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ECONOMICS

FEATURES OF ECONOMIC POLICY COORDINATION OF ARAB COUNTRIES-PARTICIPANTS OF REGIONAL INTEGRATION ALIGNMENTS

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Annotation. The article analyzes modern processes of coordination of economic policies of Arab countries belonging to various regional integration alignments, the most common forms of their effective interaction. A description of disintegration and fragmentation, globalization and localization as contradictory and ambiguous tendencies of development of the international economy in the context of inter-Arab cooperation is given. Five prediction scenarios for coordination of the economic policies of the Arab states have been investigated.

Key words: integration, globalization, coordination, regional integration alignment, Arab region, oil exporting countries, prediction scenario.

Introduction. Under conditions of globalization, the harmonization of political and socio-economic relations with the use of international integration mechanisms is an important tool for forming an economic paradigm of integration cooperation. With their significant potential not only for their own economic development, but also for influencing global economic processes, the Arab states participating in regional integration alignments (RIAs) occupy an intermediate position among the countries of the world community in the conditions of global transformations and new challenges according to the degree of their involvement in the processes of international economic integration. Modern economic policies of Arab states participating in regional integration alignments are coordinated ambiguously. These processes are determined by significant differentiation in their economic development, access to raw materials, potential of foreign exchange earnings, and practical macroeconomic policies used by national governments. In this regard, it is important to analyze the changes of selected strategies, their diagnosis according to the programme-target components, their features of strategic planning and controlling, as well as development of prediction scenarios.

Literature Review. Significant contribution to the study of the theory of economic integration was made by such scholars as E. Benois, O. Bulatov, G. Kassel, J. Monneau, A. Predol, J. Ruff, V. Sidenko, S. Sokolov, M. Strizhnev, P. Trofimova, A. Filippenko, L. Fytuni, V. Halstein, Y. Chentukov, R. Schumann. The peculiarities of the economic development of the Arab countries of the Middle East and North Africa (MENA) are the focus of attention of such researchers as R. Burton, Y. Bocharova, G. Diergi, P. Dicken, F. Clermont, R. Cox, N. Reznikov, E Smith, J. Stiglitz, W. Harners and others. At the

same time, a number of significant research problems on participation of these countries in the processes of international economic integration remain unsolved such as: trends in development of regional and transregional integration processes with participation of the Arab states, and fragmentation of institutional provision of economic policy coordination in the context of development of integration of countries.

The Research Objective and Results. In the context of identifying stability determinants of various types of integration associations in accordance with the strategy adopted by their participants, theoretical and methodological principles for studying the interaction forms and coordination problems of international economic policy of countries are of particular importance. On the one hand, the low level of the integration goal in the structure of 'neo-independence–cooperation–integration'generates contradictory processes of accumulation of stagnation and disintegration conditions, because of the logic of stage determinism. On the other hand, transnationalization and building the foundations for supranational regulation are objectively accompanied by regulatory harmonization and gradual elimination of government regulatory functions in accordance with reconfiguration of economic growth poles and the world's 'centres of power'.

Adherents of the system of regulation of international cooperation in economically backward countries (distribution of final profits not in their favour and conscious choice of the secondary role of suppliers of raw materials or cheap labour) and underdeveloped countries (underdeveloped potential due to ignoring growth potential and inadequate self-positioning in the economic environment) do not offer a single recipe for economic success. As the new interstate technology specialization preserves the bipolar zoning – the civilization centre–periphery zone – in modern conditions, and is based on functional limitations of post-industrial structures, the contradiction between the benefits of openness and the threats posed by such openness determines the dependence of economic growth and national prosperity of the RIA member-states on the exogenous factors in the processes of regionalization. The latter (for example, preservation of factor mobility constraints, institutional determinants and regulatory barriers) are directly proportional to the sensitivity to changes in the global situation, the levels of 'closedness' of the integrated economic space, and the differentiation of production and consumption.

In conditions when chaotic events, disharmony, and destabilization are spreading in the world more and more rapidly in contrast to the effects of economic achievements (the law of entropy), initially, modern forms of interaction of RIA member countries in gaining benefits from the developing integration processes are influenced indirectly. Whereas, traditionally they determine the level of support for domestic investment sources (institutional provision of economic development and the quality of macroeconomic policy, and political and legal stability). In other words, we are talking primarily about flows of financial capital (primarily sectoral), which are directed specifically to those countries where, firstly, financial sector development enables its more active and widespread use under the condition of stable functioning of the relevant institutions regulating its activities. Secondly, there are favourable geographical conditions for the production of a product with innovative features. Third, the solvent demand is formed under the influence of a more or less modal structure of market actors involved in the movement of 'hot money', the cost of labour and other elements of the integrated economic system. The polycentricity of the global economic space (in spite of the announced homogenization and heterogenetization) establishes legitimate hybrid forms of cooperation:

• among individual regional alignments;

• among regional groupings and individual powerful countries;

• biregional and trans-regional relations not always limited to specific regional groups (may include countries from more than two regions).

The third wave of globalization has demonstrated the destructive effects of regional affinity of countries manifesting themselves in conflict disintegration – a combination of centripetal forces, mainly on the level of interaction between countries with extremely high destruction rates (as a result of political conflicts). The causes of disintegration can be both internal and external: currency and debt crises of the global financial market, changes in the prices of the international loan capital market, and the geography of global investment flows, the scale of crisis fluctuations that covers trade and the real sector from country to country (the 'domino' effect).

Dominating typical forms of disintegration 'from above' or 'from below' determine its speed – whether high (conflict, shock) or low (stagnant, divergent). At the same time, it is difficult to anticipate changes in players' preferences under the influence of the process of integration and the awakening of 'sleeping institutions' under compulsory integration conditions (not self-reproductive expectations). According to N. Reznikova, "integration and fragmentation, globalization and localization, as contradictory, but inextricable tendencies in the development of the international economy, form new processes of framegration and globalization" [1, p. 144-156; 2, p. 8]. Indeed, today the institutionalization of economic cooperation between countries takes place in the context of the formation of: a) in-depth and extended forms of classical stages of international economic integration – free trade zones and customs unions; b) megaregional currency, banking, insurance, power, innovation alliances and trade integration mega-formations and, in particular, sectoral (sectoral) economic unions based on adaptation of the interstate coordination policy to the needs of international cooperation. The latter's effectiveness depends, firstly, on the level of prudential supervision and financial regulation, which is extremely important for the implementation of optimal monetary and fiscal policies (the technical aspect).

Secondly, on the functioning institutional structure with the appropriate set of longterm rules and emerging expectations, interests and behaviours (from informal to formal commitments), since historical practice shows that international coordination policy is possible only if the institution is created.

Thirdly, on preservation of the existing 'political behaviour' (preservation of the political regime), since policy-makers possessing investment resources will have an incentive for cooperation to preserve it. Thus, successful international cooperation is a

specific tool for preserving the regime.

Fourthly, on the peculiarities of reaching agreement between the countries on the technical as well as economic and financial aspects of the policy, which creates adequate prerequisites for their policy coordination [3].

Strategic interdependence and international economic policy co-operation can be interpreted through the theory of games based on the classical 'the prisoner's dilemmas', and in this case, players are the governments of countries that resort to different strategies to achieve their goals, both fixed and flexible (compromise, compensation, etc.). K. Hamadi's diagram and Nash-Cournot and Stackelberg scenarios [4, pp. 187-190] provide an opportunity to analyze the effectiveness of coordinated actions in the context of their agreement and according to the configuration of each country according to a model demonstrating international interdependence. 'Different speed' models of integration determine the deep integration of one country with respect to the group of RIA member states, which can itegrate based on jointly developed criteria. In this regard, the fundamental law of universality providing for existence of differences defines both the common level of integration of all CIA participants and, at the same time, the flexibility that manifests itself in the phase of implementation of the planned initiatives of each individual country.

The integration model "for all" [5], like the models of concentric circles, provides for the possibility of a constant choice by the RIA member states of their own policies, regardless of the previously selected 'membership package', which is a more functional form (focusing on politics) than a geographic one. It is worth noting, that according to the theory of clubs [6], which became the development of the integration model "for all", it is proved that:

1) production costs within the zone of the RIA are reduced (economy of scale);

2) the guarantee of "four freedoms" (free movement of goods, services, labour and capital) stimulates the domestic market by unification of trade rules and introduction of uniform environmental and commodity standards that ensure consumer protection;

3) static and dynamic increase of the efficiency of production in the RIA zone leads to an increase in the efficiency of resource allocation;

4) optimal use of fiscal policy and investment in infrastructure and social projects have a positive impact on the spillover effects (Nash equilibrium – all RIA member countries get their benefits).

5) the level of cooperation based on combination of implementing monetary and trade policies determines the 'optimum factor' by F. Etro (the relation between the elimination of the spillover effects and the heterogeneity of costs for different strategies of cooperation between the RIA member countries) [7].

So, the advantages for RIA member countries' policies coordination are broadly increasing, but they have an even greater effect for countries that implement the strategic complementarity policy.

Although interdependence involves certain benefitial systemic economic interaction of countries with each other, in reality one of the participants in the trade dyad can depend

more on the other, firstly, on the degree of symmetry or even distribution of comparative advantages, and secondly, on the amount of relative winnings (the level of vulnerability and sensitivity), and thirdly, according to the structure of the economy and the exchange relations (time dimension of domination). Under these conditions, economic development is transformed into a dominant modification of the existing specific development models for each region in their plurality and variations. In addition, the structural dependence involves a variety of forms of resource and technological dependencies – specialization, terms of trade and the level of market liberalization, highlights of the access to financial resources; investment-innovation cycles and more.

Cooperation in the field of economic policy, political and integration cooperation have recently not only turned into the most common forms of interaction of countries with each other during the third wave of globalization, but have also affected the significant transformation of the role of the state. The further development of the subordination principle and strict hierarchy of rights and norms adopted by institutions is the basis of elimination of centroperipheral fragmentation of the world economy based on the new format of inter-country interaction and their movement towards symmetry in the context of formation of common rules of cooperation. The cause-effect relationships 'violent liberalism – technological dependence', 'forced competition – trade dependence' lead to the situation where mutual (symmetric) benefits and expenditures of economic policy coordination are ranked as high, medium or alternative.

Modern changing intentions of capital flows dictated by the interests of both TNCs and donors of investment capital (external factors) influence the dynamics of changes in the economic activity of RIA members; as a result transformations inherent to the age of unprecedented transnationalization have a different effect on the economy of the member states. Cross-country interaction lies in the plane of multiple coordinates – from TNCs, rating agencies, international financial organizations (including G7 / G8 / G20), trans- and mega-regional trade agreements to meaningful keynotes in determining the major economic interests of states. Well-considered decisions of the latter influence the forms (inherent to the diffusion of globalization) and the pace of transformation of destructive symbiotic dependence into the balanced synergetic interdependence of the countries. In its turn, a wide range of multi-vector interconnections subordinated to the global and regional integration levels forms a complex metasystem of relations between the RIA members.

While trade and economic integration remain central aspects of the continuous change in integration schemes in the countries of Middle East and North Africa (MENA), the so-called wave of new regionalism has begun since the mid-2000s introducing certain adjustments in interpretation of the phenomenon of regional integration as a multidimensional process (symbiosis of the economic union, politics, diplomacy, security, and culture). At the same time, foreign trade at the subregional level has always played a key role in the process of implementing integration initiatives and the formation of the national economies of the countries of this region. The Arab League, as a collegiate body, initiated the process of studying the prospects for improving inter-Arab trade in

the early 1950's, realizing that this trade could catalyse the socio-economic progress of each country.

The first step was the Special Agreement on Facilitation of Transit Trade by providing the most-favoured-nation regime with issuing export and import licenses and facilitating transit traffic. However, the system of import licenses created barriers to regulating trade flows between countries, reducing customs duties was not accompanied by abolition of other foreign trade restrictions (contingent and import licensing, control over currency exchange, etc.). Despite the Agreement on the Uniform Customs Tariff, many bilateral agreements already provided for concessions under multilateral agreements [8; 9].

In the 1970's and 1980's, the volume of trade increased from about \$ 2 bln. in 1971 to almost 28 billion dollars in 1981 due to rising oil prices. The average annual growth rate of the Arab goods trade for 1971-1981 was 130%. However, over the period 1982-1992, it fell to 98.9%, due to fluctuations in fossil fuel prices, single good national economies, and persistent differences between countries on energy pricing issues within the OPEC [10]. The Arab League oil exporters have been striving to develop a single oil and gas pricing policy for all Arab countries; at the same time, they have been adhering to an expressively excluding decision-making strategy, thus not contributing to an increase in mutual understanding and trust. The situation changed in the early 1990s-2000s, when the value of bilateral trade more than doubled (from 1993 to 2003 from \$ 22.3 billion to \$ 46.7 billion). However, this growth was not at all consistent and stable, and very differed from country to country in the Council of Arab States of the Persian Gulf and the states of North Africa (Arab Maghreb Union) [11, c. 161].

The analysis of statistics of the last decade shows that the average share of inter-Arab trade in the total trade volume of Arab countries does not exceed 10%, i.e., it plays insufficient role in the development of the economy of this group in general. For example, for Algeria, Mauritania, Tunisia, Kuwait, Libya and Egypt, it is less than 7% (Saudi Arabia – 7.31%) of the total foreign trade of each of these countries. However, for individual countries – Somalia, Sudan, Bahrain, it reaches 39%, 33% and 29% respectively. In addition, the regional trade has decreased in the countries not included in the integration alignments of the Council of Arab States of the Persian Gulf and the Arab Maghreb Union (except Egypt), and among the Arab Maghreb Union countries, the lowest increase in union, including mutual, trade was in Morocco and Algeria. In general, the Arab countries rank last in such integration groups as ASEAN, ECOWAS (Economic Community of West African States), all Latin American alignments, not to mention the EU and NAFTA [12].

Unfortunately, the current situation does not contribute to the full realization of the potential in the interests of economic development of trade partners of the Arab region, and does not reflect the opportunities available to meet their needs. According to the World Bank data, the MENA countries have sufficient reserves to expand foreign economic relations with the countries of the region and trade with other countries by specialization:

• production of fresh, dried and frozen agricultural products - Morocco, Egypt,

Tunisia and Syria;

• production of fresh and frozen livestock and fisheries' products – Egypt, Morocco, Iraq, Syria and Djibouti;

• fabrics, ready-made clothes and leather goods – Egypt, Tunisia, Jordan, Iraq, Morocco and Syria;

 household goods, refrigerators, heating appliances – Tunisia, Egypt, Syria, Kuwait and Jordan;

• phosphates, iron ore, refined copper, potassium salts and sulfur – Saudi Arabia, UAE, Kuwait, Algeria, Morocco and Tunisia.

• petroleum, liquefied gas, petrochemicals and fertilizers – Kuwait, Saudi Arabia, Algeria and Libya;

• iron ore, refined lead and aluminum – Egypt, Bahrain, UAE and Algeria;

• sertain types of equipment for manufacturing industry, finished and semi-finished industrial products – Egypt, Syria, Algeria, Tunisia [13].

For example, Algeria and Egypt have a relatively developed industry, including heavy, and could export a wide range of industrial goods to Arab countries, from heavy machinery to textiles and household goods (on the contrary, foreign products of the same type take about 30% of foreign exchange funds allocated for import). In this regard, displacement of non-Arab countries by Arab partners without loss of export earnings is promising in terms of opportunities for reorientation and adjustment of trade relations of Arab countries. On the one hand, the cooling of relations between the parties to the agreements, the change in the political situation often paralyze contracts designed to weaken and eliminate existing trade restrictions or to prevent the introduction of any new ones. On the other hand, many existing inter-Arab agreements are not implemented as a result of the reluctance of the parties to comply with all the conditions, most of which are adopted too quickly, without sufficient economic justification, consideration of the consequences of implementation or without any real assessment of the possibilities of their implementation (not to mention adoption of decisions pursuing political or other non-economic interests).

Despite the need to eliminate any political barriers to development of trade within the Arab community stipulated by the 1981 Agreement (on introduction of additional privileges for Arab countries within the framework of the inter-Arab trade), the nature of interethnic relations largely determines the level of development of the economic ties of MENA countries (political motives often dominatle over economic). For example, there are agreements with non-Arab states for political reasons or within the framework of long-term financing programmes. Many existing Arab agreements are oriented on further inter-Arab trade based on coordinated development of national economies on a complementary basis, to this day there are cases of barter agreements between Arab and non-Arab states.

It should also be noted that, on the one hand, the Arab countries view the inter-Arab trade as a secondary one not securing their vital needs; on the other hand, there is a certain historical psychological pattern of the Arab consumer who prefers West European

goods at higher prices (adherence to non-Arab markets). In general, today, the inter-Arab trade is experiencing severe defeciences in mechanisms for stimulating exports at the regional level, as well as in institutions and funds for direct and indirect financing, and in regional control over export operations in respect of the specifics and quality of goods. In this regard, the effectiveness of the inter-Arab trade remains relatively low in spite of the continuous efforts of the Arab League bodies (primarily the Secretary General for Economic Affairs and the Council for Economic Unity) and specialized inter-Arab institutions – the Arab Monetary Fund (AUF), the Arab Investment Guarantee Organization, the Union of Commerce, Industry and Agricultural Chambers.

On the whole, the entire Arab oil producing region is facing quite tangible challenges and threats. They only differ when in some countries they are already rigorously manifested or tend to manifest with varying degrees of intensity; while others mask them by effective practice of adopting macroeconomic decisions regarding distribution of income from the sale of oil, development of infrastructure, comforts of living for the indigenous population, and stimulating entrepreneurship and foreign investment. We mean a coherent economic doctrine based on weighing the most general opportunities and options for development allowing us to identify the general trend for accumulating the potential for growth of oil exporters and finding their worthy place in the system of international division of labour.

Material production used to have the exclusive priority in formation of basic clusters in the economy, now this function is increasingly shifting to economic and social infrastructure. For oil exporters of the Arab region, it becomes a key component linking domestic markets and external investment interest in the region, on the one hand, as a new financial and industrial area, on the other - as a transit area by foreign investors, commodity producers and international suppliers of products and services. In other words, in an effort to completely monopolize their own region, to become the main financial actors here, the governments of these countries seek to minimize the risks, overcome the strong pressure from influential foreign partners by diversifying their international economic and political relations and expanding the scope of contacts with other counterparts of the modern system of international economic relations.

As a tool for strategic forecasting of regional development the scenario approach includes four key concepts (strategic diagnostics, strategic goal choice, strategic planning and strategic control) and two types of forecasts: 1) search/genetic – forecasting the development of processes of different levels and scales (including step by step description of possible changes in the situation); 2) normative/programme-target – planning and developing a system of actions aimed at achieving certain goals (the desired situation). At the same time, the two scenarios allow development of two ideas about the future, which are very different (pessimistic and optimistic); three scenarios give rise to the idea that one of the scenarios is predictable or optimal; more than three scenarios stimulate divergent type thinking and can be used to form certain ideas. In our case, five scenarios will be analyzed, which will provide an opportunity to predict the prospects for coordinating the economic policies of the Arab states participating in the regional

integration alignments.

According to the forecast scenario $\mathbb{N} = 1$ – Energy Forever – because of gradual exhaustion of oil and gas fields, the Arab oil exporting countries carry out the transition to: a) solar (helio-) power, which will allow to save those heavy industries which operate on local or imported raw materials and cheap energy (ferrous and nonferrous metallurgy, chemical industry); b) accelerated creation of national nuclear power. A similar forecasts are currently being developed by national and Western experts in Saudi Arabia and the UAE. The proposed development option (with the active use of foreign investment and substantial growth of non-oil sectors of the national economy), while maintaining the foundations of existing social policies, will negatively affect the level of national social security. Given the expectation of the emergence and introduction of new, revolutionary technological solutions to the problems of industry and transport, which can dramatically reduce the value of fossil fuels and raw materials, this scenario is most likely.

Oil and gas stocks in the MENA Arab countries (especially in the Persian Gulf states) will last for more than 100 years, and this should positively affect the overall situation there. THus, the explored oil fields in Kuwait can be exploited for 180 years at current rates of production, in Saudi Arabia – for more than 100 years, in the UAE – for 70-80 years, in Qatar - for 120 years (Bahrain is doubtful but it will 'stand' on supply and processing of oil from Saudi Arabia). [14]. The medium term demand for traditional fuels will remain stable, despite both high-tech innovations in the field of energy conservation and innovative activity of the MENA countries associated with borrowing, copying and participation in the development of alternative energy and environmental technologies, the process of diversification of the economy, infrastructure growth for future projects. Over the next 50 years, oil in Saudi Arabia, Kuwait, the UAE, Oman, and also in Iraq will not dry out. Although in industrialized countries, due to the search for alternative energy sources, there may be a certain drop in oil prices, but Arab oil exporting countries can offset this by reducing domestic oil production and expanding other sources of energy. In addition, possible internal social upheavals with confessional or political undertones can have a negative effect for these countries.

Return to the Desert – Forecast scenario \mathbb{N} 2 is an alternative development option after depletion of oil and gas fields. It essentially assumes that insufficient efficiency of solar energy and potential danger of nuclear power plants dramatically reduce opportunities for further development of the national economy. Due to this, as well as taking into account the significant decline in state revenues, difficulties in creating competitive enterprises in non-oil industry, attractive financial markets and recreational zones, the basic principles of increasing the economic potential of the MENA countries are changing. As a result, there is a process of the structure of the economy is simplified whose most dangerous consequences are the severe crisis of water and food resources, the outflow of labour and foreign workers from these countries.

Scenario N_{23} – Mediterranean Integration – is based on the trend of economic integration of the MENA Arab countries and the EU countries into a system of close economic partnership and cooperation. The larger scale development of solar power

and transportation of electric energy by submarine cables along the bottom of the Mediterranean sea transforms North African countries into new non-oil-based powerful energy exporters (even today, according to optimistic estimates, the potential of this group of countries to use solar energy fourfold outweighs the opportunities of all European countries). At the same time, EU countries are interested in the economic development of the MENA countries to prevent immigration of labour resources from these countries to Europe, and the rising cost of laboUr in China makes it expedient to shift energy-consuming and labour-intensive industries to other regions, including the MENA countries. Although the scenario of Mediterranean Integration was most feasible before 'Arab Spring', all internal problems of the region are so aggravated that Europe is abandoning many projects of close cooperation with Arab countries. For example, it is impossible to predict that Libya or Algeria will export solar power electricity to the EU given their big current oil and gas reserves. The ARE and Tunisia do not have necessary funds to develop such energy, and they still lack skilled labour even now, not to mention the transfer of production to North Africa, which requires significant investment in training (besides, energy is a well-functioning economy and it could hardly help to stop migration).

Arab Street scenario No4. In a situation of inevitable reduction of natural resources and growing contradictions between the levels of economic and political development in all Arab countries a socio-political conflict is arising. Unemployment and social injustice, along with overwhelming social expectations, are leading to marginalization of a large number of people, and their possible structuring and institutionalization under national and/or religious slogans - to political instability, thus impeding achievement of the goal of sustainable economic development. The Arab Street scenario is quite probable for the next 3-5 years at 75%, but with stability in the region up to 2050, the probability of this scenario can be 50%. In the case of a prolonged negative scenario, other countries – the EU, the USA, including Arab oil exporters, will be involved in localization of instability in the region, which will provide humanitarian and development assistance (at worst, the region becomes similar to the Palestinian Arab territories, Pakistan or Bangladesh substantially developing with external financial assistance). Lately discovered huge natural freshwater reservoirs below Sahara and Mauritania add optimism, as they can provide an opportunity to combine regional efforts for rational use of natural resources to solve food problems, export products, develop the food industry and partly increase employment in North Africa.

According to scenario N_{25} – Islamic Revival – the states of the region, having survived the 'Arab Spring', find firm authority in the person of Islamic parties and leaders undertaking organization and implementation of economic modernization with the financial and economic support of Turkey, Iran, Malaysia and Indonesia as technology leaders of the Islamic world and Arab oil-exporting countries. The use of the Iranian model – economic modernization under the authoritarian political regime and the traditionalist cultural and religious environment – can convince the EU, the USA, China, India, Japan and Korea in the political stability of the regimes and opportunities

for investing in the region. It is also possible that modernization in some Arab countries will follow the Turkish model in accordance with the Islamic Revival scenario. Although the process of globalization leads to unification, Islamic Revival is not synonymous with the Islamic Regime, authoritarian by definition (today, even in Saudi Arabia, the existing regime has more and more elements of a secular democratic state). In consideration of the heterogeneity and instability, this part of the Arab region will continue to stay flexible with slowing and accelerating economic development, struggle between creative and destructive tendencies (differences lying only in rates and intensity), following the direction of previous decades.

Indeed, the scenario approach is an effective tool for strategic planning, which allows finding solutions to the challenges of multivariate regional development from the unified position. However, a more complex prospect has been found for the Arab countries which do not export oil. Firstly, the content of the scenarios (especially the original ones) and the terms of their implementation are interpreted with significant difference. Secondly, the experts' opinions vary considerably in estimation of the scenario probability and realistic variants of development, bearing in mind significant economic, political and socio-cultural differences. If the global oil market is a unifying circumstance for oilexporters, which motivates the formation of more or less similar positions in line with the dynamics of global processes of energy consumption and the complex world market prices, for non-oil exporters, the impact of turbulence in the MENA region, complicated geopolitical and geo-economic situation, and the activity of world players in the region is ambiguous. That is, unpredictable occurrence of contingencies can contribute to emergence of unexpected circumstances and factors that can both substantially adjust the vector of development of the states under consideration or change the paradigm of their development. For example, Libya, Iraq, and Algeria cannot be compared to the member states of the Arab Gulf Cooperation Council in terms of well-being, and they remain among states in the region which experience a difficult period of historical development with vague prospects.

Conclusions. Under the influence of such imperatives as reducing food and water resources, increasing role of demographic factors, present environmental threats, the Arab states participating in regional integration alignments will search for new solutions. On the one hand, they will search for directions in coordinating the economic policies of Arab states. On the other hand, they can choose forms of enlightened, feasible or any other authoritarianism to fit more adaptive models and management tools. However, in other equal conditions, the latter should include at least a metered national dialogue, compromises in line with the progressive processes of modernizing economic structures and national interests. Modern Arab countries are highly differentiated – uniformity cannot be achieved due to fundamentally individualized ways of their evolution. The process of their convergence and coordination of national policies will depend not only on equalization of indicators of their economic growth, but also on the growth, nature and pace of mobilization of internal and external sources of accumulation and the volume of material, technical and financial support for development processes. This gives grounds

for asserting that in general the position of the group of countries in question is reactive in many respects, but the tendency to palliative solutions to the problems will persist for decades. Although some of the Arab countries are WTO members and participate in IMF and World Bank programmes and projects, their unwillingness to accept Western standards prevents their integration even in neighbouring industrial clusters in Europe, not to mention a wider range of international integration groups.

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THEORETICAL BASIS OF THE STUDY OF GLOBALIZATION AND ITS IMPACT ON DEVELOPMENT OF THE WORLD ECONOMY

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Annotation. This article examines the basic concepts and methodological approaches to the phenomenon of globalization. Attention is also paid to the effect of globalization on countries. *Key words:* globalization, advantages, disadvantages, hyperglobalists, skeptics and transformationalists.

Relevance of the study. Global cooperation between countries characterizes the current state of the economy. The impact of globalization on the world economy and the economy of an individual country is becoming ever more tangible. This interaction occurs not only in economic life, but also has political, social and even cultural and civilizational consequences. It is quite difficult for a country to remain closed considering the limited resources, capabilities and current trends. Therefore, there is a need to study globalization in a theoretical and practical sense.

For a full understanding of the relationship between the economic development of a single country and globalization, it is important to study theoretically the essence of the concept, basic manifestations, features, and so on. Features and effectiveness of interaction of objective macroeconomic phenomena with domestic economic processes are projected onto the general state of development of the national economy, and, consequently, on the standard of living of the country's population.

Analysis of research and publications. Fundamental studies of the theoretical and practical aspects of globalization are reflected in the scientific writings of many authors, including David Held, David Goldblatt, Anthony McGrew, Jonathan, Hirst and Thompson, Thompson and Allen, Wriston, Guehenno, Strange, etc. However, wide problems and dynamic changes in internal and external conditions in relation to the subjects of globalization require constant studies of essential characteristics and the disclosure of modern features of the development of this process

Setting objectives. The purpose of the study is to consider classical approaches to the essence of globalization, to explore the effect of globalization on world economy and draw their own conclusions based on previous studies in this field and current trends

Main study material. Globalization is a differentiated and multi-faceted process of strengthening the interaction of countries. The process of globalization encompasses not only key economic processes such as trade, which was inherent in the world, since ancient times. Today, cooperation between countries reaches cultural, legislative, social and even ecological sphere. The peculiarity of the phenomenon of globalization is magnitude. Therefore, the researchers of globalization determine this term as processes of gradual integration of the world community into a single space, existing under unified laws and legal rules, which in the end should lead to loss of diversity and uniqueness of societies and the diversity of different civilizations.

It must therefore be concluded that globalization is a human-made process, a sort of policy, aware control of which is often attributed to developed countries headed by the United States. For example, N. Abludghamidov and S. Gurbanov view globalization as a process with a unipolar nature, and define it as "the institutionalization of the system of neocolonial exploitation of the world economy by the imperialism of the dollar". A. G. Dugin and several other researchers also believe that all events within the framework of globalization take place in the interests of the United States. In this case, their main goal is to maximize the spread of the US dollar.

There are also radical points of view, such as a foreign researcher I. Wallerstein, who views globalization as an attempt to establish control of one civilization over the rest of the world, or as the establishment by one state of monopoly over world markets.

The authors of the book "Global Transformations Politics, Economics and Culture" oppose the globalization and integration, convergence, interdependence and universality. Researching term "interdependence", they emphasize the symmetry of power relations, when globalization allows a hierarchy. The term "integration" includes "the unity of historical destiny and the only institutions of power." From universalism, globalization differs in various degrees or methods of influence on the country. Analogous situation is presented between convergence and globalization, because globalization does not always have harmony and homogeneity [3, C. 34].

The main drivers of globalization are the international division of labor, internationalization and transnationalization. At the first stage, the international division of labor can be underlined: each country, specializing in production, in which it has an advantage over other countries, produces a certain surplus of products for export. The process of formation of stable international relations in the production and economic sphere, based on the international division of labor, is internationalization. Accordingly, the national economy is transformed into an international one. Historically, the internationalization of the economy begins with the internationalization of exchange. Gradually, the internationalization of the exchange turns into the internationalization of capital and the industrial internationalization. Internationalization causes a tendency towards openness of national economies, the erosion of tariff barriers and the removal of non-tariff barriers. If in 1947 the average level of import tariff rates was 50-60%, then in the late 90's it dropped to 9.6%, and in the future it could drop to 3%. The tendency towards internationalization is opposed to the tendency of the preservation of the identity and national uniqueness of the economies of different countries of the world. Thus, internationalization can be considered as the company's exit to foreign markets and strengthening its positions in these markets [4].

A natural result of the capital and industrial internationalization is the globalization of the world economy. Internationalization and globalization of production create a situation where practically any country is already unprofitable only with its own production. The movement of work force, training, exchange of specialists, technologies and information acquire international character.

The main driving force of the present stage of globalization is transnationalization.

Several hundreds of the largest giant companies determine the major proportions of the world production, the development of the most important sectors of the world economy. The aggregate power of some TNCs is comparable to either small or medium countries [9].

"If in the past even a large private business had to adapt to the procedures in force in one or another country, now affiliates of TNCs have an impact on the structure of its economy, employment, wages, and put forward requirements for the level of qualification of local personnel. The governments have fallen into the international industrial network. Countries are forced to rely on these external conditions and adapt to them ", - says Shishkov U.V. in his work "Realities of the modern economy and the archaic of the state regulation" [8]

Modern theories of globalization do not provide an unambiguous answer to the question of the connection of this process with the earlier stages of development of society. They have a number of approaches to understanding this process, which can be categorized according to several criteria. The most famous of them, to which several researchers came independently by highlighting three groups of globalization theorists are "hyperglobalists", "skeptics" and "transformationalists" [10].

Revolutionary globalism (hyperglobalism) represents the globalization of the future as a fundamental reconfiguration of the entire system of human actions. According to this theory, globalization is inevitable. Moreover, the country's exclusion from this process will lead to technological lag, economic stagnation, marginalization in the international community. Finally, country voluntarily or "under pressure of circumstances" will be included in global processes. Such approach was predominant after the collapse of the USSR [3].

Free competition and market should automatically guarantee the most rational and efficient distribution of resources and capital and lead to the formation of a global economic, legal and political space before the emergence of a new world economic order. National state is gradually losing its importance as a subject of international relations through the formation and development of transnational production, trade and financial networks [5]. National culture is gradually replaced by universal values. Global expansion of the values and institutions of liberal democracy also strengthens the formation of a single global civilization, which finds the forms of global governance represented by various types of transnational organizations such as the World Bank, the World Monetary Fund, and the UN Security Council.

The special place in the works of Fukuyama "End of history and the last man" is given to the United States. Particularly the authors view globalization as the establishment of American capitalism, culture, democracy. They believe that the United States is an ideal embodiment of all human aspirations and it makes no sense to try to create something else; it is only necessary to accept already existing system. Brzezinski emphasizes the attractiveness of the Western lifestyle among young people, while Fukuyama stresses Confucian Asia inability to overcome globalization coming from the opposite side of the world.

According to the theory of hyperglobalists, globalization is viewed through the economic prism and the modern world is a global market, global civilization and a global civil society (P. Dicken, T. Cowan, S. Latos) [8 6]. Among hyperglobalists there are two currents. The first scientists attribute the importance of market mechanisms to the government and the state's hegemony (T. Cowen). Another group argues that this is a more dismal spread of world capitalism (S. Latosha) [5].

Transformationalism - the assessment of globalization as an unfinished social transformation, open to political influence and able to change its character. From the point of view of the supporters of this theory, globalization is an objective phenomenon of the consistent development of the West and modernization. But they leave open the question of the sustainability of globalization as opposed to hyperglobalists.

The basis for the development of globalization is culture (M. Waters, P. Berger, R. Robertson, D. Tomlinson). The idea of a global market or civilization is refuted. Instead, the concept of a social hierarchy in all regions of the world takes place. The great modern city serves as a cutting edge of the globalization processes of many scholars of this direction (W. Hanners, D. Held, R. Robertson, D. Tomlinson, M. Albrow, W. Beck, E. King).

Another key idea of transformationalists is the significant role of the national state (D. Friedman, M. Featon, T. Luke, M. Mnakatsanyan, I. Vasilenko). Transformists argue that, under the influence of globalization processes certain mechanisms of self-defence are triggered, which call for the intensification and revival of national identity [4]. The European Union can serve as a confirmation to this. Among the population there is a question of nationality or separation of the national state from the European state. Citizens want to belong to a particular country not Europe as evidenced by the rejection of a single constitution. Yet the idea of a united Europe continues to support and expand the borders of the EU.

By comparing statistics, which from the 19th century have characterized the world flows of goods, investments and labour, sceptics concluded that the current level of economic interdependence is not unprecedented in history. For sceptics, globalization means a fully integrated global market. In their opinion, current the level of economic integration is below this "ideal type" and less significant compared to what was at the end of the 19 century. (in the era of the classical gold standard) (P. Hirst).

Sceptics singled out the processes of regionalization based on the concentration of the global economy on three financial and trade blocs: Europe, the Asia-Pacific area and North America (P. Hirst, G. Thompson, and others). Sceptics perceive globalization and regionalization as two opposite trends. D. Gordon and L. Weiss come to the conclusion that in terms of their geographical coverage the present international economy is much less global than at the time of world empires.

Despite the differences in the accents, sceptics are united in the idea that regardless of direction internationalization forces are not accompanied by the elimination of inequality

between the North and the South. On the contrary, there is an increase in the economic marginalization of many Third World countries as trade and investment flows in the rich North grow. According to many sceptics this inequality, contributes to the development of fundamentalism and aggressive nationalism, which refutes the idea of hyperglobalists about global civilization and divides the world into civilization blocks and cultural and ethnic closed territories which in turn refutes the idea of transformationalists of global culture.

Sceptics pay a lot of attention to the significance of the state. A. Cullinicos and his co-authors explain the recent intensification of the world trade and foreign investment as a new phase of Western imperialism, in which national governments are deeply involved as institutions of power of monopoly capital. R. Gilpin regards internationalization as a by-product of the multilateral economic order initiated by the United States which after World War II, gave birth to the liberalization of national economies [3, p. 7].

It is noteworthy that none of these three schools is bound up with any traditional ideology and with traditional look. Thus, one can find orthodox neoliberal views on globalization within the hyperglobalists along with Marxists. The concept of sceptics includes both conservative and radical thoughts about the nature of modern globalization. Moreover, in the framework of each great tradition of social research – liberals, conservatives, and Marxist - there is no single view of globalization as a socio-economic phenomenon. Marxists in their explanation of globalization turn to totally incompatible concepts such as the expansion of the monopoly of capitalist imperialism or conversely a radically new form of globalized capitalism. Similarly, contrary to its clearly orthodox neoliberal outlooks Omae and Redwood come to quite different conclusions about the dynamics of modern globalization and almost contradictory estimates. Hyperglobalists, sceptics and transformists show a wide variety of intellectual approaches and normative assessments [3, C. 4].

There is a large number of 90s literature that considers economic globalization as the successor to social democracy and the modern state of general welfare. In the same year, two opposing theories were brought out by different researchers. According to the first group, the concept of globalization as an "iron cage" hanging over all countries without exception reduces the state intervention and its progressive policy. According to the second concept, the influence of the world economy is not the same for all countries that was established during the experiment. In order to examine the effects of globalization in detail, certain factors need to be considered [3, p. 17].

First of all, the impact of globalization is based on economic factors. The first precondition for the development of globalization was the international division of labour. This phenomenon is inherent in the modern world. The optimal distribution of labour and the efficient allocation of resources are achieved due to globalization. They begin to interact with each other not only in the field of trade in goods and services but also in the specialization and cooperation of production, scientific and technological exchange, investment, the free movement of labour, monetary and financial contacts, which ultimately leads to raise of living standard.

Due to the internationalization of economies, most companies either took out the entire manufacturing business to countries with cheap labour force or went to foreign markets. Thus, economies of scale are provided, there is a reduction in costs, which contributes to lower prices. Consequently, conditions for sustainable economic growth are created.

The exit of companies into foreign markets intensifies competition within the country and also increases the competitiveness of its own state on the world stage. Aggravating competition stimulates the further development of new technologies, strong interconnection between countries and their rapid expansion in the global economy.

Such a system of cooperation between countries opens opportunities for access to mobilization of significant financial resources for the subjects of the world economy. Investors can use a wider financial instrument due to the increased number of markets.

In addition to the economic benefits of globalization, there are cultural, environmental and other. Globalization has formed the basis for addressing the problems of all humankind due to the possibility of uniting the efforts of the world community, consolidation of resources, coordination of actions in various spheres.

However, globalization also has negative consequences for the economy. In the short term, specialization in one industry, the export of its products or the export of overseas production leads to economic growth. And in the long run, it threatens the loss of competitiveness of non-export industries that further can lead to a reduction in the industry. Such trend is observed now. "It was hard to imagine, at my home, in Scotland, during my youth that it was possible to shut down about 300 coal-mining enterprises, leaving only a few. Now there are about a dozen of them. Shipbuilding as former economic pillar practically ceased to exist. There are only two or three operating shipyards. Heavy machinery also has disappeared. All this has led to radical and painful changes in society, "Alan Tate commented. The government needs adaptation measures: retraining of personnel, social support for the unemployed. All this requires public spending [1].

No matter how paradoxical it is, an example of a positive and negative impact of globalization at one and the same time is the transfer of production capacities by firms to countries with low wages. The negative aspect is the loss of jobs in the national economy and the worsening of the acceptor countries' poverty by increasing the concentration of capital in donor countries. From this economists are led by model 20: 80. 80% of all resources are controlled by the so-called "golden billion" which covers only one-fifth of the world's population. However, the nature of these relationships should be noted. Often, TNCs use a franchising system to expand their business. In other words there should be demand for a particular company's products in this market. Also we should remember about the fact of creating jobs in countries where they are needed. Moreover, the reason for leaving the company abroad for the national market is saturation of goods that with further production of goods would lead to losses of the company [1].

Potential danger is caused by labour mobility. The outflow of highly skilled workers at world scale contributes to the optimal allocation of resources. At the level of the individual state it reduces its competitiveness, makes labour cheap as low-level specialists remain. Also this situation contributes to crisis phenomena. In this question both options for a complete loss of a specialist and a temporary loss of work force are unfavourable. Migration of the workforce to countries with higher wages and their subsequent returns contributes to inflation as the money supply is artificially increasing in circulation, and national goods that could cover this surplus of money are absent. This problem was one of the causes of the Southern European Debt Crisis [1].

Globalization increases the volatility of the economy. Standard causes are the faster flow of capital, the acceleration of technical progress, the strengthening of the negative effects of false decisions. However, Diego Pisano, director of economic research at the National Coffee Producers' Federation of Colombia, in his scientific paper, "Globalization and the International Financial Crisis," points out the correlation between the degree of interconnection of the parameters of a complex system and the degree of its instability. "As was shown in the article by two biologists, published in 1970 in the journal Nature, an increase in the degree of interaction between the parameters of a complex system leads to a sharp increase in the degree of its instability" [11].

Another actual problem of globalization is "Americanization". America covers a wide variety of national markets due to the spread of TNCs known to the world: Pepsi, CocaCola, Procter and Gamble, Ford, etc. It's hard to find a country that would not know about Disney or McDonald's. Moreover, America leads not only economic activity but also cultural propaganda. The American way of life has become attractive to young people. There is no man who would not dream to go to America to study or to live. Synonyms of globalization often include "Americanization." The American political establishment uses this term to denote its right to interfere in any war in the US area of interests. Thus, the United States can actually intervene in any country in the world [7].

Globalization is a complex multicomponent process. The variety of forms of manifestation makes it difficult to analyse and requires a comprehensive consideration of influence in the economic, political, cultural spheres, and social spheres. According to the latest tendencies in the world social area can be crucial.

US reorientation to protectionist policies to meet the voters' desire for national production. Britain's Brexit can be considered as illogical in terms of the economy. The question of refugees in Europe can be considered open. These events reflect the importance of social analysis before economic in developed countries and raise issues of globalization of the world economy in the future. After all, despite the benefits of globalization, the disadvantages can be more influential.

Conclusions. Thus, comparing the theoretical and practical bases of globalization, we can say that researchers cannot reach a common view of the development of globalization. On the basis of this researches conclude the ambiguity and inconsistency of the phenomenon of globalization. This has been proved by economic examples. But given all the negative effects on developing countries and the potentially negative social impact on developed countries globalization causes a negative impact on the world but countries can no longer exist from each other. This situation raises the question of the

uncertainty of the future and its great dependence on the present moment.

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CONCEPTUAL PRINCIPLES OF REGULATION OF THE UKRAINIAN LABOR MARKET IN THE CONDITIONS OF CRISIS

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Annotation. The article substantiates the necessity of developing a national concept of regulation of the labor market, discloses its components: state regulation, self regulation and contractual regulation of the labor market, principles, priority directions of regulation of the labor market. The labor market in the conditions of crisis, mechanism of implementation and expected results. The directions of perfection of regulatory processes of the mechanism of the labor market on the basis of the developed concept are offered.

Key words: concept, principles of the concept of labor market regulation, priority directions, mechanism of concept implementation, expected results.

Statement of the problem. The long-term development of crisis phenomena in the Ukrainian economy creates significant obstacles to the socialization of the economic system, including in labor relations. The basis of social regression in modern Ukrainian society is the low productivity of the economic system, the significant technological lag behind the developed countries of the world, the insufficiency of the social partnership system. Modern challenges and threats to the economy structure and put forward new claims to the formation of the national economy structure and put forward new challenges to the processes of labor market formation and regulation. The current economic reforms in the state are focused on regulating the scope of official unemployment through the promotion of inefficient employment. At the same time, the Labor Code, a state strategy for the preservation and development of labor potential, has not been adopted in Ukraine.

Consequently, the new principles for the functioning, development and regulation of the national labor market should be realized through overcoming the crisis phenomena in the economy and achieving a productive type of employment. That is why the development of a mechanism for regulating the labor market as a coordinated interaction of state, contractual regulation and self-regulation of the labor market on the basis of the best world standards and peculiarities of complex domestic socio-economic processes under the conditions of the systemic crisis becomes extremely relevant.

Over the last four years, since the beginning of hostilities in eastern Ukraine, the state of the economy has deteriorated significantly, which has led to a decline in employment and an increase in unemployment, which contradicts the fundamental principles of national security. In Art. 6 of the Law of Ukraine "On the Fundamentals of National Security of Ukraine" as priorities of national interests, creation of a competitive, socially oriented market economy and ensuring the constant improvement of living standards and welfare of the population are noted.

In Ukraine, recently, a number of documents were adopted, which are aimed at stopping crisis phenomena and entering a new stage in socio-economic development. These are: The Strategy for sustainable development "Ukraine – 2020" [1], The National Human Rights Strategy [2], The Strategy of Modernization and Development of the State Employment Service [3], Resolution Cabinet of Ministers of Ukraine On Approval of the State Program for Implementing the Principles of State Anti-Corruption Policy in Ukraine (Anticorruption Strategy) for 2015-2017 [4], etc. At the same time, the Labor Code has not yet been adopted in Ukraine, there is no state strategy for the preservation and development of labor potential.

Modern challenges and threats to the economic growth of Ukraine put new challenges to the processes of labor market formation and regulation. There is a need to develop a concept for labor market regulation.

Analysis of recent research and publications. Theoretical and methodological basis of the study of the problem of conceptual foundations of the coordination of the interaction of market and state regulators of socio-economic relations, including the labor market, are devoted to the well-known theoretical researches, the founders of which are the representatives of classical scientific schools: A. Smith, D. Ricardo, A. Pigou, K. Menger, F. Wieser, J.B. Sey, F. List, R. Hall, G. Talok, J. Brouzon, K. Marx, D. Keynes and others. Problems of coordinating the interaction of state regulation and self-regulation of the labor market are devoted to the publication of VL. Minenko [5, p. 1-7].

The great important for the research is the works of domestic scientists devoted to studying the problem of combining excessive regulation of the labor market, on the one hand, and the weakness of legal and disciplinary mechanisms that control the implementation of established norms, on the other. Among them are S. Grinkevich, Y. Marshavin, Yu. Chernyavsky, I. Chayka [6, p.141-144; 7, p. 29-37; 8, p. 185-188; 9, p. 72-76]. O. Pyshchulina and her colleagues systematized the main negative effects of excessive regulation of the labor market [10, c.35-36]. A profound analysis of non-standard forms of employment were carried out by scientists A. Kolot, U. Husar, M. Lutsik.

As for study of the current state of the contractual regulation of labor relations in Ukraine and their impact on labor market regulation through the system of social dialogue, it should be noted that they are carried out fragmentarily.

All of the above-mentioned scholars focus their scientific work on the state regulation of the labor market; beyond this field of research, the concept of a combination of regulation, self-regulation and contractual regulation of the labor market remains to be developed.

The purpose of the article is to justify the concept of regulation of the labor market, which includes state regulation, self-regulation and contractual regulation of the labor market, principles, priority directions of regulation of the labor market in a crisis, the mechanism of implementation and expected results.

Result of the research. The purpose of the concept of labor market regulation is to clearly define the proportions of state regulation, self-regulation and contractual regulation of the labor market, justification of the limited level of state interference in the regulatory process for solving multifaceted issues of employment and social protection of the unemployed.

Principles of the concept of regulation of the labor market are the guidelines, basic provisions, norms of behavior, reflecting the most stable features of the laws and regulatory patterns, which must be observed in management activities. Principles of regulation of the Ukrainian labor market in the context of the crisis are: general (the rule of law, the provision of guarantees and freedoms of citizens, a high level of protection of the individual, social protection and social security of citizens); special (priority to achieve full, productive and freely chosen employment, harmonization of the interests of freelance workers, employers and society, the interdependence of the state, contractual regulation of the labor market and self-regulation, social dialogue at the national, territorial and production levels, systemic); additional, which are operating in a systemic crisis (countercyclical measures, a combination of an anti-crisis package of measures and regulatory strategies, the principle of the "corridor of optimal regulation", the principle of structured pre-assessment of regulatory measures according to certain criteria).

On the basis of the above-mentioned principles, priority directions of labor market regulation in the context of the crisis are formed. The provision of regulation of the labor market under the conditions of the crisis should be carried out through the improvement of the regulatory mechanism in the following priority areas:

• bringing of labor legislation in the part of labor market regulation, characterized by a combination of the modern legal framework and the laws adopted in the socialist past (the Code of Labor Laws of Ukraine) to the threats and challenges of the systemic crisis;

• improvement of labor legislation of Ukraine by eliminating disproportions of excessive regulation of the labor market, on the one hand, and the weakness of legal and disciplinary mechanisms that control the implementation of established norms, on the other hand;

• improvement of the sources of formation of the Fund of obligatory state social insurance of Ukraine in case of unemployment, the order of their use;

• creating conditions for reducing the level of informal employment, non-standard forms of employment;

• reorganization of the state employment service from the traditionally bureaucratic model into a modern service organization of a new type, which should act as an intermediary between the job seeker and the employer;

• achievement of the correspondence between the professional qualification structure of the workforce and the qualitative characteristics of vacancies through vocational training;

• improvement of the mechanism of contractual regulation of the labor market

through social dialogue and collective-contractual regulation;

• harmonization of the mechanisms of regulation and self-regulation of the labor market by differentiating the spheres of activity between the state and the market.

The mechanism of implementation of the concept of regulation of the labor market in the context of the crisis is the interaction of legislative, financial, organizational and personnel supports.

Legislative provision of regulation of the labor market is carried out by current laws and legislative acts of Ukraine and those that are planned for adoption. Implementation of the Concept requires adoption of the Labor Code, elaboration and approval of the Decent Work Program for 2016-2019 within the framework of the Memorandum of Understanding between the Ministry of Social Policy of Ukraine and the International Labor Organization, the development of a special state program on the return of labor migrants; adoption of laws of Ukraine: "On employment", "On vocational education", "On vocational education", "On the national system of qualifications"; updating the laws of Ukraine "On professional development of workers", "On the formation and placement of state orders for the training of specialists, scientific, scientific and pedagogical and labor personnel, training and retraining of personnel".

The main directions of improvement of legislative provision of regulation of the labor market should be:

• to exclude discriminatory norms regarding the rights of employers and certain categories of employees from the draft Labor Code (Articles 121, 22, 25);

• to consider ratifying the International Labor Organization conventions: No. 173 - on the protection of workers' claims in the event of insolvency of the employer (Part III); $N_{\rm P}$ 88 - about the organization of employment service; No. 181 - on private employment agencies;

• to make changes to the Law of Ukraine "On employment of the population" in terms of constructive cooperation with employers in promoting the effective employment of socially vulnerable groups of the population (first of all ATO and VPO participants);

• to increase the effectiveness of the supervision of compliance with labor law requirements by the State Service of Ukraine;

• to develop a mechanism for improving the division of powers in the field of regulation of the labor market between state and regional authorities, local self-government bodies;

• to provide legal legalization of the new forms of non-typical employment, which is widespread in the world in order to solve the problems of unemployment, search for new sources of labor and optimize its use;

• to ensure compliance of the legislation in the area of collective-contractual regulation with the needs for regulation of the labor market of Ukraine;

• to substantiate the criteria of representativeness of the subjects of social dialogue by employers, which will lead to the definition of the most representative organization of employers in the system of indicators (quantitative and qualitative);

• to improve of the current legislation of Ukraine in the part of synchronous

development and implementation of the General Agreement, territorial agreements, collective agreements;

• to harmonize the current legislation of Ukraine with regard to the delimitation of state regulation and self-regulation of the labor market.

The financial support of the state regulation of the labor market includes sources for the formation of the Fund of Obligatory State Social Insurance of Ukraine in case of unemployment, which is formed at the expense of a single contribution to the compulsory state social insurance.

The main direction of financial security improvement is:

• creation a Guarantee Fund in Ukraine to ensure the protection of employees' claims in the event of bankruptcy of the employer;

• legislative regulation of the growth of the number of persons paying a single social contribution;

• initiation of standards for the provision of social services to uninsured persons.

The organizational support includes the means of the state employment system through the employment service, organization of vocational training, retraining and professional development of personnel. The main areas of improvement are:

• the fastest way to put into operation the new Work Regulations of employment centers at all levels in order to meet the needs of clients, which will allow sensitively and without loss of time to respond to changes in the control facility;

• the introduction of a new type of service institutions - consulting centers, which solve the problem of ensuring the support of beginner businessmen from among the unemployed who received a one-time material assistance in the Employment Service to open their own business (individuals-entrepreneurs);

• the variability of the use of appropriate tools for situational management (rearrangement of priorities, rapid reorganization of organizational relations in accordance with the needs of clients within the Service, modernization of methods of interaction with clients);

• identification of new indicators of the success of the Service activity, the essence of which in targeting the achievement of the final result - the satisfaction of demand and supply of labor, based on providing quality social services to its clients;

• creation of units in the structure of the Service that will be responsible for forecasting the state of the labor market and strategic planning, analysis and control and implementation of such plans, their current adjustment, the study of regional imbalances in the labor market, the formation of a policy of labor interregional migration and "village-city" migration;

• development of strategies for regulating the labor market: organizational, structural adjustment, innovation, strategies of the relationship of the labor market with business strategies.

The personnel support is realized through the formation of highly skilled personnel of legislative and executive bodies, the Ukrainian state employment service on the latest methods, tools and instruments for regulating the labor market. The main areas of improvement of staffing are:

• definition of tools and methods of professional selection for vacant positions of managers and specialists, their evaluation and attestation;

• a new system for assessing the activities of employment centers by indicators of the provision of social services;

• the acquisition of employment skills by staff and professional competencies in the context of the introduction of a new Work Regulations.

Expected results of the implementation of the concept will be possible:

• to substantially improve the mechanism of regulation of the labor market in Ukraine, increase the level of employment, reduce unemployment;

• to change the role of the state employment service from a traditionally bureaucratic model to a modern service organization according to European standards, rebuild it as an intermediary between the jobseeker and the employer;

• to solve the problem of efficient employment of unemployed people with low competitiveness through the implementation of active employment programs in the labor market;

• to reduce unemployment to a level balanced with the structure and quality of the national labor potential, first of all, among young people;

• to improve the employment structure by creating new high-tech jobs radically;

• to reach the level of wages, adequate to the real cost of labor;

• to overcome large-scale poverty and reduce the level of social stratification to the European average;

• to create a powerful middle class and social structure of the European model;

• to solve the problem of employment and social protection of VPO, ATO participants and their families, the most vulnerable groups of the population at the state, regional, and individual levels;

• to enhance the interconnection of the labor market and vocational education;

• to introduce European standards of quality of social services provision;

• to resolve issues of social dialogue at the state, territorial and production levels;

• to limit the role of state intervention in the mechanism of regulation of the labor market;

• to reduce the threat of mass redundancies;

• to increase professional mobility of labor resources;

• to increase the efficiency of control and supervision in the field of labor, which will contribute to a significant reduction of violations of labor rights of citizens, prevention of discrimination in the workplace.

Conclusions. In the result of the investigation it was determined that the problem of labor market needs to be solved by developing an appropriate concept that combines the complex mechanisms of the state, contract and self-regulation of the labor market, taking into account the conclusions of this study. In order to overcome the negative consequences of the economic crisis, it is necessary, in developing the concept, to develop strategic priority directions of the mechanism of regulation of the labor market in a crisis. The need for convergence of the main strategies of socio-economic development, achieve appropriate social standards of the EU - the requirements of today.

Prospects for further research are the integrated combination of all regulatory processes of the labor market mechanism based on the concept of labor market regulation in a crisis.

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A NEW DAWN: POSSIBILITY OF REIGNITING GROWTH WITH R + D + I MANAGEMENT IN 16+1 COOPERATION. (CASE STUDY FROM HUNGARY'S POINT OF VIEW.)

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Annotation. The purpose of this study is to investigate empirically the role of innovation activity in 16+1 cooperation, within the Central and Eastern Europe (CEE). We also identified those internal and external factors, which might cause improvements in innovation performance of CEE companies. Our main focus was on technology-based research and innovations. We applied qualitative research methods.

Our findings demonstrate that CEE companies have significant contribution to performance. We found that key success factors of these organizations are based on four elements: knowledge management, access to financial resources, managing formal and informal networks, as well as achieving synergies between technological and non-technological innovations.

The preparation of the analytical study was facilitated by being part of a Slovene -Hungarian MASH European Grouping of Territorial Cooperation and thus, through our cross - border relations, we have more information, we are deeper into the functioning and / or non – functioning EU systems.

Key words: innovation management, R&D, technology, Central and Eastern Europe, OBOR, China.

Introduction. The myth of the European paradox. We attempt to provide an overview on the questions raised by the current trends and changes in research and development, innovation and the approaches towards them. In Europe and in Hungary, the debate around research and development (R&D) mainly caused by the re-proposed targets of EU's Lisbon-Strategy, which puts the education, the research and the innovation – as the "triangle of knowledge" to the focus as the vault of European competitiveness. The rhetoric of the "European dream" built around society is overshadowed by statistical data showing that position of the continent is deteriorating in the global competitiveness.

The permanent restructuring and shifting preferences of the R&D sector cannot be always explained by the traditional concepts of social sciences. Although the trend setting school of economics is still the neoclassic, the economics based innovation management started to focus on economic-evolution theory. The latter seems to be more applicable to the "new economy" deeply founded in society, as it has non-linear dynamics.

We would like to put your attention to those changes of R&D, which requires establishing new indicators. As the unintended alteration of paradigm resulted changes and the new types of technology-application based society innovation provided aesthetic developments and new cultural contents require new types of valuation methods.

Today's change diagnosing studies are not based on technology sectors, but rather on geo-political environment. We could clearly see the globalisation of R&D and the winners of its globalisation are China and India. Europe is loosing out contrary to the developing economies of Asia. The innovation output of the "old continent" is getting compared to the USA, which contrast out the lag of performance and demolish the myth of the "European Paradox".

The essence of European Paradox is that number of scientific publications of Europe in par with the USA, what indicates that Europe has the upper hand and if it can exploit this, than Europe can overcome its disadvantage in competitiveness. However, we have to emphasise the misleading nature of such a conclusion. When we analyse the usage of these publications, we have to conclude that the USA has the real advantage.

When we narrow down the number of countries and create the "Visegrad Paradox", we see that Central and East Europe has an even worse application level of its scientific capacity and performance compare to the EU-15. The 4 Visegrad-countries have only one way to step forward by creating a European Research Area (ERA) by reconciling their innovation processes and systems.

Brussel tries to push these 4 countries to increase the efficiencies of their innovation systems. The Lisbon Strategy is targeting the R&D spending level at 2.5% of GDP at state level and the double of this at the private sector.

The question remains: what model Hungary should use to be able to have knowledge based economy. For example, the "Finnish miracle" is not only a set of target oriented rules and legislations, but it required an appropriate social-cultural environment too. On the other hand, Singapore or the Silicon Valley are using completely different models for their flourishing innovation spray.

Summary – part 1: European Innovation Scoreboard. R&D and innovation are elements of the economic development, which requires target oriented, long term planning without the possibility of instantaneous measurement most of its impact. The centre of innovation is the mind and thinking, but the successful innovation is also creating applications and products, which are practical, they are able to be used in real life. The costs of R&D become an investment only if the result will be used and than its application will become an achievement. To measure the successfulness of R&D and innovation we need to assess the inputs and outputs to see the appropriateness of money spent and quality of expedient. The expenditures of R&D and innovation could be measured by various ratios to provide information to fine-tune the eco-political targets with expectations.

The European Union, to measure the effectiveness of R&D and innovation, created a complex indicator system comprising 8 dimensions, within that 25 ratios and the

summarized value of all provides an index number, which evaluates the results of R&D and innovation. To be consistent and comparable, it uses a unified, statistic based set of data specific to R&D and innovation activities. The content of each ratio (indicators) is clearly defined. The reliability is ensured by the use of data solely provided by the statistical offices of the member states of the Union.

Our analysis for 2015 details out the major numbers of performance of R&D and innovation by the EU-indicator system and also provides a comparison of these figures for the period between 2008 and 2015. For specifically Hungary, we provide an overview of legal framework, organisation of support and the major targets, strategy and performance indicators from 2010 onward.

The most commonly used international ratio to express the costs spent on R&D and innovation is to state the total expenses as "%" of the GDP. From 2000 to 2015 the GDP based spending in the EU and in Hungary has increased, but fall a bit short of the original target number. Both the Lisbon Strategy and the later approved Europe 2020 Strategy have the explicit target number for R&D and innovation spending level at 3% of the GDP for the EU member states. In 2010, Hungary had a target figure of 1.8% for 2020 and achieved the level of 1.38% in 2015.

The European Innovation Scoreboard (EIS) shows the relevant data for the given year per country by the combined innovation index and puts the member states into four different performance category:

• Leading innovator – states significantly succeeding the EU average innovation performance

• Strong innovator – those countries which have at or above innovation performance compare to the EU average

• Moderate innovator – the performance is slightly below the EU average innovation performance

• Lagging innovator – the ones with considerably lower performance compared to the EU average

In 2008 Hungary had lower performance than the EU average in innovation, but remained as a moderate innovator and continued as moderate innovator for the period 2008-2015. Hungary, on the basis of 2015 data, achieved 68% of the EU average innovation performance with a slightly decreasing tendency. Reviewing the details of Hungarian data for 2015, we could see the country has underperformed in all dimensions of the EU average. 20 out of the 25 ratios did not reach the EU average and in case of 5 ratios it exceeded it. In case of 11 ratios the performance of the country has improved in 2015 compare to previous years. Compare to EU countries, the Hungarian SMS-sector's innovation performance is very weak. Within the Hungarian SMS-sector, the companies carrying out innovation activities represents only 10.6% of the sector total, which is about the third of the EU average (28.7%) and only 12.8% of them introduced new products or innovative process into their activities. The R&D and innovation activities are concentrated at the large enterprises in Hungary.

The GDP based R&D and innovation expenditures were under or about at 1%
in Hungary for the past 2 decades. Such stagnation did not motivated research and development at all. Since 2008 we could see a change of course by an above 1% level of spending in the sector.

The analysis of the EU indicator system shows that those countries at the top of the innovation performance are delivering average exceeding results at almost all dimensions. This fact is also supporting that the innovation as such is a very complex phenomenon and its success requires appropriate contribution form a number of factors parallel. That is why there was no fast pace or significant change in the hierarchy of positions amongst the countries between 2008 and 2015. However, some of the countries managed to improve their performance year by year, hence achieved a considerable result over the period.

We have reviewed the 8 dimensions used for comparison to identify those with the strongest link to innovation performance. On the basis of 2015 data, the strongest correlation is between the overall index and "enterprises and relations". There is also a very strong correlation between overall index and "research systems". The enterprises and relations dimension measures the innovation at small and medium sized (SMS) enterprises and the innovative-cooperation amongst them. These are the ratios where Hungary lags behind within the EU. These are also show that the very modest level of R&D and innovation at the SMS sector drags back the overall performance of Hungary. Also, there is a very limited number of small enterprises founded for innovation and related activities.

The Lisbon Strategy and the Europe 2020 Strategy and furthermore the Horizont 2020 program are dedicated to set goals and objectives supporting the economic growth, job-creation, R&D and innovation to enhance the competitiveness of the European Union. These targets have to be applied at the member states' budgets, eco-policies and strategies to support a sustainable and inclusive expansion priority.

In Hungary, these strategies were the basis of support to R&D and innovation both domestic and international point of view. During the period 2007-2013 the "New Hungary Development Plan" the "Science, Technology and Innovation Policy", the "National Action Program" and the "New Széchenyi Plan" were those strategic initiatives. For the period 2014-2020 these initiatives are the "Investment in Future – National Research, Development and Innovation Strategy", the "White Books of sector based Research, Development and Innovation", the "National Intelligence Specialisation Strategy" and the "Széchenyi 2020" are the approved operative programs of the Hungarian government on the fields of R&D and innovation.

The framework of the Hungarian R&D and innovation activities are set on the basis of the EU's budget cycles, relevant policies, performance formatives and strategy framework.

For the period 2007-2013, the strategy of the Science-, Technology- and Innovationpolicy set the goals of the expansion of research and development activities at enterprise level, creation of research universities, establishment of internationally recognised R&D and innovation centres, strengthening of knowledge based social competitiveness, and capacity expansion of regional R&D and innovation. The "Investment in the Future" as the National R&D and Innovation Strategy now includes the Science-, Technology- and Innovation-policy Strategy. All of these strategies put emphasis on improvement of R&D and innovation at enterprise level to increase the competitiveness of the knowledge based society, the creation of knowledge base, encouraging cooperation between enterprises and research institutions and regional development incorporated in the complex national R&D strategy.

The Hungarian strategies and programs for R&D and innovation comprise performance indicators (with set numbers and ratios). The achievement of those targets however, cannot be measured by publicly available data.

After 2010 in Hungary the required changes of legislation, supporting organisations and systems are initiated and at some areas are even completed to backing R&D and innovation. The National Research, Development and Innovation Office (NRDI Office) have been established at 1 January 2015. This Office replaced all other R&D oriented suborganisations and stipulates both horizontal and vertical cooperation and coordination amongst the participants. Such reorganisation of the supporting environment caused some delays in the realisation of R&D strategies.

With the creation of NRDI Office the Hungarian Government intended to set a framework to a more effective coordination of public financing. The increase in available funds require a more advanced level of coordination not only at a national level, but at the level of the Union, which, amongst others, includes supporting programs, standardised patent and copyright protection, involvement of venture capital, joint programs of different organisations and different countries in accordance with the best practices of EU member states.

There are two main questions to be answered with regards to the evaluation and assessment of R&D and Innovation performance of activities:

1. The evaluation of performance of the EU member states indicates that the leading and strong innovators are having a balanced and generally high performance in all dimensions. This means that those countries are able to deliver strong performance where all the parameters and conditions of successful innovation are present. What could be the conclusion to those who prepare and execute the Hungarian innovation strategy?

2. The analysis of correlation between the dimensions and the aggregated innovation index show that the most comprehensive relation is between the innovation index and the "enterprises and relations" dimension (0.923). This dimension measures the innovation level of small and medium sized (SMS) businesses and the cooperation/interactions amongst them. The same time, these are the ratios where Hungary lags behind within the EU. How and with what could we increase the innovation performance of small and medium sized businesses?

Summary – part 2: Conclusion or "Rolling dollars" by Gusztav G. HITTIG

How could we get to the conclusion even before we have the analysis done?

It is really simple! We have already indicated that how many national and EU organisation; office and institutions are busy with the management of R&D and

Innovation. Some estimates – these are really just estimates – the number of entities involved in R&D within the European Union is about 100, and the member states have couple of thousands of additional organisations. One could conclude – in reflection to these numbers – the less would be more!

Now, if 16 other countries hold the mirror to the current structure, than we could say "it is even worse" because in those countries where (compared to GDP or innovation level) the R&D and innovation level is more successful, the number of supervisory or managing entity is inversely proportional. More developed and more successful R&D in a country means fewer supporting and/or supervising entity. This is not due to centralisation, but the recognition of that R&D and innovation could not be effective with too many layers of autocracy.

In certain developed countries the decentralized, over simplified control and management structure could also lead to troubles, like in Germany, where the large car manufacturers under the cover of R&D instead of real innovation just falsified the emission data for their diesel engines.



Naturally, attempts to cheat the system is always be there, but it does not invalidate the original conclusion, namely, the level of economic development is reversely proportional to the size of autocracy, the water-head of public services.

Back to the mirror-example, now 16+1 country holds the mirror – because of China. As you could see China made 95 % of its investments in 6 countries with developed economy. The table shows the relevant numbers and ratios of these investments.

As mathematician and researcher of physics and quantum computing – someone

really effected by R&D and innovation – I was puzzled and disturbed. What has happened here? Hungary received 36.79% of the total Chinese investment in the region and what has happened with it? Where is it? In which sectors? And this sum is about the total of investment made in Poland and Czech Republic.

It is not my task to identify responsibility, but I could see that something does not happened the way how it should have been. I am sure it is partly due to the overwhelming number of supervisory and management organisations with highly unproductive processes. The invested amount of USD millions should have had direct, measurable effect on the increase of GDP.

I could simply state that, on the basis of my experience and gathered data, but also by a rough estimation that Hungary – including the other 2 developed countries from the 16 - did not utilize the economic growth potential provided by the Chinese investments.

But if the +1 country really want to make all its efforts to properly invest the millions and billions of investments outlined in the 16+1 model, the One Belt One Road theory, the expectations of the New Silk Road project, than these resources should be the financial basis of a new dawn of development and not rolling dollars program. I know the 16+1, the OBOR is at an early stage of development, but this is the time, together with our Chinese scientist-colleagues to create a "professors' committee" (which has to be acknowledged by the 16+1) and this committee would have the responsibility to prepare and oversee the most effective program of research, development and innovation to be able to use the financial resources invested in future scientific work in that most efficient way. Naturally the results and achievements would be shared amongst the 16+1 countries.

Similarly, as described above as "professors' committee" for R&D and innovation, we have to set up some other, equally important committee, like for traffic and transportation, energy-policy, etc. Obviously, these committees are forced to cooperate, as there is no clear cut amongst the fields/areas, like the self-driving cars or smart cities programs. Evidently, as I think about it, the 16+1 countries, or China itself should set up a sort of "Office of Planning" where these committees could work, cooperate and coordinate their work, this could be the "China – CEEC Planning Board".

In such a case it would not happen a case like the Belgrád – Budapest railway line with spending hundreds of USD millions and at the end to discover that the project could not get the necessary authority approval from the EU. Please review the possibility of such option; otherwise the 16+1 or OBOR could end up like the hundred-legs EU - with many legs and he goes slow.

Analysis. Introduction the system of measuring indicators of effectiveness and accomplishments of the european union

Measuring the results of R&D activities. The R&D and Innovation are result oriented improvements of economie – requiring long term planning and determination – but some or most of the elements of success are not measurable immediately. There are certain factors playing role on the return or recovery of expenses born by R&D. Innovation and R&D activities are overlappning and strongly related to each-other.

Their relation is based on the innovation chain (basic research, applied research, pivotal development, technological application, mass production, consumption). When the areas of inter-relations are successful, the elements create the innovation chain and due to the complexity of the flows and reactions, the elements are not separable. Please note that not all initiatives reach the level to become an innovation chain to be a product or a sale-ready service.

	Chinese investment in 16 CEE countries in 2009 and 2014 (stock/USD m)											
	2009	2010	2011	2012	2013	2014	2009-2014 growth	Share of total Chinese investment in CEE (2014)				
Hungary	97.41	465.70	475.35	507.41	532.35	556.35	471.14%	32.79%				
Poland	120.30	140.31	201.26	208.11	257.04	329.35	173.77%	19.41%				
Czech Republic	49.34	52.33	66.83	202.45	204.68	242.69	391.87%	14.31%				
Romania	93.34	124.95	125.83	161.09	145.13	191.37	105.02%	11.28%				
Bulgaria	2.31	18.60	72.56	126.74	149.85	170.27	7271.00%	10.04%				
Slovakia	9.36	9.82	25.78	86.01	82.77	127.79	1265.28%	7.53%				
Serbia	2.68	4.84	5.05	6.57	18.54	29.71	1008.58%	1.75%				
Lithuania	3.93	3.93	3.93	6.97	12.48	12.48	217.56%	0.74%				
Croatia	8.10	8.13	8.18	8.63	8.31	11.87	46.54%	0.70%				
Albania	4.35	4.43	4.43	4.43	7.03	7.03	61.61%	0.41%				
Bosnia- Herzegovina	5.92	5.98	6.01	6.07	6.13	6.13	3.55%	0.36%				
Slovenia	5.00	5.00	5.00	5.00	5.00	5.00	0.00%	0.29%				
Estonia	7.50	7.50	7.50	3.50	3.50	3.50	-53.33%	0.21%				
Macedonia	0.20	0.20	0.20	0.26	2.09	2.11	955.00%	0.12%				
Latvia	0.54	0.54	0.54	0.54	0.54	0.54	0.00%	0.03%				
Montenegro	0.32	0.32	0.32	0.32	0.32	0.32	0.00%	0.02%				
Total	410.60	852.58	1008.77	1334.00	1435.76	1696.51	3.13	100%				

Soutce: Liu Zuokui's compilation based on data from the Ministry of Commerce and the National Statistics Bureou

The center of Innovation is the thinking, however, the successful innovation also needs demand from the user, beneficial side. The expenses occurred could become investment only when the result becomes product or service sold, thus make the innovation quantifiable. The success of research, development and innovation are gauged differently. In research, the level of success is measured by the scientific level – recognized contribution to science – of the research. Development is assessed by the

application of technology or process to achieve the relevant goal of economy or society. In case of Innovation, the gauge is the result achived by the application of the outcome of research and/or development.

The R&D+I activities are getting more and more determining factor of economic progress, hence there is relevant legislation in place to ensure the proper use of resources for such activities in Hungary. The law on scientific research, development and innovation is the 2014 LXXXVI Law, which provides the framework of all and any activity enhancing the competitiveness and income generating capabilities of the society to conclude a sustainable economic growth and job creation.

To be able to gauge the performance of R&D+I activities, we need to evaluate the effectiveness of money spent by reviewing the expenses paid. In practice it means the introduction of a permanent monitoring system of spending, including the constantly updated calculation of various ratios to ensure that we get an early warning in case of significant deviation from the original target, hence providing the possibility of adjustment. Such a permanent analysis of research results deliver substatial information to judge whether there is a need of fine-tuning of current activities to be able to meet prior targets set by eco-political derictives.

The European Innovation result table. The European Union has created a complex indication system using a calculated sum of individual ratios and dimensions generating one index-value which assess the successfulness and effects of R&D+I activities. To be able to use such calculation method, it is important to have unified statistical data structure providing the relevant and comparable values for assessment. Comparability is achieved by the pre-defined calculation method of the required ratios (indicators) and the reliability and availability ensured by the Statistical Bureau/Offices of the members states (EUROSTAT is one of the Central Directorate of the EU created to provide central statistical figures to the institutions of the EU and to harmonize the applied statistical methodologies by the member states, the EFTA countries and EU-member-applicants.

The European innovation performance result summary table – which earlier called "Innovative Union result summary table" – is a structured set of data about the innovation performance of EU member states comparing it to non-EU member states and to regional neighbours' performances.

The current layout of the table is made since 2010 (prior to 2010 it was a different table with similar data content, e.g. in 2009, it was called European Innovation Progress Report), therefore it allows the comparison of years and provides the possibility to draw up tendencies. Furthermore, it enables us to set up grading of the countries and to analyse the performance changes of the countries. It also provides the relevant breakdown of indicators of the R&D+I by country and per sectors with identical data content. The ratios are calculated regardless to specific circumstances of various countries, but fulfilling the indicator function via data-reduction to minimize the need of special, area or circumstance related information. The indicators are able to exhibite the current status, but cannot display the reasons, which requires further analysis and collection of additional information.

The performance result summary table of the Union indicates the relative strenghts and weaknesses of the national innovation structures and helps to determine the areas requiring improvements per country. In recent years, there were slight modifications to the sources of information and the definitions of methodologies to the indicators. Any content type change to the ratios are listed next to the result summary table and to enable the comparability of country-performances it also includes the innovation values calculated in line with the previous definitions (e.g.: the data relating to scientific cooperations is derived from the Centre for Science and Technology Studies (CWTS) web Science3, but the figures for 2015 has been calculated on the basis of Scopus4 data. The differences are in e.g. the definition of capital investment – currently we use industry-sector statistics instead of Industrial statistic figures – the latter providing the figure for total capital investment from a country, but the previous one providing the figure of capital investment in the country – the two do not necesserely overlap.

The ranking list of innovation performance of the countries is calculated in a very complex manner called the Summary Innovation Index, which accumulates the R&D+I performances measured by 25 different ratios. The values in the ranking list represent the average value of those ratios, however, if you take the ratios individually, there might be sometimes significant deviation in ranking of a given country per different ratios.

These 25 ratios which examining the varous factors and effects of innovative activities could be categorized into 3 main groups:

• Elements necessary to innovation activities, such as human resources, research system, financing and financial support;

• Indexes measuring the innovation activity level of enterprises in the EU, such as ratios on assets, intelectual properties, inter-company transactions and trading activities;

• Indicators of factors influencing the economy as whole, like economic environment, etc.

To have a more detailed groupping of the 25 ratios of the indicator system, they are splitted into 8 dimensional main-category. Within the dimensions the ratios dedicated to certain areas, such as 5 ratio for measuring the economic environment, 4 ratio assessing the intellectual properties and products, furthermore 2-3 ratio to evaluate the performance of other areas.

Every ratio is a proportional value, which relates an R&D+I activity to an other value, e.g.: GDP, size of population, etc. to partially filter out the deviative effect of absolute-values. The assessment of innovation activities made by both of the complex indicator system as an overall evaluation and by the dimensional ratios, as individual parameters. We have summariesed the dimensions, types and categories of the ratios in table 1., the definition of indicator types provided in the glossary.

Evaluation of the indicators only possible via comparison, as in most of the cases there are no generally accepted value levels. The direction and level of connection amongst the ratios could be examined by correlation coefficients. The correlation is measurable to prove or disprove the paralel movement of certain ratios. In case of analysis, we could disregard the top and lowest values (top and lower decile). The statistically significant changes could be determined, also the tendencies, the averages are measurable, the deviations from the averages are quantifiable. However, the indexes do not filter out the effect of lower innovation level of countries recently joined the EU, therefore these figures are distorting the overall and average values.

Table I		1	le	h	Ta	7	
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	Dimensions of the EU innovation Scoreboard										
	Name of dimensuion	Indicator type	Number of indicator								
1	Human resources	Positional/impact	3								
2	Research Systems	Positional/impact	3								
3	Finance and subsidies	Positional/impact	2								
4	R & D & I activities	Result	2								
	company, investments										
5	Connections and businesses	Result	3								
6	Intellectual property, instrume	en Result	4								
7	innovators	Output/output	3								
8	Economic environment	Output/output	5								

Source: Edited by the Hungarian State Audit Office

The actuality of figures for 2015 – published in 2016 – is improved compare to previous years. To push the publishing date somewhat later allowed to have the most recent figures included in the report. The sources of information have also changed, like the copyright and patent data has been provided by EUIPO (European Union Intellectual Property Office), venture capital investments' data are from Invest Europe (Eurostat has only indirect sources about it).

EU coutry ranking 2015. In 2016, the European Innovation Performance summary has been published on the basis of 2015 results and evaluated the innovation accomplishments by the combined innovation index – as in previous years – and listed 4 performance group of the member states.

• Danmark, Finnland, Germany, The Netherlands and Sweden are the leading innovators with their innovation index substantially exceeding the EU average (innovation leaders).

• Belgium, France, Ireland, Luxemburg, Slovenia and the UK are strong performers, having innovation index values around the average value (strong innovators).

• Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Litvania, Malta, Poland, Portugal, Slovakia and Spain are having index values somewhat below the EU average and considered as moderate performers (moderate innovtors).

• Bulgary and Romania have innovation index values significantly under the EU average, hence are seen as lagging behind performers (modest innovators).

The summary table show the ranking in accordance with an average innovation performance, but the detailed calculation show a far more fragmented picture with significant deviations in varous ratios. The summary table provides a fair ranking, however, it could be used only partially to evaluate effeciency. To spend a higher % of GDP on R&D, or having an elevated ratio of people with higher education of the population, or the increase of the number of small and medium sized business in the economy do not – alone – mean the increase of innovation performance, but there are other factors to be taken into consideration (e.g.: number of researchers, renumeration and other incentives, etc.).

The general innovation performance and the country ranking based on the overall innovation indexes are similar to previous years, there are no significant deviation between the years. The good performers had good performance in every year. Measurable deviations had happened, but they are not tendentious.

In 2015, there were two significant change within the performance groups, Latvia became moderate performer (prevously it was lagging behind performer) and the Netherlands stepped up to leading innvoator from strong performer.

Hungary has been a moderate performer in 2015, leaving most of its Central European neighbours behind, such as Slovakia, Poland, Latvia, Litvania, Croatia and also the lagging behind performer Bulgaria and Romania. The Czech Republic and Estonia had better performance, while Slovenia is amongst the strong performers due to its balanced and over the EU average results. In the EU-28 ranking, Hungary has the 20th place based on its overall innovation index, which was 0.355 - the EU average is 0.521 - in 2015. The ranking is shown in table 1 - giving different colors to the different performance groups and to the EU average.



Az uniós tagállamok innovációs teljesítménye a 2015. évi adatok összevont indexe alapján

Fig. 1. Innovation performance of EU Member States based on the aggregate index for 2015

Source: European Innovation Scoreboard 2016, edited by the Hungarian State Audit Office

Innovation performance per dimension in the EU in 2015. Table 2 details the overall and the dimensional average index values for the EU countries and Turkey, the values of the top deciles are red and lower deciles are green (the description/specification of the dimensions contained in table 1).

Table 2 shows that the leading innovators (countries in row 1 to 5) are in the top deciles in most of the dimensions, in other words, they show an evenly high performance.

The colors used in the table makes it easy to identify the performance levels – like in case of Sweden and Denmark, they delivered top results in all dimension, but other countries have different color-mix on the basis of their marks.

Table 2

Placement				A	verage	Index Dir	nension	s		
2015.	Country	SII	1.	2.	3.	4.	5.	6.	7.	8.
1.	Sweden	0,704	0,831	0,814	0,710	0,619	0,689	0,728	0,640	0,622
2.	Denmark	0,700	0,703	0,765	0,654	0,495	0,767	0,789	0,624	0,709
3.	Finland	0,649	0,783	0,625	0,765	0,500	0,676	0,716	0,595	0,561
4.	Germany	0,632	0,573	0,443	0,563	0,753	0,624	0,701	0,761	0,63
5.	Netherlands	0,631	0,653	0,774	0,663	0,237	0,727	0,624	0,542	0,681
6.	Ireland	0,609	0,816	0,582	0,363	0,300	0,593	0,426	0,773	0,777
7.	Belgium	0,602	0,622	0,768	0,502	0,492	0,814	0,487	0,565	0,561
8.	UK	0,602	0,786	0,795	0,506	0,270	0,591	0,502	0,519	0,681
9.	Luxembourg	0,589	0,431	0,771	0,372	0,136	0,544	0,720	0,704	0,742
10.	Austria	0,591	0,650	0,561	0,538	0,517	0,629	0,707	0,647	0,475
11.	France	0,568	0,657	0,678	0,566	0,363	0,505	0,488	0,663	0,578
12.	Slovenia	0,485	0,829	0,386	0,241	0,472	0,576	0,484	0,420	0,424
13.	Cyprus	0,451	0,662	0,392	0,278	0,153	0,454	0,403	0,621	0,425
14.	Estonia	0,448	0,554	0,340	0,727	0,555	0,456	0,426	0,422	0,323
15.	Malta	0,437	0,274	0,258	0,100	0,423	0,276	0,645	0,624	0,602
16.	Czech Republic	0,434	0,561	0,300	0,446	0,404	0,422	0,336	0,473	0,505
17.	Italy	0,432	0,407	0,398	0,279	0277	0,418	0,505	0,577	0,456
18.	Portugal	0,419	0,591	0,453	0,471	0,260	0,378	0,385	0,513	0,332
19.	Greece	0,364	0,562	0,408	0,224	0,281	0,412	0,243	0,471	0,322
20.	Spain	0,361	0448	0,413	0,357	0,185	0,236	0,437	0,250	0,432
21.	Hungary	0,355	0,462	0,218	0,272	0,367	0,206	0,281	0,319	0,570
22.	Slovakia	0,350	0,642	0,166	0,255	0,267	0,209	0,239	0,415	0,490
23.	Poland	0,292	0,556	0,125	0,274	0,361	0,094	0,391	0,210	0,301
24.	Lithuania	0,282	0,726	0,134	0,538	0,352	0,167	0,256	0,109	0,168
25.	Latvia	0,281	0,534	0,168	0,424	0,426	0,105	0,326	0,113	0,255
26.	Croatia	0,280	0,606	0,160	0,287	0,324	0,271	0,218	0,190	0,247
27.	Turkey	0,267	0,093	0,124	0,374	0,590	0,194	0,169	0,375	0,389
28.	Bulgaria	0,242	0,498	0,087	0,104	0,212	0,071	0,500	0,186	0,176
29.	Romania	0,180	0,392	0,111	0,070	0,084	0,045	0,149	0,193	0,273

The combined innovation index of EU countries and Turkey and the average index of dimensions in 2015

Source: European Innovation Scoreboard 2016, edited by the Hungarian State Audit Office

Similarly, the countries at the end of the list have results at the lower deciles and some countries have higher performances in certain dimensions, like Litvania, compare to its category. Even in case of leading innovators, in some dimension, there could be areas where they have a lower value level, like Finnland, Germany or Ireland and even some countries have performance level at the lower deciles – in case of the Netherlands and the UK.

From an overall point of view, the highly balanced level of performance in all eight dimensions supports the interpretation of that innovation is a very complex phenomenon influenced by the joint effects of many parameters together. Some of the countries have outstanding results in some of the dimensions, however, they cannot be leading innovators, because the under-performance of the other dimensions weight out the lead.

Out of the 8 dimensions, Hungary is amongst the lower 10 countires in 6 dimensions, 1 dimension's performance is in the middle and an other one in the top 10 countries category.

In 2015, the joint index of enterprises operating in R&D+I activities in Hungary reached the 86.1% of the EU level, however, it is still a significant improvement compare to 2014 (almost 16% increase year on year). Regardless to the improvement, this value puts Hungary to the lower deciles, but you will also find strong performers in the category, like the Netherlands, the UK and Luxemburg.

With favourable resource index, we find – amongst the top 10 countries – Litvania (0.726), Slovenia (0.829) and the Czech Republic (0.561) from the Central European Region (see table 2).

The financial and supporting indicators worsened in Hungary in 2015. They have fallen to 55.58% of the EU average and also considerably declined – about 4.4% weakening – compare to 2014. Interestingly, Ireland, Belgium and Luxemburg – who are amongst the strong performers – have lower than EU-average indicator value.

In 2015, in the research systems evaluating dimension Hungary has the lowest value (0.218). It is 0.248 lower than the EU-average and has about 6% decline compare to the previous year. Generally this index has very high value at innovation leader countries, the only exeption is Germany (0.443) who is below the EU-average in this category.

The Hungarian performance is the worst in small and medium sized businesses category, the index is continously and considerably under the EU-average, which significantly influences the overall innovation performance of the country.

Change of innovation performance from 2008 to 2015. The second graphe shows the 2015 ranking of the 28 EU countries on the basis of their overall index values and also provides the index values of previous years (from 2008). This shows the tendencies of the past 8 years in accordance with the innovation performance indexes per country. The values of the indexes are presented in appendix 1, the graphe 2 shows the indication of tendencies only.

Having look at graph 2, it is clearly identifiable the advantage of Luxemburg in 2008 has been diminished, however, they are still in the group of top performers. On the other hand, the relative poor performance of the UK in 2008 improved so much it

got close to the top performes in 2015. Within the moderate performers group, Malta had a declining trend until 2011, but they have managed to turn it around and got up to the average of the group by 2015. Croatia have done the contrary, it had a mixed, but continous decline from 2008 to 2015. Meanwhile Hungary has a somewhat stagnating performance over this period.

Qualification	Country			Summary	/ Innovati	on Index	(SII)		
2015.		2015	2014	2013	2012	2011	2010	2009	2008
Leading	Sweden	0,831	0,814		0,619	0,689	0,728	r	0,622
Leading	Denmark	0,703	0,765	0,654	0,49	0,767	0,789	0,624	0,709
Leading	Finland	0,783	0,625	0,765	•	0,676	0,716	0,595	0,56
Leading	Germany	0,57	0,4	0,56	0,753	0,624	0,701	0,761	•
Leading	Netherlands	0,653	0,774	0,663		0,727	0,624	0,54	0,681
Strong	Ireland	0,816	0,58	0,	•	0,59	0,4	0,773	0,777
Strong	Belgium	0,622	0,768	0,50	0,4	0,814	0,4	0,56	0,56
Strong	UK	0,786	0,795	0,50	·	0,59	0,50	0,51	0,681
Strong	Luxembourg	0,4	0,771	0,		0,54	0,72	0,704	0,742
Strong	Austria		0,56	0,53	0,51	0,629	0,707	0,647	0,4
Strong	France	0,657	0,678	0,56	0,	0,50	0,4	0,663	0,57
Strong	Slovenia	0,829	0,		0,4	0,57	0,4	0,4	0,4
Moderate	Cyprus	0,662	0,	C		0,4	0,4	0,621	0,4
Moderate	Estonia	0,554	0,340	0,727	0,555	0,456	0,426	0,422	0,323
Moderate	Malta	0,274	0,258	0,100	0,423	0,276	0,645	0,624	0,602
Moderate	Czech Republic	0,561	0,300	0,446	0,404	0,422	0,336	0,473	0,505
Moderate	Italy	0,407	0,398	0,279	0277	0,418	0,505	0,577	0,456
Moderate	Portugal	0,591	0,453	0,471	0,260	0,378	0,385	0,513	0,332
Moderate	Greece	0,562	0,408	0,224	0,281	0,412	0,243	0,471	0,322
Moderate	Spain	0448	0,413	0,357	0,185	0,236	0,437	0,250	0,432
Moderate	Hungary	0,462	0,218	0,272	0,367	0,206	0,281	0,319	0,570
Moderate	Slovakia	0,642	0,166	0,255	0,267	0,209	0,239	0,415	0,490
Moderate	Poland	0,556	0,125	0,274	0,361	0,094	0,391	0,210	0,301
Moderate	Lithuania	0,726	0,134	0,538	0,352	0,167	0,256	0,109	0,168
Moderate	Latvia	0,534	0,168	0,424	0,426	0,105	0,326	0,113	0,255
Moderate	Croatia	0,606	0,160	0,287	0,324	0,271	0,218	0,190	0,247
Moderate	Turkey	0,093	0,124	0,374	0,590	0,194	0,169	0,375	0,389
Straggler	Bulgaria	0,498	0,087	0,104	0,212	0,071	0,500	0,186	0,176
Straggler	Romania	0,392	0,111	0,070	0,084	0,045	0,149	0,193	0,273

Fig. 2. Summary Innovation Index (SII) time series

Source: European Innovation Scoreboard 2016, edited by the Hungarian State Audit Office

Few tendencies. Table 3 shows a summary of the changes in the overall indexes

of the EU member states and level of change between 2008 and 2015. The top deciles is highlighted by red color and the lower deciles is green. The table renders proper observation of changes over the 8 year period. There are 2 countries to be mentioned, the UK was able to manage to rise from the middle to the top deciles and Malat from the lower deciles to the midfield. On the other hand, taking a look of the dynamics of improvement, we find strong and leading performers (Denmark, the Netherlands, UK, Belgium and Slovenia) and moderate performer (Malta, Italy, Latvia, Litvania and Turkey) amongst them. Even the among the top performers you find countries with minimal improvement (Sweden, Germany) or decline (Finnland). Dispite these movements, the performance differences amongst the EU-member countries did not change significantly. Exceptionally large progress is highlighted by yellow color and significant regressions with dark green. From 2012 onward the number of countries with worsening overall index values has increased.

Table 3

Placement	Country	SII	értéke	SII CHANGE OF VALUE							
2015.		2015	2008	2008-2015	2015-2014	2014-2013	2013-2012	2012-2011	2011-2010	2010-2009	2009-2008
1.	Sweden	0,704	0,697	0,007	-0,015	-0,002	0,005	0,002	-0,004	0,010	0,012
2.	Denmark	0,700	0,624	0,077	0,025	-0,017	-0,001	0,016	0,039	0,010	0,007
3.	Finland	0,649	0,663	-0,013	-0,008	0,016	-0,009	0,000	-0,020	0,009	0,005
4.	Germany	0,632	0,624	0,008	-0,023	-0,006	-0,006	0,012	0,002	0,003	0,012
5.	Netherlands	0,631	0,549	0,083	-0,008	0,009	0,045	0,006	0,007	0,017	0,014
6.	Ireland	0,609	0,584	0,024	0,002	0,006	-0,026	0,008	0,003	0,010	0,012
7.	Belgium	0,602	0,564	0,038	-0,005	0,011	0,004	0,004	0,010	0,021	0,012
8.	UK	0,602	0,525	0,077	0,021	0,011	0,003	0,006	0,018	0,002	0,005
9.	Luxembourg	0,589	0,632	-0,034	-0,028	-0,020	0,023	0,005	-0,013	0,013	0,014
10.	Austria	0,591	0,583	0,009	-0,008	-0,005	0,023	0,004	-0,031	-0,014	0,016
11.	France	0,568	0,539	0,029	0,013	-0,004	-0,006	0,005	0,002	0,010	0,011
12.	Slovenia	0,485	0,446	0,038	-0,013	0,022	-0,015	0,012	0,015	0,009	0,007
13.	Cyprus	0,451	0,470	-0,018	-0,036	0,007	-0,011	0,002	0,012	0,011	0,004
14.	Estonia	0,448	0,416	0,032	-0,031	-0,011	-0,015	0,037	-0,001	0,002	0,025
15.	Malta	0,437	0,342	0,095	0,066	-0,008	0,045	0,008	-0,025	0,028	0,012
16.	Czech Rep.	0,434	0,413	0,021	0,000	0,012	-0,021	0,003	0,018	-0,004	0,000
17.	Italy	0,432	0,389	0,044	-0,001	0,008	0,009	-0,002	0,011	0,009	0,011
18.	Portugal	0,419	0,393	0,026	0,000	0,017	-0,004	0,001	0,003	0,007	0,010
19.	Greece	0,364	0,370	-0,005	-0,035	0,013	0,010	0,004	0,003	-0,002	-0,006
20.	Spain	0,361	0,381	-0,020	-0,025	-0,008	0,007	0,002	-0,003	0,004	0,005
21.	Hungary	0,355	0,345	0,009	-0,009	0,009	-0,008	0,005	0,004	0,003	-0,002
22.	Slovakia	0,350	0,318	0,032	-0,004	0,008	0,032	-0,012	-0,013	0,011	0,011
23.	Poland	0,292	0,290	0,002	0,000	0,005	-0,011	0,006	-0,008	0,010	0,008
24.	Lithuania	0,282	0,239	0,043	-0,006	0,013	0,008	0,012	0,004	0,001	-0,001
25.	Latvia	0,281	0,214	0,067	0,048	0,018	-0,032	0,013	0,010	0,014	0,003
26.	Croatia	0,280	0,299	-0,019	-0,012	-0,006	-0,006	0,002	0,011	0,007	-0,006
27.	Turkey	0,267	0,188	0,079	0,062	0,005	-0,003	0,003	0,007	-0,003	0,001
28.	Bulgaria	0,242	0,219	0,022	0,003	0,028	-0,029	0,001	0,009	0,002	-0,010
29.	Romania	0,180	0,246	-0,066	-0,044	-0,004	-0,033	-0,003	-0,001	0,020	0,009

The aggregate index of innovations per country between 2008-2015 years

Source: European Innovation Scoreboard 2016, edited by the Hungarian State Audit Office

Hungary have been a very moderate innovator throughout the period between 2008 and 2015 (the performance increased only by 0.009).

Over the 8 year period, 21 of the EU member states could improve its innovation index, however, Hungary has one of the smallest level of growth. The highest rise is made by Malta (0.095) and the Netherlands (0.083). Significant imrovements were made by some of the strong innovators, such as Denmark (0.077), UK (0.077), Belgium (0.038) and by the moderate ones, such as Slovenia (0.038) and Italy (0.044). It is very remarkable that 2 countries from the moderate innovators were able to jump to the top 10 performers, they are Litvania (0.043) and Latvia (0.067). In case of 7 countries there were long term deterioration of performance, among those Romania had the biggest drop (-0.066) and it was a significant decline in case of Luxemburg (-0.034) who otherwise is considered a strong innovator. From the top countries, the leading Sweden had a minimal progress (0.007), while Finnland had decline (-0.0013).

In the last period of 2014-2015 there were 18 member states with negative combined innovation index copare to the previous period, which indicates the exhaustion of reserves for the permanent growth. The negative change also reached the strong and top performers (Sweden, Finnland, Germany, the Netherlands, Belgium, Luxemburg, Austria, Slovenia) and obviously the midfield players (Cyprus, Estonia, Italy, Greece, Spain, Hungary, Slovakia, Litvania, Croatia).

Performance of Hungary compare to the EU-average within the dimensions for the period between 2008 and 2015. The joint index is a calculated average of the separate indexes of the dimensions. Table 4 presents the ration (in %) of the joint and the 8 dimensional indexes of Hungary compare to the EU-averrage. In 2015, on the basis of that year's data (EU average index value considered as 100%) Hungary has delivered 68% of the EU overall average. Hunary's performance had its highest level – 72% of the EU overall average – in 2008. It is thanked to the fact one of the dimension had an average exceeding level of performance and an other one delivered at about the average (human resources dimension 101.9%, R&D+I enterprices and investments dimension 100%). Throughout the period, these dimensions had mixed performance, while the rest of the dimensions had very little change.

In table 4, the red color indicates the areas where the Hungarian results are under 50% of the EU average over the 8 year period.

The red color cells of the table in most part of the 8 year period clearly show that the performance of Hungary in R&D+I activities are under the EU average in the following categories:

- Research systems;
- Finance and support;
- Relations and enterprices.

Innovation performance of Hungary per dimensions in % of the EU average in the period of 2008 to 2015. The Relations and enterprises dimension measures the innovation at small and medium sized enterprices and the cooperation of such enterprises, where Hungary has a significant deficiency within the EU. In all the years the index was at or

below the 50% of the EU average value.

Table 4

	000 4414			20				
Dimension / Year	2015	2014	2013	2012	2011	2010	2009	2008
Concentrated index	67,99	69,51	68,12	68,35	69,56	69,18	68,23	71,62
Human resources	80,30	80,36	80,72	88,58	79,33	81,74	74,63	101,91
Research systems	46,81	52,75	49,59	51,02	51,84	46,98	49,24	53,76
Finance and subsidies	55,58	61,00	58,16	55,75	42,34	45,41	49,18	51,94
R & D & I company, investment	86,10	70,21	63,47	58,52	78,61	81,30	75,74	99,97
Connections and businesses	43,48	45,82	44,89	42,14	50,32	50,69	50,11	44,28
Knowledge value, instrument	50,63	51,78	52,74	52,96	51,95	54,30	49,63	50,84
Innovators	60,66	56,22	52,97	54,34	52,46	56,28	56,28	55,11
Economic environment	99,43	107,62	108,10	108,58	115,66	109,06	111,38	106,39

Changes in Hungary's innovation performance by dimension between 2008 and 2015 as % of EU average values

Finance and support dimension show the GDP rated level of expenditures on research and development in the public sector, where Hungary has about 50% of the EU average value. In Research systems Hungary has an unfavourable tendency as the number of non-EU MA-s compare to total MA-s has a low ratio.

Hungary has its best performing dimension the Economic environment, where the figures are close or around the EU average. This dimension measures the employment rate in the knowledge-intensive areas, the export of high-tech products, level of export in knowledge intensive services, sales of new innovation, licences and intellectual properties.

Human resources dimension was the area where Hungary could constantly deliver an EU average adjacent performance. It was the highest in 2008 (101.91% of the EU average), but it slowly started to decline since 2012. Despite the favorable figures, Hungary is amongst the lower 10 countries in the ranks. The decline has clear correlation to the reducing number of students in the higher education, number of degrees and MA-s from the universities and even falling numbers of pupils graduating from secondary schools.

The index of enterprises with R&D+I activities and investments was 86.1% of the EU average level in Hungary for 2015. After the drop in 2012, the index slowly, but constantly risen. In 2014 it had a substantial gain (almost 16%), however, the 2008 level remained the highest. Hungary is in the lower deciles with these values. The index represents those expenses paid by the business sector for R&D and the ratio of non-R&D innovation expenses compare to turnover generated. It clearly shows that this index could be improved only via change of ratios in financing.

From an overall point of view, the parameters measuring the innovators had a 60.66% level for Hungary compare to the EU average. This index had its highest level in 2013, in spite of this, Hungary was still in the group of the lowest 10 performers.

Source: European Innovation Scoreboard 2016, edited by the Hungarian State Audit Office

The Finance and supporting dimension's indicators declined in 2015, thery were at 55.58% of the EU average (it is a 4.4% decrease compare to the previous period). The index had a mixed performance throughout the period, after the lowest point in 2011, it had rose for 2 years, than droped again (to 0.272).

The intellectual properties and non-tangible assets index had maintained its about the EU average level (50.63%) during the entire period.

The research systems index had larger scale of movements amongst the years. In 2015 had its most unfavorable level in Hungary, it was 0.248 below the EU average and it was about 6% decline compare to the previous year (currently at 0.218).

This index has high value in case of typically leader and strong innovators, except Germany (0.443), they were the only one from the top countries with such a low figure.

The Hungarian performance in Relations and enterprises category shows the worst result. Since 2012, this index is continously and significantly underperforms, hence infulencing Hungary's overall performance negatively.

Innovation performance of Hungary on the basis of individual indexes in 2015. In 2015, Hungary had underperformance in all dimensions and indexes relative to the EU averege, however, almost at half of the incexes the values were improving compare to prior years (see table 5). From the 25 indexes, in case of 20 it did not reach the EU average level, the other 5 were around or above the average values.

Table 5 indicates clearly that in 2015, Hungary had only one index where it outperformed the EU average (the Licence and Patent rights income from outside of Hungary in the % of the GDP). Compare to 2014, there was a minimal increase, therefore it was not a one-time result.

Furthermore, there are 4 indexes with close EU average values:

• Middle and high-tech products export participation from the total export,

• The ratio of completed/graduated from secondary school compare to the total population in the age group of 20-24 years old,

• Non-R&D innovation expenses (% of the GDP),

• Employment rate in the fast-growing and innovative sectors compare to the total number of employed.

In case of the other 20 index, Hungary is under the statistical EU average.

By assessing the indicators of Hungary, the best performance was made by the Economic environment index, which had an outstanding level at 277. On the other hand, the largest level of drop is in the case of patent registration (7.2%), followed by the sales of new innovation on the market (4.1%) and the small and medium sized businesses innovation process implementation (3.8%).

The Research systems indexes typical value is very low compare to the EU average, especially in case of non-EU MA graduates level compare to the total number of MA graduates, its value is 22%. Infavorable shortage is also present in case of Relations and enterprises dimension due to the innovation level of small and medium sized enterprises, which is very low (only at 37%) compare to EU average. The index barely exceeded the half of the EU average in 2015.

Table 5

Hungary's R & D performance by 8 dimensions and 25 indicators as a percentage of the EU average in 2015 and the rate of change between 2014 and 2015 percentage point

		EU 28	Change %
		= 100 %	2015-2014
	COMPREHENSIVE innovation index	68	-1,5
_	Human Resources Dimension	80	3,3
1	Number of doctoral degrees per thousand inhabitants a	49	3,6
	within the age of 25-34		1.1
2	Higher education studies are 30 - 34 years old	91	6,3
	age population		1.1
3	Performs at least high school studies	102	0,1
	% of population between 20 and 24 years of age		
	Research Systems Dimension	47	2,6
4	International scientific joint publications		199
	per million people	90	5,6
5	The world's top citations are top 10% of the	62	-2.2
	number of scientific publications in %		
	for all the scientific publications in the country		
6	Dectoral students from outside of the El lare all	22	4.6
	desteel desses		4,0
	Cinceres and Aid Dimension		12
7	Pinance and Aid Dimension	50	1,2
0	Kastere Central Fund (% of CDD)	23	-2,1
8	Venture Capital Fund (% of GDP)	8/	5,3
	R & D & I company, investment dimension	86	5
9	R & D expenditures in the business sector (% of GDP)	75	10
10	Non-R & D innovation expenditure (% of GDP)	102	-0,5
	Growth and business dimension	43	1,3
11	Innovation of Small and Medium Enterprises	37	-1,4
12	Innovative small and medium sized businesses cooperate with others	54	-1,5
13	Private and public sector publications per million inhabitants	68	1,3
	Knowledge value, instrument	51	-1,4
14	PCT patent applications to GDP	34	-1,5
15	PCT patent applications in the societal challenges as measured by GDP	28	-7,2
16	Number of Community trademarks in relation to GDP	48	8,1
17	Number of community designs measured for GDP	20	-4.3
	Innovators dimension	61	-1.2
18	Introduction of product and process innovations	42	-3.8
	for small and medium-sized enterprises		
19	Introduction of businesses marketing or organizational	70	-0.6
-	innovations for small and medium-sized externoises		
20	Environment for far Largeving businesses is innegative	102	0.8
	Economic environment dimensio	99	-0.8
21	Employment in knowledge-intensive activities	88	-0.6
22	The contribution of expects of marine and high tack module	124	.0.1
11	to the feeding tends belongs	124	-0,1
	to the foreign trade balance		
23	% of the value of exports of knowledge-intensive services	61	0
	compared to the export of all services		
24	The new for the market and the company is selling new innovations revenue in %	79	-4,1
25	License and patent revenues from abroad as % of GDP	277	0,7

Source: European Innovation Scoreboard 2016, edited by the Hungarian State Audit Office

R&D+I expenditures compare to the GDP. The most common measure of R&D+I expenditures and R&D activities is to express its % level compare to the GDP. In 2015 the EU countries in total spent about EUR 300 billion on R&D+I. It intensity (its % of the GDP) has been 2.03% for 2015 – it was 1.74% in 2005

Table 6

Country	R + D expenditure as % of GDP		R + D exp (million	R + D expenditure (million EUR)		
	2005	2015	2005	2015		
EU	1,7	2,03	202 129	298 811	147,8	
Hungary	0,9	1,38	838	1 511	180,3	
China	1,3	2,05	24 030	159 004	661,7	
Russia	1	1,13	60 559	13 437	204,9	
Japan	3,3	3,59	121 831	124 531	102,2	
South Korea (2014 year)	2,6	4,29	18 966	45 585	240,4	
USA (2013 year)	2,5	2,73	263 747	344 083	130,5	

R & D expenditure as a percentage of GDP in 2005 and 2015

Source: European Innovation Scoreboard 2016, edited by the Hungarian State Audit Office

The Lisbon Agreement and later the Europa 2020 Strategy incorporates the R&D as primary target and the expenses spent on it should reach 3% of the GDP by 2020. In Europe, the R&D spending lack behind compare to its global competitors, the USA (2.73%), Japan (3.59%), and significantly short relative to South Korea (4.29%). At the same time, Europe has a level similar to China (2.05%) and much higher than Russia (1.13%). In nominal value only the USA spend higher amount on R&d, than Europe. In Hungary, the level of increase compare to GDP is significant, about 80% expansion over the 10 year period between 2005 and 2015 (the EU had 47.8% increas on average for the same period – see table 6).

The GDP proportional research and development expenses in Hungary (see graph 3) were at or below 1% until 2008. In 2008, there was a slight improvement and since than it is above 1%. In spite of this, the years of stagnation has its effect on long term improvement, as R&D needs relatively long term to bring its benefits. In 2015, Hungary spend about HUF 468 billion on R&D, which is a 6.2% increase from the previous year. The deviation from the EU average have not changed during the whole period. Regardless to the increase in monetary terms, the R&D spending was 0.6% less than the EU average for 2015.

The "Innovative Union" is integral part of the "Europe 2020 Strategy" with the target of 3% (of the GDP) spending on R&D activities and related investments by the public and the business sectors. In this respect, the target for Hungary is 1.8%. The total such spending at the EU level was about 2.03% in 2015, Hungary had 1.38% respectively.

In accordance with a linear projection, there is a need of very serious efforts to achieve the original R&D+I targets for both Hungary and the EU. In Hungary, the increase is thanked to the dynamic expansion of the business sector. The higher education had/has very limited resources (represents only 0.2%) which is the 25th place in the ranking of EU countries. The research activity is considerably influenced by the lack of research institutions and researchers, which show a strongly declining tendency – there were 1,400 places in 2015, which is 300 less than in previous years.



Fig. 3. Research and development expenditure as a% of GDP (2000-2015) Source: Hungarian Statistical Office, edited by the Hungarian State Audit Office

Conclusions. In 2015, from the total spending on research and development, more than half of it was spent on experimental reaserch, about 26.4% was spent on applied research and about 18.7% has been spent on base research. The business sector primarly paid those researches, which has direct effect on business activites, hence able to generate income within short notice, therefore the applied and base reaserch had to be paid by the state (public spending).

From the 2015 R&D spending 39.4% has been paid on industrial and technological research, 20.4% on healthcare, 13.6% on traffic, telecommunication and other infrastructure and the remaining about 25% on all other (about 10) research areas.

The number of MA graduated is also a very low figure in Hungary (the persons potentially doing R&D+I activities). The Hungarian figure is 0.9% (over 1,000 person), the Czech has 1.7%, Slovakia has 2.4%, Poland has 0.6% and the EU average is 1.8%. As a positive tendency Hungary had a growth for the age group of 30-34, where the number of graduates is 31.9%, which is getting closer to the EU average of 36.9%.

In 2015, 98% of the researchers were graduate, 43% of them are at research institutions, 41% of them are at research places in the higher education, the remaing part is at business related research places and other governmental organizations. The Hungarian Academy of Science (MTA) tries to create the next generation of researchers by various programs for post doctorals and young researchers to create employment possibilities. The number of members of the MTA and researchers with scientific titles has increased by 2.5% in 2015 (in total 16,203 people).

The number of published scientific articles has increased only in the electronic

media in 2015. In other medias (like printed journals, etc.) there is a constant decline. Hungary traditionally is active in scientific publishing, however, the past years show a stagnating tendency. In the Nature Index database display the split of publications where the author (at least one of the authors) is working at the institution where it is published (called "Article Count"), which for Hungary is about one third (34%) of the publications are in geography, earth and environmental subjects and about the half of them (47%) on physics – generally 56% of the publications born by academic-research institutions. The publication activity and the number of articles uploaded into international databases (like Web of Science, Scopus) and to the Hungarian Scientific Publications database show mix tendency, where there was a rise in 2011 and 2014 and a slight set back in 2015 (see table 7).

Table 7

Description	Public	Higher Education	Entrepreneurship	Total
	sector	sector	sector	
Payments, million HUF	62 241	56 742	343 984	462 967
Actual number of researchers, chief	6 290	15 643	16 485	38 418
Per hundred researchers	61	139	3	203
scientific paper, in Hungarian				
language; piece				
Per hundred researchers	95	175	3	273
scientific paper, in foreign				
language; piece				

Data of research and development in Hungary at 2015

Source: Hungarian Statistical Office, Statistical Mirror, Research and Development 2015

The number of published scientific articles has increased only in the electronic media in 2015. In other medias (like printed journals, etc.) there is a constant decline. Hungary traditionally is active in scientific publishing, however, the past years show a stagnating tendency. In the Nature Index database display the split of publications where the author (at least one of the authors) is working at the institution where it is published (called "Article Count"), which for Hungary is about one third (34%) of the publications are in geography, earth and environmental subjects and about the half of them (47%) on physics – generally 56% of the publications born by academic-research institutions. The publication activity and the number of articles uploaded into international databases (like Web of Science, Scopus) and to the Hungarian Scientific Publications database show mix tendency, where there was a rise in 2011 and 2014 and a slight set back in 2015 (see table 7).

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FEATURES OF THE MANAGEMENT OF INSURANCE SECTOR COMPETITIVENESS

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Annotation. The intensification of competition led to increased competitiveness in all its aspects. The competitiveness of the insurance sector is an important component of the competitiveness of the economy as a whole. The insurance sector affects for the development of the country's economy and depends on it. In view of this, there are issues of determining the essence of the competitiveness of the insurance sector and the features of its management. The improvement of the insurance sector's competitiveness management implies an effective assessment by each insurance company of its competitive positions and competitors' positions, an analysis of the competitiveness of insurance services and the formation of an effective mechanism for its management in order to reduce the negative impact of external and internal factors.

Key words: insurance sector, financial sector, competitiveness of the insurance sector, management of competitiveness of the insurance sector.

From the Latin "sector" means "the dissecting one". There are many definitions in the literature: the explanatory dictionary of the Ukrainian language interprets this concept as follows: sector - 1. Part of a circle, limited by an arc and two radii; 2. Plot limited by radial lines; 3. Department in an institution or organization with a certain specialization; 4. The sphere of the national economy, which has certain economic and social characteristics. The analysis of literary sources has shown that the term "financial sector" is used more in researches. In some cases, the term "financial corporations sector" is used, which includes resident corporations and quasi corporations engaged in financial intermediation and other related financial services on a commercial basis.

In accordance with international practice, the country's economy as a whole is divided into five sectors [2]:

• non-financial corporations sector, which consists of own non-financial corporations, quasi-corporations and non-profit organizations that are market producers of goods and non-financial services;

• financial corporations sector that includes financial corporations and quasicorporations as well as non-profit organizations funded and controlled by financial corporations whose main function is to provide financial intermediation services or auxiliary activities in the field of financial intermediation;

• public administration sector covers the institutional units that perform the functions of public administration as the main type of activity;

• household sector includes a set of households and family enterprises (subsidiaries, family farms, etc.);

• non-profit organizations catering for households (uniting non-market non-profit organizations funded and controlled by households).

The financial sector (financial corporations sector) includes all corporations and resident quasi-corporations, whose main function is financial intermediation (auxiliary financial activity associated with it). Accordingly, the division of the financial corporations sector into the subsectors is the main sectors of the banking sector and the insurance sector. Consequently, the insurance sector is an economic sector that includes non-bank financial and credit institutions involved in insurance and reinsurance activities. The insurance sector is formed by insurance companies (insurance companies risk, life insurance companies), reinsurance companies, insurance pools (insurance companies for insurance of large risks).

Accordingly, the division of the sector of financial corporations of the national economy into the subsectors is the main sectors of the banking sector and the insurance sector. The insurance sector as an integral part of the financial sector forms the GDP of the country, affects investment activity, social protection and is a participant in a competitive struggle that affects its competitiveness. In the process of market relations between national economies, countries, business entities there is a competitive struggle for the best conditions of economic activity, which determines the strengthening of their competitiveness.

Competitiveness is evaluated differently by actors: consumers, producers, investors, the state. An analysis of the works of scientists has revealed that there are differences in the interpretation of the concept of "industry competitiveness". A number of authors in their works [1] under the competitiveness of industries understands the efficiency of certain sectors of the national economy, which is evaluated, in addition to traditional criteria, by indicators that characterize and describe the degree of dynamism of the industry with different variants of economic development of this country and the world as a whole.

Theoretical analysis of the essence of the concept of competitiveness enables industry defined as multi-property business competition (sectors of economic activities, sectors), which can be characterized by a degree of real or potential actors meet the needs of this or that in compared with similar entities competition. During competitiveness of the insurance sector should understand its participants the opportunity to create services that have a competitive advantage relative to other financial services financial corporations sector. It is expedient to analyze the competitiveness of the insurance sector using the system of quantitative assessments, criteria and parameters. In our opinion, they should include: analysis of the volume of the insurance sector, as well as the limits of its functioning; analysis of its capacity; study of openness; study of the degree of monopolization of the insurance sector; identification of barriers and barriers to entry and exit; integrated competitiveness assessment; determining the level of capitalization of insurers. Thus, the competitiveness of the industry forms the competitiveness of the country and the national economy, and also characterized by the level of competitiveness of the enterprises that make it.

The competitiveness of the sector should be understood as the possibility for all participants of the sector to create goods and services that have competitive advantages over goods and services of other sectors of the economy and ensure the country's economic growth.

It should be noted that the competitiveness of the sector of the producer differs from the competitiveness of the sector, where the object of sale is the services, and especially financial services. Therefore, the competitiveness of the insurance sector is the ability of the insurance sector participants to compete in the competition between sectors that provide the same services in the domestic and foreign markets for the benefit of all.

The activity of insurance companies by both external and internal factors is influenced. To the internal factors of the formation of the competitive environment of the insurance sector includes: the network structure of representations of insurance companies; share of the insurance company in the insurance sector; diversification of insurance services; cooperation with foreign insurance companies; reduction of tariff rates for insurance services.

External factors of the competitive environment of the insurance sector include: the country's competitiveness index, the quality of life index, per capita GDP (quality of life indicators and GDP per capita determine the level of solvent demand for insurance services), the innovative potential of the internal insurance market (development and introduction of new insurance products or improvement of existing ones allow to maintain the demand for insurance services and level the fluctuations associated with the life cycles of individual insurance s products), political factors (political elements in competitiveness can occur in lobbying individual insurance companies), taxation, the level of investment climate and so on.

Types of competitiveness of the insurance sector can be considered in different characteristics and categories. Thus, according to the object of competition, one can distinguish: the price, based on which is the tariff rate, on which offer to arrange a contract of insurance of a certain type; non-price, which puts forward additional services of insurers to its clients (for example, the primary right to buy shares of an insurance company, assistance in the purchase of real estate, free legal services).

In accordance with the adaptation of the competitiveness of the insurance sector to market competition distinguish: the potential competitiveness (expressed in qualitative characteristics), which is a set of managerial, organizational, technical, technological factors of activity, representing competitive potential opportunities; real competitiveness (expressed in real economic indicators), which represents a set of potential opportunities calculated after the influence of many environmental factors.

According to the timeframe distinguish: current competitiveness, as the ability of companies and the sector as a whole to compete at the expense of quality and prices of services with other companies during the year, quarter, month; promising competitiveness, which represents a forecast for the development of competition between companies and

the sector as a whole on the international market and their ability to maintain or increase / decrease competitiveness in the future, for example in the next five years.

By geographical features distinguish: international competitiveness of the insurance sector, domestic national competitiveness and regional.

Managing the competitiveness of the insurance sector is ensured by managing this competitiveness at the level of the insurance company and the services it offers. Accordingly, if the market will have a competitive insurance service and an insurance company, then the insurance sector in the country will be competitive.

Because the management of the insurance company's competitiveness can be portrayed as a process of implementing a certain set of management functions, namely: targeting, planning, organizing, motivating and controlling activities to build competitive advantages and ensure the life of an insurance company, the following features should be highlighted:

• targeting determines the orientation of the management of the competitiveness of the insurance company to achieve its goals;

• planning is due to the formation of strategy and tactics for the implementation of goals and objectives, the development of programs, the preparation of plans and schedules for the implementation of certain measures to increase competitiveness, as a whole, according to the insurance company and its separate structural subdivisions;

• organization ensures the implementation of the adopted plans and programs in practice; is responsible for the distribution of material, financial and labor resources between individual areas of activity;

• motivation guarantees the using of motivational (economic and psychological) regulators of activity of the subjects of management of the competitiveness of the insurance company;

• control provides supervision and verification to know whether the achieved level of competitiveness of the insurance company is consistent with the goals set. Such actions involve the development of standards for monitoring in the form of a system of quantitative indicators that allow to check whether the implementation of the plans and programs or their individual measures is effective, to timely adjust the changes that will contribute to the achievement of the objectives of the insurance company.

For any insurance company, its competitiveness is an important factor, since it allows us to conclude on this insurance company. Such information is appropriate for clientconsumers of insurance products, so they will take into consideration the competitive position of the insurance company in the market. The higher this position, the greater the likelihood that the client will choose the insurance company, and not the other.

In modern science, there are several approaches to managing the competitiveness of an insurance company, among which one can distinguish between classical (systemic, process, situational) and specific (logical, marketing, innovative, complex, global, integration, functional, structural, normative, logistic).

The system of competitiveness management by the system approach consists of two components:

1) the primary-external sphere (input and output of the system, connection with the external environment, feedback);

2) secondary-internal sphere (the integrity of interdependent components, which influence the subject of control on the object, the processing of input to the output and achieve the goals of the system).

The process approach provides consideration of the process of managing the competitiveness of an insurance company as a set of continuous actions in strategic marketing, planning, process organization, accounting and control, motivation and regulation.

The situational approach to managing an insurance company's competitiveness is due to the use of those parameters and management methods that are based on a particular situation in a certain place and at a certain time.

In our opinion, the management of the competitiveness of an insurance company should be considered in a process and system approach. In accordance with the process approach to managing the competitiveness of an insurance company – a process aimed at the formation, development and implementation of competitive advantages and ensuring its stability and solvency under different economic conditions.

A systemic approach to managing the competitiveness of an insurance company involves reserach it as a set of complex blocks that distinguish measures that contribute to increasing the competition of an insurance company by creating and maintaining long-term competitive advantages.

Consequently, under the control of the insurance company's competitiveness under the process-system approach it is necessary to understand a complicated process that provides a targeted influence on the activity of the insurance company and involves a coherent combination of separate elements of the management system in order to ensure the implementation of competitive advantages in any social, political, economic and other shifts in the economic environment.

Combining these two approaches can be argued that the mechanism of managing the competitiveness of insurance companies is influenced by the object and subject of management, which initially receive and analyze the information received and at the exit it is issued.

The competitiveness of an insurance company as an object of management acts as a multilevel and complex, since it is influenced by a large number of factors, which excludes direct management influence on it. The object of management of the competitiveness of insurance company is only internal factors, the influence on which forms and implements the competitive advantages of an insurance company. We can not distinguish external factors as an object of management, since the influence of an insurance company on them is not possible or substantially limited.

The subjects of management of the competitiveness of insurance companies in the process of achieving their goals and objectives affect the object of management through a specific mechanism. A management entity is a person, a group of individuals or an organization that makes decisions and manages objects, processes or relationships by

influencing a managed subsystem to achieve its objectives.

The mechanism of competitiveness management is the interaction of elements, which should guarantee the influence on the factors of competitiveness of the insurance company, and is aimed at providing, creating and maintaining the competitive advantages of an insurance company for its long-term operation in an uncertain environment.

The aim of managing the competitiveness of an insurance company should be to ensure the realization of competitive advantages in any social, political, economic and other changes in the external environment. Therefore, the objectives of insurance company's competitiveness management should be aimed at:

• reducing the influence of factors that have a negative impact on the competitiveness of an insurance company;

• application of factors that have a positive impact on the competitiveness of insurance companies to increase the number of competitive advantages and their implementation;

• ensuring the speed of adoption and adaptability of management decisions, their synchronization with changes in factors external and internal environment of the insurance company.

Methods of managing the competitiveness of an insurance company can be characterized as a set of methods and methods of influencing the object of management in order to achieve the goals set within the specified time, provided that the rational use of all types of resources. By content management methods are compared with the main management functions. It should be noted that the functions of managing the competitiveness of an insurance company must be distinguished from the tasks performed by a particular subject of management in one direction or another of management activity. In the first case - these are management actions that are of a continuous nature, inherent in any subject of management of the competitiveness of the insurance company. Tasks are always characteristic of a specific entity, which is responsible for a certain area of management that solves specific tasks (a specific manager of a management level).

Such a mechanism for managing the competitiveness of an insurance company (Mp) based on the function presented by the formula 1:

$Mp = \{Mg, Md, Mr, Mk\}$

where Mg - targets management mechanism - the process of identifying and adjusting target parameters that ensure the achievement of the desired level of competitiveness of the insurance company;

Md - mechanism of diagnostics – a process of studying the competitiveness of an insurance company and assessing its sensitivity to changes in factors of the external and internal environment;

Mr - decision-making mechanism for achieving the specified target parameters;

Mk - a control mechanism that provides supervision and verification of compliance of the achieved level of competitiveness of the insurance company with quantitative control standards and the timely introduction of necessary changes.

Conclusions. Thus, at the present stage of development the urgent issues remain the

increase of the level of competitiveness of the insurance sector, therefore there is a need for effective management of insurance companies. This is achieved through a set of actor actions that have interconnectedness and interact with each other, exercising influence over the objects of management, using methods and tools of influence to provide aim, goals and defined tasks.

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PEDAGOGY AND PSYCHOLOGY

PECULIARITIES OF ACTUALIZED VALUES AND THEIR AVAILABILITY OF THE PERSONNEL OF THE STATE BORDER GUARD SERVICE OF UKRAINE

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Annotation. In the article the results of the empirical research of values and their accessibility to the personnel of the State Border Guard Service of Ukraine are represented. The discrepancies between values and their accessibility, which cause internal conflicts and vacuum at the border guards, and correlation relations between the indicators of their value orientations: the index of difference of values their accessibility, internal conflicts and vacuums are revealed.

Key words: actualized values, available values, internal conflicts and personality vacuums.

Statement of the scientific problem and its significance. Personal value priorities determine what is important for the individual and are decisive in the individual's behavior. Personal values are stable in different situations and represent the main individual motives of the individual, actual, desirable and most important in life and are the basis of the individual's life and the individual's attitude to himself and other people (Schwartz, 1992). The psychological indicators of the experience of personal life situations as successful are the sphere of actualized values and needs and the scope of their availability in the living environment in the actual present. The actualized values and needs of the living environment (actual "I appreciate", "I want"), when connecting with the possibilities of their feasibility/availability (actual "I can "), ensure that an individual experiences the situations as successful. If there is no possibility of achieving actualized values and needs of the living environment (the actual "I appreciate, I want, but I cannot"), there is deprivation (conflict or vacuum) of actualized values and needs that make the individual to experience the life situations like unsuccessful. The actualized values and needs and possibilities for their satisfaction by Border guards are actualized by the activity (work) environment, due to the inclusion in the professional environment, which ensures the implementation of social interactions, communication and acquisition of professional competence, and the like.

The personal and professional behavior and effectiveness of Border guards activity is a generalized result of the application of knowledge, skills, values and other personal qualities that they demonstrate when carrying out their tasks when performing the State border control. Especially relevant is the identification of actualized values and needs and in accordance with their availability for Border guards in the context of their moral and psychological preparation for the performance of the official tasks, the formation of professional interests and inclinations and in the context of experiencing their own psychological well-being.

The analysis of recent research. The value orientations of Border guards were studied mainly in the professional training of the personnel of the State Border Guard Service of Ukraine for the implementation of the professional activities in the context of the formation of their psychological readiness for professional activity, professional motivation and professional competence and are presented in the works of Yu. Balashova (Balashova, 2011), I. Hriaznov (Hriaznov, 2004), T. Ivashkova (Ivashkova, 2015), V. Kaliuzhnyi (Kaliuzhnyi, 2014), I. Kovalska (Kovalska 2013), S. Mul (Mul, 2016), O. Stavytskyi (Stavytskyi, 2015), H. Topolnytska (Topolnytska, 2011) and others.

The purpose of the article is to highlight the results of an empirical study of the features of actualized values and their availability for Border guards.

Methods of research. The empirical study of the actualized values and their availability to the personnel of the State Border Guard Service of Ukraine was conducted on the basis of the National Academy of the State Border Guard Service of Ukraine named after Bohdan Khmelnytsky. The research involved 302 Border servicemen, 203 of whom attended the re-qualification courses (183 of them were men and 20 women), 99 officers from the Faculty for leadership training (men) aged from 23 to 55 years old, with the length of service in the State Border Guard Service of Ukraine from 1 to 26 years. The sample involves respondents from all regional offices of the State Border Guard Service of Ukraine.

To study the value orientations of the staff of the State Border Guard Service of Ukraine, the value-oriented system of O.Fantalova's methods were used: the method for diagnosing the level of the ratio of "value" and "availability" in various life spheres, the "Seven states" methods, the discomfort assessment scale and the "Free Choice of Values" (Fantalova, 1999). In order to identify the correlation between the indicators of value orientations: the index of the difference in values and their availability, internal conflicts and the vacuum of the staff of the State Border Guard Service of Ukraine, the Sparmen rank correlation coefficient was calculated. Statistical processing of data was carried out using the SPSS software package Version 17.0.

Results of the research. According to the results of the testing under the methodology "The level of relations between" values" and availability" in various life spheres, the following features were revealed:

1) The value set of Border guards:

- The Border guards consider the most valuable and important the following spheres of life (high levels of values): happy family life - 58.28% of persons, health -52.65% of persons, love -44.7% of persons;

- The Border guards consider (average levels of values) valuable and important: having faithful and true friends - 64.9% of persons, material security - 60.6% of persons, self-confidence - 53.31% of persons, cognition (possibility of expansion of own education, world outlook, culture and intellectual development) - 49.34% of persons, Active living position - 47.68% of persons, fancy job - 45.7% of persons, love - 44.7% of persons;

- The Border guards consider the least valuable and important spheres of life (low levels of values): beauty of nature and art - 80.13% of persons, creativity - 72.19% of persons, freedom - 51.99% of persons;

2) The set of availability values for Border guards:

- The Border guards consider available the following spheres of life (average levels of availability): Interesting job - 59.27% of persons, cognition - 58.28% of persons, having faithful and true friends- 51.99% of persons, freedom - 49.34% of persons, health - 49.34% of persons, Active living position - 48.34% of persons, love - 47.35% of persons, happy family life - 39.07%. The prevalence of high levels of availability of values over the middle and low levels in the study group was not revealed;

- the Border guards consider the least available the following spheres of life (low levels of availability): material security - 69.87% of persons, creativity - 55.3% of persons, self-confidence - 53.31% of persons, beauty of nature and art - 45.7% of persons.

According to the results of testing under the methodology "The level of relations between "values" and " availability" in various life spheres, the following peculiarities of internal conflicts of Border guards that represent a disruption in the system "awarenessexistence" between the need to achieve internally significant value objects and the possibility of their achievement in reality (the represent between what is and what should be, between I want and I have, between I want and I can):

- High levels of demonstration: in the health sphere - 10.6% of persons, in the sphere of love (spiritual and physical intimacy with a loved one) - 3.98% of persons, in the sphere of happy family life - 3.31% of persons in the sphere Having faithful and true friends - 2.98% of persons, in the sphere of Freedom as independence in deeds and actions - 1.32% of persons and in the sphere of Material security - 0.99% of persons;

- Average levels of demonstration: in the sphere of happy family life - 12.58% of persons, in Health - 11.92% of persons, in the sphere of Love - 6.95% of persons, in Material provision - 4.97 % of persons, in the sphere of Self-confidence - 3.97% of persons, in the sphere of Having faithful and true friends" - 1.99% of persons, in the sphere of Freedom as independence in deeds and actions - 1, 66% of persons, in the spheres of Interesting job, Beauty of nature and art, Creativity respectively - 0.99% of persons and in the sphere of Cognition (the possibility of expanding of own education, worldview, culture and intellectual development) "- 0.66% of persons;

- Weak levels of demonstration: in the sphere of Material provision - 20.86% of persons, in the sphere of Happy family life - 18.88% of persons, in the sphere of Love - 17.88% of persons, in the sphere of Health – 15.89% of persons, in the sphere of Having faithful and true friends - 12.91% of persons, in the sphere of Freedom as independence in deeds and actions - 7.28% of persons, in the sphere of Creativity - 5.96% of persons, in the sphere Self-confidence - 5.29% of persons, in the sphere of Cognition (the possibility of expanding of own education, worldview, culture and intellectual development) - 4.30% of persons, in the sphere of Beauty of nature and art - 3.31% of persons, in the spheres of Active living position and Interesting job in each sphere respectively - 2.98%

of persons.

Internal conflicts concerning the researched values and their availability are revealed in the spheres: Health (38.41%), Happy family life (34.77%), Love (28.81%), Material security (26.82%), Having faithful and true friends (17.88% of persons), Freedom (10.26% of persons), Self-confidence (9.26% of persons), Creativity (6.95%), Cognition (4, 96% people), Beauty of nature and art (4.30% of persons), Interesting job (3.97% of persons) and Active living position (2.98% of persons).

As for the peculiarities of the internal vacuums of Border guards, according to the results of testing under the methodology "The level of relations between" values" and "availability" in various life spheres, there were revealed:

- The high levels of their demonstration: in the sphere of Beauty of nature and art - 3.98% of persons, in health - 2.98% of persons and in the sphere of Active living position - 1.99% of persons;

- The average levels of demonstration: in the sphere of Beauty of nature and art - 9.93% of persons in the sphere of Active living position - 5.96% of persons, in the sphere of Self-confidence - 4.64% in the sphere of Creativity - 3.97% of persons, in the sphere of Happy family life - 3.31% of persons, in the sphere of Interesting job - 2.98% of persons and in the sphere of health, cognition, freedom in each sphere respectively, - 0.66% of persons;

- The weak levels of demonstration: in the sphere of Beauty of nature and art - 24.50% of persons, in the sphere of Active living position - 20.86% of persons, in the sphere of Self-confidence - 19.7% of persons, in the sphere of Creativity - 16.56% of persons, in the sphere of Cognition - 15.23% of persons, in the sphere of Interesting job - 14.90% of persons, in the sphere of Freedom - 13.91% of persons, in the sphere of Having faithful and true friends- 6.62% of persons, in the sphere of Love - 5.96% of persons, in the sphere of Health - 2.98% of persons, in the sphere of Material security - 2.98% of persons and in the sphere of Happy family life - 1.99% of persons.

Internal vacuums concerning the studied values and their availability were revealed in the spheres: Beauty of nature and art (38.41%), Active living position (28.81%), Selfconfidence (24.51%), creativity (20 5 %), Interesting job (17.88%), cognition (17.22%), Freedom (15.9%), Health (7.95%), Having faithful and true friends (6.62 % of persons), Love (5.96% of persons), Happy family life (5.3% of persons) and material security (2.98% of persons).

Among the studied Border guards, there were identified persons, whose values and availability enter a conflict-free neutral zone, where there are no noticeable internal conflicts and internal vacuum, where the needs of the desired and the possibilities for his satisfying basically coincide: in the sphere of Interesting job - 78.15% of persons, in the sphere of cognition - 77.82% of persons, in the sphere of Having faithful and true friends - 75.50% of persons, in the sphere of Freedom - 73.84% of persons, in the sphere of Creativity - 72.52% of persons, in the sphere of Material security - 70.20% of persons, in the sphere of Active living position - 68.21% of persons, in the sphere of Self-confidence - 66.23% of persons, in the sphere of Love - 65.23% of persons, in the sphere of Happy

family life - 59.93% of persons, in the sphere of Beauty of nature and art - 57, 29% of persons, in the sphere of Health - 53.64% of persons.

The results of the indicators revealed according to the methods "The level of relations between" values" and "availability" in various spheres of life", "Seven states" and according to the discomfort assessment scale, describing the peculiarities of the assessment by the Border guards of the subjective emotional experiences in spheres where they demonstrate the internal conflicts and internal vacuum, and associated with them a sense of discomfort demonstrated that the study group of Border guards have identified a high level of the integral indicator "Value-availability" in 16.89% of persons, the average - in 43.38% of persons and low level in 39.73% of persons that show the corresponding depth levels of the not always conscious state of immersion of a person in his own internal conflicts, the levels of internal dissatisfaction and the blocking of basic life needs. In conditions of internal conflicts and vacuum of the staff of the State Border Guard Service of Ukraine, the prevalence of a low level of emotional-negative states in 83.78% of Border guards was revealed. In the zone of absence of noticeable internal conflicts and internal vacuum, where the needs of the desired and the possibilities of its satisfying are basically coincide, the Border guards have emotional-positive states at a high level of 32.45% of persons, at middle level - 53.31% of persons, at low level-14.24% of persons, which indicates the corresponding levels of inner peace, tranquility, inner comfort, inner well-being and safety. In the state of internal conflicts and vacuums, a distinctive level of subjective experience of discomfort in 6.95% of persons was revealed, and a mild level- in 13.25% of persons. In the neutral zone of the absence of noticeable internal conflicts and internal vacuums, a lack of experience of discomfort in 79.8% of Border guards was revealed.

By the method of "Free choice of values", peculiarities of the "valuable core" of the staff of the State Border Guard Service of Ukraine were revealed. The results of the values kinds of the "valuable core " of the staff of the State Border Guard Service of Ukraine are presented in Table 1.

The following values are included in the person's "value core" of the State Border Guard Service of Ukraine Personnel:

1) Values as attitude to the life manifestations and objects: Love for children - 33.11% of persons, Respect for people - 31.45% of persons, Faith in God - in 25.50% of persons, Cheerfulness - 22 84% persons, Sociability - 21.85% of persons, Benevolence - 19.54% of persons, Love for the Motherland - 18.21% of persons, Generosity - 16.90% of persons, Forgiveness - 14.57% of persons, Immodesty - 13.24% of persons, Sympathy - 7.62% of persons, Tolerance - 7.28% of persons, Fond of animals - 4.97% of persons, Understanding of others, Love of neighbor and love of nature - 4.63% of persons, Sacrifice and Thriftiness - 3.65% of persons;

Table 1

Types of values of "valuable core" of the staff of the State Border Guard Service of Ukraine.

Values as a rela life manifestati objects	tion to the ons and	Values characterolo personal q	as gical and ualities	Values as material and essentials		Values as processes activity (occupation		Values as material and essentials Values as processes of activity (occupations)		Values as interest	
Value type	Total number of persons (%)	Value type	Total number of persons (%)	Value type	Total number of persons (%)	Value type	Total number of persons (%)	Value type	Total number of persons (%)		
love for children	100 (33.11)	Inflexible will	102 (33.78)			Purpos- efulness	107 (35,43)				
respect for people	95 (31.45)	Firmness of opinion	92 (30.46)	Presence of family	121 (40.07)	Courage	78 (25,84)	Entertai- nment	37 (12,25)		
Faith in God	77 (25.50)	Truthfu- Iness	88 (29.14)			Patience	76 (25,17)				
Cheerfulness	69 (22.84)	Honesty	84 (27.81)			Performance capability	65 (21,52)				
Sociability	66 (21.85)	Decency	80 (26.49)	Money	109		50	Games	23		
Benevolence	59 (19.54)	Straightfo- rwardness. openness	78 (25.82)		(00.10)	Acumen	58 (19,21)		(7,01)		
Love to motherland	55 (18.21)	Optimism	77 (25.49)			Vacation	39				
Generosity	51 (16.90)	Sincerity	61 (20.20)	Love	101 (33.45)	Vacation	(12,91)	Interest in	23		
Forgiveness	44 (14.57)	Kindness	60 (19.87)			Moral	23	reading, books	(7,62)		
Forgiveness	40 (13.24)	Emotional intelligence	60 (19.87)			support	(7,62)				
Sympath	23 (7.62)	Spirituality	57 (18.87)	Children availability	94 (31.13)	Commu-	16	Interest	14		
Tolerance	22 (7.28)	Practical mind	55 (18.21)			nication	(5.30)	in music	(4.64)		
Fond of Animals	15 (4.97)	Sense of humor	50 (16.56)			Leieure	13	Coort	13		
Understanding other people	14 (4.63)	Altruism	47 (15.56)	Pleasure	83 (27.48)	Leisure	(4.30)	Sport	(4.30)		
Love for one's neighbor	14 (4.63)	Nobility	36 (11.92)				40	Interest	0		
Love of nature	14 (4.63)	Mind of philosophic cast	13 (4.31	Windom	63	Sociability	(3.97)	in theatre	o (2.65)		
Sacrifice	11 (3.64)	Breadth of	12	vvisuom	(20.87)	Deet	8	Interest	4		
Thriftiness	11 (3.65)	view	(3.98)			Rest	(2.65)	painting	(1.32)		

2) Values as characterological and personal qualities: Inflexible will - 33.78% of persons, Firmness of views - in 30.46% of persons, Truthfulness - 29.14% of persons, Honesty - 27.81% of persons, Decency - 26.49% of persons, Straightforwardness, Openness - 25.82% of persons, optimism - 25.49% of persons, Sincerity - 20.20% of persons, Kindness - 19.87% of persons, Emotional intelligence - 19 87 % of persons, Spirituality - 18.87% of persons, Practical mind - 18.21% of persons, Sense of humor - 16.56% of persons, Altruism - 15.56% of persons, Nobility - 11.92% of persons, Philosophical mentality - 4.31% of individuals, Breadth of views - 3.98% of persons;

3) Values as material and essentials: Presence of family - 40,07% of persons, Money - 36,10% of persons, Love - 33,45% of persons, Availability of children - 31,13% of persons, pleasure - 27.48% of persons, Wisdom - 20.87% of persons;

4) Values as processes of activity (occupation): Purposefulness - 35.43% of persons, Courage - 25.84% of persons, Patience - 25.17% of persons, Performance capability -21.52% of persons, Intelligence - 19 21% of persons, Vacation - 12.91% of persons, Moral support - 7.62% of persons, Communication - 5.30% of persons, Leisure - 4.30% of persons, Sociability - 12 (3.97%) of persons, Rest - 8 (2.65%) of persons;

5) Values as interests: Entertainment - 37 (12.25%) of persons, Games and interest in reading, books - 23 (7.61%) of persons, Interest in music - 14 (4.64%) of persons, Sports - 4,30% of persons, Interest in the theater - 2,65% of persons, Interest in painting - 1,32% of persons.

Such values as: tactfulness, politeness, intelligence, restraint, the beauty of the behavior, morality, the beauty of things, of the environment, the beauty of the human appearance, neatness, comfort, fun, self-criticism, lack of conceit, lack of snobbery and condescension to the weaknesses of others in the value core of the person were not revealed.

Thus, according to the results of testing, it was revealed that ten main values of the "value core" of the personality of the Border guards include the following: presence of family, money, purposefulness, strong will, love, love for children, respect for people, having children, firmness of views, truthfulness.

The assessment of the level of availability of all values selected by Border guards from the proposed list in the questionnaire "Free Choice of Values" was carried out using the analysis of identified internal conflicts and the vacuum presented in Table 2.

The most significant manifestations of internal conflicts among the Border guards are found in the following values (Tables 1, 2): Inflexible will - 8.62% of persons, Truthfulness - 7.95% of persons, Purposefulness - 7.62% of persons, Money – 6.96% of persons, Honesty - 6.62% of persons, Wisdom - 5.30% of persons, Pleasure - 4.97% of persons, Straightforwardness, Openness, sincerity, Respect for people (respectively for each value) - 4, 30% of persons, Faith in God - 3.97% of persons, Firmness of views - 3.65% of persons. The most significant manifestations of internal vacuums are found in the following values: Sacrifice - 2.97% of persons, Faith in God - 2.98% of persons, Sociability - 2.32% of persons, Altruism - 2.32% of persons, Practical mind - 1.99% of persons, Emotional intelligence - 1.99% of persons, Forgiveness - 1.65% of persons,

Fond of Animals - 1.65% of persons, Games - 1.66% of persons, Spirituality – 1.65% of persons.

Table 2

№ з/п	Set of values	Set of availability	Internal conflicts	Internal vacuum
1	Presence of family	Love	Inflexible will	Sacrifice
2	Money	Love for children	Truthfulness	Faith in God
3	Purposefulness	Presence of family	Purposefulness	Sociability
4	Inflexible will	Firmness of views	Money	Altruism
5	Love	respect for people	Honesty	Practical mind
6	Love for children	Presence of children	Wisdom	Emotional intelligence
7	Respect for people	Money	Pleasure	Forgiveness
8	Presence of children	Purposefulness	Straightforwardness, openness, sincerity, respect for people	Fond of Animals
9	Firmness of views	Truthfulness	Faith in God	Games
10	Truthfulness	Inflexible will	Firmness of views	Spirituality

Set of values and their availability, internal conflicts and vacuums of the "value core" of the State Border Guard Service of Ukraine

According to the results of Spearman's nonparametric test calculation, the following correlation relationship between the indices of value orientations are revealed: the index of difference in values and their availability, internal conflicts and the vacuum of the staff of the State Border Guard Service of Ukraine (Table 3).

The revealed correlation relationships of the index "Difference Index" V-A" show that the discrepancy between the values and possibility regarding their availability directly depends on: internal conflicts (0.837 with p < 0.01), internal vacuums (0.799with p < 0, 01), life values: Health (0.155 with p = 0.007), Beauty of nature and art (0.127) with p = 0.028), Love (0.224 with p < 0.01), Having faithful and true friends (0.225 with p < 0, 01), Freedom as independence in deeds and actions (0,192 with p = 0,001), Happy family life (0,244 with p < 0.01), Availability of values (0.393 with p < 0.01), Interesting job (0.239 with p < 0.01), Beauty of nature and art (0.393 with p < 0.01), Self-confidence (0.165 with p = 0.004), Cognition (0.178 with p = 0.002), Creativity (0.199 with p = 0.004)<0.01), and Emotional-positive states (0.130 with p = 0.024). The discrepancy between the values and possibility regarding their availability is inversely proportional to: the presence of a neutral zone of values and their availability, where the internal conflicts and vacuums are absent (-0.817 with p < 0.01), life values: Active living position (-0.164 with p = 0.004), Interesting job (-0.307 with p < 0.01), Creativity (-0.133 with p = 0.021), availability of values: Health (-0.181 with p = 0.002), Love (-0.274 with p < 0.01) (-0.220with p < 0.01), Having faithful and true friends (-0.329 with p < 0.01) and a Happy family life (-0.503 with p < 0.01).
Table 3

Correlation relationship between the indices of value orientations are revealed: the index of the difference in values and their availability, internal conflicts and the vacuum of the staff of the State Border Guard Service of Ukraine

№ з/п	Indicators that have a two-way correlation relationship	Value of the Spearman correlation coefficient	p-level
	With an index of difference "V-A":		
1	Internal conflicts	0.837	p<0.01
2	Internal vacuums	0.799	p<0.01
3	Neutral zone	-0.817	p<0.01
4	Life values:		
4.1	Active living position	-0.164	p=0.004
4.2	Health	0.155	p=0.007
4.3	Interesting job	-0.307	p<0.01
4.4	Beauty of nature and art	0.127	p=0.028
4.5	Love	0.224	p<0.01
4.6	Having faithful and true friends	0.225	p<0.01
4.7	Freedom as independence in deeds and actions	0.192	p=0.001
4.8	Happy family life	0.244	p<0.01
4.9	Creativity	-0.133	p=0.021
5	Available values:		
5.1	Active living position	0.393	p<0.01
5.2	Health	-0.181	p=0.002
5.3	Interesting job	0.239	p<0.01
5.4	Beauty of nature and art	0.393	p<0.01
5.5	Love	-0.274	p<0.01
5.6	Material security	-0.220	p<0.01
5.7	Having faithful and true friends	-0.329	p<0.01
5.8	Self-confidence	0.165	p=0.004
5.9	Cognition	0.178	p=0.002
5.10	Freedom as independence in deeds and actions	0.174	p=0.002
5.11	Happy family life	-0.503	p<0.01
5.12	Creativity	0.199	p<0.01
6	Emotional-positive states	0.130	p=0.024
	With internal conflicts:		
1	Index of difference "V-A"	0.837	p<0.01

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2	Internal vacuums	0.594	p<0.01
3	Neutral zone	-0.791	p<0.01
4	Life values:		
4.1	Active living position	-0.140	p=0.015
4.2	Health	0.179	p=0.002
4.3	Interesting job	-0.220	p<0.01
4.4	Beauty of nature and art	-0.155	p=0.007
4.5	Love	0.219	p<0.01
4.6	Material security	0.141	p=0.014
4.7	Having faithful and true friends	0.255	p<0.01
4.8	Freedom as independence in deeds and actions	0.165	p=0.004
4.9	Happy family life	0.250	p<0.01
4.10	Creativity	0.115	p=0.046
5	Available values:		
5.1	Active living position	0.259	p<0.01
5.2	Health	-0.130	p=0.024
5.3	Interesting job	0.184	p=0.001
5.4	Beauty of nature and art	0.407	p<0.01
5.5	Love	-0.314	p<0.01
5.6	Material security	-0.169	p=0.003
5.7	Having faithful and true friends	-0.311	p<0.01
5.8	Cognition	0.178	p=0.002
5.9	Freedom as independence in deeds and actions	0.132	p=0.021
5.10	Happy family life	-0.534	p<0.01
5.11	Creativity	0.207	p<0.01
III	With internal vacuums:		
1	Index of difference "V-A"	0.799	p<0.01
2	Internal conflicts	0.594	p<0.01
3	Neutral zone	-0.785	p<0.01
4	Life values:		
4.1	Active living position	-0.159	p=0.006
4.2	Health	0.119	p=0.039
4.3	Interesting job	-0.393	p<0.01
4.4	Love	0.180	p=0.002
4.5	Having faithful and true friends	0.227	p<0.01
4.6	Cognition	-0.148	p=0.010
4.7	Freedom as independence in deeds and actions	0.162	p=0.005

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4.8	Happy family life	0.205	p<0.01
4.9	Creativity	-0.116	p=0.043
5	Available values:		
5.1	Active living position	0.414	p<0.01
5.2	Health	-0.205	p<0.01
5.3	Interesting job	0.257	p<0.01
5.4	Beauty of nature and art	0.404	p<0.01
5.5	Love	-0.254	p<0.01
5.6	Material security	-0.220	p<0.01
5.7	Having faithful and true friends	-0.170	p=0.003
5.8	Self-confidence	0.288	p<0.01
5.9	Cognition	0.236	p<0.01
5.10	Freedom as independence in deeds and actions	0.193	p=0.001
5.11	Happy family life	-0.375	p<0.01
5.12	Creativity	0.216	p<0.01
6	Emotional-positive states	0.122	p=0.034

Internal conflicts that arise against the impossibility of satisfying the actualized values directly depend on the index of the difference "V-A" (0,837 with p <0,01), Internal vacuums (0,594 with p < 0,01), life values: Health (0.179 with p = 0.002), Love (0.219 with p < 0.01), Material security (0.141 with p = 0.014), Having faithful and true friends (0.255 with p < 0.01), Freedom as independence in deeds and (0,165 with p = 0,004), Happy family life (0,250 with p < 0,01) and Creativity (0,115 with p = 0,046) availability of values: Active living position (0,259 with p < 0.01), Interesting job (0.184 with p = 0.001), Beauty of nature and art (0.407 with p < 0.01), Cognition (0.178 with p = 0.002), Freedom as independence in deeds and actions (0.132 with p= 0.021) and creativity (0.207 with p < 0.01). The impossibility of satisfying actualized values is inversely proportional to the presence of a neutral zone of values and their availability (-0.791 with p <0.01), life values: Active living position (-0.140 with p =0.015), Interesting job (-0.220 with p < 0, 01), the beauty of nature and art (-0.155 with p = 0.007), the availability of values: health (-0.130 with p = 0.024), Love (-0.314 with p < 0.01), material security (-0.169 with p = 0.003), Having faithful and true friends (-0.311 with p < 0.01) and a Happy family life (-0.534 with p < 0.01).

Internal vacuums arising as a result of dissatisfaction with available life spheres due to redundancy and a sense of internal ballast of available values are directly proportional to: the index of difference "V-A" (0.799 with p <0.01), internal conflicts (0.594 with p <0, 01), life values: Health (0.119 with p = 0.039), Love (0.180 with p = 0.002), Having faithful and true friends (0.227 with p <0.01), Freedom as independence in deeds and actions (0.162 with p = 0.005), Happy family life (0.205 with p <0.01), and Emotional-positive states (0.122 with p = 0.034); Availability of values: Active living position

(0.414 with p <0.01), Interesting job (0.257 with p <0.01), beauty of nature and art (0.404 with p <0.01), self-confidence (0.288 with p <0, 01), Cognition (0.236 with p <0.01), Freedom as independence in acts and actions (0.193 with p = 0.001), Creativity (0.216 with p <0.01), Emotionally positive states (0.122 with p = 0.034).

Dissatisfaction with the available spheres of life spheres is inversely proportional to the presence of a neutral zone of values and their availability (-0.785 with p <0.01), life values: Active living position (-0.159 with p = 0.006), Interesting job (-0.393 with p <0, 01), Cognition (-0.148 with p = 0.010), Creativity (-0.116 with p = 0.043), Availability of values: health (-0.250 with p <0.01), Love (-0.254 with p <0.01), Material security (-0.220 with p <0.01), Having faithful and true friends (-0.170 with p = 0.003) and a Happy family life (-0.375 with p <0.01).

Conclusions. Thus, according to the results of testing, it was revealed that the most deprived by the needs of the staff of the State Border Guard Service of Ukraine, which cause in them Internal conflicts, is Health, Happy family life, Love and Material security, which indicates a high degree of dissatisfaction with the current life situation, internal conflict and the blockade of these needs with and self-realization, internal identity, integration, harmony in these spheres, as well as a high degree of inconsistency, disintegration in the motivational and personal sphere in the specified aspects. The most available values of the staff of the State Border Guard Service of Ukraine, which cause them Internal vacuums, is the beauty of nature and art, Active living position, self-confidence and creativity that form an internal vacuum, that generates a feeling of internal ballast, redundancy, uselessness and dissatisfaction in the corresponding life spheres. The most significant discrepancies between the values and their availability are revealed in such spheres as: health, happy family life, Love and material security (like Internal conflicts) and beauty of nature and art, Active living position, Self-confidence and creativity (like Internal vacuums). In the areas of Interesting job, cognition, Having faithful and true friends and freedom, high indices of the conflict-free zone are revealed, where the actual values for Border guards are available.

The most pronounced Internal conflicts (health, happy family life, Love and material security) and Internal vacuums (the beauty of nature and art, Active living position, self-confidence and creativity) of Border guards are accompanied by emotionally negative experiences (feelings of internal tension, disharmony, frustration, lack of interest in anything, inner anxiety, longing, depression, apathy and lack of strength to overcome difficulties) and experiencing discomfort. The emotional-positive experiences (internal tranquility, serenity, inner comfort, inner well-being and safety) prevail in the neutral zone of the absence of noticeable internal conflicts and internal vacuums, as well as the lack of discomfort.

The set of value of the "value core" of Border guards has the following sequence (from the most valuable to the least valuable): availability of family, money, purposefulness, inflexible will, love, love for children, respect for people, presence of children, firmness of views, truthfulness. A set of the values availability has the following sequence (from the most available in the least available): love, love for children, family, firmness of views, respect for people, presence of children, money, purposefulness, truthfulness, inflexible will.

Prospects for further research are related to the identification of the specific features of the impact of actualized values and needs and their availability on the psychological well-being of the Border guards.

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ASSERTIVENESS AND ITS ROLE IN FORMING THE CONFLICTOLOGICAL CULTURE OF THE STUDENTS OF HIGHER TECHNICAL EDUCATIONAL INSTITUTIONS

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Annotation. The questions about formation of assertiveness in students of higher technical educational institutions, as an important component of the conflict management culture, are raised in the article. The author has analyzed the essence of concepts of "engineer conflict management culture" and "assertiveness". The methodological approach to development of assertiveness trainings is described, and the examples of techniques used by the author in her work at training sessions are given.

Key words: assertiveness, conflict management culture, training, conflict, culture, aggression, tolerance, identification.

Introduction. The issue of training technical specialists has come to the fore when technical progress has gained momentum and the need for appropriate education of future specialists has become apparent. Modern world technical trends are characterized by rapid changes and transformations, steady growth of professional skills, cultural flexibility, and higher competitiveness, which are also factors of possible conflicts in various spheres of human life. In addition, the requirements to specialists are increasing as the labor market put forward demands to higher education graduates pertaining not only to professional competence, but to cultural, tolerant behavior, the ability of non-conflict, assertive communication, and harmonious development of a personality, which focuses not only on the cultural heritage of his/her country, but is also quite aware of cultural specifics of other peoples.

Definition of problem and objective. At the beginning of the last century, S. Hessen convincingly argued that the culture was an essential prerequisite of education in the true sense. In his view, education was nothing but an individual's culture. Moreover, if the culture is an assembly of inexhaustible objectives-tasks of the very existence of a people, then education is an inexhaustible task of mastering the cultural way of life in the context of an individual [1].

A technical specialist, a graduate of a higher technical school, should be, first of all, a highly cultural individual, because attracting young people to cultural achievements facilitates development of professional properties required for their further work, inasmuch as an engineer lacking common human and cultural values may pose a threat to the society. Therefore, we consider formation of a conflict management culture an important factor of the study at a technical higher education institution.

Latest achievements and publications. The issues and problems of conflict

and culture have been of interest to scholars for many centuries. To date, there are many definitions of the concepts of "conflict" and "culture". Theoretical and practical experience of analysis of conflicts and ways of their settlement are represented in the works of many scholars: S. Freud, C. G. Jung, R. Dahrendorf. M. Deutsch, L. Coser, K. Lewin, J. Moreno, D. Carnegie, H. Cornelius, W. Ury, R. Fisher, D. Scott, A. Maslow, C. Rogers, A. Antsupov, E. Ershov, P. Blonsky, D. Vygotsky, M. Piren, L. Petrovska, A. Shepilova, H. Lozhkina, N. Poviakel, et. Al.

Cultural issues (as a broad concept) were touched upon in the works of such scientists as R. Benedict, L. Berezhnova, J. Gerder, S. Hessen, A. Hurevich, I. Zymnia, A. Kroeber, C. Kluckhohn, I. Ohiienko, S. Pufendorf, P. Sorokin, E. Tailor, A. Touraine, S. Charnovskyi, and many others.

To date, the concept of conflict management culture has not been widely explored. O. Shcherbakova, N. Samsonova, N. Pidbutska, A. Antsupova, W. Mastenbroek, L. Petrovska, I. Shypilova, et. al. devoted their works to the problems of conflict management culture and conflict management competency in various fields of social life.

In our opinion, a conflict management culture is an ability to predict and find a compromise solution for settlement of conflict in different life situations and the ability to adapt in a conflict-generating environment. We consider the conflict management culture of a future engineer as part of the professionally important properties of occupational competence gained in the course of studying at a higher educational institution.

Presentation of the basic material. In the process of formation of the conflict management culture, students of higher technical education institutions combine cultural, psychological, social, humanistic, and cognitive components, being uncovered and mastered by students while studying both humanitarian and technical disciplines with the help of innovative teaching methods. We believe that mastering these components should carry on simultaneously, which is actually the basic principle of configuring the culture of conflict management.

We consider mastering the assertiveness skills an important component of the conflict management culture. The researches of this phenomenon were E. Salter, E. Bern, M. James, A. Maslow, G. Allport, C. Rogers, A. Fedorov, L. Nikolaiev, V. Capponi, T. Novak, T. Fasolko, S. Stout and others. For the most part, scientists define assertiveness as a constructive way of interpersonal interaction in a creative perception of the environment. The term "assertiveness" comes from the English language, and it means perseverance in proving own point of view, defending and asserting own rights. In psychology, the assertiveness is often associated with confident behavior. By definition of E. Salter [2], the assertiveness is viewed as an ability of an individual to constructively insist on his/her rights, showing a positive respect to other people, while being fully responsible for own behavior.

The assertiveness is also interpreted as a trait of a mature individual, which characterizes the ability of a human being to change his/her behavior in common activities, the process of communication and positive cognition, expressed in a sense of inner strength, the ability of personal self-expression, emotional stability, responsibility

for implementation of decisions taken, a positive attitude towards him/herself and others. The assertiveness contributes to achievement of the goals set without causing any harm to others, and occupies a middle position between passivity and aggressiveness - two unproductive behavior strategies [3].

The concept of assertiveness came into the domestic psychological terminology in the early 90's of the XX century in the aftermath of the book by Czech psychologists V. Capponi and T. Novak "How to do things in own way." In the book, the authors highlighted the principles of assertiveness based on the belief that no one could successfully manipulate others if they themselves would not allow it [4].

For the most part, the assertiveness is a subject of the psychological science and, alas, very little attention is paid to it in pedagogy and in the educational sphere of higher education institutions. In our opinion, in order to consider the assertiveness as part of the higher educational process, attention should be paid not only to formation of the assertive skills in students, but also to the aptitude to assertiveness in teachers, since, in some cases, the teachers are initiators of interpersonal conflicts in the course of learning process. Failure to constructively address the problems that may arise leads to aggression and conflict situations on both sides.

The interpersonal interaction is characterized by four types of behavior, namely: an aggressive type of behavior when an individual demonstrates him/herself by invading other's personal territory, violating other's rights; a passive type of behavior when the actions of an individual lead to restriction of his/her own interests and rights; and the mixed type combining passive-aggressive reactions and an assertive type of behavior that demonstrates the ability to express feelings, thoughts and beliefs openly, honestly, without violating the rights of other individuals [5].

Students should comprehend that professionalism consists in not only theoretical knowledge of professional skills, but also in the ability to find a compromise in challenging situations, to be confident in their own views and actions, to understand the role of their behavior in the occupational activities. Therefore, higher technical education institutions should attempt to form assertiveness or assertive skills in masters by means of innovative teaching methods. There may be a question, whether it is too late to form the assertiveness in the magistracy? Of course, while studying at initial and undergraduate courses, it is also necessary to pay attention to formation of students' assertiveness, but we believe that at the phases of socialization and adaptation of students to new environment when professional identification and identification of personal priorities are carried on, the formation and comprehension of the assertiveness passes the general stages, which contribute mostly to a social area, while master students should develop the assertiveness, directed in the first instance on the occupational orientation, and knowledge obtained at primary courses will help them in formation of assertiveness as an occupational trait.

For example, to explore the ability of master students of the Department of Construction and Heat Power Engineering of the Vinnytsia National Technical University, we have used a number of the below techniques.

Since we regard aggression as one of the factors of conflict behavior and destructive problem solving, master students were asked to undergo diagnostics of indicators and forms of aggression using the Buss-Durkey Inventory (adapted by A.K. Osnytskyi) [6]. This technique, which involves the Buss-Durkey personalized questionnaire, was developed by A. Buss and A. Durkey in 1957 and designed to characterize aggressive and adverse reactions. According to the authors, one may recognize aggression as a property of an individual, characterized by the presence of destructive trends, mainly in the domain of subjective - subjective relations. Probably, the destructive component of human activity is an indispensable element of creative activity, since the needs of individual development inevitably call for the ability of individuals to remove and destroy obstacles, to overcome everything that opposes this process. Aggressiveness is characterized by qualitative and quantitative aspects. Like any trait, it may exist with a different degree of expression - from almost complete absence to its ultimate grade. Every individual may be characterized by a certain degree of aggressiveness. Lack of it leads to passivity, control, conformance, etc. The authors proposed the following eight important indicators and forms of aggression: physical aggression - the use of physical force against other person(s); verbal aggression - expression of negative feelings (quarrels, yelling, threats, etc.); indirect threat – covert use of gossip, jokes and explosions of anger (yelling, Katzenjammer) directed against others; negativism - an oppositional form of behavior, usually directed against the authority of the leadership, which can range from passive resistance to active actions against regulations, rules, and laws; annoyance – an inclination to ill temper, readiness to falling in ill humor, acridity, and rudeness at the slightest excitement; suspiciousness - a tendency toward distrust and cautious attitude towards people, which stem from the conviction that others may cause harm; resentment - a manifestation of envy and hatred of others caused by feelings of anger for real or imaginary suffering; autoaggression or feelings of guilt - actions and attitudes towards oneself and others, preconditioned by possible conviction of a respondent that he/she is a bad person doing wrong things. Also, the authors proposed in their techniques to define the indexes of aggressiveness and hostility. The index of aggressiveness is represented by averaged indicators of physical, verbal aggression, mediated threat and negativism. The index of hostility involves averaged results of suspicion, annoyance and resentment.

This methodology cannot be an exhaustive source for analysis, therefore, after conducting this survey, it is necessary to hold a conversation or a secret interview with students to find out the factors that may influence the manifestation of aggression or hostility, if the teacher is not sure of sincerity of the respondents. For example, students are focused mostly on such factors as uncertainty, employment problems, economic problems, and hardships in their private lives. These facts should also be taken into account in the further work.

We consider the conversation as an important step towards understanding and further collaboration with students and as one of the important steps in developing the training session. We regard holding the secret interview as a transitional phase between testing and conversation. In our work we also used the Express Questionnaire Methodology "Tolerance Index" (H.U. Soldatova, O.A. Kravtsova, O.I. Khukhlaiev, L.A. Shaiherova) [7]. We also consider tolerance as one of the manifestations of assertiveness and professional competence, therefore, we consider it important to conduct this testing for the further development of the training session. It is designed to assess the general level of tolerance. The text of the questionnaire consists of statements that reflect both the general attitude to the environment and other people, and social settings regarding different spheres of interaction, in which tolerance or human intolerance manifest themselves. The method is inclusive of statements that show the attitude to some social groups (minorities, mentally ill people, beggars), communicative settings (respect to opponents, willingness to constructively resolve conflicts and productive cooperation). Particular attention is paid to ethnic tolerance/intolerance (attitude towards people of other races and ethnic groups, to their own ethnic group(s)). The sub-scales of the questionnaire are aimed at diagnostics of such aspects of tolerance as ethnic tolerance, social tolerance, tolerance as a personality trait.

To determine the level of assertiveness in master students and for a more thorough approach to developing a training session, we hold an "Assertiveness Level Test-Questionnaire" modified by V. Capponi and T. Novak [8]. In the test, the authors propose three scales with three levels against the number of points scored. These scales are distributed as follows: Scale A - independence and autonomy; Scale B - confidence, determination, self-reliance; and scale C - a social need.

We conduct this testing in order to view an initial level of students' assertiveness prior to beginning of the training sessions; we also conduct a post-training test to analyze the effectiveness of our work.

To form up and develop the assertiveness of masters we consider effective and necessary to use training sessions or classes with training elements. Being geared to the results of the methodology/tests, we develop a training session, at which we try to get rid of shortcomings revealed by the tests. We view the training session not only as a psychological or educational setting, but as a simulator of life situations, so we give great importance to selection of practical elements we use during our work. The assertiveness training sessions should be tailored to meet the needs of students who might not always be able to understand their needs. Therefore, before development of the training session, we practice to apply a number of techniques to understand what problems need to be highlighted during development of the training agenda. We consider trainings as educational work with students that is not possible to carry out under a same scheme in different groups, therefore, we develop the above for each group individually, being guided by the results of previous tests. For example, if most students have problems with ethnic or social tolerance, we use training elements to improve and increase the tolerance level. Of course, there are quite a variety of techniques that can be used to guide the assertiveness trainings.

Conclusions. The problem of the present days is a replacement of values that cannot be overestimated. In pursuit of occupational performance, we often forget that

professionalism is, first of all, an interpersonal understanding. We consider the conflict management culture as one of the components of professional competence with the assertiveness as an important component thereof, which is rarely paid attention while studying at a higher education institution. The educational process at a higher school, which, in most cases, has moved to the Internet, sometimes loses the most important educational goal - the formation of a full-fledged, cultural, moral, and humanistic individual who comprehends the importance of proper communication with other people. Therefore, we believe that formation of conflict management culture, assertiveness training sessions, and an individual approach to their development and implementation in the educational process is an important step of a future professional for obtaining so much desired occupational properties.

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MODERN APPROACHES TO THE FORMATION OF THE COMPETENCE OF THE FUTURE TEACHER OF ELEMENTARY SCHOOL

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Annotation. The article considers modern approaches to the formation of the ethnographic competence of the future teacher of elementary school. The basic pedagogical conditions concerning the formation of the competence of the future teachers of the elementary school are determined and analyzed. The specifics of the content of pedagogical education, ethnographic, informational and methodological, educational, technological, and evaluation aspects are considered. The formation of the professional competence of future primary school teachers is revealed.

Key words: ethnography, ethnography competence, professional training, future teachers, elementary school.

The rise of man, the formation of it as a personality is the main goal of any culture, because culture is the concentration of all spiritual, moral, ethical in the development of personality. And the essential feature of culture is the national component, ethnic peculiarities, the idea of the nationality, its origins on the basis of the native language, history, ethnology. The peculiarity of ethnographic education is the multidimensional nature of its content, which makes it possible to study the problems of ethnographic character in the complex of educational humanities disciplines.

Each nation, every nation, even every social group has its own traditions that have been developed for many centuries and have been consecrated for centuries. However, customs are not a separate phenomenon in the life of the people; it is embodied in the movement and action of the worldview, perception of the world and the relationship between individual people.

Ukrainian ethnography has its specific ethno colored. The basic base of the ethnographic vocabulary is rich and versatile. The circle of national oriented vocabulary includes numerous thematic groups of words that reflect the living conditions, the peculiarities of worldview and worldview of Ukrainians, and reproduce a general picture of their behavior and priorities. An important component of the ethnographic vocabulary is oral folk art: songs, dumas, legends, carols, fairy tales, fairy-tales, holidays, holidays, holidays, which should serve as the basis for the formation of the competence of the future teachers of elementary school.

Modern life is characterized by rapid pace of development and implementation of professional qualities of specialists. In many European countries, the notion of competence not only concerns the content of education, but also involves the formation of young people with certain skills necessary for life and activity. It is the competence that solves

vital problems. They allow you to apply knowledge throughout your life, to operate with the knowledge gained. The European countries that participated in the international DeSeCo project, which aimed to outline key competencies, were identified with the main competencies that best fit the education systems of the countries whose education has the following priority areas for community development and key competencies: substantive; personal; social methodological [1]. In the pedagogical sense, the concept of competence is often used to refer to: the educational result, which is expressed in real possession of methods, means activities, in the ability to solve the tasks; such a form of combination of knowledge, skills and abilities that make it possible to set and achieve the goal of the transformation of the environment.

The term "competence" is a good knowledge of something or the terms of authority of an organization, institution, person [2].

According to T. Oschepko, the concept of "competence" is most used in educational activities, namely, this definition by modern specialists in the field of pedagogy is considered to possess the relevant knowledge and abilities that allow a person to reasonably judge a particular industry and act effectively in it [5].

The notion of "competence" (Latin competens - appropriate, capable) means a certain circle of authority of any official or body; possessing knowledge, skills, skills and experience in a particular field. Under the definition of professional competence of the teacher refers to the personality of the teacher, allowing him to independently and effectively realize the goals of the pedagogical process.

In addition, the competence of the individual will be relevant, which shows the real level of specialist training, in our case, the future teacher, who is able to choose the most optimal, argument, among many decisions, to eliminate the false, that is, has a critical thinking.

According to O. Pometun, human activity, in particular the assimilation of any knowledge, skills and abilities, consists of concrete actions, operations performed by a person. Under the competence of a person, a scientist understands the specially structured (organized) sets of knowledge, skills, and attitudes acquired in the learning process, which enable a person to identify, namely identify and solve, regardless of the context of the problem (situation), characteristic of a particular field of activity.

Initiating the research, we took into account that for the first time the term "ethnography" was proposed by I. Franko. He noted that "ethnography" actually means something more than what constitutes the field of our science. For the knowledge of the people means to know the people who live in a certain territory, as well as to know their current and past position, their physical and mental characteristics, their institutions and economic situation, their trade relations and intellectual connections with other peoples.

On the basis of this we have concluded that formation of ethnographic competence at the present stage of development of education is important. Ukraine is an independent state, where the national component is at a high level. A large amount of information, indepth study of ethnography, prompts the young specialist to direct the right information to the right. Cognitive competence has a complex structure, and therefore a difficult mechanism of formation, which makes this process difficult and time-consuming. This process is considered as obtaining the individual objective knowledge and ideas about his ethnic culture, the history of his native land, spiritual and moral values and the characteristics of his nation [4].

Cognitive competence is the perfect knowledge of the native language, history, culture, folk pedagogy, various forms of art, acquired in the process of learning, which allows you to successfully solve problems that have arisen in this field.

We consider competence in the field of ethnography as a complex integral phenomenon, as a socio-pedagogical phenomenon characterizing the degree of the teacher's possession of the system of ethno pedagogical knowledge, the ability to correctly use the achievements of world folk pedagogy in the modern conditions that enable the specialist to realize the humanistic approach in his professional activities and to best identify his own creative potential.

The content of the national competence is defined by the following structural components:

- a system of knowledge from various branches of philosophy (ethics, aesthetics), pedagogy (general foundations of pedagogy, history of pedagogy, theory of education, didactics, age pedagogy, family pedagogy, folk pedagogy), psychology (general psychology, psychology of development, age psychology, ethno psychology), ethnography (ethnography of childhood), characterized by complexity and dynamism;

- conscious value orientations and ideals, social maturity, interest in Ukrainian culture, the culture of other peoples, professional self-improvement, readiness to organize professional activities from the standpoint of ethno cultural culture;

- intellectual and practical skills, which allow to apply creatively the achievements of world peoples pedagogical experience in the modern practice of raising children (analytical, forecasting, projective, reflexive, organizational, communicative, and applied);

- high level of professionalism of mental processes (organization of professional thinking, attention, imagination, memory, effective transformation of received information into pedagogical consciousness), professionally important personal qualities (responsibility, goodwill, optimism, tolerance, observation, empathy, erudition, individual style, etc.).);

- adequate professional self-esteem, positive self-concept, self-awareness and selfdetermination on the basis of universal values, the ability to create conditions for selfimprovement, self-realization and self-preservation, a certain professional position, development of individuality within the framework of certain activities.

The genius cultivates a sense of dignity, patriotism, interest in the assets of Ukrainian culture, conscious attitude and knowledge of the historical path of their people, the desire to act for its further development.

Traditional traditions, customs and ordinances combine the past and the future of the people, the elders and younger generations, integrate the ethnic community of people

into a highly developed modern nation. Traditions and customs are the original eternal spiritual foundations of the development of the people, the nations that embody the best achievements in ideological, moral, labor and aesthetic life. Practically joining the ethnography, young people absorb their philosophical, ideological, moral, psychological and aesthetic content, gradually becoming an integral part of their native people, the nation.

The genre has an important content, emotional and aesthetic load, since it preserves universal and national values, the genetic code of the ethnos. Therefore, the revival of the native language by using in the process of studying the ethnography of future teachers is an integral task of linguistic-didactic science.

We have identified the pedagogical conditions for the effective formation of the competence of the future teachers of the elementary school. Among them are: orientation of students to the national focus of teaching and speech work in elementary school; provision of interdisciplinary connections in the teaching of professional disciplines in the field of enrichment of ethnography, the involvement of students in the research activities of the ethnographic orientation; stimulation of assessment and control of students, which will contribute to the formation of an adequate self-assessment of the results of teaching and speech activities; realization of students' knowledge in the process of pedagogical practice in elementary school [3].

We are confident that these pedagogical conditions will help to form the competence of the future teacher of the future teacher. But, by the end it is impossible to say that in them the ethnographic competence will be formed in full. Motivational reasons are related to the underestimation of educators of the educational role of humanitarian subjects, the lack of proper methodological provision for them. The informational reasons include the lack of emphasis on the ethnographic component in the content of most programs and textbooks on subjects in the humanitarian cycle, lack of information security. Among the organizational reasons, the most important is the inadequacy of the organizational structure of the educational process with the interests of youth: the palette of choices for certain types of activities is often limited.

Consequently, the formation of ethnographic competence does not end with the graduation of a higher educational establishment, but occurs during human life.

The democratic, humane Ukrainian society that we strive to build involves the formation of such universal human virtues as conscience, honor, dignity, justice, humanity, kindness, mercy, and hard work. The components of ethnography (language, culture, traditions, morals, etc.) are legitimately considered as factors of ethno pedagogy, through which the goals and objectives of the national component of the educational and educational system are realized. Acquiring material and spiritual values, produced by the people and humanity, the young person becomes a person with the appropriate features of the character. National values contribute to the formation of national qualities in the individual and are means for the implementation of the national component in educational institutions of educational institutions. Cognitive competence involves conducting cultural and educational work, promoting the best examples of national

culture, providing conditions for the development of creative abilities of youth, artistic and creative and artistic and educational activities.

Conclusions. At the present stage of education development, professional competence plays an important role. Competence acts as a quality, personal property of a person, which allows him to solve certain tasks, make decisions, judgments in a particular field. Since the knowledge, skills, and skills acquired throughout the training in the future will help to become a professional in their business.

When organizing young people for the implementation of national traditions, customs, rituals, it is necessary to take into account the methods of work, the ways of performing certain ceremonies and other actions that are distributed in a certain region of Ukraine.

It is necessary to train teachers who would have a high level of national selfawareness, professionalism, creative activity, prepare a worthy change, the future intelligentsia, which will take an active part in the cultural and political life of their state.

Consequently, we believe that the problem we are facing requires a continuation of the research in contemporary language teaching and education of younger generation in order to create favorable conditions for the formation of ethnographic competence, which will increase the efficiency of the educational process. Future teacher will be able to correctly orientate in choosing the right information for the educational process.

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MEDICINE AND PHYSIOLOGY

ОСОБЕННОСТИ МИКРОБИОЦЕНОЗА КИШЕЧНИКА У БЕРЕМЕННЫХ С МЕТАБОЛИЧЕСКИМ СИНДРОМОМ, У КОТОРЫХ СОСТОЯЛИСЬ ПРЕЖДЕВРЕМЕННЫЕ РОДЫ

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Gladchuk I., Malyuk V., Pavlovskaya O., Latii K., Pavlovskaya E. Peculiarities of intestinal microbiocenosis in pregnant women with metabolic syndrome and pemature births.

Annotation. The state of intestinal microbiocenosis in 72 patients with diagnosed metabolic syndrome (MS) at the background of premature births has been investigated. Depending on the gestation period by the time of delivery (22-27 weeks, 28-33 weeks, 34-36 weeks), pregnant women were divided into three subgroups. The majority of the women under examination had different complications of pregnancy since the early gestation. Among them there were the threat of interruption of pregnancy in the first trimester (81.9% of cases), vomiting of varying severity (62.5%), non severe degree of pre-eclampsia (26.4%), severe pre-eclampsia (11.1%), premature detachment of the normally located placenta (5.6%), delayed fetal development (91.7%), fetal distress (4.2%). Births through natural birth canals occurred in 79.2% of cases, operative delivery by cesarean section due to complications of pregnancy was conducted in 20.8% of cases. In the bacteriological study of feces in women with MS and preterm labor, a clear violation of the microecology of the intestine was revealed, characterized by a significant decrease in the content of the main representatives of the obligate microflora (Bifidobacterium, Lacto bacillus, Escherichia coli, Foecal streptococci) and the growth of opportunistic bacteria such as Proteus, Klebsiella, pathogenic strains of E. coli, Staphylococcus epidermidis, and especially Candida albicans. The intestinal dysbiosis, accompanied by a significant decrease in the indigenous microflora and simultaneous high contamination of Candida albicans, can be considered as a predictor of premature birth in MS women. The prevention of dysbiotic disorders and timely sanation of the intestine is quite possible to reduce the frequency of preterm labor in pregnant women with MS, therefore further study of this direction is promising and pathogenetically justified.

Key words: metabolic syndrome, premature birth, intestinal microbiocenosis.

Введение. На современном этапе развития акушерства накоплен значительный фактологический материал об этиопатогенетических механизмах инициации преждевременных родов, кроме того в повседневную лечебную практику постоянно внедряются и усовершенствуются клинические протоколы по ведению беременных с данной патологией. Однако, по данным многочисленных международных исследований частота преждевременных родов за последние десятилетия все же не имеет стойкой тенденции к снижению и достигает 7-13 % [4, 8].

Данная проблематика продолжает оставаться актуальной также и в связи с высоким уровнем тяжелой перинатальной патологии и смертности, несмотря на постоянный поиск ведущими специалистами и клиницистами оптимальных лечебных алгоритмов, направленных на минимизацию развития осложнений и негативных последствий для новорожденного [5]. Так, результаты многоцентровых клинических исследований свидетельствуют о крайне высоком риске развития у недоношенных детей в неонатальном периоде дисфункции гипофизарно-надпочечниковой системы, внутрижелудочковых кровоизлияний, респираторного дистресс-синдрома, гипербилирубинемии, некротического энтероколита, пневмонии и сепсиса, которые являются основными причинами неонатальной смертности [15, 22, 26].В свою очередь гипоксически-ишемические поражения головного мозга у недоношенных детей являются ведущими этиопатогенетическимифакторами психоневрологических нарушений в последующих периодах развития и детской инвалидности [11]. Так, по данным статистики примерно у 60% недоношенных детей в течение первых 2 лет жизни диагностируются признаки нейросенсорных или неврологических нарушений, а частота спастического церебрального паралича может достигать 7-20 % [9]. Такие осложнения, как ретинопатиявыявляется у 25-30 % недоношенных детей, слепота – 4-5 %, снижение слуха – 7,5-11 %, глухота – 2-4% [1, 3, 23, 27].В школьном возрасте до 60% детей данной категории имеют различные отклонения поведенческих реакций, также у них нередко возникают достаточно серьезные проблемы с обучаемостью вследствие снижения активности когнитивных функций [24].

Как уже отмечалось выше, в настоящее время продолжается активное выявление и изучение исследователями и клиницистами факторов инициации преждевременных родов. Одним из значимых при этом признан метаболический синдром (MC) [6]. Согласно современным представлениям MC представляет собой комплекс обменных и гормональных нарушений, которые обусловливают дисрегуляцию артериального давления, эндотелиальную дисфункцию, вследствие инсулинорезистентности и компенсаторного гиперинсулинизма [10, 18]. На сегодняшний день ученые и практикующие врачи едины в своих неутешительных прогнозах – распространенность MC неуклонно растет и имеет уже все признаки эпидемии [2, 12, 25].

Необходимо подчеркнуть, что некоторые исследователи связывают развитие МС не только с отягощенной наследственностью, загрязнением окружающей среды, нездоровым образом жизни и социально-экономическими факторами, но акцентируют внимание на исключительно важную роль в его инициации, формировании и прогрессировании также микробиоты кишечника [14].Так, кишечная микрофлора, взаимодействуя с энтерорецепторами непосредственно и/или при помощи собственных метаболитов и сигнальных молекул, регулирует процессы энергетического гомеостаза путем моделирования каскадных ферментативных реакций, тем самым,оказывая прямое влияние на активность вегетативных, нейроэндокринных и иммунных взаимодействий в макроорганизме [7, 13, 19].В свою очередь, исследователями установлено, что МС, обусловливая дисбаланс между факторами вазоконстрикции, вазодилатации, медиаторами иммунной воспаления (IL-1, IL-6, TNF), простагландинами и половыми стероидами, может приводить к нарушению сосудистого тонуса маточноплацентарного комплекса и, быть одним из триггерных факторов преждевременной сократительной маточной активности [16, 17, 21].

Таким образом, представляет определенный интерес изучение особенностей микробиоты кишечника у женщин, страдающих МС и родивших преждевременно, что позволит получить уточняющую информацию и дополнить существующие клинические протоколы рекомендациями по прегравидарной подготовке, профилактике и своевременной коррекции микробиоценоза кишечникау беременных с целью снижения частоты преждевременного прерывания беременности.

Цель исследования. Выявить особенности микробиоценоза кишечника у женщин с преждевременными родами, страдающих МС.

Материалы и методы исследования. Было проведено клинико-лабораторное обследование 102 беременных с МС, которые были разделены на 2 группы.

В I группу (n = 72) вошли беременные с MC, у которых произошли преждевременные роды.

В зависимости от срока гестации пациентки были разделены на 3 подгруппы:

- Іа подгруппа (n = 20) – роды произошли в сроке гестации 22-27 недель (очень ранние преждевременные роды);

- Іb подгруппа (n = 24) – роды произошли в сроке гестации 28-33 недели (ранние преждевременные роды);

- Іс подгруппа (n = 28) – роды произошли всроке гестации 34-36 недель (преждевременные роды).

Во II группу (n = 30) вошли женщины с MC, у которых произошли своевременные роды.

Контрольную группу составили 30 здоровых женщин, у которых беременность протекала без каких-либо осложнений, и роды состоялись в срок.

Были изучены и проанализированы жалобы пациенток, данные общего анамнеза, акушерско-гинекологического анамнеза, особенности течения настоящей беременности и родов.В стационарных условиях всем женщинами проводилось комплексное объективное и общеклиническое обследование, согласно требованиям современных клинических протоколов.

Диагноз MC определяли согласно критериям, утвержденным ВОЗ для беременных женщин [20]:

1. инсулинорезистентность (сахарный диабет 2 типа, уровень глюкозы натощак ≥5,8 ммоль/л);

2. наличие двух и более дополнительных признаков:

- АД > 140/90 мм рт. ст.;

- уровень триглицеридов ≥ 1,7 ммоль /л;

- уровень липопротеидов высокой плотности <1,1 ммоль /л;

- индекс массы тела > 30 кг/ м2.

Диагноз сахарного диабета 2 типа устанавливали на основании критериев, утвержденных ВОЗ:

- 2-кратная гликемия натощак ≥7,0 ммоль/л (126 мг/дл);

- гликемия через 2 часа после перорального глюкозотолерантного теста ≥11,1 ммоль/л (200 мг/дл);

- случайная гликемия ≥11,1 ммоль/л (200 мг/дл) и сопутствующие симптомы гипергликемии (сильная жажда, кожный зуд, частое мочеиспускание, раздражительность, быстрая утомляемость, потеря сознания и кома (в особо тяжелых случаях)).

АД у обследованных женщин измеряли ручным тонометром. За 1 час до манипуляциипациенткамне рекомендовалось употребление пищи, кофеина (крепкий чай, кофе), курение (если пациентка курит), активная физическая и эмоциональная нагрузка. Исследование проводилось в спокойной комфортной обстановке при комнатной температуре, после адаптации женщины к условиям кабинета на протяжении нескольких минут. Измерение осуществляли в положении женщинысидя, в удобной позе: рука расположена свободно на столе, с опорой на спинку стула, ноги расслаблены и не перекрещиваются. Манжетадостаточно плотно и равномерно прилегает к руке и размещается на 2 - 2,5 см выше локтевого сгиба.

Индекс массы тела(ИМТ) определяли путем стандартного вычисления по формуле Кетле (ИМТ =масса тела, кг / длина тела, м2).

Уровень глюкозы определяли натощак в венозной крови (метод – гексокиназный, анализатор - Cobas 6000 (с 501 модуль), тест-системы – RocheDiagnostics (Швейцария)). Уровень триглицеридов и липопротеидов высокой плотности определяли натощак в венозной крови (метод – ферментативно-колориметрический, анализатор – Cobas 6000 (с 501 модуль), тест-системы - RocheDiagnostics (Швейцария)).

Состояние микробиоценоза кишечника оценивали путем бактериологического исследования фекалий после родоразрешения. Определяли содержание основных представителей облигатной микрофлоры (бифидобактерии, лактобактерии, полноценные кишечные палочки, фекальные стрептококки) и факультативных (условно-патогенных) микроорганизмов (представители родов Proteus, Klebsiella, патогенные штаммы E. coli, эпидермальные стафилококки, грибы рода Candida)

Образцы для исследования помещали в стерильную стеклянную посуду и не позднее 2 часов доставляли в лабораторию. Интервал между взятием биоматериала и началом посева не превышал 3-4 часов. В стерильную, предварительно взвешенную пробирку вносили порцию фекалий (0,5-1,0 г) и после повторного взвешивания

определяли вес пробы. В эту же пробирку добавляли такое количество раствора хлорида натрия, чтобы получить разведения 10-1. Путем последовательных разведений отдельными стерильными пипетками с основного готовили разведения 10-3; 10-5; 10-7; 10-8; 10-9. Из полученных разведений проводили посевы на различные питательные среды. Количественный учет выросших микроорганизмов на желточно-солевом агаре, Сабуро, Эндо и 5 % кровяном агаре осуществляли путем расчета в 1 г испражнений, учитывая при этом дозу засеянного материала и степень его разведения.

Для обработки результатов исследования использовали метод вариационной статистики и непараметрические методы с помощью программ «Excel-2000» и «StatisticaforWindows v.6.0».

Результаты исследования и их обсуждение. При статистической обработке результатов исследования срок преждевременных родов у женщин Іа подгруппы составил 24,8±0,26 недель, Іb подгруппы – 30,3±0,30 недель, Іс подгруппы – 34,4±0,11 недель. У пациенток II группы роды произошли в среднем в сроке гестации38,1±0,17 недель, в группе контроля – 39,1±0,19 недель.

Следует отметить, что у женщин I группы беременность протекала неблагоприятно уже с ранних сроков гестации (табл.1). Так, лечение по поводу угрозы прерывания беременности в I триместре получали 59 (81,9%) пациенток. Рвота беременных различной степени тяжести была диагностирована у 45 (62,5%), не тяжелая степень преэклампсии – 19 (26,4%), тяжелая степень преэклампсии–8 (11,1%), преждевременная отслойка нормально расположенной плаценты – 4 (5,6%), признаки задержки развития плода были выявлены у 66 (91,7%), дистресс плода – 3 (4,2%).

Таблица 1

родивших своевременно (11 группа)						
Осложнения беременности	I группа, n=72		II группа, n=30			
	абс.	%	абс.	%		
угроза прерывания беременности	59	81,9	13	43,3		
рвота беременных	45	62,5	17	56,7		
преэклампсияне тяжелой степени	19	26,4	5	16,7		
преэклампсия тяжелой степени	8	11,1	4	13,3		
задержка развития плода	66	91,7	19	63,3		
дистресс плода	3	4,2	2	6,7		
преждевременная отслойка нормально расположенной плаценты	4	5,6%	1	3,3		

Сравнительные данные частоты осложнений беременности у пациенток с MC, родивших до срока (I группа) и женщин с MC, роливших своевременно (II группа)

У женщин II группы беременность также протекала осложненно, однако

частота акушерских осложнений была несколько ниже. Так, например, признаки угрозы прерывания беременности в I триместре были выявлены у 13 (43,3 %) пациенток этой группы, т.е. в 1,9 раза меньше по сравнению с Ігруппой. Рвота беременных была диагностирована у 17 (56,7 %) беременных, не тяжелая степень преэклампсии – 5 (16,7 %), тяжелая степень преэклампсии – 4 (13,3 %), задержка развития плода – 19 (63,3 %), дистресс плода – 2 (6,7 %), преждевременная отслойка нормально расположенной плаценты – 1 (3,3 %).

Также было выявлено, что у большинства пациенток Іи II групп роды произошли через естественные родовые пути – у 57 (79,2%) и 23 (76,7%) женщин, соответственно (табл. 2). Кесарево сечение в связи с осложнениями беременности было выполнено у 15 (20,8%) и 7 (23,3%) беременных, соответственно.

Tabana	2
таолица	4

Показатель	l группа, n=72	II группа, n=30
возраст пациенток, лет, М±т	27,9±3,1	26,4±4,8
роды через естественные родовые пути, абс. (%)	57 (79,2)	23 (76,7)
кесарево сечение, абс. (%)	15 (20,8)	7 (23,3)

Следующим шагом нашего исследования стало выявление особенностей микробиоценоза кишечника у пациенток сравниваемых групп. При анализе результатов бактериологического исследования фекалий у пациенток с МС, которые родили своевременно (II группа) были выявлены определенные изменения микроэкологии кишечника, по сравнению со здоровыми родильницами (табл. 3).

Так, следует отметить, что у родильниц Пгруппы наблюдалось статистически достоверное снижение содержания Bifidobacterium до $(9,78\pm2,18)\cdot108$ (p=0,012), Lactobacillus - до $(6,46\pm0,73)\cdot106$ (p=0,047), Escherichia coli – до $(31,56\pm7,43)\cdot106$ (p=0,009). Также была выявлена высокая контаминация Candida albicans - $(0,40\pm0,06)$ $\cdot104$ (p=0,003) и Staphylococcus epidermidis - $(1,32\pm0,30)\cdot104$ (p=0,002).Показатели содержания таких условно-патогенных бактерий, как Foecal streptococci, Proteus и Klebsiella, не отличались от контрольных значений.

В свою очередь, сравнительный анализ результатов бактериологического исследования фекалий у пациенток с преждевременными родами и диагностированным MC, показал значительные нарушения эубиотичного соотношение микроорганизмов по сравнению с микробным пейзажем кишечника у женщин, беременность которых протекала также на фоне MC, но родивших своевременно (табл. 4).

Так, у пациенток Іа подгруппы (очень ранние преждевременные роды) отмечалось особенно значительное угнетение роста основных представителей облигатной микрофлоры, что сопровождалось чрезмерным размножением различных видов условно-патогенных микроорганизмов. Так, содержание Bifdobacterium определялось на уровне (1,28±0,64).108 (pIa-II<0,001),

Lactobacillus - $(0,69\pm0,18)\cdot106$ (pIa-II<0,001), Escherichia coli - $(5,80\pm1,22)\cdot106$ (pIa-II=0,001).Показатели содержания Foecal streptococci в фекалиях составили $(0,35\pm0,13)\cdot106$ (pIa-II=0,204), Klebsiella – $(2,19\pm1,07)\cdot105$ (pIa-II=0,094) и статистически достоверно не отличались от аналогичных значений у пациенток II группы. Однако, при этом уровень Staphylococcu sepidermidis, Proteus, Candida albicans в несколько раз превышали сравниваемые показатели и были в пределах $(3,19\pm0,70)\cdot104$ (pIa-II=0,018), $(5,12\pm1,20)\cdot103$ (pIa-II=0,033) и $(3,92\pm0,67)\cdot104$ (pIa-II<0,001), соответственно.

Таблица 3

Korophie obtim podopuspementi eboebpentenno, 14 – m					
Микроорганизмы	II группа, n=30	Группа контроля, n=30			
Bifidobacterium, (×10 ⁸)	9,78±2,18 (p=0,012)	29,68±7,35			
Lactobacillus, (×10 ⁶)	6,46±0,73 (p=0,047)	17,86±5,58			
Escherichia coli, (×10 ⁶)	31,56±7,43 (p=0,009)	62,50±8,58			
Foecal streptococci, (×10 ⁶)	0,54±0,07 (p=0,401)	0,63±0,08			
Staphylococcus epidermidis, (×10 ⁴)	1,32±0,30 (p=0,002)	0,31±0,07			
Proteus, (×10 ³)	2,05±0,71 (p=0,202)	1,05±0,31			
Klebsiella, (×10⁵)	0,36±0,05 (p=0,527)	0,30±0,08			
Candida albicans, (×10 ⁴)	0,40±0,06 (p=0,003)	0,14±0,06			

Показатели содержания микроорганизмов в 1 г фекалий у пациенток с MC (II группа) и здоровых пациенток (группа контроля), которые были родоразрешены своевременно. М ± m

Примечание: р – достоверность различий между показателиями сравниваемых групп.

Практически схожие дисбиотические нарушения кишечника были диагностированы у пациенток Ib и Ic подгрупп.

Интересным оказался выявленный факт определенных различий микробного пейзажа кишечника и между подгруппами. Так, у пациенток, у которых произошли очень ранние преждевременные роды (Ia подгруппа) содержание Bifidobacteriumu Escherichia coli был самым низким, а контаминация Candida albicans наиболее выраженной, по сравнению с результатами, полученными в Ib и Ic подгруппах.

Таблица 4

Показатели содержания микроорганизмов в 1 г фекалий у пациенток с MC, родивших до срока (I группа) и женщин с MC, родивших своевременно (II группа), M ± m

	I группа (n=72)			
Микроорганизмы	la подгруппа, (n=20)	lb подгруппа, (n=24)	Ic подгруппа, (n=28)	II группа, (n=30)
Bifidobacterium, (×10 ⁸)	1,28±0,64 (pla-II<0,001) (pla-Ib=0,038) (pla-Ic=0,035)	2,98±0,47 (plb-II=0,004) (plb-Ic=0,409)	3,93±1,04 (plc-II=0,019)	9,78±2,18
Lactobacillus, (×10 ⁶)	0,69±0,18 (pla-II<0,001) (pla-Ib=0,481) (pla-Ic=0,183)	1,19±0,68 (plb-II<0,001) (plb-Ic=0,946)	1,14±0,28 (plc-II<0,001)	6,46±0,73
Escherichia coli, (×10 ⁶)	5,80±1,22 (pla-II=0,001) (pla-Ib<0,001) (pla-Ic=0,001)	14,44±1,62 (plb-II=0,029) (plb-Ic=0,780)	15,28±2,52 (plc-II=0,043)	31,56±7,43
Foecal streptococci, (×10 ⁶)	0,35±0,13 (pla-II=0,204) (pla-Ib=0,795) (pla-Ic=0,955)	0,30±0,14 (plb-II=0,131) (plb-Ic=0,829)	0,34±0,12 (plc-II=0,156)	0,54±0,07
Staphylococcus epidermidis, (×10 ⁴)	3,19±0,70 (pla-II=0,018) (pla-Ib=0,845) (pla-Ic=0,407)	2,99±0,74 (plb-II=0,041) (plb-Ic=0,556)	2,44±0,56 (plc-II=0,083)	1,32±0,30
Proteus, (×10³)	5,12±1,20 (pla-II=0,033) (pla-Ib=0,663) (pla-Ic=0,122)	4,42±1,05 (plb-II=0,067) (plb-Ic=0,238)	2,82±0,83 (plc-II=0,483)	2,05±0,71
Klebsiella, (×10⁵)	2,19±1,07 (pla-II=0,094) (pla-Ib=0,501) (pla-Ic=0,173)	1,19±1,01 (plb-II=0,416) (plb-Ic=0,628)	0,69±0,17 (plc-II=0,068)	0,36±0,05
Candida albicans, (×10⁴)	3,92±0,67 (pla-II<0,001) (pla-Ib=0,046) (pla-Ic=0,046)	1,88±0,73 (plb-II=0,049) (plb-Ic=0,877)	2,03±0,63 (plc-II=0,013)	0,40±0,06

Примечание:

pIa-II-достоверность различий между показателями Іа подгруппы и II группы; pIb-II – достоверность различий между показателями Іb подгруппы и II группы; pIc-II – достоверность различий между показателями Іс подгруппы и II группы; pIa-Ib-достоверность различий между показателями Ia и Ib подгрупп; pIa-Ic-достоверность различий между показателями Ia и Ic подгрупп; pIb-Ic-достоверность различий между показателями Ib и Ic подгрупп.

Полученные результаты свидетельствуют о том, что при очень ранних преждевременных родах у женщин с MC отмечаются значительные дисбиотические нарушения в кишечнике. Вполне возможно, что дисбиоз кишечника, сопровождающийся снижением основных представителей индигенной микрофлоры (Bifidobacterium, Lactobacillus, Escherichia coli, Foecal streptococci) и высокой контаминацией Candida albicans, у беременных с MC может быть одним из триггерных механизмов инициации преждевременного прерывания беременности или выступать в роли отягощающего фактора, что требует дальнейшего углубленного изучения и анализа.

Выводы: 1. У женщин с МС и преждевременными родами характерно отчетливое нарушение микроэкологии кишечника, характеризующееся значительным уменьшением содержания основных представителей облигатной микрофлоры (Bifidobacterium, Lactobacillus, Escherichia coli, Foecal streptococci) с усилением роста условно-патогенных бактерий, особенно Candida albicans.

2. Дисбиоз кишечника, сопровождающийся значительным снижением индигенной микрофлоры и одновременной высокой контаминацией Candida albicans, может рассматриваться как предиктор преждевременных родов у женщин с MC.

3. Профилактика дисбиотических нарушений и своевременная санация кишечника вполне возможно позволит снизить частоту преждевременных родов у беременных с МС, поэтому дальнейшее изучение данного направления является перспективным и патогенетически оправданным.

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CELLS OF BUCCAL EPITHELIUM CHARGE STATE IN CHILDREN WITH LESIONS OF THE ORAL MUCOSA AT THE BACKGROUND OF ACUTE LYMPHOBLASTIC LEUKEMIA IN THE DYNAMICS OF THE TREATMENT

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Annotation. To study the charge state of buccal epithelial cells (BEC) in children with lesions of the mouth mucous membrane at the background of acute lymphoblastic leukemia in the dynamics of the treatment. The charge state of BEC in 126 children with lesions of the oral mucosa at the background of acute lymphoblastic leukemia (ALBL) in different periods of its course in the dynamics of treatment has been studied. All the children were divided into two groups – the basic one (n=91) and the one of comparison (n= 35). Depending on acute lymphoblastic leukemia clinical stage all the children under examination were divided into three sub-groups (the acute phase, remission, relapse). At the first acute period and at the relapse of ALBL the treatment-and-prophylactic complex including kvertsetin and polyphenol containing mucosal gel applications, the treatment of oral cavity mucosa with antimycotic agents, antiseptic with a mixture of alkaloid bisulfate with sanguinarine with chelerythrine and keratoplastic agent, probi-otic preparation INSIDE were used. At the period of remission polyphenol containing gel, kera-toplastic remedy and probiotic were administered. For the individual hygiene of mouth cavity alcohol-free lysozyme dentifrice water with anti-inflammatory effect was used.

The children under study had a reduced level of BEC functional activity in comparison with norm in both groups of the patients. During treatment, there was an increase in the number of BEC moving nuclei and nuclei and plasmolemma amplitudes in the main group of children.

Key words: children, oral mucosa, acute lymphoblastic leukemia, the charge state of buc-cal epithelial cell.

Introduction. The last years are marked by a significant raise of interest to the functions of the mucosal epithelium (epithelium of the mucous mem-branes). This is due to the recognition of its coordinating position in the reac-tions connecting the mechanisms of congenital (nonspecific) and specific im-munity, initiation and stabilization of inflammatory processes [1-5]. It turned out that mucosal epitheliocytes have a significant effector potential in inflam-mation and immunity reactions, realizing it in response to the stimulating effect of exogenous (microorganisms, allergens, pollutants) and endogenous (cyto-kines, etc.) nature [4, 5]. Due to this, mucosal epitheliocytes acquire the ability to enter into cooperation with "professional" inducers and effectors of inflam-mation and immunity, such as neutrophils, eosinophils, mast cells, dendritic cells, macrophages, T - and B - lymphocytes. This turns them into active par-ticipants in cascading and network interactions that determine the development and regulation of inflammatory and

immune processes. It is not coincidentally that mucosal epitheliocytes are referred to as "inflammatory cells" [4, 5] more often, and the pathology associated with inflammation of the mucous mem-branes is called "epithelial cell disease". This is due to the fact that, being under the sights of exogenous and endogenous stimuli, mucosal epitheliocytes are able to change their functional status, joining in the formation of vicious circles that support chronic pathology in the mucosal membranes system.

As a part of the mucosal system, the buccal epithelium (BE) retains the elements of its active position in relationships with stimuli emanating from the external and internal environment. This makes it possible to use it to study the physiology and reactivity of mucous membranes, including as an indicator of local and general disorders of the oral mucosa.

The objective: to study the charge state of buccal epithelial cells (BEC) in children with lesions of the mouth mucous membrane at the background of acute lymphoblastic leukemia in the dynamics of the treatment.

Materials and methods. 126 children aged 2 - 18 years old with acute lymphoblastic leukemia (ALBL) participated in clinical trials. They had the fol-lowing dental pathology: generalized chronic catarrhal gingivitis (GCCG), ero-sive-ulcerative and oral candidiasis. The children underwent clinical examina-tions were divided into 2 groups – the basic and comparative. Dental plaque was removed and oral cavity sanation was performed in them. Hygienic care was systematically repeated and controlled.

Oral cavity hygiene was administered with the alcohol-free anti-inflammatory tooth wash "Lizomukoid", which was developed by the De-partment of Biotechnology of the Institute for Stomatology and Maxillofacial Surgery of the Ukrainian Academy of Medical Sciences (head of the depart-ment - Doctor of Biology, Professor Levitsky A. P). The children of the main group, in addition to oral hygiene, got the developed treatment-and-prophylactic complex (TPC). At its administration the period of the diseases's course was taken into account. The first variant of the local treatment was applied in the acute period and relapse of the disease and included: application of mucosal gels "Vinogradny" and "Kvertulin" on the oral mucosa twice a day in turn for 2 weeks, the application of probiotic "Biovestin" in the appropriate age-related dosage (1 month), treatment of the affected areas of the mucosa with an antimycotic solution for the mouth of Candid (20 drops thrice a day for 10 - 14 days), oral cavity mucosa rinsing with an antimicrobial Sangviritrin 3 times a day for 10-14 days in dilution of 40- 50 drops on 200 ml of water. To accelerate the processes of epithelialization, the appliqués of the antioxidant vitamins and provitamins Catomas were used twice a day in 30 minutes after meal during 14 days, starting from the third week of treatment.

The second variant of the local treatment included: oral hygiene, the use of antiinflammatory tooth wash Lizomukoid, mucosal gel Vinogradny, probi-otic Biovestin which were used at the remission of the disease.

Variants of oral cavity mucosa treatment at acute lymphoblast leukemia by the groups of children are presented in Table 1.

Table 1

groups	5	Variants of treatment	
basic	I	Oral cavity hygiene+"Lysomucoid" + muco-sal gel "Grape" + "Quertulin" + probiotic "Biovestin" + "Candide" + "Sangviritrin" + "Katomas"	71
	II	Oral cavity hygiene +"Lysomucoid" + mu-cosal gel "Vine" + "Biovestin"	20
comparison		Oral cavity hygiene + "Lysomucoid" rinsing	35
Total			126

Variants of oral cavity mucosa treatment at ALBL by the groups of children

I - acute period + relapse; *II* - remission

The electrophoretic mobility of BEC's nuclei was determined by the method of Shahkbazov (1986) in the modification of Denga O. V. (1997). The method consists in assessing the level of general and local nonspecific resistance of the body, in particular, the oral cavity, through the complex of BEC measured charge parameters: the percentage of mobile nuclei and cellular plasmalemas, their amplitudes and shift rate, the ratio of these amplitudes [6].

Due to this technique, it is possible to objectively assess the state of cellular metabolism, and consequently, the general functional activity of the cells. The BECs were taken with a slight scraping on an empty stomach, after rinsing the oral cavity. Samples were prepared according to the technique [6]. The per-centage of BEC mobile nuclei and plasmols was estimated with biological mi-croscope with a 480 magnification for 100 intact cells in each sample. Ampli-tudes of nuclei and plasmolemmas displacement was estimated with an eye-glass ruler.

Results of the study and their discussion. The decreased level of BECs func-tional activity has been revealed in all the groups of the children under study in comparison with the norm. These changes took place both at acute period, re-lapse and remission of ALBL. A low percentage of BEC motile nuclei and small amplitude of their displacement prove it. At the same time, the ampli-tude of displacement of plasmolemmas is even more reduced, and accordingly, the ratio Apl / An equals 1.03. In children of the main group with ulcerative or candidal stomatitis in the oral cavity, these indices turned out to be the lowest, which, in our opinion, testifies to the stress reaction of the body and the insta-bility of the adaptive processes in the oral cavity in the first acute period and during the relapse of the main blood diseases. Thus, the amplitude of the nuclei was 1.22 ± 0.07 µm, the amplitude of the plasmolemmas was 1.26 ± 0.07 µm, and the number of mobile nuclei was 22.05 ± 1.11 %.

We have developed systems of treatment and prevention for the children of both groups which initiate nuclear-cytoplasmic ratio in cells, increase metabol-ic processes. The latter is evidenced by rising immediately after the correction percentage of motile BEC nuclei and displacement of their amplitude (Table. 2).

Analysis of BEC charge state changes digital values in children with ALBL in the

first acute phase and during relapse within 6 months after initiation of the researches showed increase of BEC motile nuclei at 24.6 % in the main group of the children after the application of TPC developed, with the use of kvertsetin-containing mucosal gel, and its combination with gel containing a large amount of polyphenols, flavonols, anthocyanins, and catechins, mixture of sanguinarine and chelerythrine bisulfate alkaloids with probiotic and anti - mycotic drugs.

Along with this, there was a tendency to an increase in the amplitude of displacement both BECs nuclei and plasmolemma and, hence, their ratio in the main group children. The increase of plasmolemma charge further led to opti-mization of the displacement of both plasmolemma amplitudes and nuclei ratio that is typical for the normal physiological state of adaptation reactions, start-ing from the cellular level. Thus, in children of the main group in 6 months af-ter the beginning of the research, the displacement amplitudes of plasmolem-mas and nuclei increased by 39 % and 23 %, respectively.

At the same time, in this group children, at the end of the study, the BEC charge state was almost normal (Table 2).

Table 2

	Period of	oservation	Initial data	In 6 months	In a year
		comparison	22.08±1.13	23.17±1.16 p>0.05	22.73±1.15 p>0.05
	Motile nuclei, %	main	$\begin{array}{ c c c c c c c c } \hline In \mbox{iii} & In \mbox{in} & In \mbox{a yea} \\ \hline In \mbox{ii} & 22.08 \pm 1.13 & 23.17 \pm 1.16 & 22.73 \pm 1. \\ p > 0.05 & p > 0.05 & p > 0.05 \\ p > 0.05 & p > 0.05 & p > 0.05 \\ p > 0.05 & p 1 < 0.05 & p < 0.05 \\ p 1 < 0.05 & p 1 < 0.05 & p < 0.05 \\ p 1 < 0.05 & p < 0.05 & p < 0.05 \\ p 0 & 0.05 & p > 0.05 & p < 0.05 \\ p 0 & 0.05 & p > 0.05 & p > 0.05 \\ n & 1.21 \pm 0.06 & 1.49 \pm 0.08 & 1.48 \pm 0.08 \\ p > 0.05 & p > 0.05 & p < 0.05 & p < 0.05 \\ p > 0.05 & p > 0.05 & p < 0.05 & p < 0.05 \\ p > 0.05 & p > 0.05 & p < 0.05 & p < 0.05 \\ n & 1.35 \pm 0.07 & 1.31 \pm 0.07 & 1.29 \pm 0.05 \\ n & 1.35 \pm 0.07 & 1.31 \pm 0.07 & 1.29 \pm 0.05 \\ n & 11.88 \pm 0.10 & 1.65 \pm 0.05 & p < 0.05 \\ n & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline \end{array}$	28.16±1.41 P<0.05 P1<0.05	
	Alusisie em	comparison	1.22±0.07	1.24±0.07 p>0.05	1.23±0.07 p>0.05
the charge state of BEC	plitude	main	1.21±0.06 p>0.05 p>0.05 p>0.05 p>0.05	1.48±0.08 P<0.05 P1<0.05	
	Plaamalamma	comparison	1.35±0.07 p>0.05	1.31±0.07 p>0.05	1.29±0.07 p>0.05
	amplitude	main		11.88±0.10 P<0.05 P1>0.05	1.65±0.09 P<0.05 P1<0.05
	Apl/Ap	comparison	1.03	1.06	1.05
	Αρι/ΑΠ	An main	1.03	1.26	1.11

Dynamics of changes in the charge state of BEC in children with ALBL in the first acute period and in the period of relapse, $(M \pm m)$

Notes: p - *an indicator of reliability of differences in comparison with the initial data; p1 - the indicator of reliability of differences in comparison with the com-parison group*

In the comparison group, in 6 months after lysozyme rinsing agent use, the electrophoretic indices of the BEC improved somewhat, however, did not reach normal values in somatically healthy children. Subsequently, a decrease in the electrophoretic

activity of the cells was observed and their indices practi-cally approached the initial values (p > 0.05).

In a year of observations, the numerical values of the percent of motile BEC nuclei in the main group children continued to increase and were 27.7% higher than the baseline data at the beginning of TPC use. There was also a tendency towards an increase in amplitudes displacement of both BEC nuclei and plasmolemma, and, therefore, their ratio in the children under study. The displacement amplitudes of the nuclei and plasmolemmas increased and at the end of the observation were 22.3 % and 22.2 % larger than the original values, and Apl / An equals 11.1

However, in the comparison group, where only the lysozyme rinsing agent was used, the electrophoretic activity of the cells was reduced, and their indices practically approached the initial values (p > 0.05).

The digital values of BEC functional activity were reduced in children with GCCG and stomatitis against the background of ALBL at the period of remission. This was proved by a low percentage of motile BEC nuclei and small amplitude of their displacement. In this case, the amplitude of displace-ment of the plasmolemmas, and accordingly, the ratio Apl / An was even low-ered to a greater extent and composed 1.02. Noteworthy is the fact that the main group children who had either ulcer or thrush in the mouth had the low-est indexes. This, in our opinion, may indicate instability of adaptive processes in the oral cavity during ALBL remission. Thus, the amplitude of the nuclei was $1.23 \pm 0.06 \mu m$, the amplitude of the plasmolemmas was $1.26\pm0.07 \mu m$, and the number of mobile nuclei was $23.09 \pm 1.16 \%$.

Use of the TPC developed in both groups of children initiated nuclear-cytoplasmic ratio in cells that results in increase of metabolic processes in BEC and the increase of motile nuclei their displacement amplitude immediate-ly after the correction evidences this (Table 3).

In 6 months after the beginning of the charge state of BEC studies in children with ALBL in remission we have found the increase of motile nuclei of BEC at 25.2 % in the main group children after the use of TPC developed. The complex involved the use of kvertsetin-containing mucosal gel, as well as its combination with gel containing a large number of polyphenols, flavonols, anthocyanins and catechins, a mixture of sanguinarin and chelerythrine bisul-fate alkaloids with probiotic and antimycotic agents.

At the same time, there was a tendency to increase the displacement am-plitudes of BEC both nuclei and plasmolemma, and, consequently, their ratio in the children of the main group. An increase in the charge of plasmolemmas subsequently led to an optimization of the ratio of displacement amplitudes, of both plasmolemmas and nuclei, which is typical for the normal physiological state of adaptation reactions, beginning from the cellular level. Thus, in chil-dren of the main group in 6 months after the beginning of the study, the dis-placement amplitudes of plasmolemmas and nuclei increased by 55.6 % and 28.5 %, respectively.

Table 3

Indicators of BEC charge state	Periods of observation		Initial data	In 6 months	In a year
	Motile nuclei, %	Comparison	23.11±1.18	23.97±1.21 p> 0.05	23.97±1.21 p> 0.05
		Basic	23.09±1.16 P1>0.05	28.91±1.45 P<0.05 P1<0.05	29.85±1.51 P<0.05 P1<0.05
	of nuclei, mcm	Comparison	1.24±0.06	1.27±0.07 P>0.05	1.25±0.07 p>0.05
		Main	1.23±0.06 P1>0.05	1.58±0.08 P<0.05 P<0.05	1.57±0.08 P<0.05 P<0.05
	Plasmolemma amplitude, mcm	Comparison	1.27±0.07	1.34±0.07 p>0.05	1.33±0.07 p<0.05
		Main	1.26±0.07 P1>0.05	1.96±0.10 P<0.05 P1<0.05	1.82±0.10 P<0.05 P1<0.05
	Apl/An	Comparison	1.02	1.06	1.06
		Main	1.02	1.24	1.16

Dynamics of BEC charge state in children with ALBL in remission, $(M \pm m)$

However, in the comparison group in 6 months after the application of the lysozymecontaining rinse, the electrophoretic indices of BEC improved somewhat, but did not reach normal values in somatically healthy children. Later, the electrophoretic activity of the cells decreased, and their indices did not differ significantly from the initial values (p > 0.05).

At the same time, after a year of observations, the numerical values of the percentage of motile BEC nuclei in the children of the main group contin-ued to increase and were 29.3 % higher than the baseline data at the beginning of the TPC. In addition, a tendency was established to increase the displace-ment amplitudes of BEC both nuclei and plasmolemma and amplitude of their displacement increased, and at the end of the observation they were 27.6 % and 44.4 % higher than the initial values.

However, in the comparison group, where only the lysozyme rinsing agent was used, the electrophoretic activity of the cells was reduced, and their indices practically were equal to the initial values (p > 0.05).

Conclusions. Thus, based on the results of the studies made, we may suggest that the use of the TPC developed consisting of kvertsetin – containing mucosal gel, and its combination with gel containing a large amount of poly-phenols, flavonols, anthocyanins, and catechins, and mixtures of sanguinarine and chelerythrine bisulfate alkaloids with probiotic and antimycotic agents re-sults in normalization of energy processes in BEC, stabilization of the nuclear and membrane potentials in them and is

Notes: *p* - an indicator of reliability of differences in comparison with the initial data; *p*1 - the indicator of reliability of differences in comparison with the com-parison group

an indicator of adaptive and function-al reactions normalization, starting at the cellular level. This ultimately leads to increase of general and local nonspecific resistance in ALBL children in all groups. In this case, the most pronounced reaction to correction by the method proposed was established in the children with remission of the main disease.

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PECULIARITIES OF CERTAIN IMMUNITY INDICES IN PATIENTS WITH BRONCHIAL ASTHMA AGAINST THE BACKGROUND OF OVERWEIGHT OR OBESITY

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Annotation. Bronchial asthma is a common, potentially dangerous disease, which causes a significant burden for patients, their families and society as a whole. In the international Guidelines of Gina, there is an assumption that is most concisely suited to explain the factors that may affect the development of bronchial asthma (BA). We will not list all the components, but we would like to focus on those that are most interesting to us and the least studied in our population, namely obesity or excessive body mass (EBW) and immunity. The purpose of our study was to study the peculiarities of certain indices of immunity in patients with bronchial asthma against the background of overweight or obesity. 105 patients with the main diagnosis of bronchial asthma of various degree of severity were examined and treated on the basis of the Department of Family Medicine and General Practice of Odesa National Medical University. Patients in the main group had a body weight index on an average of 31.37 ± 0.49 kg / m2. It was found that all groups of patients did not have a reliably significant difference in the indices of the humoral immunity, namely levels of IgA, IgG, Ig. The level of the secretory Ig A has a direct strong association with the severity of the BA course (r = 1.0). Patients in the main and comparison groups have a lowered CD 14 level, in our opinion, this may be one of the leading components in the incidence of bacterial viral diseases and subsequent exacerbations of BA in our patients. Patients with bronchial asthma have a decreased level of CD14, which is one of the leading components in the exacerbation rate, provoked by bacterial and viral infections requiring *immunocorrection in such a group of patients.*

Key words: bronchial asthma, excessive body weight, obesity.

Bronchial asthma is a disease with clear clinical, physiological and morphological characteristics. Its most important clinical manifestations are episodes of suffocation, especially at night, accompanied by coughing [1]. Bronchial asthma is a common, potentially dangerous disease that causes a significant burden for patients, their families and society as a whole. Limitation of life, which reduces the patient's capacity to work, exacerbation of the respiratory symptoms, which sometimes require emergency care and can be fatal, here are the key problems of BA.

Factors influencing the risk of developing BA can be divided into those that determine the development of the disease and those that provoke the development of symptoms of exacerbation. Some factors are related to both groups. The first group consists of internal factors (first of all, genetic), the second one usually refers to external factors [1, 2]. However, the mechanisms of the influence of these factors on the development and manifestation of BA are complex and interdependent. For example, the predisposition to BA is probably determined by the interaction of genes with each other, and their interaction with external factors [1, 3]. In addition, there is evidence that the peculiarities of human development may affect the risk of BA in genetically predisposed individuals [4, 5]. For example, maturation of the immune response system and the timing of contact with pathogens in the early years of life are important factors. In the international Guidelines of Gina, there is an assumption that is most concisely suited to explanation of the factors that may affect the development of BA. We will not list all the components but we would focus on those that are most interesting to us and the least studied in our population, namely obesity or excessive body mass (EBW) and immunity.

It is currently well-known that there is a relationship between BA and immunoglobin E (Ig E) as an allergic marker in the human body, but for others, namely immunoglobin A (IgA), immunoglobin (Ig G) and immunoglobulin M (IgM), we have a disappointing picture.

For over thirty years it has been known that the IgE molecule is a key ingredient in allergic responses. A direct correlation between IgE level and the development of bronchial asthma was proved, and, along with this, it has been proved that allergic rhinitis does not correlate with Ig E level and is associated with seasonal aeroallergens in patients. The cells such as CD4 and T regulate or organize most of the typical immune responses to foreign proteins in the human body, secreting cytokines such as interleukins (ILs) and interferons (IFNs), and can be classified as Th-0, Th-1 phenotypes, Th-2 [6].

The activation of Th2 and B-lymphocytes accounts for processes of sensitization to allergens in genetically predisposed people. The antigens treated with antigen presenting cells can be recognized by Th-2 cells. Interleukins that were released by activated Th-2 (IL-4, IL-13) cells enhance the production of IgE antibodies. These antibodies, in turn, get attached to other cells that have IgE receptor specificity.

In order to obtain more detailed information not only on the influence of the humoral immunity, but also on the influence of the cellular immunity on the course of BA, it is necessary to study this problem in detail in the population of comorbid patients.

The purpose of our study was to study the peculiarities of certain indices of immunity in patients with bronchial asthma against the background of overweight or obesity.

Materials and methods. We have examined 105 patients (72 women and 33 men whose average age was 41.19±1.05) who had the main diagnosis of bronchial asthma of various degree of severity and were treated on the basis of the Department of Family Medicine and General Practice of Odesa National Medical University. The diagnosis was established in accordance with international approval documents. Inclusion criteria were: agreement of the patient to participate in the study, age of patients over 18 years; BA of various degrees of severity, obesity or excessive body weight. Exclusion criteria: refusal to participate in the study, presence of acute infection, acute pathology and decompensation of any somatic accompanying pathology, endocrine obesity, metabolic syndrome, oncological pathology, mental disorders. The distribution of patients into groups was carried out by simple randomization with elements of stratification.
Patients were divided into two groups: the main group – patients with BA against the background of overweight or obesity (n = 75), the comparison group - patients with BA against the background of harmonic physical development (n = 30). Also, the study included 20 practically healthy individuals with harmonious physical development. All patients were able-bodied.

The patients were asked to make a comprehensive examination, which included: anamnesis, routine physical examination, ACT test, and anthropometry. To study the immune system indices, the indices of the humoral immunity, namely, IgA, IgE, IgG, IgM, and T lymphocyte cellular immunity (CD3 +, CD19-), T-helper / T-inductors (CD4 + .CD8-), T-suppressors / T-cytotoxic cells (CD4-, CD8 +), CD14 receptor monocytes / macrophages, NK-cells (CD3-, CD56 +), cytotoxic cells (CD3 +, CD56 +), B-lymphocytes (CD3-, CD19 +) and circulating immune cells of different calibre were investigated. The study was carried out by the method of immuno-turbidimetry from the patients' venous blood, which was taken on an empty stomach from 8 to 10 o'clock in the morning.

Statistical analysis was carried out according to generally accepted methods of variation statistics. Validity was evaluated for the t criterion of the Student. Differences were recognized as substantial at the significance level of $p \le 0.05$. The correlation connection was established using the Spirman correlation coefficient.

Results. During our study, it was found that patients in the main group had a bodymass index on an average of 31.37 ± 0.49 kg / m2, a comparison group - of 22.65 ± 0.33 kg / m2 (p<0.05), and in the control group, the average BMI was 22.64 ± 0.38 kg / m2 (p<0.05).

In everyday clinical practice, successful treatment of BA remains rather insignificant. At the same time, a very significant impact on the results of the treatment of BA proves to be the correct assessment by physicians and patients of the present symptoms and the effectiveness of therapy given. According to the available data, most physicians and patients tend to underestimate the severity of clinical symptoms of BA and overestimate the outcome of treatment. It results in As inadequately low scope of therapy and inadequate control of the disease in a significant proportion of patients [7, 8].

Our study found that only 15 % of the total number of patients passed the ACT test while taking history. We received the following data: patients in the main group -12.37 ± 3.10 , patients in the comparison group -17.63 ± 1.65 (p<0.05), which does not reach the control indices of 20-25 points. That is, we can conclude that patients with comorbidity in the form of EBW or obesity have a less controlled course of BA than patients with harmonious physical development.

Since Ig G that accounts for about 75% of serum immunoglobulins and 10-20% of the total serum protein of the blood, is synthesized by mature B-lymphocytes and is the main antibodies that are produced in response to secondary contact with the antigen, its antibodies are involved in the neutralization of the bacterial, viral toxins, phagocytosis stimulation, complement binding reactions. Immunoglobulin M is synthesized by the plasma cells, accounting for 5-10 % of the total number of immunoglobulins in

the serum. Ig M includes isohemagglutinins, antibacterial, heterophilic antibodies, rheumatoid factor. Antibodies have high complementary activity, and Ig M molecules bind complement more effectively than IgG. B-lymphocytes have superficial receptors to Ig M and are the first to secrete Ig M. Following the transformation of B-lymphocytes into a plasma cell, subsequent stimulation by the same antigen causes a pronounced "secondary response" with the secretion of Ig G. Thus, we have found that patients in all groups did not have a reliably significant difference in the indices of the humoral immunity, namely, Ig A, IgG, Ig M.

In our study, we did not focus on Ig E levels, but we found that 55% of the patients in the main group and 60% of the patients in the comparison group had an elevated IgE level. We did not find the relationship between the Ig E level and the severity of the BA course (r = 0.32).

The data presented in the Table 1 reflects the evaluation of subpopulation of T-lymphocytes in the examined groups.

Table 1

Group	CD3+,CD19-%	CD4+,CD8-%	CD4-,CD8+%
Main	**77.67±0.43	**52.07±0.54*	**24.67±0.57
Comparison	74.63±4.42	48.18±0.79	25.18±0.83^
Control	69.13±1.73	45.56±1.27	27.47±0.67

Evaluation of subpopulations of T-lymphocytes in the examined groups

Note: *p o-n<0.05

**p о-к<0.05

^*p n-к<0.05*

Subpopulations of T-lymphocytes have drawn our attention, so it was found that the patients in the main group had an elevated level of T-helper / T-inductors (CD4 + .CD8-) (p<0.05), compared with the control and comparison groups, and elevated level of T -lymphocytes (CD3 +, CD19-) compared with the control group (p<0.05), and the lower level of T-suppressors / T-cytotoxic cells (CD4-, CD8 +) in the main group and the comparison group relative to the control group (p<0.05).

The main function of the serum Ig A is a protection of the respiratory, urinary and gastrointestinal tracts from infection. The secretory IgA has a dimeric structure and is resistant to enzymes due to its structural features. The IgA secretory antibodies block the attachment of bacteria to the surface of the epithelial cells, preventing their adhesion, and, accordingly, damaging the cell and penetrating through the mucous membrane. We found that patients in the main group had a large difference in the levels of the secretory Ig A, but when we evaluated its level according to the severity, it turned out that the more severe was the course of asthma, the lower was the indices of the secretory Ig A, i.e., when a correlation analysis was performed between the level of the secretory Ig A and the severity of the BA course there was a direct strong bond (r = 1.0). In the analysis of the secretory Ig A in the control and comparison groups, it was found that in the comparison group, this figure was higher, namely 52.66 \pm 1.68 µg / ml versus 83.68 \pm

 $3.68 \ \mu g / ml$ in the control group (p 0.05).

The formation of the circulating immune complexes (CIC) is physiological for a human body, and it should result in the neutralization and elimination of the antigen. However, under certain conditions, CIC may be fixed on the vessels and cause an inflammatory reaction. The greatest pathological potential is inherent in a soluble medium-sized CIC capable of activating a complement. CICs are capable of activating a large number of cells, including eosinophils and basophils. Eosinophilic granulocytes activated by CIC have cytotoxic properties. Basophile granulocytes are able to bind Ig E, which are fixed on their surface. Therefore, we paid attention to the level of CIC in the patients being examined. We detected differences in the level of CIC in patient groups. The data is given in the Table 2

Table 2

	Groups	Large opt.unit	Middle opt.unit	Small opt.unit
	Main	**10.89±0.38*	**86.65±1.36*	**176.09±1.19*
	Comparison	8.10±0.28 [^]	79.77±1.61^	182.2±1.05^
	Control	8.25±0.38	69.0±1.51	145.3±1.65
Ľ,	< * <0.05			

The level of circulating immune cells in the examined groups

Note: *p o-n<0.05 **p o-к<0.05

 $^{p} p n \kappa < 0.05$

It is well known that mononuclear macrophages, namely tissue macrophages and monocytes, are one of the key components of the congenital immunity. They take part in the direct protection of the body from foreign substances, mainly due to phagocytosis and antibody-dependent cleansing. Along with this, the cells of the macrophage monocyte system are able to interact with the lymphoid cells, "activating" and regulating the mechanisms of the specific adaptive immunity. It is estimated that 14.9% of the daily dose of monocytes leaving the bloodstream gets into the lungs, so we can not forget about these cells in the study of BA. In our opinion, the balance in the macrophage monocyte system is an important component in the human immunity with BA and we have to investigate it in detail. Along with the CD14 receptor, our attention was attracted by NK-cells (CD3-, CD56 +), cytotoxic cells (CD3 +, CD56 +), B-lymphocytes (CD3-, CD19 +). More detailed information on these receptors is given in the Table 3.

The table 3 shows that the patients in the main and comparison groups have a lowered CD 14 level; in our opinion, this may be one of the leading components in the incidence of bacterial viral diseases and subsequent exacerbations of BA in our patients. This is confirmed by case histories of the patients included in our study. It was found that patients in the main and comparison groups were significantly more likely to be infected with bacterial and viral infections than the control group (p<0.05), and 81% of the patients noted an exacerbation of the symptoms of BA when bacterial and viral diseases developed. This is due to the fact that the CD 14 molecule recognizes the lipopolysaccharides of bacteria and viruses that are in the human body, and the

deficiency of these receptors leads to insufficient recognition that triggers the cascade of mechanisms, and the macrophage itself can not phagocyte the foreign molecule, and it infects the body and develops infection, which in turn leads to exacerbation of BA and its more severe course.

Overall, the study showed that patients with a comorbid overweight or obesity pathology have lower asthma control and have greater changes in the cellular and humoral immunity, requiring further immunocorrective therapy.

Table 3

Groups	CD 14%	CD3-,CD56+%	CD3+,CD56+%	
Main	**5.70±0.15	**8.47±0.55*	**5.17±0.43*	
Comparison	05.57±0.09	11.12±0.53	3.61±0.16	
Control	7.83±0.22	10.47±0.38	3.96±0.13	
$V_{ata} + m = m \leq 0.05$				

Separate indices of the cellular immunity in the examined groups

Note: *p o-n<0.05

**p о-к<0.05

∧ p n-к<0.05

Conclusions. 1. The patients in the main group have a less controlled course of bronchial asthma due to comorbid abnormality in the form of excessive body mass or obesity.

2. The patients in the main group have a decreased level of the secretory Ig A, which may be a criterion for more severe course of bronchial asthma in patients with excessive body weight or obesity in case asthma control is not achieved.

3. All patients suffering from bronchial asthma have an elevated level of the circulating immune complexes, which suggests persistence of chronic inflammation in such patients.

4. The patients with bronchial asthma have a decreased level of CD14, which is one of the leading components in the occurrence of exacerbations, provoked by bacterial and viral infections requiring immunocorrection in such a group of patients.

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CURRENT COMPLEX TREATMENT FOR TYPE 2 DIABETES MELLITUS IN OVERWEIGHT PATIENTS WITH COMORBIDITIES (LITERATURE REVIEW)

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Annotation. Diabetes is one of the most important medical and social problems on a global scale. This is due to the widespread character of the disease, prevalent undiagnosed diabetes and multiple complications. Despite the progress in developing new hypoglycemics, only 12.5% of patients achieve a satisfactory glycemic control.

Two of the most prevalent concurrent conditions in patients with type 2 diabetes (T2DM) are overweight and obesity which are also contributing factors to the development of diabetes and its progression. The role of chronic inflammation in the development of T2DM and obesity is subject of scientific research. Inflammatory processes are closely connected with increased speed of atherosclerosis development, hypertension and vascular diseases. Triggers for these mechanisms can include harmful eating habits, sedentary lifestyle and other lifestyle factors. These are connected to diabetes risk factors through intracellular changes which include stress of the endoplasmic reticulum and activation of stress-induced enzymes such as tumor necrotizing factor- α , interleukin-1 β and interleukin-6 as well as high sensitivity C-reactive protein.

The discovery of adipose tissue inflammation phenomenon allowed for a detailed examination of the modulation of metabolic and immune processes, which are expressed exceedingly in visceral fat.

New therapeutic agents for treatment of T2DM were developed in recent years. Current approaches to T2DM treatment include traditional hypoglycemics, the focus of which is β -cell insufficiency and/or insulin resistance, however newer classes of drugs which influence other defects such as incretin insufficiency and include other metabolic glucose pathways appear to have a significant advantage.

Key words: diabetes, overweight, obesity, cytokines, incretins, liraglutide, body mass index, review.

Diabetes mellitus (DM) is one of the current most important medical and social problems and is a global issue. This is primarily due to the widespread character of the disease and a strong tendency towards increase in the number of patients.

According to the International Diabetes Federation (IDF) 2017 data, there are 425 million DM patients in the world aged 20 to 79 [1]. Morbidity of DM in different countries ranges from 1,67% to 37,27% [1,2]. Among the countries with the highest prevalence of DM are Micronesia (37,27%), Kuwait (23,86%), Saudi Arabia (23,38%) and Qatar (23,33%). Lowest prevalence of DM is in Mali (1,67%), Gambia (1,97%) and Moldova (2,73%). Diabetes mortality in 2017 was 3.99 million patients, 50% of which were under 60 years of age. More than 80% of DM deaths, according to the WHO data falls under the lower and medium income countries. Cardiovascular pathology is

the cause of 50 % to 80 % of deaths among these patients [1, 3].

66 million people have DM in the European region, 38.2% of which are undiagnosed. The incidence of undiagnosed diabetes in Ukraine is 43,4% [1, 2].

Every year, more than 7 million of new cases of diabetes are diagnosed in the world. According to the current morbidity growth rate, IDF estimates an increase in diabetes patients to 629 million by 2045.

In 2017 2.836 million patients with type 2 DM (T2DM) were registered in Ukraine [1]. DM morbidity rates among the population of Ukraine is 7,1 %. According to official data, 41,5 thousands deaths in Ukraine occurred in 2017 due to DM complications. However taking into view European and world tendencies towards morbidity increase, we can estimate that the real figures could be much higher than the official ones.

According to WHO data, T2DM constitutes about 90 % of all diabetes cases [2]. This diabetes type is qualified as a chronic progressive disease with unavoidable loss of insulin secreting function of the pancreatic β -cells.

Current research is targeting effective preventive strategies that will allow to lower morbidity in a population as well as new treatment methods to prevent complications, improve quality of life and life expectancy of patients with DM [4-6].

Despite the constant progress in developing and implementing new hypoglycemic agents, only 12.5 % of patients achieve a satisfactory glycemic control and the prevalence of DM complications remains high and has a strong tendency towards further increase. The reasons for this could include widespread low patient motivation, insufficient availability of effective disease control and, primarily, an abundance of concurrent conditions [7].

One of the most prevalent concurrent conditions in patients with T2DM is overweight and obesity. According to different authors from 75 % to 85 % of these patients are obese [3,8]. This fact the grounds for "Global WHO Strategy on Diet, Physical Activity and Health" being the main addendum to the DM treatment and prevention program [3, 9-13].

Obesity is not only the most prominent concurrent condition in patients with DM, but also is one of the leading contributing factors to the development of DM and its progression [6]. The role of chronic inflammatory process in the development of T2DM and obesity is a subject of current scientific research [14-16].

The questions pertaining the pathogenesis, diagnostics and new effective control methods and complication prevention measures of T2DM, are still up for discussion regardless of the multiple research studies. Complexity and multiple levels of impairment in T2DM are the results of two main defects: insulin sensitivity decrease (or insulin resistance) and inadequate insulin secretion to overcome the barrier of insulin resistance [17].

Inflammatory processes are closely connected with increased speed of atherosclerosis development, as well as hypertension and vascular diseases [6, 14, 15]. Triggers for these mechanisms can include a variety of factors including harmful eating habits, sedentary lifestyle and other lifestyle factors. There is additional data that shows psychological

stress, environmental harms, infectious diseases and genetic variations to be additional factors in the immune response activation [18]. These stimuli are connected to the risk factors of T2DM through intracellular changes which include stress of the endoplasmic reticulum and activation of stress-induced enzymes such as tumor necrotizing factor- α (TNF- α), interleukin-1 β (IL-1 β) and interleukin-6 (IL-6) as well as high sensitivity C-reactive protein (hsCRP) [5, 17, 18]. Changes in the secretion in these in various tissue lead to increased concentrations of proinflammatory cytokines (PC) and histological changes which are characterized by immune cell infiltration of fatty tissue and pancreatic islets [19]. Persistence of these processes leads to chronic subclinical inflammation which is a known risk factor for insulin resistance, β -cell dysfunction and finally T2DM [20-22].

The discovery of adipose tissue inflammation phenomenon allowed for a more detailed examination of the modulation of metabolic and immune processes, the expression of which was found to be the greatest in visceral fat [23, 24]. Acquiring more details on this is an important part of conducting preventive therapeutic measures [14, 15, 21, 22].

Cytokines, such as TNF- α , IL-1 β , IL-6, transforming growth factor (TGF- β), etc play the key role in realization of the inflammatory reaction and monocyte-macrophagal chain immunity activation. Meanwhile, interleukin-10 (IL-10) is viewed as an effector inhibitor of inflammation [17, 18]. Elevated concentrations of inflammatory markers (CRP, TNF- α , IL-1 β , IL-6) data and its connection to the severity of peripheral nervous system disturbances and endothelial dysfunction in patients with DM and obesity, nephropathy, retinopathy and cardiovascular form of autonomous neuropathy broaden and detail the understanding of immune-inflammatory disease model.

Cytokines are multifunctional molecules which directly take part in a wide spectrum of physiological reactions aimed primarily at defense. In addition to their role in immunity and inflammation, cytokines play the role of mediators of different pathological states of the central nervous system and peripheral nervous system and thus are neuroimmunomodulators. Besides, the immune system uses cytokine-like messengers, chemokines do recruit and activate specific types of white blood cells. There is a theory that some cytokines lead to functional depression of β -cells while others protect them from this interaction.

This systemic and subclinical inflammatory process can be characterized by elevated concentrations of the circulating PC, including hsCRP, IL-6, IL-1 β and TNF- α . Different mechanisms through which these cytokines may lead to T2DM development were identified. For example, these cytokines can directly block insulin receptor signaling by activating the c-Jun aminoterminal kinase and inhibitor of the nuclear factor kappabeta kinase which leads to phosphorylation of substrate-1 of insulin receptors. These cytokines were additionally found to be able to stimulate fatty acid synthesis in the liver thus producing an even higher amount of the acute phase proteins by the liver as well as activating a larger number of inflammatory cells in the fatty tissue and pancreatic β -cells.

Interleukin 1- β is a powerful PC which is produced by the monocytes, macrophages

and dendrite cells. Interleukin 1- β upon immune system stimulation helps leukocytes to penetrate vascular walls into the inflammation site and leads to a reaction of fever by interacting with parts of the brain which are responsible for body temperature regulation. Patients with T2DM also experience elevated production of IL1- β . There is currently a discussion whether IL1- β is excessively produced and may be included in stress-induced obesity formation in multiple chronic stress [25].

There are studies which show that IL-1 β concentrations in T2DM directly correlates with glucose levels which leads to inflammation progress and insulin resistance induction in obesity conditions [26, 27].

Interleukin-6 is produced by various types of cells. The main cell sources for IL-6 production are macrophages, fibroblasts and endothelial cells. Some other sources include T-cells, B-cells, eosinophils, mastocytes, glial cells and astrocytes. Interleukin-6 is pleiotropic and it functions as both a proinflammatory and anti-inflammatory cytokine. It is one of the key mediators of fever and acute phase response. Besides, high levels of IL-6 indicate an increased risk of future T2DM development [20-22].

C-reactive protein, however, was shown to be a stronger predictor than IL-6 in several studies which assessed both parameters [28-30]. These studies prove the existence of a connection but not a causal relationship. The connection between IL-6 and T2DM progression may just reflect an attempt to suppress the beginning of inflammation, which was induced by other mediators. IL-6 levels also reversely correlate with insulin resistance.

Elevated levels of IL-6 which is the main stimulator of production of most of the acute phase proteins, increase risk of T2DM development. However in addition to IL-6, IL-1 β and TNF- α are central mediators of inflammatory response. It is well known that cytokines work as a framework in stimulating of acute phase protein production. Overweight and hyperglycemia leads to elevated concentrations of these inflammation markers. It needs to be noted that patients with obesity have higher concentrations of TNF- α and IL-6 compared to patients with normal weight and T2DM. However there is not enough data on the levels of these cytokines in overweight patients with T2DM.

Tumor necrotizing factor- α is a pleiotropic PC which is produced by monocytes, macrophages, NK-cells, astrocytes, Kupfer cells, T-cells, B-cells, glial cells, basophils and eosinophils.

The main role of TNF- α is immune cell regulation. TNF- α can also induce apoptosis, cause inflammation and inhibit tumor genesis and virus replication.

Research into the role of TNF- α as well as mechanisms with which this factor reduces sensitivity to insulin at the adipose and muscle tissue level is scientifically relevant. Many researchers see TNF- α as a mediator for insulin resistance in obesity.

C-reactive protein is considered to be one of the main PC which functions as a nonspecific defense mechanism in response to tissue damage or infection. CRP activity which is synthesized primarily in the liver is stimulated by other cytokines, especially IL-6, IL-1 β and TNF- α . It becomes attached to different other molecules and is a powerful activator of the classic complement system.

Several studies have shown that CRP elevation had a reverse correlation with insulin sensitivity and is an important prognostic factor for patients with metabolic syndrome [29, 30]. There is also a hypothesis that notes insulin sensitivity decrease in the conditions of elevated CRP expression through lowering of physiological immunomodulation of insulin and acute phase protein genes transcription [31].

Therefore, PC don't only influence insulin resistance but can also induce apoptosis and beta-cell insufficiency causing T2DM. These cytokines are part of a family of cytokines which are produced in the adipose tissue, so called adipokines and may be the link between obesity and T2DM [14,15,19,20].

Among etiological factors of T2DM, it needs to be noted that chronic subclinical inflammation cannot be viewed as a singular primary cause for the development of this disease in the absence of other risk factors. But regardless of that it constitutes an important mechanist which is a connective link between the primary causes of T2DM and its manifestation. Due to an existing association of systemic chronic inflammatory process and DM development it seems probable that anti-inflammatory therapy would lower the cumulative risks among the patients with T2DM. Cytokines as mediators of an inflammatory process may be the target for realizing of pharmacodynamics of the new hypoglycemic agents, such as glucagon-like peptide-1 (GLP-1). Determining the mechanism of action of the latter considering the dynamics of lipid and carbohydrate metabolism markers, allows an increase in treatment efficacy, lower the risks of complications, and develop an individualized treatment plan for patients with T2DM especially in obese patients.

Many new therapeutic agents for treatment of T2DM were developed in the recent years. Current approaches to T2DM treatment continue to include traditional hypoglycemic agents classes, the focus of which is beta-cell insufficiency and/or insulin resistance, however newer classes of hypoglycemic agents which influence other defects such as incretin insufficiency and include other metabolic glucose pathways (i.e. excretion via kidneys) have a significant advantage. The effects of these therapeutic approaches on comorbidities, such as dyslipidemia, hypertension and obesity is subject of further research.

However, not very many medications for the treatment of T2DM directly influence the level of inflammation despite the fact that many different approaches aimed at DM prevention have a proven anti-inflammatory effect.

Recent discovery of the role of kidneys in glucose homeostasis lead to the development of a new class of medication, so called type 2 sodium-glucose co-transporter inhibitors. Although this class of hypoglycemic has a high cardiovascular safety profile, these medications primarily influence only one pathogenesis link of T2DM and are known to have a range of adverse events.

Recent years have seen significant developments in the incretin-oriented theory, such as studying the role of gastrointestinal hormones in the regulation of insulin secretion and glucose homeostasis as a whole.

Incretins are gastrointestinal hormones which are secreted in response to food

intake. Two of the incretins which have been extensively studied are GLP-1 and glucosedependent insulinotropic polypeptide (GIP).

Glucagon-like peptide-1 is secreted by the L-cells of the small intestine in response to food intake. Its effects include insulin synthesis stimulation and glucagon production decrease which also leads to gluconeogenesis decrease in the liver. Native GLP-1 also stimulates pancreatic β -cell proliferation and neogenesis [32, 33]. However, native GLP-1 cannot be considered to be a promising therapeutic agent due to it's short half-life of under 2 minutes as a result of degradation by dipeptidyl peptidase-4 (DPP-4) and quick elimination with the kidneys.

There are two ways to influence incretin levels in patients with T2DM. One class of medications causes DPP-4 inhibition thus leading to native GLP-1 levels preservation. However, in the conditions if incretin defect which is commonly seen in patients with T2DM, replenishing physiological concentration of GLP-1 is not always adequate for proper glucose homeostasis.

Glucagon-like peptide-1 analogues mimic the effects of the endogenous GLP-1 which regulates plasma glucose by stimulating the synthesis and secretion of insulin, decrease production of glucagon while slowing down gastric emptying and reducing the volume of food consumed. Based on these mechanisms of action, GLP-1 analogues influence blood glucose levels and have an additional capacity for weight loss.

Liraglutide is a synthetic GLP-1 analogue that is 97 % homologous to the endogenous GLP-1 by its aminoacid components.

According to the clinical trial data, liraglutide can lead to a decrease in hypertriglyceridemia as well as lower concentrations of cardiovascular risk markers, such as plasminogen activator inhibitor-1 (PAI-1) and hsCRP [33-35].

Study results show that liraglutide administration leads to weight loss in patients with T2DM and obesity. Weight loss is usually accompanied by a decrease in abdominal circumference, which could be an indicator of a decline in visceral fat content. Weight loss noted with liraglutide administration could be explained by the activation of the hypothalamic appetite controlling center which lead to a decrease in food intake volume and calories consumption [36,37,38,39].

Liraglutide is also characterized by additional angio- and cardioprotective properties (i.e. positive inotropic effect). This cardioprotective effect has theoretical basis. It is a well known fact that GLP-1 receptors are not only expressed in the β - and α -cells of the pancreas, but also in the human and animal heart tissue. There are studies that show that GLP-1 administration in myocardial infarction and congestive heart failure increases myocardial sensitivity to insulin and glucose uptake, increases cardiac output and therefore decreases left ventricular end-diastolic pressure as well as decreasing the area of myocardial infarction, renewing left ventricular function and shortening the duration of hospital stay and in-hospital mortality following myocardial infarction.

In patients with congestive heart failure, GLP-1 administration increases ejection fraction and improves physical exercise tolerance [40-42]. There was also a note of decrease in endothelial dysfunction signs when GLP-1 was administered to patients

with T2DM [43,44,45]. One more effect of liraglutide which is drawing the interest of clinicians is lowering the blood pressure levels. Antihypertensive effect of liraglutide is linked to endothelial dysfunction which is an important factor which leads to decrease in systolic blood pressure [43-46].

Liraglutide therapy allows to reach satisfactory glycemic control along with a variety of positive non-glycemic effects, such as rare hypoglycemia episodes (along with lower risks of weight gain due to hypoglycemia compensation and hypoxic encephalopathy); as well as the ability of liraglutide to influence factors that form metabolic syndrome [4, 33, 34].

However there is insufficient data on the influence of liraglutide on PC concentrations in overweight and obese patients with T2DM. Therefore, it is relevant to conduct a deeper investigation into the actions of hypoglycemic agents, specifically on the PC levels, which can have positive metabolic effects, improve glycemic control in patients with T2DM as well as be a preventive measure for the development of cardiovascular disease, especially in overweight patients.

All of the above became the basis of a more profound research into the problem of T2DM in overweight patients which is a question on the verge of two directions of scientific research – on one side, it's a study of metabolic pathology a bright example of which is overweight and obesity and T2DM and on the other side is the further development of the concept of prevention of cardiovascular events which arise as a result of metabolic disturbances.

Our research into the assessment of efficacy of complex treatment of overweight patients with T2DM show a high level of efficacy of a combination of liraglutide and metformin as part of a complex treatment regimen which included lifestyle modification as well as differentiated dosed controlled physical exercise. Thus, the main treatment patient group, who received a combination of liraglutide and metformin saw a statistically significant decrease in body weight index (BMI) as a result of treatment from $28,48\pm2,1$ kg/m2 to $23,9\pm1,8$ kg/m2 (p<0,05), whereas the liraglutide monotherapy group noted a statistically significant, however less pronounced decrease in BMI from $28,59\pm2,5$ kg/m2 to $25,87\pm2,3$ kg/m2 (p<0,05).

Similar tendency was seen in the analysis of visceral fat content. The patient group receiving a combination of liraglutide and metformin saw a decrease in abdominal fat by $(35,1\pm3,8)$ %, whereas the liraglutide monotherapy group the decrease was less prominent – $(24,84\pm2,5)$ % (p<0,05). There was also noted a direct moderate strength correlation between BMI and abdominal fat content among the patients of both groups (r1=0,467; p<0,05, r2=0,328; p<0,05).

During assessment of the quality of life dynamics in patients receiving different hypoglycemic agents, there were significant changes among both patient groups. However, the patients receiving a combination of liraglutide and metformin saw an increase of the physical health component (PH) by $(31,2\pm2,8)$ % (p<0,05), whereas the group of patients which received liraglutide monotherapy the increase consisted only of $(22,7\pm2,5)$ % (p<0,05). Similar tendency was noted towards the mental health component

(MH). The group of patients with combination treatment of liraglutide and metformin noted an increase in MH by $(35,9\pm3,1)$ % (p<0,05), whereas the group with liraglutide monotherapy saw a less pronounced but significant increase by $(25,8\pm2,7)$ % (p<0,05).

Therefore, a combination of liraglutide and metformin leads to better results in T2DM management in overweight patients than monotherapy which is also additionally aided by the pleiotropic effects of liraglutide, thus positively influencing weight loss and quality of life parameters [47-53].

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BIOLOGY

MORPHOFUNCTIONAL CHANGES OF THE RATS PLACENTA AND OVARIES UNDER THE INFLUENCE OF LEAD ACETATE AND ITS COMBINATION WITH METAL CITRATES

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Annotation. The formation of the rats fetus and placenta, functional state of rats ovaries under injection of lead acetate and its combined injection with citrate metals (gold, silver) during pregnancy was researched. Embryotoxic, gonadotoxic and placentotoxic effect of lead acetate in isolated injection was found, modifying effect of citrate metals on toxicity of lead acetate in combined injection was found.

Key words: placenta, ovaries, embryotoxicity, lead acetate, gold citrate, silver citrate.

Introduction. The negative impact of anthropogenic factors on the environment and population of urban areas increases with the development of scientific and technological progress. The most dangerous are the heavy metals that enter the atmosphere, soils and reservoirs as a result of industrial emissions, followed by inhalation, oral or transcutaneous intake to the human body [12]. Heavy metals, even in microdoses, can cause damage to sensitive body systems [14], as they are characterized by high toxicity and biochemical activity. One of the most common heavy metals is lead and its compounds [1, 16]. The effect of lead on the human body is accompanied by a dysfunction of all organs, most sensitive to the lead influence are the circulatory, nervous, cardiovascular, digestive and urinary systems [2, 9]. Lead compounds also have an effect on the reproductive system by reducing fertility and occurrence of infertility [6, 13, 18]. Analysis of scientific literature data has shown that exposure to lead compounds increases the risk of prenatal and postnatal lesions to the organisms, leading to stillbirths, miscarriages, structural and functional alterations of the female reproductive system [8, 11]. The issue about the influence of lead low doses on the process of embryogenesis, structure and functioning of generative system organs and the condition of the fetoplacental complex remains incomplete.

The placenta is a temporary extraembryonic organ with various functions that provides the connection of the fetus with the parent organism. The study of morphofunctional changes in the placenta, as an organ that has protective properties, prevents the transport of toxic substances to the fetus and promotes their deactivation [3, 5] is an actual problem.

The search for substances that contribute reducing or neutralizing the negative action

of lead in the body is an important issue; one of the most promising areas in modern conditions is the applying of nanotechnologies. The gold and silver nanoparticles that are used in the manufacture of cosmetics, pharmaceuticals and agriculture are of greatest interest [4, 7, 15, 17, 19]. At the same time, the literature does not contain information about the interaction of nanoscale gold and silver with toxic metals, their joint effect on the development of the fetus and placenta and on the structure and function of ovaries, as a key link in the reproductive system. In this regard, the in-depth study of the morphofunctional state of ovaries under the action of heavy metals and detection of their antagonists in the context of environmental pollution is extremely urgent and modern problem.

The search of lead acetate bioanagonists among nanomaterials in the future may contribute to the development of biodrugs of directed action using nanobiotechnologies to reduce lead toxicity.

The purpose of the study is to detect the features of morphofunctional changes of rat placenta and ovaries under isolated injection of lead acetate and the combined injection of lead acetate with citrates of metals (gold, silver) and to determine the effect of the studied substances on the embryogenesis.

Materials and methods of research. In the experimental research, a complex of adequate methods and research material was used that made it possible to determine the effect of lead acetate in isolated administration and in combinations thereof with gold citrate or silver citrate on the morphofunctional state of the placenta and ovaries of experimental animals and the development of the fetuses.

In an experimental study, sexually mature female rats from the Wistar line were used. At the beginning of the experiment, the study of the estral cycle of the rats was carried out by studying the vaginal smears to determine the stage of the estrus (vesicle), which was followed by pairing. The first day of pregnancy was determined by the presence of sperm in the vaginal smears, after that the animals were divided into groups and the injection of the studied substances - lead acetate and citrates of gold and silver were started.

In the experiment, 96 female rats were examined, which were divided into 4 groups (of 24 individuals) with 3 subgroups (of 8 individuals) in each group. Group 1 (experimental group «E No1») – animals that were injected with a solution of lead acetate in a dose of 0.05 mg / kg; group 2 «E No2» – animals that were injected with a solution of lead acetate in a dose of 0.05 mg / kg and a solution of gold citrate in a dose of 1.5 mg / kg; group 3 «E No3» – animals that were injected with a solution of lead acetate in a dose of 0.05 mg / kg and a solution of gold citrate in a dose of 1.5 mg / kg; group 3 «E No3» – animals that were injected with a solution of lead acetate in a dose of 0.05 mg / kg and a solution of silver citrate at a dose of 2 mg / kg; group 4 – control, animals that were injected with distilled water. Solutions of metals and citrates of metals were injected to females through the probe once a day, at the same time, from the first day of pregnancy to a certain period of the study: in the first subgroup of each group up to the 11th day of pregnancy, in the second – up to the 15th day and in the third – up to the 19th day of pregnancy, respectively on the 12th, 16th or 20th day of pregnancy the animals were withdrawn from the experiment by injection of the overdose of etheric

anesthesia.

Fetuses and placentas were taken for further research, counting the number of yellow bodies in the ovaries. The placentas and ovaries after the measurement of the mass and size were fixed in a neutral 10 % solution of formalin, followed by the preparation of histological slides. A total of 862 fetuses, 192 ovaries and 594 placentas were obtained. The placenta was studied on 16th and 20th days of pregnancy. At 12th day of pregnancy the placenta can not be separated from the uterus, therefore, 2 control periods were selected.

Estimation of the results of the influence of metal solutions on embryogenesis was carried out on the indicators of general, preimplantation, post implantation mortality of embryos, fetus and placenta mass, fetus-placental coefficient. The teratogenic effect of lead acetate and its combinations with metal citrates was determined by the method of J.G. Wilson.

In accordance with the goals and objectives, an adequate set of methods of morphological research was used: anatomical, macroscopic examination, histological, morphometric, biostatistics.

Results of the research and their discussion. It is known that the compounds of heavy metals can cause metabolic changes, morphofunctional rearrangements of organs and systems in organism, due to their polythroplosity [10, 16]. In actual experimental study, it has been shown that lead acetate in a dose of 0.05 mg/kg in daily injection to pregnant rat females causes morphofunctional changes in reproductive organs, namely ovaries and placenta, and has embryotoxic properties.

The analysis of the data obtained as a result of the experimental study showed that the injection of lead acetate in rat during pregnancy leads to an increase the level of embryonic mortality twice, a reduction in the number of live fetuses per 1 female by 23.0 % (p < 0.05) and a decrease in the weight of the fetuses by14,6 % (p < 0.05), found the embryotoxic effect of lead acetate in the dose 0.05 mg / kg.

In combined injection of lead acetate with gold citrate, a decrease in the level of embryomortality was detected to control values in the absence of post-implantation mortality; there was an increase in the number of live fetuses per female on average by 44.5 % on the studied terms of pregnancy compared with the lead exposure group; The fetal-placental coefficient was equal to the control value.

Under the conditions of the injection of lead acetate combined with silver citrate, the tread effect of silver citrate on embryogenesis is manifested. An increase in the number of live fetuses per 1 female was detected by 40.7 %, a decrease in the total embryonic mortality by 60.8 % on average during the studied pregnancy compared with the isolated injection of lead acetate, at the same time, the fetal-placental coefficient corresponded to the norm.

The teratogenic effect of all test substances was not detected.

It was determined that the effect of lead acetate on intragastric injection is reflected on the morphofunctional state of the rats placenta, promotes the development of a circulatory disorders complex and quantitative changes in the histological elements of the placenta, and the lag in the development of the placenta of this experimental group is determined. Thus, a significantly lower mass of placenta in the 16th day of pregnancy was detected, while simultaneously reducing the overall placenta thickness with a change in the percentage of maternal and fetal layers of the placenta, which was in the norm 30 / 70 %, in the lead acetate exposure group 34 / 66 % (p < 0.05).

In the placenta of the 20th day of pregnancy, an increase at 12.6% (p < 0.001) in the total thickness of the placenta was observed, due to the expansion of the capillaries of the labyrinth section as a response to hypoxia caused by the injection of a solution of lead acetate and accompanied by an increase in relative volume Kashchenko-Hofbauer cells that take part in the processes of germination of villi and the development of placenta vessels.

The presence of discirculatory disorders was noted in the group E №1, which was manifested in a decrease in the relative volume of maternal lacunae, allantoic vessels, and dilation of the central placental vessels. There was a violation of the trophic function of the placenta, as evidenced by an increase in the relative volume of «glycogen» cells in both gestational periods, with a significantly lower amount of glycogen granules in them compared to the control group.

The aforementioned changes in the aggregate are signs of placental insufficiency, which occurs on the background of hypoxia, caused by the effect of low doses of lead acetate solution during pregnancy.

The analysis of macroscopic and microscopic placental restructure showed the emergence of compensatory and adaptive reactions in this group of rats, as evidenced by a complex of morphometric changes. Thus, the mass of placenta in the 16th day of pregnancy exceeded the values of the group E No 1 by 9.2 % (p < 0.05), and at the 20th day it was not significantly different from the placenta of the control group with simultaneous increase of the total thickness of the placenta with the growth of all its layers. The relative volume of giant cells at the 16th day of pregnancy increased by 50.2 % (p < 0.05) relative to the group of isolated lead acetate injection and did not differ significantly from the control group, and on the 20th day it was equal to it. «Glycogen» cells contained a large number of glycogen granules, in contrast to the isolated lead acetate injection group.

In the group E No 2, enhanced blood filling of lacunae and capillaries was observed, an increase in the relative volume of maternal lacunas in the 16th day of pregnancy compared with the lead acetate introduction group was noted at 58.8 % (p < 0.01). The average diameter of the fetal vessels did not have a significant difference with the control group in both terms of pregnancy.

The diameter and mass of the placenta of the group E N_2 3 were within the statistical norm in both investigated terms of the pregnancy. The total thickness of the placenta of this group was higher than that in control at the 20th day of pregnancy by 14.7 % (p < 0.001), but the ratio of layers did not change due to the uniform growth of all layers. At the 20th day of pregnancy there was a normalization of the relative volume of giant cells, an increase in the relative volume of «glycogen» cells at high levels of glycogen in it.

The effect of lead acetate combined with silver citrate leads to full-blooded of the lacunae, fetal vessels and capillaries, a decrease in the relative volume of maternal lacunas and a decrease in the mean diameter of the vessels compared to the lead acetate injection group (22.8 % (p < 0.01)) at the 16th day and 30.3 % (p < 0.001) at the 20th day of pregnancy) with a normal index of their relative volume.

Consequently, the injection of gold and silver citrates against the background of lead effect contributes to the formation of a number of adaptations in the placenta, which enable to provide the developing fetus by necessary substances and contribute to the normal functioning of the placenta.

The completed research have established that the injection of lead acetate in the dose of 0.05 mg/kg over the course of 12, 16, 20 days negatively impacts on the morphological-functional state of ovaries and affects both organometric and histostological-structural characteristics. Thus, in animals receiving lead acetate, average values of absolute (+ 13.1 %) and relative (+7.3 %) mass of ovaries reliably decreased (p <0.05) as well as mass index of the investigated organ (+7.4 %). Index of influence of solutions of metals (I) of the test compound below the unit value from (0.78 \pm 0.033) c.u. to (0,93 \pm 0,045) c.u., is the objective verification of the negative effect of lead acetate on mass-metric indices, which indicates to the inhibition of gonads development.

It has been found that injection of low doses of lead acetate (0.05 mg/kg) leads to: accelerated and active atresia of follicles, which is manifested by the decrease in the total number of primordial follicles (on average by 24.3 %, p < 0.01) in the increase of atretic (on average by 2.8 times, p < 0.001) in the ovary of rats; decrease in the number (on average by 7.3 %, p > 0.05) and sizes of yellow bodies (an average by 18.0 %, p < 0.05), their premature regress, degeneration and reduction of luteocytes content, enlargement of organ stroma, hemodynamic disturbances which contribute to the enhancement of alternating effect of lead acetate.

By the analysis of organometric indices in the research groups of combined effect of lead acetate with citrates of gold / silver in comparison with the group of lead exposure, there was established the increase in indices of absolute mass of ovaries according to investigated gestation terms (12th, 16th, 20th day): $E \mathbb{N} \ge 2 - by 28.2 \%$ (p < 0.01); 25.0 % (p > 0.05); 15.8 % (p < 0.05); and $E \mathbb{N} \ge 3 - by 31.2 \%$ (p < 0.001), 25.7 % (p < 0.001), 10.4 % (p < 0.05), and relative mass of ovaries: $E \mathbb{N} \ge 2 - by 20,1 \%$ (p < 0.001); 20.4 % (p < 0.001); 15.8 % (p < 0.05); and $E \mathbb{N} \ge 3 - by 27.9 \%$ (p < 0.001); 22.3 % (p < 0.001); 10,4 % (p < 0.05), increase in total parameters of ovarian volume with simultaneous decrease in specific gravity.

Thus, completed research have determined that injection of lead acetate with citrates of gold and silver into the organism of pregnant rat female reduces toxicity of lead and positively influences on mass-metric indicators of ovaries and testifies to the presence of compensatory reactions in the organ under the influence of citrates of metals in terms of introduction of lead acetate, this is confirmed by the positive average values of the index I, which makes up $(1.02 \pm 0.022) - (1.14 \pm 0.062)$ c.u.

It has been found that in experimental groups of combined injection of lead

acetate with citrates of metals, generative and stromal elements of ovaries did not have significant differences from the control group. However, in rats receiving lead acetate in the groups undergoing combined injection, average indices of number of primordial follicles increased, they were arranged reliably (p < 0.01) in decreasing order: E No 3 (+ 38.5 %) > E No 2 (+ 27.6 %), and the number of atretic follicles reliably (p < 0.001) decreased, the latter were arranged as follows: E No 3 (-65.5 %) > E No 2 (-62.9 %), testifying to a larger follicular reserve and a slower process of atresia in ovaries of rats in combined administration of lead acetate with citrates of metals.

It has been established that in groups of combined action of lead acetate with citrates of gold / silver in relation to the group of isolated injection of lead acetate, both indices of the number of yellow bodies: $E \mathbb{N}_{2} 2 (22.2 \%) > E \mathbb{N}_{2} 3 (+15.7 \%)$, and indices of the relative area of yellow bodies: $E \mathbb{N}_{2} 3 (+66.2 \%) > E \mathbb{N}_{2} 2 (+ 64.7 \%)$ had more higher values on average.

It has been found that in groups of combined action of lead acetate with citrates of gold / silver in relation to the group of isolated injection of lead acetate, indices of yellow bodies on average had more higher values: $E \mathbb{N} \ 2 \ (22.2 \ \%) > E \mathbb{N} \ 3 \ (+15.7 \ \%)$, this was also typical for indices of the relative area of yellow bodies: $E \mathbb{N} \ 3 \ (+66.2 \ \%) > E \mathbb{N} \ 2 \ (+64.7 \ \%)$.

The results of the study make it possible to predict the degree of embryonic toxicity of low doses of lead acetate, its influence on morphofunctional state of mammals' ovaries, being an important prerequisite for developing a framework of preventive and corrective measures in lesions to the genital sphere by lead compounds.

Conclusions. 1) On the basis of the complex of morphological and morphometric studies, it has been proved that experimental animals administered during pregnancy citrate metals against the backdrop of lead exposure the 20th day of pregnancy forming compensatory adjustment in the placenta which leads to improvement of morphofunctional development rates compared with the isolated lead introduction group, namely: the growth of the labyrinth, increased blood supply to the placenta, the normalization of the relative volume of giant cells and the increase in the amount of glycogen in the «glycogen» cells. The combination of these adaptations contributes to form a live fetus during pregnancy, accompanied by the influence of lead compounds.

2) Isolated injection of lead acetate negatively impacts on morphological-functional condition of rats' ovaries and leads to the changes of organometric indicators of gonads with accelerated and active atresia of follicles, reduction of the corpora lutea sizes, their premature regression, proliferation of ovaries stroma, hemodynamic disturbances. In the groups of animals with combined impact there was revealed compensatory effect of metal citrates on gonadotoxicity of lead acetate, which was accompanied by the increase in the number of primordial follicles on a background of reduction of atretic and increase in the number and relative area of corpora lutea in all investigated stages of gestation.

3) Performed experimental research allowed to determine modifying properties of gold/silver citrates for the negative impact of lead on morphofunctional state of placenta and ovaries of rats and processes of embryogenesis, the most pronounced biological

antagonism was observed in the group of combined influence of lead acetate and silver citrate.

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HISTORY

CLASSIFICATION OF ORNAMENTAL MOTHERS OF HEMPY SHEEP SHEETS

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Annotation. The article is devoted to the study of the classification of ornamental motifs of folk embroidery of the Ukrainians of Podillya, which are typical of native female and male shirts of the XIXth - the first half of the twentieth century. A detailed description of archaic forms of ornamentation and motifs of Ukrainian folk ornamentation, distributed among Podolians, is given.

Key words: folk embroidery, traditional women's and men's shirts, historical and ethnographic region of Podillya, ornament, motif, archaic forms, Ukrainian folk ornamentation.

During the historical and cultural development of the historical and ethnographic region of Podillya, in every corner of it, its local features of embroidery, which were manifested in ornamental motifs and compositions, coloristics and techniques of execution, passed from generation to generation, developed. Narrowly locally, each district, even each village, was characterized by a peculiarity of patterns. Therefore, embroidery is not only an artistic design of the clothing components of the traditional complex of clothes and household things, but also a kind of world perception, world outlook and world attitude of man and the environment, reproduced by specific artistic means, the study of which is a necessary and always relevant process.

The historiographical analysis of this problem shows that the research of embroidery in Podolia has paid much attention to such scholars and ethnographers as: O. Prusevich [31], V.Gagnameister [16], R. Zakharchuk-Chugai [19], O. Hassyuk and M. Stepan [17], T. Kara-Vasiliev [25; 26] and A. Chernomorets [26], Y.Kozhlyanko [27], M.Kostishina [28], T.Nikolaeva [30], L. Bulgakov-Sitnik [13; 18], M.Selivachov [32], G.Medvedchuk [29], E.Prichepy and T.Prichepy [14], N.Volyanyuk [15], T. Zuziak [20] and L. Ivanevych [21-24].

In its turn, the source base of work includes own-handed materials of stock collections of the Podilsky traditional structures of the National Museum of Ukrainian Folk Decorative Arts of Ukraine [6], the National Museum of Folk Architecture and Life of Ukraine [5], the Ukrainian Center for Folk Culture "The Museum of Ivan Gonchar" [9] Kyiv, Vinnitsa [2], Ternopil [8], Khmelnytsky [10] and Chernivtsi [12] regional regional museums, Chernivtsi Museum of Folk Architecture and Life [11], Odessa State History and Local History about the museum [7], the State Historical and

Cultural Reserve "Mezhibiz" [3] and the Kamyanets-Podilsky State Historical Museum-Reserve [4] (Khmelnytsky Region). Relying on materials of historiographic and stock sources, we will reveal below the regional and local features of ornaments on Ukrainian embroidered shirts of Bukovinsky, Western, Eastern and Central Podillya of the XIXth the first half of the twentieth century.

By the time of origin and origin of the well-known in Ukraine, including and in Podillia types of ornaments it is possible to conditionally separate archaic forms of ornamentation and motifs of Ukrainian folk ornamentation.

It is common knowledge that in Podilly during the investigative time Ukrainian peasants continued to embroider ornaments by sign systems similar to the trim elements of the Trypillya culture V-III millennium BC living on the territory of the present Podillya. And although their connection is mediated, these influences must have left their effects.

The archaic forms of ornamentation that occur in traditional Podillya embroidery include the "tree of life" and the image of a female figure with a widened bottom down with triangular garments raised up and down by hands and head. One of the oldest images is the "tree of life" ("tree") in the form of a vertical barrel - ribbons of geometric or geometric-plant ornament with skewed branches of it also ornamental tapes of geometric or geometric-vegetative nature, but much larger in size than the base of the tree. The motive "the tree of life" embodies the image of "mother-nature", as well as the triune symbol of the continuation of the genus (father-mother-child in the form of a trident) or as a three-dimensional philosophical understanding of the past, present and future.

An example of the use of the motive of the "tree of life" are women's holiday shirts with a ribbon tree composition of the patterns of Bukovinsky Podillya and Transnistrian areas of Western Podillya. Bukovina booty still called them shirts with ornament "vaznok" or "pillar", which was placed on the sleeve below the shelf and was surrounded by narrow ornamental stripes ("wings"). Moreover, the composition of the shirts of the Bukovynian slippers differed in size and brightly colored multicolored motifs of stylized leaves and flowers. Unlike them, in the Borshchian shirts of the western subways, the dark gamut and small motifs of shoots with leaves or flowers dominated by tiny pieces prevailed. On the territory of Eastern Podillya on the sleeves of women's shirts of the nineteenth century. Embroidered "tree of life" not rarely had the appearance of images of human figures with raised hands. In general, the figure of the female figure, which was the image of the ancient goddess Beregina, was mostly decorated with towels, less than a shirt. At the time of Trypillian culture, Bereginya was considered a goddess for the protection of the home hearth, and the ancient Slavs denoted motherhood. Therefore, the symbolic image of Beregina - the mother who raised her arms to protect her house from the Ukrainians in the trident, the core of which is the mother's torso, and the left and right parts are hands raised to protect. Subsequently, our ancestors associated a trident with a family sign.

The motifs of Ukrainian folk ornamentation are mainly divided into: geometric (abstract, geometric-vegetative and geometric-animal forms) and isomorphic (phytomorphic (vegetative), zoomorphic (animal) and anthropomorphic (image

of a person)). In turn, among zoomorphic motifs, the images of mammals, birds (ornithomorphic motifs), insects and fish were isolated.

Of course, among all the embroidered clothing components of the traditional complex of Ukrainian clothes in general and podolyan in particular, the most regional, local and locally-zonal diversity was characterized by motifs of ornamentation of shirts. In the XIX century Geometric motives dominated Podolia territory, and only with the beginning of the twentieth century. more often phytomorphic, rarely zoomorphic and anthropomorphic motifs of Ukrainian folk ornamentation. Therefore, in the article below, we will reveal the diversity of the geometric motifs of Podilsky embroidered shirts.

First of all, we note that simpler geometric ornamental motifs prevailed in the northern regions of the Western, Eastern and Central Podillya, whereas in the Bukovyna Podillya and in the central and especially southern regions of the Western, Eastern and Central Podillya, as well as in the foothills and most in the mountainous regions of the Carpathians, folk patterned compositions acquired complicated forms.

In general, the Podilly folk names of geometric ornamental motifs denoted specific objects (abstract forms), plants (geometric-plant forms) or animals (geometric-animal forms) depicted in the ornament. Geometric abstract motives mostly resembled the objects of everyday life, in particular: "infinite", "troubles", "turning", "windows", "windmills" ("windmills"), "gesiches", "comb", "bells", "stars" ("Star"), "kiski", "books", "hams", "curly", "kryvogi", "kryvulka" ("kryvuliuchka"), "cruetor", "chains", "lemmash", "meander", "Music", "octopus" ("octopus"), "double hook", "palms", "rivulets", "sockets", "sockets", "seven-rods", "hearts", " Sycamore "," Sun "," Trigger "," Trinity "," Chris st "(" crosses "," crosses ")," boats "," shells "," trousers "," yurks ". The most popular motifs of geometric-plant forms in the embroidery of Podillia were the following: vases, grapes, vivis, heads, ("Shoots"), "Kupchak" ("Kupchaks"), "Kukheri", "Break", "Parsley", "Strawberries", "Sparrows", "Pork", "Rout", "cream", "sunflower", "pine", "horsetail", "hops" ("hops"), "blackberry", "apple". Among the geometric-animal forms were: "rams" ("lamb"), "mutton heads", "mutton horns" ("lamb horns", "mutton horns are steep"), "wolf teeth", "oxen eye", " "" bunny "," bunny "," bunny "," pigeon "," caterpillar "," toad "," bug "(" bugs ")," harnesses of teeth "," zozuliki "(" cuckoo "), ducks "," kachuryks "(" качурист ")," grasshoppers "," carpal scales "," swallows "," swallowtails "(" swallowtails ")," mutli "," deer horns "," eagles ", "Spiders", "leeches", "crayfish", "fish scales", "cuttings" ("cut cats "," steep horns ")," horns "(" horns ")," locusts "," dogs "," owl beasts "," owls "," captive muzzles "," zucchini "and others like that.

Among the geometric abstract ornaments in Podillya embroidered shirts, the difficult combinations of motifs were used, the tiny development of which resembled a precious mosaic. To abstract motifs belonged to the simplest geometric elements (dots, spots, stripes, risks), elementary homogeneous signs (squares, circles, spirals, S-shaped motifs, rhombs, triangles, etc.) and composite homogeneous and heterogeneous signs combined in different the methods of symmetry (two triplets, multi-beam sockets-stars, meanders, "swastika", crosses, etc.) with ancient semantics, known from the Paleolithic,

the Aeneolithic (Trypillian culture) and the Bronze Age.

The basis of the geometric abstract ornament in the shades of the podilane was a line that united the composition into a single whole, forming a continuous rhythm of motion and subordinating all the images. At the same time, this line was combined with various non-rarely complex elements. Masters of the studied region used the following variations of the line: straight, laman, zigzag or meandrich.

Among the variety of Podillya variety of embroidering techniques, rich in geometric ornamental motifs with roots still from pagan times and with agrarian symbols, was the embroidery of the nose. First of all, low-laced embroidery of Ukrainian podolane is known by geometric abstract motifs - diamonds, S-shaped motifs, crosses of various modifications and spirals (endless). Rhombus in the lowland stylized the longitudinal and crossed sides in the form of horns or hooks (a rhombus with dots, a diamond with hooks), and a spiral - a broken line or a zigzag ("knits", "kryvulka", "hops").

In general, all Podillya geometric ornamental compositions resembled an endless chain, in which some parts of the elements acted as parts of others. In view of this, the pattern can be considered as a combination of either a chain of diamonds and, at the same time, as a combination of oblique corners or two zigzag lines, or as complex combinations and alternations of various simple figures (simple diamond, rhombus with elongated sides, numerous variants of diamond with hooks or tails etc). In general, the motif of the diamond (diamond-square) of various variations in the Podillia is dominant. Most often in Podillya traditional embroidery there is a diamond with hooks. Moreover, the hooks were formed by the extension of the sides with a number of sprouts with straight or meandering finishes. So in pairs (one, two or four) hooks could be observed hooks curved outside or inside. Taking into account the research of scientists and ethnologists and museum collections of clothing, the following locally-zonal names of the rhombus (rhombus-square) were recorded: "rams" (Pyatkin village, Bershad district, Eastern Podillya), "lamb horns" (village Kalusik (flooded in 1981), Novooshitsky district, Central Podillya), "windows" (village Berehmeny and Nikolaevka, Buchach district, West Podillya, Litynka village, Lityn district, Eastern Podillya), "Head" (Novooshitsky district, Central Podolia), "toad" (village Bilche-Zolote, Borshchiv district, West Podillya), "bugs" (village Nikolaevka, Buchatsk, "Kupchak" (Kaliusik village (flooded in 1981), Novooshitsky district, Central Podillya), "strawberry" (Olgopilsky county, Eastern Podillya), "Semigree" (Oslami village, Vinkovetsky district, Central Podillya), "damn muzzles" (Bakota village (flooded in 1981), Kamyanets-Podilskyi district, Central Podillya), "Shells" (village Dniester, Borshchiv district, West Podillya).

As additions to the diamond-shaped figures were S-shaped motif "direct," "oblique" and "broken" ("Loman") cross coil (bezkonechnyk), polylines, multifaceted triangles, etc. Not rarely used in the eyes of shirts comb pieces, which sometimes performed so thickly that there was one non-threaded thread of the background to avoid the merging of the composition. Moreover, various images of diamond, S-shaped motif, cross, endless, meander, comb pieces are considered the most ancient ornamental motifs.

Among the geometric abstract motifs of the cross, a cross with hooks, that is,

"swastika", which is typical of the embroidery of the south-eastern regions of Podillya and partly of the Carpathians and Carpathians, was popular. Note that "Podillya swastika" often resembles a socket with a central element - a rhombus, whose corners are withdrawn from the outside, hooks curved in one direction (from left to right and from right to left). Along with "swastika" in Podolsk embroidery ornaments occupy a prominent position and even different versions angled crosses, such as "live cross", "oblique cross", "cross klynuvatyy" (Phillips socket of five squares), "broken cross" ("Broken cross") Among the narrow local folk ymen cross motif on the tail were used, such as "Kupchak" (Murovanokurilovetskiy district, Eastern skirts), "cancer" (Kamenetz-Podolsk district, Central skirts), "rizhkatyy" "horns "(Trostyanets district, Eastern Podillya)," crosses "(Novooshitsky district, Central Podolia, Olgopil district, Eastern Podillya)," crosses "(Borshchiv district, West Podillya).

Often used Ukrainians Podillya and geometric abstract S-shaped motive. Moreover, the grapheme mentioned in Trypillian culture depicted a serpent-snake-patroness of the house, which was associated with the goddess of fertility. Among people's names locally zone Podolyan S-shaped motif was common following most "snake" and "hesyky" (Borshchiv district, Western skirts) "tracks" (p. Braga, Kamenets district, Central skirts), "kachuryky" (Tulchin district, Eastern skirts) or "kachuryste" (Borshchiv district, Western skirts), "kryvulyuchka" "Kryven'ka" (p. carted, Buchach district, Western skirts) "Kukheri" (Borshchiv district, West Podillya, Sina village, Tomashpil district, Eastern Podillya), "double hook", "leeches" (Tulchyn district, Eastern Podillya). Although in East Podillia the "snake" called the figure as a broken line.

However Podolsk embroiderers among other geometric ornamental motifs abstract nature rarely used and star-shaped motifs, namely, four-, and six-outlet vosmypelyustkovi the stars (vosmypromenevi stars or the stars), or half of the outlets. All of them, as part of the solar signs, were bound in ancient times with the idea of the sun and the sky. In general, the sacredness of geometric ornaments of Podillya embroidery is to reflect the representation of our ancestors about the universe. After all, the motives of the "star", "melee", "cross" are the symbols of the sun, the four sides of the world, the motive "trigger" or "trinig" - signifies a heaven, earth and air or air, fire and water, that is, the symbols of life, and the motives "Windrowers", "cruetrigs", "spiders" and "sockets" - are some of the oldest solar characters. However, over time, their original meaning was lost, and local masters increasingly associate these characters with modern images. For example, the eight-rim star Ukrainian sweatshirts used in ornaments of shirts as a symbol of Christ and Christian faith.

Podolian masters and geometric ornaments with plant and animal forms were in love. In particular, the motive "sun" - "rozha" ("melee") was popular among the geometric-vegetative plants, as evidenced by the names of its various variants - "rozhy viklasta", "rozha zirkata" ("starta", "star", "stars ")," Crescent pink "," full pectoral "," pectoral simple "," pink dog "," pillar "(" stroke "," pillar "). According to research by O. Prusevich, the motif of the rose was of the form of a four or eight pinnipal calyx of the mallow flower, which was called locally by the rouge. And in the Letychiv district (Central Podillya), besides the names of the "star of the star", "crescent grove", "rozha simple" and "rozha stobchast", the name "goritsvit" was used in the four-pointed petalled mallow flower. In general, the motif of "rouge" is considered to be a transition from geometric to plant ornament, and its multivariateness emphasizes the originality and originality of the Podilskaya lowland, which researchers uneasily compare with woody.

Along with the motif "rozhy" were distinguished especially in the ornament of technology in various variants and geometric-vegetative motif of a strawberry flower under the same name "strawberry" (or "half-nymph") - head, round, columnar and caudate, as well as geometric and animal motive " mutton horns "with narrowly local names" mutton heads "," lamb horns "," mutton horns "," mutton horns steep "," rams "," lambs "," steep horns "," razgoti "," horns "," horns ". Thus, the motifs of "mutton horns", "chives" (wild tulip), "kupchak" and "cancer" were used in the embroidery of the Olhopil district (East Podillya) and with. Kalyusik Ushitsk district (Central Podillya), the motifs of "mutton heads" and "heart" were loved with. Forests of Borshchiv district (West Podillya), Vivisyk - in the Bratslav district (Vinnytsia region, Eastern Podillya), the "infected" - in the Ushitsk district (Central Podillya), "troubles" - in the village. Balanivka of the Olgopil district (Vinnitsychyna, East Podillya), "the snake" - in Letychivsky (Central Podillya) and Olgopil district (Eastern Podillya), "owl beast" - p. Kalyusik Ushitsk District (Central Podillya). It is worth noting that the same motive in different places had its locally-zonal folk name. For example, the motif "swallow" was known in the village. Ginashki of the Yampil district (Vinnytsia region, Eastern Podillya), instead of in the village. Balanivka, he used to be called "pigeons", in with. Yalanets of Olgopil district (Vinnytsia region, Eastern Podillya) - "cuckoo", and in other places - "comb", "lemesh", "rival". The motive "Kupchak", which was popular with. Kalyusik Ushitsk District (Central Podillya), in the village of. Oslami was called the "Semirog" or "Sevens" (Central Podillya), and in other eastern and central Podolian districts - "head", as the head of the flower of the Kupchak. The motive "rams" came from with. Pyatakivka of the Olgopil district (Vinnytsia region, Eastern Podillya), and in the village of. Kalyusik Ushitsk district (Central Podillya) was called "mutton horns".

Analyzing the results of research on embroidery of Podilsky shirts, one can state the fact of the extraordinary variety of their ornamental motifs, especially the geometric and deep sacred significance of all patterns of patterns. And first of all, symbolism of images and plots of Podillya ornaments was associated with signs of traditional beliefs that claimed the idea of unity of the universe, protection against dark forces, the continuation of the genus, the protection of life and health, well-being and fertility. And although there are tendencies to lose the primary sacredness of the Podilsky ornaments, modern folk masters of Podillya are trying to preserve their main attributes. The value of these traditions lies in the fact that their preservation ensures the development of the best features and qualities of the Ukrainian people, its mentality, and the increase of the material and spiritual achievements of the nation.

Approbation. The article is submitted for the first time and has never been published anywhere.

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PERSONAL AND INDIVIDUAL POTENTIAL OF L'UBICY BABOTY

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Annotation. The personal and individual potential of leading specialist in the field of the history of Ukrainian literature in Eastern Slovakia and Transcarpathia, the candidate of art studies, former director of the Institute of Russian Studies, Ukrainian Studies and Slavic Studies of the University of Prešov (Slovakia), L'ubicy (Lyubi) Babota is disclosed.

Key words: L'ubica Babota, candidate of art history, Ukraine, Prešov (Slovakia).

Expanding the notion of the term "personal and-individual potential" I. Murashko [34] etc. [37] confirm that this is "a complex of psychological properties, which gives the person the opportunity to make decisions and regulate their behavior, taking into account and evaluating the situation, but based primarily on their internal representations and criteria". That is, the individual potential that "captures the ability to creativity, the desire for self-improvement, self-development" [34, p.201] and includes "predispositions, inclinations, interests, the desire to create a new manifestation of the general intelligence, perseverance, purposefulness, determination, diligence, the ability to develop personal strategies" [34, p.203]. N. Derigalov, defining the degree of development of the personality potential and the extent of its use by the individual, argues that "individual manifestations of personality form its individuality", which "reflects a person specific in a particular, individual" [15, p.233-234]. At the same time, each object of research, as a person, is the bearer of two potentials at once: first, social, that is, family; and secondly, the personal potential, which are closely interconnected and interacting with one another" [15, p.235], and only in their unity, "the possible formation and harmonious development of the individual, the improvement of its potential capabilities" [34, p.203]. In the study, the life paths of each individual member of the Sitsinsky-Chekhov-Sichinsky-Shandor family, as individuals, are characterized by its activity, which depends not only on the measure of realizing its own individual and individual potential, but also on the potential of the whole family, the change and development of the whole Ukrainian society as a whole is carried out, in particular, the history and culture of Ukraine and the Ukrainian diaspora.

To understand the phenomenon of personality-individual potential of a leading specialist in the history of Ukrainian literature in Eastern Slovakia and Transcarpathia, [13], candidate of art studies of L'ubica Babotová (*04.09.1944), the daughters of Margareta and Mykola Babota, the nieces of a talented lawyer, Vikentyi Shandor, director of the Institute of Russian Studies, Ukrainian Studies and Slavic Studies, Prešov University (2007-2011) [19; 25, ark.1], it should be noted that she was born in the Slovak

city of Pieshtyanka in the family of a teacher and a government official who during the Second World War were forced to move from Transcarpathia to the then Czechoslovakia. Graduated from an eight-year school in Slovak with a degree in education. Yesenskoe (district of Rimavska Sobota), because its parents lived in this village. However, after the end of an eight-year school, her, according to the decision of the secretariat of the local branch of the Communist Party, without explanation, did not enroll in high school. Only after her mother's talk Margareta Babota with the director of the Prešovsky Ukrainian eleventh-year high school Yuri Myagonchak about all the "vicissitudes" of the family, Lyubu was accepted for study [26, ark.1].

In 1961, she successfully completed this high school with the Ukrainian language of instruction [25, ark.1] and she was even recommended to study at the medical faculty. She entered the entrance exams successfully, but she was denied enrollment in students [26, ark.2], because the family "was constantly under the watchful eye of special services of the then Czechoslovakia" [1]. Only on the request of her father, the secretary of the pedagogical faculty of the Prešov University. P. Ya. Safarika (he was taught by Lyuba in mathematics at high school), he accepted L'ubica (Lyuba) for his studies and she was in 1965.Graduated from the Faculty of Pedagogy in the specialty of a teacher of biology and chemistry [29].

In 1970 he graduated from the Philosophy Faculty, where he studied English and Ukrainian languages and literature. After completing his studies at the University, first worked at the Prešov Gymnasium with the Ukrainian language of instruction, and since 1977 the employee of the research department of the Department of Ukrainian Language and Literature (now the Department of Ukrainian Studies) at the Faculty of Philosophy of the Prešov University. P. Y. Shafarika (head of the year 1984 Olena Rudlovchak, in 1984-1993 - Zuzana Hanudel, and in 1993 - September 2003 - Mykola Mushink). In particular, Mykola Mushinka tried to transform the research department first into the Institute of Ukrainian-Rusyn Studies, and subsequently into an independent department of ethnology. However, his efforts did not find adequate support from the faculty and in September 2003 the department ceased to exist. In the research department, who carried out extensive research work, he organized many scientific forums, assembled and staffed a large library and film library, prepared a lot of skilled staff, worked Olena Rudlovchak, Mykola Mushink, L'ubica Babota, Anna Krajnyak, Margareta Babota, Alexander Mushinka and others [21].

Since 2000 L'ubica Babota has been an associate professor, and in 2001-2003 [11; 32] and 2005-2008 head of the Department of Ukrainian Studies [25, ark.2; 26, ark.2], where for a long time worked prominent Ukrainians pursued by the authorities, including Yuri Bacha, Olena Rudlovchak, Mykola Mushink, Joseph Shelepets and Pavlo Murashko [21]. In 2003-2007 Prodecan (deputy dean) of the Faculty of Philosophy of International Relations [5], Director of the Institute of Russian Studies, Ukrainian Studies and Slavic Studies at the Faculty of Philosophy of the Prešov University. P. Y. Safarika. In 1981 he received the title PhDr., In 1987 he received the degree of a candidate of art studies, defending in Bratislava a dissertation entitled "Development of

Transcarpathian literature in the second half of the nineteenth century." In 1999, after protecting the work "Kontext a kontakty ukrajinsko-slovenských literárnych vzťahov na Slovensku v 19. Storočí", honed at the assistant professor of Slovak literature. Annually he supervises 4-5 graduation theses and 2-3 ribohoroznyh works, under her guidance successfully defended five candidate dissertations [25, ark.2; 26, ark.2].

He traveled for several weeks in the Czech Republic (Prague), Hungary (Budapest, Debrecen, Nyiregyhaza), in 1991-1992 at the Canadian Multicultural History Society of Ontario, in 1993-1995. Professor of the Department of Slavic Languages and Literatures at the University of Toronto, Canada, where he taught Ukrainian language, literature and history of Ukrainian culture. Since 1996 he taught Ukrainian literature at the Department of Ukrainian Studies at the Faculty of Philosophy of Prešov University, where he lectured on Ukrainian literature of the 19th and 20th centuries and local Ukrainian literature from ancient times to the present. He explores the literature and culture of the Ukrainian ethnic territory of the former Austro-Hungarian Empire (beginning of the nineteenth century), the interwar and contemporary literature of Rusyn-Ukrainians, translates Ukrainian literature into Czech and Slovak, and from English and Ukrainian into Slovak (25, ark.2; 34].

L'ubica Babota, author of the monographs "Transcarpathian Ukrainian Prose of the Second Half of the XIXth Century" (Prešov, 1994) [16; 17; 25, ark.2] and "Vybrané kapitoly z ukrajinskej literatúry. Literatúra Rusínov-Ukrajincov od 19. Storočia" (Prešov, 2009) [45], separate sections in monographs and professional book editions (6), co-author of textbooks for secondary and higher schools (5) [22, p.3], scientific researches (82), translations of professional and fiction literature (9), etc. [2; 3; 4; 6; 7; 9; 10; 12; 19; 22, p.212-216; 23; 24; 39; 42].

She has also made a significant contribution to the creation of Ukrainian study encyclopedic reference books. M. Mušinka writes that she published the entire section "Literature of Rusyn-Ukrainians of Slovakia" (pp. 158-178) in the encyclopedic reference book "Rukovät literatúry" ("Textbook of Literature", Košice, 1998), in which she presented short portraits 70 writers of this region from Alexander Dukhnovich and Adolf Dobryansky to Taras Murashko and Bohdan Kopchak and 15 literary scholars (from Yevhen Nezelsky and Orest Zilinsky to Joseph Search and Joseph Shelepts). He also prepared nine slogans for the Ukrainian Literary Encyclopedia (Kyiv, 1988-1995), six for the Encyclopedia of Contemporary Ukraine (Kyiv, 2001-2206), eleven for "Materials for the Dictionary of Culture of Ukrainians of Czechoslovakia" (Dukl'a, 1988-1990) and forty-five for the "Local History Dictionary of Rusyn-Ukrainians of Slovakia, Presovshchina" (Prešov, 1999) [20, p.191-224; 33, p.7].

She is a member of over 60 scientific forums in Canada, Germany, Poland, Slovakia, the USA, Hungary, Ukraine, Finland and the Czech Republic [8; 14; 18; 28; 30; 31; 38; 40; 44], collaborates with the scientific centers of these countries and with Ukrainianists in Novi Sad (Serbia) [25, ark.2]. She pays much attention to public education work, since 1991 she is a secretary of the Association of Ukrainian Studies of Slovakia [36], a member of the Committee of the International Association of Ukrainian Studies (2002-

2008), a member of the Union of Ukrainian Writers in Slovakia, a member of the editorial boards of Ukrainian-language scholarly journals in Slovakia and Canada. In 2004, from the international academic rating "Golden Fortune" in Kiev received the St. George's Medal "Honor. Glory. Labor". In 2009 he became an honorary doctor (Doctor honoris causa) of Uzhgorod National University [35; 43, p.5] and received the Memorial Medal on the occasion of the 50th anniversary of the foundation of the philosophical faculty of Prešov University [25, ark.2].

In 2009, L'ubica Babota, in an interview with Oksana Stefanov, remarks that her family "managed to meet the helping people" and she enlists herself to those people who "have not achieved their dreams and plans through persecution", but they still "found his place in life" [1]. In 2013, she retired, but did not abandon scientific work. So, on February 25-26, 2016, together with the author, took part in the international scientific and practical conference "Mykola Mushinka: a portrait on the background of the day", on the occasion of the 80th anniversary of the birth of a prominent figure of our time, folklore and Ukrainian art. - a literary critic, a bibliographer of Ukrainian origin, a doctor of philological sciences, a member of the International Commission on the Study of the National Culture of the Carpathians and the Balkans, the President of the NTSh in Slovakia, the Chairman of the Association of Ukrainians in Slovakia, a foreign academician of the National Academy of Sciences of Ukraine (Uzhhorod) cited in the collection "For all my own destiny..." (Prešov, 2016) an article about an anniversary [41, p.280-281]. And today, L'ubica Babota continues to actively work in the field of Ukrainian studies and Slavic studies, she writes in particular in a letter to the author on March 11, 2018: "I have a lot of translations, but only two translate in Prešov" [27].

The scientific novelty of the obtained results is that for the first time, the personality and individual potential of a member of the famous Ukrainian family Sitsinskij-Chekhov-Sichinsk-Shandorov, a leading specialist in the history of Ukrainian literature in Eastern Slovakia and Transcarpathia, a candidate of art studies, L'ubicy (Lyubi) Babota, was revealed.

The concrete theoretical and practical significance of the results obtained is that they enable the creation of a holistic social portrait of the Ukrainian Sitsinsky-Chekhov-Sichinsky-Shandor dynasty, whose members lived in Ukraine, and, with their daily work, took care that Ukraine became a powerful state and lived up to the "free life in the circle of free peoples" [26, ark.6].

Approbation. The article is submitted for the first time and has never been published anywhere.

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THE PECULIARITIES OF GENEALOGY OF KYIVAN RUS PRINCESS VYSHESLAVA, THE QUEEN OF POLAND

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Annotation. The paper outlines the peculiarities of genealogy of Kyivan Rus (Ruthenian) princess Vysheslava (c. 1047 – after 1089), queen of Poland (since c. 1067). It reviews the existing theories of Vysheslava's origin and propounds the new hypothesis of her parentage, analyses the circumstances of one of Polish-Ruthenian matrimonial alliances – between Vysheslava and the king of Poland Bolesław II the Generous (the Bold; circa 1042 – after 1081). The peculiarities of the life and activities of the royal couple are ascertained, as well as their role in cultural development of Poland in the second half of 11th century.

Key words: Poland, Kyivan Rus, Vysheslava, Bolesław II the Generous (the Bold), Gniezno, the Royal Gniezno Cathedral, dynastic relations.

During the 11th–12th c. Kyivan Rus (Ruthenia) had a significant international influence, maintained permanent relations with many European states, often strengthening them with dynastic marriages. Matrimonial alliances were a powerful factor in the interaction of Ukrainian (Kyivan Rus) and European cultures.

The topicality of the research is conditioned, on the one hand, by the growth of interest in national history and culture in the society, striving for European values, and, on the other, the lack of systematic studies of national history of the 11th–12th centuries in the context of European civilization, the existence of many "blank spots" in native and European genealogies, especially in reference to royal female descendants.

To cover the chosen topic, the works of Ukrainian and foreign scholars devoted to the study of genealogies were used – Rus' (descendants of Volodymyr the Great) [5; 10; 12; 13; 17; 18; 19; 20; 23; 28; 29; 33; 38] and Polish (Piasts – descendants of Bolesław the Brave) [31; 32; 35; 36; 37; 39, 40; 41; 43; 46; 47; 50] as well as Polish-Ukrainian dynastic relations [15; 17; 18; 19; 20; 21; 27; 28; 29; 33; 44].

The source of the research are national chronicles [16; 9; 26] and European annals and records [1; 2; 3; 4; 6; 7; 11; 14; 22; 24; 25; 27; 30; 45].

The purpose of the article is to find out the peculiarities in the genealogy of the Kyivan princess Vysheslava, presenting the most popular theories and substantiating the researcher's hypothesis of her origin, to describe the conditions of her dynastic marriage with the king of Poland Bolesław II the Generous (the Bold), to study the circumstances of their lives and activities, as well as to outline the role of the spouses in the cultural development of the Old Polish state.

Secundum artem, native chronicles often ignored the female representatives of the princely family. Thus, the Hypatian Codex (also known as Hypatian Chronicle) in particular, the personal index, complied by L. Makhnovets, contains, for example, 169 men's names beginning with letter "B" and only 11 women's names [16, p. 472–478]. Much of the same is true for the names beginning with other letters. Many women's personalities of the Chronicle have been preserved under the nameless notation: "wife", "daughter", "sister", or "unknown".

One of those little-known in Ukrainian history is the princess Vysheslava (circa 1047 – after 1089), queen of Poland (since circa 1067), the wife of Bolesław the Generous (circa 1042 – after 1081).

The etymology of the name of the Rus princess – "High (great) glory", however, did not guarantee her certain mentions in the native chronicles. Because of a disappointing tradition, the sources often ignored female representatives of a princely family. Unfortunately, Vysheslava is not an exception.

Modern historical generalias contain no information about Vysheslava, Queen of Poland, f.e. the Encyclopedia of the History of Ukraine. The article devoted to Boleslav II, placed in EHU, contain no information about the Rus princess Dobroniga-Maria, the mother of Bolesław II, and the Rus princess Vysheslava – his wife [8, p. 331–332]. However, the facts of such a dynastic affinity of the kings of Poland with the Kyivan ruling dynasty we consider to be very important.





Fig. 1. Postage Stamps Series "Kyivan Princess on the thrones of Europe", issued by "Stamps of Ukraine" using O. Yasynetska research results, 2015.

Fig. 2. Vysheslava. By V. Vasylenko, Postage Stamps Series "Kyivan Princess on the thrones of Europe", (fragment) "Stamps of Ukraine" Company, 2015.

Polish genealogist O. Balzer considered information about the wife of Bolesław II insufficient to convincingly testify to her origin [31, p. 98], researcher T. Yurek supposed that Vysheslava could be a representative of the Czech Přemyslid dynasty [41, p. 95–104]. However, the vast majority of researchers and ancient sources clearly indicate her Kyivan Rus origin.

The Hypatian Codex does not mention Vysheslava. The oldest Polish chronicles (Gallus Anonymus, Kadlubek, Chronicle of Greater Poland) also do not know the princess name. Information about the princess we found in later sources, in particular, by Jan Długosz. The Chronicle calls her "a daughter of the Prince of Ruthenia", however, does not indicate the name of her father [27, p. 259]. A. Guagnini and M. Strykowski call the princess Viszeslava (Wizesławę) [7, p. 88] and "The successor of the Rus princes" [25, p. 229].

N. Karamzin also calls the wife of Bolesław II "an unknown princess of Ruthenia" [12, p. 49].

L. Makhnovets presents another variant of the name of Vysheslava – Vyslava, and, according to his comments to the Hypatian Codex, she was the daughter of the Grand Prince of Kyiv Sviatoslav Yaroslavych [16, p. 176]. The researcher is referring to the Russian historian V. Tatishchev. The Ioachim Chronicle in Tatishchev's exposition of 1065 states: "... This year Vysheslava, the daughter of Sviatoslav of Chernigov was given in marriage to Bolesław of Poland" [26, p. 84]. This theory is supported also by I. Linnichenko [15, p. 53], M. Baumgarten [33, p. 13], D. Donskoy [10, p. 36–37] and others.

However, we know from Długosz Chronicle that the bride of Bolesław II was "the only daughter" of the Rus' prince [27, p. 260]. Consequently, there is a contradiction: Sviatoslav Yaroslavych, as the Hypatian Codex testifies, had also a daughter with the name Predslava, who evidently was a wife of the Hungarian king Laszlo (Saint Ladislaus), and after his death (1095) she returned to Rus and ended her life taking monastic vows [16, p. 176].

M. Kromer wrote that Vysheslava father's name is unknown [43]; J. Hubner in his "Genealogische Tabellen" calls her to be a daughter of Vyslav [12, p. 236].

The Gustian Chronicle calls Vysheslava the daughter of Vyacheslav Yaroslavych, Prince of Smolensk [9, p. 57]. This opinion is supported also by A. Ekzempliarski [28, p. 586]. It is just a weight of N. Karamzin made the hypothesis very popular and expanded, as A. Nazarenko states (it was supported by K. Krause, V. Timiryazev, F. Brown and others) [20, p. 181–194]. At the same time, Karamzin idenfitied the wife of Vyacheslav Yaroslavych as Oda von Stade [12, p. 25]. However, most researchers consider Oda to be the wife of Sviatoslav Yaroslavych [20, p. 181–194].

"Annales Stadenses" reported about the marriage of Oda von Stade to the "king of Rus" ("regi Ruzie") and her return to the homeland after his death but without naming the ruler of Rus [30, p. 319].

I. Linnichenko wrote that Vyacheslav (born at 1034) at the time of Bolesław marriage (1065, according to Tatischev) [26, p. 84], could not have a daughter of a marriage age [15, p. 53]. We agree with J. Długosz and suppose the marriage could take place somewhat later – c. 1067–1068 [27, p. 259–260]. According to the tradition of those times, the girl could be married at the age of 13–14. Assuming that Vyacheslav married early (at the age of 18–20), it is quite probable that his daughter in 1068 could already be 14–16 years old.

In favor of this hypothesis is the fact that Vyacheslav Yaroslavych had no other daughters, and Vysheslava in this case was really "the only daughter of her father" [27, p. 260]. Indirectly the hypothesis is supported by the fact that Bolesław helped Kyivan prince Iziaslav in his struggle against Sviatoslav Yaroslavych (father-in-law of Bolesław II, according to Makhnovets and others). The campaign of Iziaslav Yaroslavych against his brothers – Vsevolod and Sviatoslav happened just after the marriage of Bolesław II to Vysheslava – c. 1069. To our opinion, it's doubtful that the "newly-minted" son-in-law immediately went against his wife's father. Jan Długosz and M. Strykowski announce the campaigns of Bolesław exectly against Sviatoslav and Vsevolod [27, p. 268–270; 25, p. 272].

In addition, Dlugosz, recalling the death of Sviatoslav Yaroslavych (in 1072) and his son Hlib, does not mention that this is the closest Rus relatives of Vysheslava [27, p. 267], to whom he devoted a lot of attention in his chronicle.

A unique testimony is also contained in the Chronicles of M. Strykowski - he calls Przemysl principality to be Vysheslava's homeland. The reigning rulers of this lands later were descendants of another Yaroslavych – Volodymyr. So, according to our original opinion, Vysheslava could be a daughter of Volodymyr Yaroslavych. All the more, some of the historians consider the wife of Volodymyr Yaroslavych to be the same Oda von Stade [33, p. 95–102].

Consequently, the question remains controversial [5, p. 305–306; 13, p. 16–19].

Jan Długosz describes that the prince's marriage was promoted by constant blandishments of secular councilors, in order "to continue the family line" inasmuch as one of the descendants of the throne of Poland – the youngest of Bolesław's brothers – Mieszko (Meczysław) died one year before [27, p. 259].

When the councilors began to learn which of the women could be well-deserved of such a king, "their eyes lay on" the only daughter of the Prince of Ruthenia. Długosz does not name the prince, only indicates that the bride "owned a large part of Rus" according to her father's inheritance. The Chronicle points out that the princess "surpassed all the others with her beauty as well as spiritual and physical qualities" [27, p. 260].

The Ioakim Chronicle in V. Tatishchev's exposition gives information about the event under 1065, it is more likely that the marriage could be arranged later -c. 1067/1068. The gorgeous wedding took place in Krakow, wedding celebrations included knight tournaments on spears, as Jan Długosz wrote [27, p. 260].

Already in the next (1069) year, all who were "concerned about the childlessness and infertility of their princes" were announced that the Queen became pregnant. Jan Długosz points out even the exact date of birth of the prince's firstborn – April 12 (ibid.). The newborn received "Baptistery Mersion" in Krakow church (evidently Royal Cathedral) from the Bishop Zula (Lampert) and assumed "grandfather's name" Mieczysław (ibid.) – Mieszko. Then the chronicler gives a detailed description of the joyful event celebrations.

In 1079, Vyshelawa shared the fate of her husband and was exiled in Hungary (ibid.). She became a widow c. 1081/1082, few years later (around 1086), she returned

to Poland together with her son.

A tragic fate lay in store for the son of Bolesław II and the Vysheslava - Mieszko (1069–1089). First, the young Prince stayed with his parents in exile in Hungary at the court of king Laszlo I (Vladislav). Gallus Anonymus shows that in a while Mieszko's uncle, Władisław I Herman, "... decided (...) to call him to Poland ..." [6, p. 59]. However, there is another theory, testified by the Hungarian Illuminated Chronicle (Chronicon Pictum): In 1089, the Hungarian king made a military campaign against Poland and put Mieszko Bolesławych on the Krakow's throne [45, p. 1360].

Soon, the prince married a "Ruthenian girl" [6, p. 59]. The exact date of the marriage is announced by "Rocznik Swientokrzyski" and "Rocznik Kapituly Krakowskiej" – 1088 [2, p. 214; 1, p. 345]. But soon after the marriage Mieszko was poisoned [6, p. 59].

Mieszko's death opened the opportunity to the younger brother of Bolesław II – Władisław I Herman to ascend to the throne (1042 / 1044–1102). That's why some researchers assume his probable participation in these tragic events.

The death of Mieszko dates back to 1089. Gallus Anonymus describes the suffering of Vysheslava over her son: "... poor mother was lying all the time like a dead" on the grave of her only son, "and after the funeral bishops barely brought her to life ..." [6, p. 59–60]. This was the last mention of Vysheslava in sources. The further fate of the Ruthenian princess and a Polish queen is unknown. Her place of burial, as well as burial places of her son and daughter-in-law remains unknown.

The descendants of younger brother of Bolesław II became the next rulers on the Polish state for centiries.

Thuswise, the dynastic relations of Poland and Kyivan Rus in the 11th –12th centuries were very active and became an important factor in international and intercultural cooperation, as it was shown by the example of the marriage of Bolesław II the Generous and Ruthenian princess Vysheslava. The research confirms the thousand-year commonality of Polish-Ukrainian dynastic and cultural history.

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TECHNICAL SCIENCES

ADAPTATION OF THE MAPLE SYSTEM FOR IMPROVEMENT THE EFFICIENCY OF THE STUDENTS' INDIVIDUAL WORK AT THE STUDY OF THE TOPIC THE DIFFERENTIAL EQUATIONS SYSTEM

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Annotation. The concept of adaptation of the Maple system of computer mathematics to the study of higher mathematics topic "Differential equations system" is offered in order to master students' materialmore effectively. The use of the training simulator activates the educational and cognitive activity of students.

Key words: the system of computer mathematics, Maple-training simulators, higher mathematics, the independent work of the student.

One of the conditions for improving mathematical education in the technical university is the active use of modern information technology, as well as systems of computer mathematics (SCM).

After analyzing the work of M. I. Zhaldak [1, 3], C. A. Rakov [11, 12], S. O. Semerikov [13], Yu. V. Trius [16, 17, 18], O. V. Spivakovsky [14], O. M. Spirin [15] one can identify the tendencies of using IT in education, as well as in these works, attention is drawn to the problems of forming skills of students' individual work using IT.

While studying higher mathematics students use SCM to provide visualization, graphical interpretation, mathematical modeling of processes, conduct large calculations, and it also provides the opportunity to use SCM as a means for students' individual work.

To organize a systematic, individual and systematic process of studying in a high school, optimization of the educational process is required, which should combine traditional methods and new forms of learning using information technology. These technologies are implemented at all stages: the study of the theoretical course at lectures - a combination of lecturers, manuals and information computer technology (ICT); conducting of practical classes and individual work of a student - solving individual tasks using algorithms for solving problems with comments and examples and their computer visualization; making calculation and graphic works - application of automated complexes to solving research and creative tasks.

Implementation of educational innovative technologies in higher education is always relevant. Problems of using ICT as well as systems of computer algebra are highlighted in the works of O. B. Zhiltsov [4], M. I. Zhaldak [2], V. I. Klochka [5], N. V. Morse [10]. These works indicate the search for the necessary methods to increase the efficiency of the educational process and the coefficient of usefulness of the "student - teacher" system. The need to combine traditional teaching methods, which are mostly explanatory, with new forms of learning, including the use of modern multimedia technologies, is dictated by the limited time of material mastery, in particular higher mathematics, poor student educational and ineffective organization of the educational process.

Optimization of the educational process with the use of modern information technologies can be achieved by combining verbal and visual presentation of the material, individual work at all stages of obtaining knowledge and skills and organization of individual and systematic training.

In the organization of the educational process in studying the course "Higher Mathematics" is used a broad set of teaching aids, which requires the use of a variety of methods and tools for managing the cognitive activity of each student at different levels of learning knowledge and skills development.

1. Lecture course is one of the main forms of knowledge transfer and is a combination of the presentation of theoretical material by the lecturer and the use of information technology in the audience.

2. Practical classes are focused on teaching methods for solving typical problems in higher mathematics.

Practical classes are a combination of: individual tasks, - algorithms for solving problems from all sections of practical classes with comments and examples illustrating their use, which allow to study methods for solving problems with the student's direct participation in logical considerations, the construction of variants of drawings, the choice of paths solution;

3. Typical student calculations are one of the forms of solving students' problems of higher complexity.

4. Student's individual work. To increase the CPC, the student must realize the need for new knowledge and skills. To implement and help the student in the CPC, it is advisable to use the training maple simulators (NMT) [6, 7, 8, 9] which provide the opportunity to gradually get the course of the task solution. In addition, the use of NMT stimulates the cognitive activity of students, contributing to the intellectual development of the individual. The availability of NMTs will enable students to test their abilities and skills or, in the event of difficulties, the program will tell you the next step.

According to O.V. Spivakovsky generating programs are intended for presentation sets of tasks of a certain type from a given topic to the students. Their use provides the opportunity to perform control or individual work in the classroom, providing each student with a specific task that corresponds to his individual abilities [14]. Therefore, for the selection of tasks for practical work on the topic of the system of differential equations, the generator of higher mathematics tasks on the topic of the system of differential equations was developed, which gives the teacher the opportunity to provide each student with individual tasks (Fig. 1) in a short time, to the teacher it is enough to specify the required number examples, as well as the range of coefficients. In addition to the task generator itself, the author's NMT, at the choice of the teacher, has the ability to insert an answer to each task (Figure 2). The work of the generator is directed in such a way that during the calculations there are no complicated irrational coefficients in finding solutions.

To improve the efficiency of the students' individual work during the study of the topic of the differential equations system was developed the educational Maple simulator. Let's consider a brief description of the developed NMT on the topic of differential equations and the results of work on solving typical problems of higher mathematics. The procedure simulator "mysistemdifur (7, -5,5, -3);" step by step is solving the system of differential equations by the method of exclusion (Figure 4). It is enough for the student to perform the author procedure "mysistemdifur (*, *, *, *);", where instead of the asterisks it is necessary to insert the coefficients of the task. The first two values correspond to the coefficients of the first equation for x and y respectively, and the second two for the other equation. The purpose of creating this simulator is to ensure a high level of higher mathematics education, as well as to reduce the routine assignment on the teacher. In the presence of the simulator, the student's individual work becomes more effective. The role of the teacher is to provide an advisory assistance. Also, the student has the opportunity to independently solve the examples, and to use the simulator as a check of their steps and, in case of an error, without the teacher's assistance, to localize them. And also change the condition of the example and observe how the solution changes.

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Fig. 1. Generation of individual tasks.

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Розвязати систему	_
x' = -7 x - 9 y	
y' = 10 x - y	
Відповідь:	
X=	
$\frac{3}{10}e^{(-4t)}(C_1\cos(9t) + C_2\sin(9t)) - \frac{1}{10}e^{(-4t)}(-9C_2)$	$1\sin(9t) + 9C_2\cos(9t))$
У	
$e^{(-4 t)} (C_1 \cos(9 t) + C_2 \sin(9 t))$))
Розвязати систему	
x' = -x - 10 y	
y' = -7 x - 4 y	
Відповідь:	
x=	
$\frac{10}{7}C_1 e^{(6t)} - C_2 e^{(-11t)}$	
Y=	
$C_1 e^{(6t)} + C_2 e^{(-11t)}$	
[>	-
	Time: 1.0s Butes: 2.56M Available: 4.00G

Fig. 2. Result of generation of individual tasks with answers.

The use of a training simulator creates conditions for studying or familiarizing students with the topic "Differential equations systems". At a practical class, and even more, in the typical calculation, other methods may be considered (Figure 3.).

Maple 9.5 - [SistemaDifUravnf(t)g(t).mws - [Server 1]]
<u> <u> </u></u>
<u>□ ☞ 畅 ⊟ ⊜ </u>
end do;
Варіант, 1
$x' = 6x - 9y + e^{(4t)}$
$y' = 3x - 6y + \sin(2t)$
Варіант, 2
x' = -5 x + 3 y + t - 8
$y' = 10 x + 2 y - \sin(5 t)$
Варіант, 3
x' = x - 5y + t + 1
$y' = 2x - y - 18t^2 - 14t + 12$
Варіант, 4
$x' = -6x - 10y + e^{(6t)}$
$y' = 5x + 8y + 9x^2 - 3x + 1$
Time: 0.3s Bytes: 3.56M Available: 4.00G

Fig. 3. Result of generation of individual tasks.

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Fig. 4. The work of NMT on the differential equations system.

Conclusions. Thus, it can be seen that the use of ICT tools is one of the ways to optimize the learning process by creating conditions for organizing active individual learning activities, for a differentiated and individualized approach to student learning. Researches show that the use of SCM in today's conditions significantly changes the role

and functions of teachers and students, greatly affects all components of the educational process: the nature, place and methods change themselves.

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ВОЗМОЖНОСТИ ПОВЫШЕНИЯ ПРОДУКТИВНОСТИ ОБРАБОТКИ ДЕТАЛЕЙ ЗА СЧЕТ ИСПОЛЬЗОВАНИЯ СТАНКОВ ПАРАЛЛЕЛЬНОЙ СТРУКТУРЫ С ИЗБЫТОЧНЫМИ ПРИВОДАМИ И СПЕЦИАЛЬНЫМ РАБОЧИМ ОРГАНОМ

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Alibrahemmi Methaq Mohammed, Kyrychenko A. Opportunities of increasing the productivity of part machining through using parallel structure machine tools with excessive drives and special movable operating element.

Annotation. The increase in the working space of parallel machine tools with redundant drives and a special operating element, as well as the accuracy of the positioning of the working element, makes it possible to expand the possibilities of increasing the productivity of processing parts at the level of 15 ... 44%.

Key words: parallel structure machines, processing efficiency, working space.

Вызовы настоящего времени к машиностроению требуют применения высокопроизводительных технологических машин и оборудования, которые связаны с повышением уровня сложности геометрических форм исходных деталей, а также увеличенные требования к точности требуемых поверхностей и применение сверхновых материалов. Основной задачей машиностроителей является повышение производительности во время обработки материалов с условием не снижения уровня качества.

Станки параллельной структуры являются новым и перспективным видом существующего металлообрабатывающего оборудования [1-7]. Станки параллельной структуры представляют собой шестикоординатные системы.

В настоящее время станки параллельной структуры постепенно, но достаточно быстро входят в номенклатуру оборудований, которые используются практически в каждой отрасли металлообрабатывающей промышленности.

К основным преимуществам станков параллельной структуры можно отнести:

- высокую точность позиционирования рабочего органа;

- высокую скорость перемещения и ускорение рабочего органа;

- улучшенные массогабаритные параметры и низкую материалоемкость, которые связаны с отсутствием традиционных элементов, таких как: направляющие и станина;

- более низкую величину затрат на техническое обслуживание и ремонт;

- более высокую надежность через отсутствие таких элементов как: силовые

зубчатые передачи и силовой гидропривод, а также системы централизованной смазки;

- высокую степень унификации узлов, которая приводит к обеспечению технологичности изготовления всего изделия и его конструктивной гибкости.

Основными элементами станков параллельной структуры являются неподвижное основание и подвижная платформа, имеющие связь с помощью приводных штанг, которые соединяются с приведенными элементами – шарнирами.

Перемещение рабочего органа станка параллельной структуры происходит по трем линейным и трем поворотным осям, которое обеспечивается согласованным изменением длин штанг с соответствующим программным обеспечением.

Особый интерес вызывают станки параллельной структуры с избыточными приводами и специальным рабочим органом [4-7], которые позволяют расширить возможности повышения продуктивности обработки деталей такими станками. Повышение продуктивности достигается повышением рабочего пространства и более высоким уровнем точности обработки.

В работе приведены результаты исследования прототипа станка с шестью штангами на основе параллельных кинематических структур, который спроектирован и изготовлен на кафедре «Металлорежущие станки и системы» ЦНТУ.

Прототип станка состоит из основания, на котором размещено шесть карданных подвесов со штангами переменной длины. Другим концом каждая штанга прикреплена к рабочему органу через шарниры таким образом, что ось каждой штанги проходит через ось рабочего органа.

Характерной особенностью прототипа станка является то, что рабочий орган способен поворачиваться на угол более 90° относительно одной из осей. Это дает возможность осуществлять обработку заготовок с размещением рабочего органа, как в горизонтальном положении, так и в вертикальном. Последнее существенно увеличивает сферу применения данного прототипа станка с шестью штангами на основе параллельных кинематических структур.

На рис. 1 приведены зависимости угла наклона рабочего органа прототипа станка с шестью штангами на основе параллельных кинематических структур для различных дискретных полусферических радиусов рабочего пространства.

Следует отметить, что рабочее пространство прототипа станка с шестью штангами на основе параллельных кинематических структур было рассмотрено в виде полусферической поверхности, в которой все позиции в пределах ее объема достижимые по центру рабочего органа, а сам рабочий орган нормально расположен к полусферической поверхности во всем рабочем пространстве. При этом угол наклона рабочего органа определялся как максимальный угол, который может образоваться между положением рабочего органа и вертикальной осью Z, а центральная точка рабочего органа находится в рабочем пространстве.



Рис. 1 Максимальный угол наклона рабочего органа прототипа станка с шестью штангами на основе параллельных кинематических структур

С рис. 1 можно видеть, что с увеличением радиуса полусферы достижимые углы наклона рабочего органа уменьшаются. Но для прототипа станка с шестью штангами на основе параллельных кинематических структур это лучший результат по сравнению с другими (Metrom Pentapod, 6DOF PKM), что позволяет получить более высокие характеристики угла наклона рабочего органа, а значит и большее рабочее пространство.

Кроме того, происходит интенсивный рост объема рабочего пространства прототипа станка с шестью штангами на основе параллельных кинематических структур (рис. 2).

Можно утверждать, что рост объема рабочего пространства прототипа станка с шестью штангами на основе параллельных кинематических структур происходит под влиянием изменения диапазона длин штанг (рис. 2).

Изменение угла наклона рабочего органа также влияет на объем рабочего пространства прототипа станка с шестью штангами на основе параллельных кинематических структур. Результаты приведены на рис. 3.

При повышении угла наклона рабочего органа относительно оси ОХ до 45 градусов (рис. 3) – уменьшается диаметр поперечного сечения рабочего пространства на 25%, а его высота – на 37,5%, что, в результате, происходит уменьшение объема рабочего пространства прототипа станка с шестью штангами на основе параллельных кинематических структур на 20%.





с шестью штангами на основе параллельных кинематических структур от изменения угла наклона рабочего органа

Для приведенных результатов, следует отметить, что добавление избыточных приводов позволяет улучшить качество (увеличить рабочее пространство) рабочего органа прототипа станка по сравнению, например, с Metrom Pentapod.

Таблица 1

Расположение точки	Значение отклонения, мм			
позиционирования, мм	по координате Х	по координате Ү		
0	0,0220	0,0201		
10	0,0245	0,0248		
25	0,0174	0,004		
50	0,0240	0,01		
75	0,0080	0,02496		
100	0,0280	0,02104		
125	-0,0012	0,01504		
150	0,0220	0,01104		
175	0,0209	0,018		
200	0,0101	0,01848		

Точность позиционирования рабочего органа прототипа станка с шестью штангами на основе параллельных кинематических структур

Таблица 2

Точность позиционирования рабочего органа прототипа станка с шестью штангами на основе параллельных кинематических структур

	Значение отклонения, мм				
позиционирования, мм	по координате Z (Y=0)	по координате Z (Y=+200мм)	по координате Z (Y=-200мм)		
-200	0,0549	0,0501	0,0283		
-175	0,0649	0,0449	0,0216		
-150	0,0520	0,0536	0,0179		
-130	0,0449	0,0268	0,0188		
-115	0,0489	0,0444	0,0173		
-100	0,0475	0,0424	0,0151		
-85	0,0409	0,0217	0,0148		
-75	0,0320	0,0338	0,0163		
-50	0,0184	0,0423	0,0129		
-25	0,0112	0,0112	0,0160		

Также проведены исследования по измерению точности позиционирования рабочего органа прототипа станка с шестью штангами на основе параллельных

кинематических структур. Результаты экспериментальных исследований приведены в табл. 1, 2.

Втабл. 1 приведены экспериментальные результаты точности позиционирования рабочего органа прототипа станка с шестью штангами на основе параллельных кинематических структур по координатам X, Y; в табл.. 2 – по координате Z.

Относительное отклонение (наибольшее) в точности позиционирования рабочего органа прототипа станка с шестью штангами на основе параллельных кинематических структур и Metrom Pentapod приведено на рис. 4.

Данные, приведенные на рис. 4, показывают увеличение точности позиционирования рабочего органа прототипа станка с шестью штангами на основе параллельных кинематических структур по сравнению с Metrom Pentapod. Величина относительного увеличения точности в зависимости от расположения точки позиционирования рабочего органа станка составляет 1,5...19 %.



Рис. 4 Относительное отклонение (наибольшее) в точности позиционирования рабочего органа прототипа станка с шестью штангами на основе параллельных кинематических структур и Metrom Pentapod

В связи с вышеприведенным, покажем на рис. 5 изменение продуктивности обработки деталей при использовании станков параллельной структуры с избыточными приводами и специальным рабочим органом за счет увеличения рабочего пространства и точности позиционирования рабочего органа.



Рис. 5 Относительное увеличение продуктивности обработки деталей при использовании станков параллельной структуры с избыточными приводами и специальным рабочим органом по сравнению с Metrom Pentapod

Выводи. Увеличение рабочего пространства станков параллельной структуры с избыточными приводами и специальным рабочим органом, а также точности позиционирования рабочего органа позволяет расширить возможности повышения продуктивности обработки деталей. Как показано на рис. 5, повышение продуктивности для разных радиусов полусфер рабочего пространства для станков параллельной структуры с избыточными приводами и специальным рабочим органом органом.

Представленные результаты имеют научную новизну и практическую ценность, которые подтверждают целесообразность применения станков параллельной структуры с избыточными приводами и специальным рабочим органом для повышения продуктивности обработки деталей.

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ESTIMATION FOR THE EFFECT OF BALANCED FERTILIZATION SYSTEM ON THE LAND USE EFFICIENCY IN THE AGRICULTURAL INDUSTRY

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Annotaion. The article analyzes the importance of the fertilizing system for improving the land use efficiency in the agrarian sector. The concept of "balanced land use" and its features in the field of agricultural activity are studied. The main factors influencing the formation of a balanced land use system in the agrarian sector and their further consideration for optimization of agricultural activity are defined. The importance of balancing the fertilizer system for agricultural crops with the amount of organic and mineral fertilizers introduced for increasing the productivity of agricultural crops and improving the quality of land and resource potential for substantiation of the possibilities for the development of environmentally and economically efficient agricultural production was established. It is substantiated that the priority in the work of agrarian formations is to improve the productivity of agricultural crops by increasing the use of organic elements in their fertilization.

Key words: agrarian production, ecologization, balanced land use, mineral fertilizers, organic fertilizers, impact assessment, fertilizer system, yield, impact factors.

Introduction. These days, due to the intensive land use, the quality of the Ukrainian land fund is constantly deteriorating. In some areas, where land drainage is carried out, there is an uncontrolled decrease in groundwater levels, a decrease in the mass of organic matter; flooding and salinization of soils takes place, degradation of chernozems in areas of irrigation, which leads to negative environmental effects in many regions of Ukraine.

According to research results [1], 10.4 million hectares (26.3%) of Ukraine's agricultural land are sour soils. Solonetzic (medium and strong) and saline soils make up 4.7 million hectares (14.3%). In addition, pearled and marshy soils cover an area of 3.9 million hectares (10%), rocky soils - 5.4 million hectares (1.4%).

According to the State Committee for Land Resources of Ukraine, the total area of agricultural land affected by water and wind erosion is 30.7%, deflationary-hazardous soils account for 19.1% of the total area. Today, about 15.0 percent of the total area of irrigated land is subjected to erosion, 1.5 percent - for reloading, more than 4 percent are solonetzic and salted. An increase in the groundwater mineralization leads to the secondary salinization of land.

At the same time, humus content decreased by 0.22 percent in absolute terms on average in Ukraine over the past 20 years, which is a significant loss, since a period of 25-30 years is required for its increase in the soil by 0.1 percent in natural conditions (Broshchak et al. 2013).

According to the State Geological Survey of Ukraine, more than 1 million hectares of agricultural land require preservation today, of which about 563 thousand hectares are degraded, more than 475 thousand hectares are unproductive and about 12 thousand hectares are technically contaminated. More than 409 thousand hectares of land require reclamation and improvement.

To overcome the current situation, determining the balanced land use processes in the direction of optimizing the impact of anthropogenic factors on the qualitative state of land is required.

The issue of the balanced land use in the agrarian sector and its development in modern economic conditions was studied by many domestic and foreign scientists, among which are the following: V. Baranovskyi (Baranovskyi V.A. 2004), V. Budziak (Budziak V.M. 2008), T. Hardashuk (Hardashuk T.V.), Yu. Hubeni (Svatosh M., Hubeni Yu. 2008), O. Shubravska (Shubravska O. 2009), M. Andreoli, V. Tellarini. (Andreoli M., Tellarini V. 2000), D.Baldock (Baldock D. 2012), P. Matson, W. Parton, A. Power, M. Swift (Matson P.A., Parton W.J., Power A.G., Swift M.J. 1997), T. Read (Read T. 1997), P. Verburg, P. Schot, M. Dijst, A. Veldkamp (Verburg P.H., Schot P.P., Dijst M.J., Veldkamp A. 2004). However, the problem of assessing the impact of balanced fertilizer system on land use efficiency in terms of increasing crop yields is poorly investigated and requires thorough estimation.

Therefore, the purpose of this study is to assess the impact of the fertilizer system by the mineral and organic components on the yield of agricultural crops based on quality indicators of agricultural land.

In accordance with the set goal, the following tasks were defined:

- to study the main factors influencing balanced land use in the agrarian sector;

- to evaluate the influence of fertilizer system by mineral and organic components on yields of agricultural crops based on the quality indicators agricultural land.

Methods. The research was conducted using the dialectical method estimating the effect of economic laws and a systematic approach to the study of economic phenomena and processes in order to study the balanced land use; monographic method was used during the processing of scientific publications on the study for the essence of the "balanced land use" concept; economics and mathematics methods were applied to study the tightness of the relationship between the indicators of anthropogenic impact and yield of agricultural land; abstract-logical method was used at the theoretical generalizations and formulating conclusions.

Results. In our opinion, balanced land use in the agrarian sector should be interpreted as a system of land use, based on the principles of meeting the growing material needs of the population and the ecologically efficient use of land resources, in which anthropogenic load on land resources and the natural environment as a whole

does not exceed the self-restoration potential of agroecosystems and contributes to its reproduction.

The following components should be included in the general characteristics of balanced agricultural land use:

1) the integration of natural and production systems in the process of use, protection and reproduction of agricultural land;

2) comprehensive solution for economic, environmental and social tasks;

3) obligatory indemnification for the destruction of quality indicators of land;

4) the priority of preserving and improving the state of agroecosystems over the production need for one-time economic effects;

5) the limited intensification for the use of agricultural land in accordance with their qualitative characteristics and the ability to restore.

In general, in order to achieve a balanced land use system in the agrarian sector, we propose to take into account the following influencing factors:

- the quality of agricultural land and the possibility of their use for the cultivation of the particular crops;

- natural and climatic conditions in a certain territory;

- the level of anthropogenic pressure on agricultural land should be in line with the possibilities for self-restoration of natural ecosystems;

- balancing the use of chemical and organic components in agricultural land use;

- formation of an ecologically safe and economically efficient land use system;

- improving the competitiveness of modern land use through the use of the latest ecologically safe technologies and innovative developments;

- withdrawal of erosion-hazardous agricultural lands from intensive cultivation, preservation of degraded, unproductive and technogenically contaminated lands, reclamation of disturbed lands.

In the current economic conditions, the important role in balanced use of land resources belongs to the fertility of agricultural land that is crucial for achieving high performance indicators of land use. A system of fertilizing agricultural land, which involves the use of organic and mineral fertilizers, is of great importance for improving the land quality and reproduction of land-resource potential. These elements are crucial for improving crop yields and achieving a high level of economic efficiency in agricultural activities.

To assess the impact of nutrients introduced with mineral and organic fertilizers on crop yields, a factor analysis was applied. Since the largest amount of mineral fertilizers, which currently are defining the structure of the fertilizing system, was introduced per 1 ha of crop area in 2016 in Lviv, Volyn, Rivne, Ternopil, Ivano-Frankivsk, Chernihiv, Sumy, Khmelnytsky, Transcarpathian and Vinnitsa regions (120 to 163 kg of fertilizer nutrients), a factor analysis was conducted based on one of these regions, namely the Ternopil. The result of factor analysis is the transition from the set of output variables to a smaller number of new variables - factors. Using the analysis method for the main components, the minimum number of factors that give the largest contribution to the data

variance was defined. These factors are called the main components.

The statistics by the 2016 yield for the major crops and the supply of nutrients to the soil due to the use of organic and mineral fertilizers was used for the analysis.

After the analysis, 7 indicators were identified. The yield of main crops, in centners from 1 hectare, is a dependent variable . The remaining 6 indicators are independent variables: , and – the amount of nutrients added to the soil with organic fertilizers, N, P, K, respectively, kg/ha; , and – the amount of nutrients added to the soil with mineral fertilizers, N, P, K, respectively, kg/ha.

It can be assumed that there are many causal relationships between these indicators that can give rise to the multicollinearity phenomenon. To avoid this, it is expedient to replace such a set of indicators with fewer uncorrelated indicators.

Table 1

Indicator	у	x ₁	x ₂	X ₃	X4	X ₅	X ₆
v	1	0.64	0.64	0.64	0.23	0.41	0.62
x ₁		1	0.99	0.99	0.09	- 0.1	-0.02
X ₂			1	0.98	0.09	- 0.1	-0.02
X ₃				1	0.09	- 0.1	-0.02
X ₄					1	0.83	0.68
Х ₅						1	0.93
Х ₅							1

Correlation matrix for the relationship between indicators *

* Source: calculated by authors

As it can be seen from Table 1, the hypothesis of the existence of close interactions between the individual indicators affecting yields is confirmed. In particular, there is a close correlation between all the indicators for nutrients introduced with organic fertilizers, as well as among all the indicators for nutrients introduced with mineral fertilizers.

The next step in the study is to reduce the number of independent variables and to identify the main components explaining the causal mechanisms of increasing yields.

Factor analysis was carried out by the method of the main components, followed by the inversion of the found load matrix by the Varimax method. The package of Statistica 10 applications was used for statistic analysis.

Initial data before conducting a multivariate statistical analysis is preliminary reduced to standard conditions. In this case, the condition is that the number of observations (11 crops) is 2-3 times more than the number of independent variables (6 indicators). Based on 6 independent variables, the table of eigenvalues for the correlation matrix was calculated (Table 2).

Component number	Own values	Share of total dispersion, %			
1	3.02	50.37			
2	2.62	43.70			
3	0.32	5.37			
4	0.03	0.56			
5	0.00	0.00			
6	0.00	0.00			
*Course of a local stand for most of the					

Own	values	and	total	component	t variances	*
U M	values	anu	iviai	component	t variances	

**Source: calculated by authors*

As it can be seen from the Table 2, the first two components are obtained, which in aggregate account for 95.07% of the total dispersion for the output variables, indicating a high degree of factorization. In addition, the eigenvalues of these components are greater than 1, thus, the first two components can be attributed to the main ones.

For a visual confirmation for the correct selection of the main components, the criterion of "rocky collapse" was used. According to this criterion, there is a line close to the straight parallel to the abscissa, on the graph (Fig. 1) of the eigenvalues, beginning with the third component. It means that the first two components have the greatest impact on yields.



Fig. 1. Own values of the main components * * Source: calculated by authors

To interpret the first two main components, the matrix of factor load on the main components is presented (Table 3). Key component 1 includes indicators , , , and

٦

Table 2

component 2 includes indicators x_4, x_5, x_6 .

Table 3

Factor load on the main components *						
Indicators	Load not	reversed	Load back with the VariMax procedure			
	Component 1	Component 2	Component 1	Component 2		
X ₁	- 1	- 0.09	1	- 0.01		
X ₂	– 1	- 0.09	1	- 0.01		
X ₃	-1	- 0.09	1	- 0.01		
X ₄	- 0.01	- 0.9	0.1	0.89		
X ₅	0.19	- 0.97	- 0.09	0.98		
X ₆	0.11	- 0.93	- 0.02	0.93		
Share of total dispersion, %	0.5	0.44	0.5	0.44		
* Source: calculated by authors						

Comparing factor loads, the following conclusions can be drawn:

- the first component is closely related to all the indicators characterizng the amount of introduced N, P, K in the soil with organic fertilizers;

- the second component has the closest connection with all the indicators characterizing the amount of introduced N, P, K in the soil with mineral fertilizers.

After reducing the dimension and obtaining two main components, the correlation analysis for the dependent variable of the main crops productivity with the obtained factors was conducted (Table 4). The correlation coefficient between the yield and the first component has high and positive value - 0.63, which indicates a significant degree of influence for N, P, K in organic fertilizer applied in the soil on the yield of crops.

Table 4

Name	Crop yield	Component 1	Component 2
Crop yield	1	0.00	0.63
Component 1		1	0.45
Component 2			1

Correlation between the dependent variable and the main components*

*Source: calculated by authors

To estimate the dependence for the yield of certain types of agricultural crops on the nutrients introduces into the soil with organic and mineral fertilizers, econometric models, which are given in Table 5, were constructed.

As it can be seen from the results of the simulation, all coefficients in the variable are positive, indicating the positive impact of the mineral fertilizers introduction on the yield of crops. Coefficients in the variable for models have different signs indicating

the positive and negative effects of applying organic fertilizers to certain crops. This situation can be the result of the imbalance in the fertilizer system by the organic and mineral components and the lack of nutrient input through organic fertilizers, which reduces the effect of their use.

Table 5

Types of crops	Regression equation, x_1 - nutrients from organic fertilizers, kg/ha, x_2 - nutrients from mineral fertilizers, kg/ha
Cereals and legumes	$y = 26,99 - 4,93x_1 + 0,2x_2$
Winter wheat	$y = 21,11 - 2,17x_1 + 0,18x_2$
Corn	$y = 1,34 + 0,4x_1 + 0,47x_2$
Potato	$y = 174,56 - 6,78x_1 + 0,17x_2$
Vegetables	$y = 130,19 + 0,01x_1 + 0,47x_2$
Fodder corn	$y = 165,52 + 0,4x_1 + 1,07x_2$
Cultivated forag herbs	$y = 55,02 + 0,1x_1 + 0,14x_2$

Dependence of crop yields on the inputs of soil nutrients wit	h
organic and mineral fertilizers *	

Thus, the priorities in the work of agrarian units to improve yields should be primarily to increase the use of organic elements in the fertilization of crops, which form the very first component. As a result, agricultural producers will be able to achieve significantly better crop yields and a synergistic integrated effect from the use of a balanced fertilizer system.

Conclusions. Thus, a promising direction in improving the efficiency of landresource potential use is the further balancing in the use of mineral and organic fertilizers for fertilizing crops, which will increase the economic and ecological efficiency of land use. That is, the further development of the agrarian sector should be focused on increasing the use of organic elements to improve the yield of crops.

The result of balancing the fertilizer system is also the improvement of the environment due to the optimization in the use of chemical elements to improve the quality characteristics of the land. It will also help to further balance the land use system and improve the quality characteristics of agricultural products.

In the long run, the balance of the fertilization system for agricultural land and land use, in general, will become one of the prerequisites for improving the ecological state of land, addressing the problems of rational use of land-resource potential and improving the well-being of citizens living in rural areas.

^{*}Source: calculated by authors

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