nerve and parathyroid glands from the parenchyma of the thyroid gland. Hemostasis was monitored, eight similar sutures were used to raise the dilated muscles, the surface of which was irrigated with a solution of ceftriaxone (bicillin - 5 according to model №54) to prevent purulent complications and applied nodal sutures to the skin. The effect of electromagnetic radiation was performed by a high-frequency signal generator - G4 - 83 (7.5 - 10.5 GHz) with a frequency of 10 GHz, with a wavelength of 3 cm, exposure of 45 and 120 minutes, daily for 10 days on the whole body with a pyramidal horn - type P 6-23A with a power flux of 1.1×103 W / m2. This experiment was conducted at the Department of Applied and Computer Radiophysics, Dnipropetrovsk National University. Oles Honchar, according to the

agreement on scientific and creative cooperation (2017).

Signs of disorders in the myocardium of the heart wall were observed on the 11th day after exposure to ultra-high frequencies of electromagnetic radiation with an exposure period of 120 minutes, both independently and in experimental hypothyroidism. The latter techniques were used mainly after euthanasia of the experimental animal. The heart wall was examined by immunohistochemical examination using markers of vascular endothelium - CD-34 and proliferative activity - Ki-67.

The results of the study and their discussion. A total of 126 rats participated in the experiment. The main trend in changes in the heart wall, especially in the myocardium, was vasodilation and angiogenesis, which were observed in experimental rats relative to the length of stay in the experiment. The direct effect of circulatory disorders in the myocardium of the heart of rats was manifested in the formation of changes in the thickness of the walls of the heart due to suppression or enhancement of cell proliferation.

The use of the immunohistochemical marker CD-34, which is a marker of vascular endothelium, made it possible to determine the main stages of angiogenesis. We observed uneven accumulation of the marker in different parts of the heart wall in normal and after exposure to ultrahigh frequencies of electromagnetic radiation with different duration of exposure - 45 and 120 minutes, as well as after exposure to ultrahigh frequencies of electromagnetic radiation with exposure for 45 and 120 minutes in experimental hypothyroidism.

As expected, normally the largest amount of CD - 34 marker was observed, of course, in the walls of the heart vessels. The vessels of the heart wall of rats after the experiment with exposure of 45 minutes reach the greatest degree of differentiation.

In experimental hypothyroidism, the largest accumulation of vascular endothelial marker - CD - 34, was observed in the heart wall after exposure to ultrahigh frequencies of electromagnetic radiation with an exposure period of 45 minutes, indicating the activity of angiogenesis in the heart as a compensatory activity in experimental hypothyroidism. decompensatory after exposure to ultra-high frequencies of electromagnetic radiation with an exposure period of 120 minutes in the conditions of experimental hypothyroidism, which was confirmed by immunohistochemical studies (Fig. 1).

More intense or less intense color of the vessels only indicates the degree of differentiation of the wall of the vessel. The use of the CD - 34 marker showed that the effect of ultrahigh frequencies of electromagnetic radiation with an exposure period of 45 minutes not only increases the number of blood vessels, but also leads to the differentiation of vessel walls. Thus, the most rapid increase in the relative volume of endothelium in areas of the myocardium of the rat we observed in the experiment after exposure to ultrahigh frequencies of electromagnetic radiation with an exposure period of 45 minutes, as assessed by the accumulation of marker CD-34, and a decrease in heart rate after exposure ultrahigh frequencies of electromagnetic radiation with an exposure to ultrahigh frequencies. Under experimental hypothyroidism after exposure to ultrahigh frequencies of electromagnetic radiation with an exposure period of 45 minutes, we also observed the accumulation of vascular endothelial marker - CD-34, but this accumulation was less ulcerative than the accumulation of this marker without

experimental hypothyroidism at the same exposure period (Fig. 2).



Fig.1. Vessels of the heart wall without irradiation (A) and after exposure to ultrahigh frequencies of electromagnetic radiation with an exposure period of 45 minutes (B) and 120 minutes (C). Vascular endothelium is colored brown (CD - 34 marker accumulation). Magnification: A - about 40, approx. 8. B, C - about. 10, approx. 4.



Fig. 2. Vessels of the heart wall after thyroidectomy (A) and exposure to electromagnetic radiation with an exposure period of 45 (B) and 120 minutes (C) under conditions of hypothyroidism. The vascular endothelium was stained brown (CD - 34 accumulation) after the experiment, which is indicated by arrows. Magnification: A - about. 40, approx. 4. B, C - about. 10, approx. 4.

Along with the increase in the accumulation of the CD-34 marker in areas of the heart wall after exposure to ultrahigh frequencies of electromagnetic radiation with an exposure period of 45 minutes alone and in experimental hypothyroidism and a decrease in the amount of marker accumulation that was caused in the experimental group after exposure to ultrahigh frequency electromagnetic radiation with an exposure period of 120 minutes, both independently and under experimental hypothyroidism, we observed in our studies ambiguous location of proliferative centers. The nuclear marker Ki - 67 stained the nuclei of cells at different stages of mitosis brown (Fig. 3). The mitotic index of the heart myocardium was increased both after exposure to electromagnetic radiation with an exposure period of 45 minutes, but the localization of dividing cells differed significantly even within the experiment and exposure period.



Fig. 3. Myocardium of the heart (marker of proliferation - Ki-67). Magnification: A - about. 10, approx. 4. B - enlarged fragment of Fig. 3 - A - about. 40, approx. 4.

For a more general description of the course of histogenetic processes in terms of comparison, we considered proliferative changes, ie the ratio of the number of cells that multiply in each group of experimental animals. The results showed that proliferative changes after exposure to electromagnetic radiation, both independently and under conditions of hypothyroidism, differ in terms of exposure time in experimental animals relative to normal. Significantly increased cells with proliferative activity in the heart wall of rats after exposure to electromagnetic radiation with an exposure period of 45 minutes both alone and in experimental hypothyroidism, and significantly decreased in

the heart wall of rats after exposure to electromagnetic radiation and in conditions of experimental hypothyroidism 120 minutes Fig.4, 5).



Fig. 4. Myocardium of the heart wall after thyroidectomy (A) and exposure to electromagnetic radiation with an exposure period of 45 (B) and 120 minutes (C). The arrows indicate the accumulation of a proliferation marker - Ki-67. Magnification: A, B - about. 10, approx. 4.



Fig. 5. Myocardium of the heart after thyroidectomy (A) and exposure to electromagnetic radiation with an exposure period of 45 (B) and 120 minutes (C) under conditions of hypothyroidism (proliferation marker - Ki-67). Magnification: A, B - about. 10, approx. 4. In - about. 40, approx. 4.

Conclusions. The uneven accumulation of the marker CD - 34. showed that the greatest degree of differentiation is reached by vessels in the myocardium of the heart of rats after exposure to ultra-high frequencies of electromagnetic radiation with an exposure period of 45 minutes. After exposure to ultra-high frequencies of electromagnetic radiation with an exposure period of 45 minutes in hypothyroidism increases the number of blood vessels, because the amount of accumulation of this marker decreased in the myocardium of rats after an experiment with an exposure period of 120 minutes, both alone and in experimental hypothyroidism. The proliferation index (Ki-67) indicates the highest activity of morphogenetic transformations in the myocardium after exposure to ultrahigh frequencies of electromagnetic radiation, both independently and in experimental conditions with an exposure period of 45 minutes, which has a positive effect on morphology and reparative properties in the myocardium.

Thus, the results of the study revealed the general patterns of changes in the heart wall after exposure to ultra-high frequencies of electromagnetic radiation, both independently and in experimental hypothyroidism with different exposure times, as well as to determine the participation of major histogenetic processes in rats. experimental conditions.

Prospects for further research. Further immunohistochemical and morphological studies will reveal the mechanism of abnormalities in the heart after exposure to electromagnetic radiation, both independently and in experimental hypothyroidism with an exposure period of 120 minutes at the cellular level and may reveal a way to prevent them.

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<u>HISTORY</u>

LITERARY HERITAGE OF THE PERIOD OF NATIONAL AND CULTURAL REVIVAL OF THE UKRAINIAN PEOPLE IN THE 1920S

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Annotation. The article explores the formation and development of the literary heritage of the period of national and cultural revival of the Ukrainian people in the 1920s. The author analyzes peculiarities of literary activity during the period of national and cultural revival of the Ukrainian people in the 1920s and establishes the place of Ukrainian literature in Podillia region in 1920s in historical perspective.

Key words: education and science in Podillia in the 1920s, Ukrainization, documents of the Podillia department of vocational education, agitators, intellectuals.

Formulation of the problem. Ukrainian literature of the early 1920s was in a very difficult situation. The new division of Ukrainian lands completed at that time slowed down the maturation of the nation and, consequently, its culture. The cultural potential of the people was undermined by the destructive consequences of civil strife in the society of previous years, which not only destroyed the spiritual and material achievements of the past, but also destroyed the intelligentsia – the main creator of cultural values.

The literary heritage of writers of Podillia region became an important component of the literary process of the period of national and cultural revival of the Ukrainian people in the 1920s. At this time an ideological differentiation of the literary movement in Podillia took place, featuring an organizationally unformed group of young proletarian writers who focused on Soviet power and a broad and vague group of artists whose worldview had been influenced by the national upheaval caused by the Ukrainian liberation struggle of the period.

Analysis of recent research. Ukrainian intelligentsia, which participated in the liberation struggle of 1917–1920 not on the side of the Bolsheviks, mostly emigrated. However, the part of it that remained in Ukraine, being "compromised" by previous activities, did not have the opportunity to be actively involved in national and cultural transformations. In addition, the relationship between the new government and the intelligentsia was not limited to the past. The Bolsheviks sought political and ideological monopoly. The intelligentsia essentially focused on the democratic structure of society. This also had tragic consequences for both the intelligentsia and the national culture.

Under the conditions of the NEP and the internal struggle within the party, elements of democracy were allowed. For the first time in many years, Ukrainian culture received state support. Negative attitude to the Soviet government and its policy led to a significant emigration of literary and artistic figures (V. Vynnychenko, S. Cherkasenko, T. Shapoval, D. Dontsov, M. Sadovsky, O. Oles). Until recently, the works of emigrant writers were silenced or distorted, they were unreasonably classified as bourgeois-nationalist, counter-revolutionary. Thus, there is a need to find men of letters, who on both sides of the severe events of that time contributed to the development of literary heritage and culture in general.

The aim of the article is to highlight the problems of the literary heritage of the period of national and cultural revival of the Ukrainian people in the 1920s.

Outline of the main material. The centers of literary life in Podillia were the cities of Kamianets-Podilskyi and Vinnytsia. In 1922, the Association of Young Proletarian Writers of Podillia was founded, which included such prominent Ukrainian writers as M. Trublaini, M. Godovanets, E. Kyryliuk, O. Kundzich, K. Andriychuk, and others. The centers of the peasant literary association "Plow" started their activity. In particular, the Kamianets-Podilskyi branch of the "Plow" included well-known writers and poets at the time: D. Kopytsya, M. Shklyaruk, S. Bozhko, T. Ognevyk and others (about 100 members). In 1926, in connection with the relocation of many writers to the cities of the USSR, a branch of the Molodniak associations were characterized by uncertainty and variability caused by creative pursuits among artists. The peculiarity of this process was the coexistence of traditional national forms with trends which were new for Ukrainian literature [5, p. 74].

There was almost no writer who did not begin his literary career with a newspaper or magazine. It is no exaggeration to say that the magazine literature of Podillia was the main form in the literary process of the first half of the 1920s [4, p. 13]. The newspaper was the most operative informant in the field of novelties of literature, so to say, a transitional stage of the reader to the book. A significant role in the dissemination and popularization of literature in Podillia in the 1920s was played by the then well-known magazine "Red Land", which was published in Vinnytsia since 1924.

In November 1922, the literary and artistic circle of the Vinnytsia Institute of Public Education named after Lesia Ukrainka restarted its work. The group was led by Melnyk (chairman), Shmal and Kurban (board members), but in December Kurban resigned and was replaced by Gontkovsky [3, p. 59]. The members of the circle published the literary magazine "Strumky", edited by Schmal. At literary gatherings literary novelties were presented; their critical analysis was carried out. Other writers from Vinnytsia region took part in the gatherings in addition to the members of the circle.

The names of Caesar Andriychuk, Volodymyr Svidzynsky, Trokhim Ognevyk, Prokhor Voronin and others became the pride of the literary life of Podillya.

The origins of the Ukrainian turnabout can also be deduced from the appearance of printed publications in the 1920s, which began to defend the ideas of Sovietophilism. Thus, from February 1920 to October 1921, the Foreign Group of the Ukrainian Communist Party, founded in 1920 in Vienna by former members of the Foreign Group of the Ukrainian Social Democratic Workers' Party, published the weekly "Nova Doba",

edited by Volodymyr Vynnychenko and Volodymyr Levynsky.

In 1920, a foreign delegation of the Ukrainian Party of Socialists-Revolutionaries (UPSR) launched the magazine "Fight – Overcome", which was periodically marked by publications with Sovietophilistic sentiments.

One of the ideological bastions of the "Zminovikhivtsi" was considered to be the magazine "Nova Hromada", which was published in Vienna during 1923–1924. It was edited by Semen Vityk, a well-known Galician Social Democrat with communist sympathies, who believed that the overthrow of Soviet power in Ukraine could lead to the decline of independent Ukrainian culture [6, p. 201].

It was in these publications that representatives of the Ukrainian emigration testified to their attempts to look at the USSR and the future of Soviet Ukraine in a different way.

In 1921, M. Hrushevsky wrote an open letter to the Prime Minister of the USSR H. Rakovsky, which, in particular, contained the following lines: "On the part of the ruling Communist Party, it seems to me that there was a desire to use Ukrainian forces as a structural element in building Soviet Ukraine paying tribute to Ukrainian national needs and aspirations. On the other hand, on the Ukrainian side – even among non-socialist elements – there was a growing desire to set aside the old accounts and the entire history of the USSR, to take from the Soviet regime everything it could give to consolidate the achievements of the revolution and meet the cultural and national demands of the Ukrainian people, and at the same time to support the Soviet regime, as it would be guided by the interests of the region and not only by name, but by the deeds would be the government of Ukraine. If these mutually approaching currents came together and shook hands, in the process of work, with mutual desire, the misunderstandings and prejudices that meet on both sides could soon be smoothed over" [2, p. 195]. This letter can be considered a kind of "program document" of the Ukrainian Zminovikh movement.

At first, the appearance of Ukrainian Zminovikhivtsi came as a surprise. Yu. Kotsyubynsky and O. Shumsky at the initial stage of their work as ambassadors of the USSR, not yet having the proper experience, did not consider the possibility of widespread development of the Zminovikh movement among emigrants. "The issue was referred to Comrade Kotsyubinsky, and the latter, not yet aware of the state of emigration, together with Comrade Shumsky decided that among the Ukrainian intelligentsia not only there is no change of milestones, but there can be none." Subsequently, Soviet diplomats in the process of getting acquainted with the socio-political life of emigrants changed their view on this issue [8, p. 71].

In May 1920, Volodymyr Vynnychenko, the former head of the Ukrainian People's Republic Directory, was one of the first to look for ways to return home and even paid a study visit, during which he received offers of cooperation and the position of deputy chairman of the USSR Council of People's Commissars. However, he refused and returned abroad.

Representatives of the Ukrainian emigration, such as P. Andrievsky, A. Makarenko (ex-members of the Directory) and General Oleksandr Grekiv, wrote a letter to the USSR mission in 1921 requesting amnesty. In Vienna, Soviet diplomats also held talks

with Mykola Shrag, one of the organizers of the foreign mission of the Ukrainian Party of Socialists-Revolutionaries in Vienna. The return of Ukrainian politicians to Ukraine was discussed [5, p. 624]. The Bolsheviks promised emigrants the opportunity to engage in cultural and educational activities for the benefit of the Ukrainian people in case of their return to the USSR.

It should be noted that from the very beginning, Ukrainian Zminovikh members were criticized by both the left and right camps of the Ukrainian emigration. Thus, one of the leaders of the USSR Mykyta Shapoval considered Zminovikh movement a betrayal of Ukraine and socialism [1, p. 385].

Of course, the Bolsheviks sought to use Sovietophilistic sentiments to their advantage. At the same time, they themselves admitted that they received this trump card without much effort. In particular, Soviet diplomats noted: "The main circumstance (the appearance of Ukrainian Zminovikhivtsy. -M.M.) was still, of course, not our work, but the very fact of the emergence of our missions in Europe, the independent speech of the Soviet Ukraine" [9, sheet 71].

The largest centers of Ukrainian emigration were located in Austria, Germany and Poland. Therefore, the USSR received the right to open diplomatic missions in these countries.

In our opinion, the reason for the emergence of Ukrainian Zminovikh movement should be sought deeper than in the simple bribery of the Soviet government, which in the early 1920s simply had difficulty financing work abroad. Despite some support from outside (from the Bolsheviks), we can talk about the demand for such ideas that existed in the emigration environment. In the early 1920s, Soviet plenipotentiaries lacked funding. For example, the Galician Communist newspaper "Nasha Pravda" (Vienna) was published in part at the expense of Ukrainian emigrants in America. In the summer of 1922, the newspaper was threatened with closure due to lack of funds. The Galician Communist press played an important role in the "Sovietization" of Ukrainian emigration, as noted by Soviet diplomats: "A thousand copies are sent to America, five hundred are transported illegally to Galicia, the rest are distributed in other countries of Ukrainian emigration. America pays for about half of the publication" [15, p. 212].

Even those modern researchers who interpret "Ukrainian Zminovikh movement" as a result of the activities of Bolshevik agents admit that the "turners" expanded the Ukrainian segment in the Soviet space with their work in the cultural, educational and scientific fields [5, p. 27].

Of course, the Ukrainian "Zminovikhivtsi" differed in the reasons for their cooperation with the Bolsheviks, ideological and political convictions, and so on. They failed to develop a clear common ideology: "As for the ideology, it should be noted that the situation is very weak in our Zminovikh movement. The ideologues of the movement themselves admit this" [8, p. 76].

Soviet officials were wary of Ukrainian Zminovikhivtsi: "As you can see, we have to deal with completely crude material and we will have to confuse ourselves to adjust the appropriate ideology to the vague aspirations of our Zminovikh movement members, and keep a sharp outlook to make sure that in the heat of controversy their ideology will not develop into something unexpectedly undesirable for us" [91, p. 92].

Nadezhda Surovtsova (1896–1985), an employee of the foreign policy department of the Ukrainian Central Rada, the Ukrainian People's Republic, the Ukrainian State, the Directory of the Ukrainian People's Republic, and the author of the New Community, can be named among the brightest representatives of Zminovikh movement [6, p. 198]. While in exile, she gradually became interested in the ideas of Marxism and became a member of the Austrian Communist Party.

She noted that Sovietophilistic sentiments also spread among people from Western Ukraine: "Students from Western Ukraine who were studying at the time read with enthusiasm with me. They were Mykhailo Chichkevich, Petro Demchuk, Vasyl Kossak "[13, p. 5]. The achievements of Ukrainization in the USSR were especially noticeable against the background of the unsatisfactory situation of Ukrainians in Poland. The population of Western Ukraine was Polonized at a time when the number of Ukrainian-language educational institutions in the USSR was steadily growing. Many people from Western Ukraine immigrated to the USSR during the 1920s.

N. Surovtsova actively participated in propaganda work in the Republic of Austria and in other countries. In 1924, she spoke at meetings of Ukrainian emigrants in the United States and passed on communist literature in agreement with the RSFSR envoy Mykola Krestynsky. In 1925 she returned to Ukraine, where in 1927 she was convicted.

Until 1925, N. Suvortsova's requests for repatriation were rejected. The Bolsheviks sought to use Ukrainian emigrants abroad. In 1921, the envoy of the USSR in Vienna had the following instructions: "We consider declarations of full loyalty and a break with Petliurovism and all the past as a precondition for the amnesty of your group <...> All negotiations should be held with them in Vienna. The second condition should be work abroad as foreign Zminovikhsts. It is necessary to use them abroad to decompose emigration before letting them into Ukraine" [12, p. 149].

Among the Ukrainian prisoners of war who were still in Austria after the First World War, on the instructions of the Soviet embassy, propaganda work was carried out to return them to the USSR, in which the Zminovikhivtsi took part [11, p. 8]. On March 17, 1922, the Politburo of the Central Committee of the Communist Party of Ukraine passed a resolution "On amnesty for soldiers of the Wrangel and Petliura armies" [5, p. 479]. Thus, the Bolsheviks tried to deprive their opponents of a source of recruitment. In 1921, representatives of about 3,000 former soldiers of the Wrangel Army, who came from Ukraine, appealed to the USSR mission in Vienna to help them return to their homeland.

During the 1920s, "Zminovikh movement" remained a controversial and complex phenomenon of Ukrainian political thought. Disappointment after the defeat of the UPR and difficult social conditions led to the growing popularity of new ideas. Some leaders of the Ukrainian democratic parties expected that the Soviet government would continue to evolve toward the independence of the USSR. Zminovikhivtsi believed that the state, pursuing a policy of Ukrainization, provided an opportunity to develop the Ukrainian national culture. They saw their return to Ukraine as a way to join the development of Soviet Ukraine, hoping to expand Ukraine's independence in the USSR.

Such figures as Mykhailo Hrushevsky, actor and director Mykola Sadovsky, poet Volodymyr Samiilenko, politician Pavlo Khrystiuk, economist Mykola Shrah, member of the USSR Mykola Chechel returned to Ukraine. Of course, the motives for the return varied. We can talk about the lack of a single ideological and political base among the "Zminovikhivtsi". The Bolsheviks did not always give permission for the arrival of emigrants, because they were afraid that, getting acquainted with the realities of the USSR, they would realize the contradictions of Soviet reality, as happened during Volodymyr Vynnychenko's trip to the USSR in 1920 [11, p. 149].

In 1923, Yakiv Demianovych Kachura, the author of a number of short stories, novels and novels, who belonged to the Union of Peasant Writers "Plow" and the All-Ukrainian Union of Proletarian Writers, began his literary work. In 1925, the short stories "Two Forces", "History of One Team", collections of short stories "Without Bread" (1927), "Funeral" (1929) and others were published in separate editions. The novel "Fumes" (1929) covers the events of World War I and the Civil War. One of the most famous works of the author is the novel "Ivan Bohun" (1940) [4, p. 3]. In the essays of the Second World War period he reflected episodes of frontline life.

Conclusions. The activity of artists of the period of national and cultural revival of the Ukrainian people in the 1920s testifies to the fact that the literary process both in Podillia and throughout Ukraine developed under difficult conditions of Soviet reality. Some artists in the conditions of the formation of a totalitarian regime, having lost their freedom of creativity, were forced to switch to pro-Soviet positions; others tried not to give up their principles, for which they were persecuted and repressed. However, their love for their native land united them, and their work became an indisputable achievement of national literature.

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12. CSAPAU, f.1, op. 20, file1035, sheet 149.

13. CSAPAU, f. 302, op.1, file 1, sheet 5.

14. CSAPAU, f. 302, op.1, file 1, sheet 8.

15. CSAPAU, f.1, op. 20, file 1035, sheet 212.

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