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OBSAH

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ECONOMICS

RESTRUCTUTING OF COMPANIES UNDER THE CONDITIONS OF INNOVATION AND INVESTMENT DEVELOPMENTOF ECONOMY

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Annotation. *The need for research of forms of structuring companies, directions of their strategic planning and innovating policy becomes the most important. Business practice shows that only companies with long-term planning will stay in market. Restructuring is one of the tool company can use to improve level of competitiveness. The current research aims at proving the efficiency of the method of corporate restructuring, especially mechanism of this method. This article also proves effectiveness of restructuring, and shows that this kind of policies can be implemented, not only in Ukrainian conditions, but also in any emerging economies. Mostly attention pays to Ukrainian experience in strategic planning and companies ruling.*

Key words: *restructuring, company, integration, corporatization.*

Introduction. Topicality of the research. The efficiency increase of restructuring measures at the national business entities, in particular in the context of innovation and investment development of the Ukrainian economy, necessitates studying the application of the newest restructuring forms of company management in terms of post-crisis operation of Ukrainian economic system, which is on starting its European integration path.

Problem statement. To develop scientific and practical recommendations in the field of improvement of innovation and investment climate in Ukraine based on restructuring of national companies, it is necessary to study the efficiency of using the newest forms of restructuring under the conditions of innovation and investment development of the national economy.

Literature review. Taking into account the importance of companies restructuring on all levels of economic systems operation, a significant degree of scientific works on problems related to development and implementation of different restructuring forms of management on all stages of the life cycle in the subjects of entrepreneurship have been singled out. Based on the study of works written by domestic and foreign scholars, the current research has identified three key directions in scientific writings on restructuring of companies: 1. The study of restructuring of companies as an economic phenomenon. In this context the restructuring essence, its strategies, types, sub-types, directions, methods, and tools have been identified. In addition, their corresponding characteristics have been provided. There is a wide range of scientific publications on this subject, in

particular the works of such scholars as: S.O. Arefiev (Arefiev, 2014), S. Commander (Commander, 1998), V.G. Prushkivskyi (Prushkivskyi, 2008), O.Y. Savruk (Savruk, 2010), K. Santarek (Santarek,2011) and others. 2. Characteristics and peculiarities disclosure of restructuring of companies in terms of market relations development in the countries of Western Europe. The research has emphasized the problems solving of state companies privatization with the help of restructuring tools usage. The scholars who study the following topic are as follows: A. Amsden, J. Kochannowicz and L. Taylor (Amsdenet al, 1994), I. Goldberg and A. Watkins (Goldberg and Watkins, 2000), V. Carlin, C. Mayer, H.-W. Sinn and V. Grilli (Carlin et al, 1992), N.Stojčić (Stojčić, 2012) and others.

Determination of unstudied components of the general problem. The active development of integration and consolidation processes in Ukrainian business affects all aspects of the activities of national companies, in particular, the peculiarities of innovation and investment development of the economy. Taking into account the new European requirements in the framework of the implementation of our country's reforms, at the initial stages of integration with the European Community, strategic importance is attached to the flexibility of the external environment changes (taking into account the complex conditions of companies' activity as a result of the economic and political crisis in the country and post-crisis stagnation of national economy) and the use of different forms of restructuring, which should take into account not only interests of the state, but also those of owners of international business having Ukrainian industrial, agricultural, financial and other assets in their portfolio. **Research objective.** The research aims at systematizing the existing approaches to the restructuring essence, development of it several objective and asset of goals as well as to the development of methods, tools, mechanisms of restructuring of national companies under the conditions of innovation and investment development of the economy; proving the effectiveness of using the method of corporate structuring as a restructuring form in the management system of national companies (in particular, in the context of innovation and investment development); substantiating the author's vision of the directions of improving the companies' efficiency on the basis of restructuring measures in modern economic conditions. **Scientific novelty of the research.** The research has improved:

- the interpretation of the notion "restructuring", which in comparison with the current ones considers functioning of the economic entity during all its life cycle stages (generation, growth, stability, decline); it is also based on the appropriate mechanism and is designed to provide the high level of adaptability of the company to the terms of innovation and investment development of the country's economy;

- theoretical and methodological basis for the determination of the overall objective and the set of goals of business entities restructuring, which unlike the current ones consider the enterprise life cycles as well as innovation and investment operation of economic entities. The entities carry out this operation in the context of innovation and investment development of the state.

The further development has been implied to:

- structuralization of organizational and financial methods of companies restructuring, among which the method of corporate structuring has been distinguished. The research focuses on this particular method. Among restructuring strategies the strategies for introducing innovations (modernization of production, introduction of innovative technologies, development of new types of products and services) and strategies for diversification, mainly production of goods (operations, services), have been identified.

1. The essence and goals of restructuring of companies under the conditions of innovation and investment development of the economy. Post-crisis development of national economy demands the efficiency increase of financial and economic activities realization by business units in Ukraine. The crisis and stagnation of economic system of the country have led to the unprofitability growth and the expansion of the unprofitable companies ratio. Thus, if in 2008 net loss of all economic entities in the country was about 41 billion Ukrainian hryvnas with the share of unprofitable companies equal to 38.7 %, in 2015 business units of the country generated approximately 374 billion Ukrainian hryvnas of net loss with the share of unprofitable business entities equal to 26.7 %. In addition, it should be mentioned that in 2008-2016 the share of unprofitable companies in economy of Ukraine varied within the interval from 26.7 % (2015) to 46.3 % (2010), reaching 27.0 % of all economic entities operating in the country in 2016 (State Statistics Service of Ukraine, 2018).

The significant number of state companies that operate highly ineffective and need privatization complicates the situation provided above. Thus, according to statistic data, on January 1, 2018 3893 state companies (0.32 % of all registered legal entities), 32 state-owned unitary companies and 11640 utility companies (0.94 % of all registered legal entities) operated in Ukraine (State Statistics Service of Ukraine, 2018).

The availability of a huge number of unprofitable companies and subjects of business activities that belong to the state (utility) ownership requires activating restructuring processes in national economy. It is particularly essential within the context of the beginning of economic system transformation in the country from an industrial and post-industrial type that must be based on the increase of innovation ratio. It is impossible to reach without the raising of investment inputs. It means that this is about innovation and investment development of Ukrainian economy. So, the research states that the efficiency increase in operation of the national economic system and some of its elements (economic entities) based on restructuring usage is a foundation for the modern innovation and investment development of the country's economy.

It is also necessary to state that under the conditions of the integration of the national economy, the directions of company restructuring should take into account the peculiarities of all business processes occurring in the structural subdivisions of corporate entities. This is due to the fact that so far, the overwhelming majority (over 85% (Mordvytska, 2016, p. 62)) of national companies and companies operating in various fields of business is a part of the organizational structures of international corporate associations. The most common form of integration in Ukraine is vertical integration, which, of course, is an effective strategic restructuring tool. First of all, one should pay

attention to the fact that such a form of company restructuring is characterized by a synergistic effect that allows the implementation of advanced innovative developments, technologies and has the ability to consolidate significant amounts of capital and turn them into investments in line with corporate needs and projects.

At the same time, the disclosure of problems referred to restructuring of companies in the context of innovation and investment development of Ukrainian economy demands the strict determination of the essence of the term "restructuring".

2. The scientific discussion on the definition of the term and its significant differences given by Ukrainian and foreign scholars has been detected. Thus, O. Filimonenkov argues that restructuring of a company means the implementation of organizational, economic, financial, legal and technical measures aimed at reorganization of a company, in particular, by its division with the transfer of debt obligations to a legal entity that is not subject to reorganization, if this is provided for by the reorganization plan, at change of ownership, management structure, a legal form of organization, that will facilitate the company's financial improvement, increase in the production volume of competitive products, increase in the production efficiency and satisfaction of the requirements of creditors (Filimonenkov, 2002, p. 28).

O. Tereshchenko, N. Voloshniuk indicate that restructuring is a set of financial and economic, organizational and legal measures directed towards updating of company's structure and its management, finances and production, organizational and legal form of operation, which enables entities to improve financial and economic relationship of the company to ensure effective use of its potential and the increase of its market value in terms of the sanitation process (Tereshchenko and Voloshniuk, 2009, p. 85).

O. Viatkovych understands restructuring as a way of providing the best enterprise operation in the uninterrupted changeable market terms in accordance with the strategy of its development by a set of activities of organizational, economic, technological, technical and financial character directed towards the increase of the production efficiency and competitiveness as well as the strengthening of financial resilience under the economic crisis (Viatrovych, 2011, p. 41).

As G. Kozytska writes in her work, restructuring is a formation process of the company ability to react, including a preventive reaction, on changes of the environment in accordance with the strategies of its development by implementation of a set of organizational, economical, technical, technological, legal and financial measures directed towards the increase of its market value during the post crisis period (Kozytska, 2008, p. 6).

Thus, Ukrainian scholars mainly concentrate on the fact that restructuring is used when the enterprise goes through the crisis and it is one of its key sanitation elements, which is undertaken with the usage of the particular set of various measures. Also, it is directed towards pulling the economic entity out of crisis, the fullest realization of its financial and production potential and the increase of the market value of such a business unit in long-term vision. The stated interpretation of the term "restructuring" is groundlessly narrow and does not consider operation of business activities' subjects

during other phases of the life cycle except crisis or decay.

Regarding the essence determination of the term "restructuring" by foreign scholars, its understanding as a component of effective privatization for countries of post-communist territory is predominant.

Thus, Bernard M. Hoekman and Gerhard Pohl distinguish the point of view of radical economists who regard restructuring built on economic stimuli as a key element of mass privatization of state companies with the aim to transform them into joint stock companies, that is corporations of economic entities that are owned by the state (Hoekman and Pohl, 1995, p. 9).

Val Samonis indicates that restructuring is a rather complex and essential notion for the realization of privatization advantages on both macro and micro levels (Samonis, 1998, p. 3).

Simon Commander recognizes restructuring as a key element of the transition period from command and administrative to the market economy (Commander, 1998, p.2).

At the same time, studying the Polish experience of banks and companies restructuring under the terms of country's economy transition to the market type of operation, Fernando Montes-Negret and Luka Papi emphasize the macro-aspects of this economic phenomenon. They also mark a negative influence of state companies and banks restructuring on the employment in the country and other aspects of social protection of the population, stressing the considerable time period of this process on the macro-level aiming at such negative consequences removal (Montes-Negret, 1997, p. 12).

3. Viewpoints of the stated foreign scholars are important and essential. However, they are rather narrow and cannot be used completely to the efficiency increase of the national economy and its economic entities under conditions of innovation and investment development. However, studying publications of foreign scholars, other trends in their research of the term "restructuring" essence have been identified. For example, scholars explain this term through privatization of state companies in post-communist countries. In this context, the definition given by S. Commander needs special attention. The author writes:

Restructuring embraces a multitude of actions, ranging from what has been termed reactive restructuring, which primarily involves adjustment to employment and wages, to strategic restructuring, which requires trade reorganization and establishment of new market channels, to deep restructuring, which entails new investment in plant and technology (Commander, 1998, p. 7).

Thus, this scholar stresses the connection between restructuring and innovation and investment development of the country's economy and explains restructuring as a broad economic phenomenon that influences all components of financial and operational activities in the markets of goods (operations, services) sales.

Having studied critically the definitions of the term "restructuring" given above, the current research indicates that while determination of its essence it is necessary to take into consideration: - an company can need restructuring during all stages of its life

cycle (generation, growth, stability, decline); - restructuring demands the appropriate mechanism implementation, which will include types, strategies, methods, tools, and restructuring levers; at the same time this mechanism must have a high level of adaptability to terms of financial and operational activities realization by every single company; - restructuring must be directed towards the efficiency and effectiveness increase of economic entities on the goods (operations, services) markets; - restructuring must also consider innovation and investment development of the country's economy.

It immediately follows that restructuring is a process of ensuring efficiency and effectiveness of economic entities operation in the markets of goods (operations, services) during all stages of its life cycle; and it is reached by development and implementation of the appropriate mechanism and allows an company to have a high level of adaptability to the conditions of innovation and investment development of the country's economy.

It should be noted that in Ukraine all measures for the restructuring of companies are carried out in accordance with the Regulations on the Procedure for Restructuring of Companies, approved by the State Property Fund of Ukraine (as amended on May 04, 2007) (Regulations on the procedure of restructuring of enterprises, 2002, p.37)). According to the text of the Regulations, the procedure for restructuring of companies includes: making a decision to restructure the company; creation of a commission to restructure the company; development and implementation of a restructuring plan for a company (Regulations on the procedure of restructuring of enterprises, 2002, p.37).

In the context of the revealing of restructuring essence it must be stated that efficiency and effectiveness ensuring of a company operation in the markets of goods (operations, services) during different stages of its life cycle is achieved by determination of the overall objective and the set of goals within such a process.

The overall objective while business enterprise emerging within its restructuring must be aimed at survival and adaptation in the market. New companies rather often become a bankrupt and leave the market due to the lack of effective restructuring. The set of goals for such economic entities during the process of restructuring includes: achievement of operation profitability; image formation; determination of goods (operations, services) range; achievement of a certain level of competitiveness; formation of the effective and efficient management and production structure as well as formation of the personnel motivation system; investors engagement; development and implementation of innovations.

As a part of the growth, the company can also need implementation of restructuring. It is connected with the problems of growing, increase of negative influence of competitors and environment. The overall objective of such an economic entity in the context of restructuring must include the increase of the market share and its market value. A set of goals for companies that are growing within restructuring consists of: the increase of operation profitability; the increase of owners' and employees' profits; the increase of availability in the traditional markets as well as the establishment of new sales markets; products diversification; the increase of investment funded by economic entities, its owners and other concerned market subjects (the state, local authorities, legal entities,

households); the increase of competitiveness both of the company and its products; the increase of marketing effectiveness; the increase of development scope and especially implementation of novation and innovations.

Discussion. For the subjects of business activity that are on the life cycle stage named "stability", restructuring is needed not to allow loss of their leading competitive positions and to prevent the beginning of decline (crisis). Concerning a set of restructuring goals within the life cycle stage stated above for the economic entities, the following ones are to be stated: maintenance of competitiveness in the traditional markets and establishment of new sales markets for goods (operations, services) or new possibilities for goods (operations, services) usage in the traditional markets for the company; profitability maximization; a range of goods (operations, services) diversification; the increase of the market value of a business-unit; the increase of investment to innovations in the first place; the increase of innovative activity in all spheres of the company (management, marketing, production, sales, logistics, finance, accounting, scientific and research, research and development drafts).

If the decline (crisis) appears the overall objective for the company is to eliminate unprofitability based on the increase of efficiency of financial and economic activities and the increase of competitiveness. The set of goals for restructuring in this case includes: the increase of profits or optimization of loss scale; improvement of the range of goods (operations, services); ensuring of liquidity, payment capacity and financial stability of the company; optimization of organizational and operating structure of economic entities; maximization of investment attraction to all spheres of business units operation; preservation of the most valuable employees through optimization of the number of those who work at the company.

Conclusions. Disclosing the overall objective and the set of goals of restructuring for economic entities during different stages of their life cycle it is necessary to state that depending on peculiarities of financial and business activities as well as the place of the company in the market, goals stated above can be changed, and their number can increase (decrease). The research emphasizes the maximum usage of creative potential and creativity of employees of business companies in the context of development and realization of the overall objective and the set of goals within restructuring process. In addition, the special attention is paid to the key components of the company restructuring, that is to its innovation and investment activities implemented by the company in the context of innovation and investment development of the state. The considerable problems connected with investment attraction, development and implementation of innovation at Ukrainian companies due to poor quality and efficiency of innovation and investment development of Ukrainian economy have been identified. Such a situation has occurred as the consequence of problems on the state and municipal levels. Moreover, it has happened because of a low level of interest on the part of private businesses and households in investment realization, especially concerning development and implementation of innovations in the country.

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OPERATIONAL EFFICIENCY IN THE IMPLEMENTATION OF ENTERPRISE STRATEGY

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Annotation. *The current paper dwells on such significant problem for economic activity of enterprises as operational efficiency and its importance for the enterprise strategy implementation. A closer look have been taken at the approaches to the strategy effectiveness assessment, in particular both strategic and operational efficiency have been singled out. The authors proposed to apply a system of flexible adaptive triple evaluation of the strategy implementation effectiveness, which is based on the interconnection between the strategy, the goals an the operational control.*

Key words: *strategy, strategic management, strategic efficiency, operational efficiency, operational control, strategy implementation budget, budgeting.*

Statement of the problem. Changes in the role of organizations and management in society result in the search for new methods of management systems efficiency improvement. Obviously, the organizations of the past were primarily created in order to increase the capital of their founders, however, at the current stage of social and economic development, the success of the enterprise in the market is ensured by the correspondence of its results with the expectations of various stakeholders. Such factors as globalization and integration, which are intensively developing at both macro and micro levels significantly sway the change in the management efficiency.

It is insufficient for modern enterprises, performing in conditions of instability and uncertainty of the external strategic environment just to choose the optimal development strategies to form the strategic set out of them. Nowadays, it is important to figure out on what stage of its development the company is, how close it is to the strategic goal, and whether it is moving away from its goals. In other words, in order to implement the strategy of the enterprise, it is necessary to determine its operational efficiency.

The essence of definitions, criteria, methods of evaluation of objects for analysis of the management efficiency occupies a special place in the theory of management, providing it with a comprehensive (systematic) or in-depth (detailed) characteristics.

Such concepts as "effect" and "efficiency", "result" and "performance" are widely used in theoretical and applied research of various social and economic systems and processes, alongside with the management of the organization (enterprise). These concepts are very close in their meaning, they are interrelated, however, their gist differs.

New management concepts require new approaches to the efficiency evaluation. Hence, it is indispensable to develop an enterprise performance evaluation system that takes into account the enterprise efficiency, the management efficiency, and the

effectiveness of the goals achievement by the various stakeholders.

However, in practice, most performance evaluation systems are based on a financial analysis of the company, considering a short-term period and catering for certain stakeholders, rather than evaluating a company strategy efficiency in the long-term perspective. Obviously, it is quite dubious to get objective evidence of strategic performance without considering the operational efficiency.

Analysis of recent research and publications. Various aspects of the problem of the enterprise strategic plans efficiency evaluation were initially researched by scholars from the countries with the developed market economy. Amid the numerous researches on the problem we initially point out the works of M. Porter, I. Ansoff, P. Drucker, A. Thompson, A.J. Strickland, P. Walker, J.Champi.

In the researches of Y. Azaryan, O. Belyi, V. Budkin, V. Voichak, V. Gerasimchuk, M. Dudchenko, O. Kanishchenko, G. Klimko, R. Leveshko, L. Moroz, I. Rogach, Ye. Romat, dedicated to the problems of the strategy formation and implementation, only some aspects of its efficiency evaluation were considered.

The analysis of theoretical studies in the field of strategic management efficiency evaluation shows that most of them dwell on the strategic and operational aspects of evaluation. However, the issue of operational efficiency in the process of strategy implementation has been insufficiently examined.

Result of the research. Measurement of strategy implementation efficiency is based on a comparative analysis of the organization's economic activity with its objectives. A strategy efficiency evaluation is considered as a feedback mechanism for adjusting the strategy.

It should be noted that the efficiency of strategic management can be seen both in a broad and narrow sense. In the narrow sense, the efficiency of strategic management (as a time-limited process) is the ratio of the outcome (the strategy developed by the enterprise in terms of its completeness, logic, coherence, compliance with the situation, timeliness, etc.) to the cost of resources associated with the strategy development.

In a more comprehensive sense, the efficiency of strategic management is considered as the efficiency of the enterprise strategy implementation. The second approach is apt, since the existence of a strategy does not mean the successful development of the enterprise, therefore the process of strategic management only makes sense in the case of the practical implementation of the developed strategy.

Some researchers [1] state that since the activity of any enterprise is influenced by a combination of factors of the external and internal environment that can have effect on the strategy successful implementation, so it would be expedient to consider both the strategic efficiency of management with external target facilities and operational efficiency.

It stands to reason that the company strategy implementation efficiency to a large extent depends on the overall operational efficiency of the company management system. Yu. Mironenko and A. Terekhanov [2] emphasize that the quality of the company management system can be evaluated by two parameters - the quality of

strategic management and the quality of operational management. Within the structure of the company management system, D. Melnichuk [3] considers not only the system of strategic and operational management but also singles out a system of current management, which can affect the whole system's effectiveness.

The analysis of the studies on the management efficiency proves that methodological elaboration of operational efficiency should be based on the integration of two approaches. For one thing, it is a study of the goals achievement followed by their prioritization, for another thing - an integrated evaluation of how efficiently the company management performed to implement the adopted strategy. The conducted researches have given an opportunity to offer a methodological elaboration of the prioritization of the company goals for the purpose of further utilizing of the evaluation results in the analysis of the overall company performance. The general scheme for the strategic goals prioritizing is presented in Figure 1.

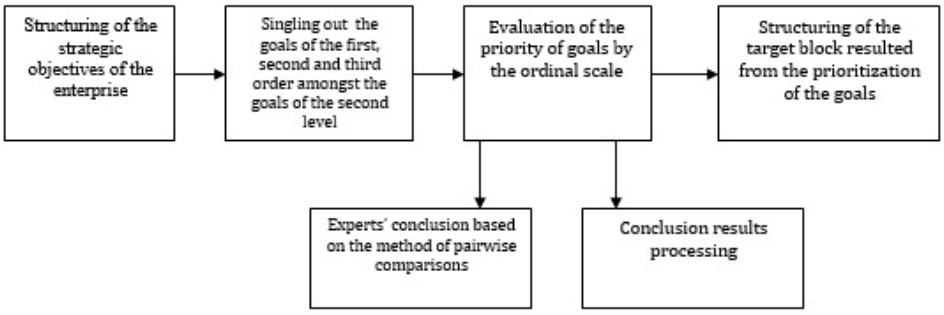

Fig. 1. The general scheme for the strategic goals prioritizing

This goals prioritization process is non-formalized and requires an expert evaluation. There is a good deal of the technical methods for obtaining the expert's evaluation utilizing the ordinal scale, but the method of pairwise comparisons is considered to be the most organic.

Using the method of pairwise comparison, the expert must compare all goals in pairs in respect to the sequence of their implementation in order to make a conclusion for each pair about the benefits of one goal, by a certain criterion, or their equivalence. In this case, the following characters <,>, = may be used. At the next stage, the conclusion should be worked out by the expert, and the goals should be ranked. The results processing can be accomplished by constructing a "graph of preferences", or in a chart, making use of coefficients aij [17, p.124]:

$$a_{ij} = \begin{cases} 2 \text{ when } g_i > g_j \\ 1 \text{ when } g_i = g_j \\ 0 \text{ when } g_i < g_j, \end{cases}$$

where g_i, g_j – goals to be compared with each other

So, if at the second level, due to decomposition of the global goal, we get five goals: G_1, G_2, G_3, G_4, G_5, then at the next stage a group of experts may receive conclusions in the form of paired comparisons with respect to the priority of the selected goals:

$G_1 > G_2$, $G_1 > G_3$, $G_1 > G_4$, $G_1 > G_5$, $G_2 > G_3$, $G_2 > G_4$, $G_2 > G_5$,

$G_3 = G_4$, $G_3 < G_5$, $G_4 < G_5$.

At the next stage, the graph of “preferences" is performed. Each goal corresponds to a definite vertex of the graph. If the goal gi is more important than the goal gj, then a curve ij appears on the graph, which proceeds from gi and enters the goal gj. Under conditions of equal importance of the goals, the arrows are indicated on the two ends of the line. Goals priority is determined by the number of arrows entering the top of the graph. The goal with the highest priority is the first one, there is no arrow entering it. Next follows the second goal, and so on.

After setting the priority of the goals realization, the expert group divides them into the goals of the first, second and third order. It is recommended that the beginning of the ranked row is to be referred to the goals of the first order, the end of the row - to the objectives of the third order, and the middle of the row should be referred to – the goals of the second order. The main task of experts, in this case, is to determine the boundaries of the beginning and end of each group. The results of such work will be needed in the transition from strategic guidance to tactical tasks. Approbation calculations, based on methodological recommendations, were carried out with the data presented by JSC Volodarka, JSC Vorskla, JSC Zhelan, JSC Dana. The selected companies are large Ukrainian clothing manufactures that, at the same time, are the major competitors. These enterprises were chosen as the research object because their blocks of goals were not influenced by the sectoral features or the scale factor. The results of calculating the goals priority conducted on data of the research objects are given in Appendix B.

The implementation of the second stage of evaluation of the goals achievement effectiveness in terms of goals prioritization study is based on the application of the method of geometric summation. The essence of the method is as follows: for a selected group of indicators, a graph is made in the form of a square (Fig. 2). Each side of the square is a measuring scale for fixing the value of a particular indicator for a certain period of time. The ratio of the criterion, which is evaluated to the indicator is quite important for the practical construction of the graph.

The following indicators are presented in the enterprise activity - "the more, the better" (labor productivity), on the other hand - "the less, the better" (cost per unit per unit of output). They must be taken into account when orienting the measurement scales in the graph. For each period of time when a system's goals are measured, its total score represents a point on the graph that moves when the value of at least one indicator is changed.

In order to regulate the movement of the point and make the analysis possible, one of the angles of the graph is selected and fixed, and the movement of the point will be regarded in relation to it as the growth of the goal effectiveness and the enterprise performance (in Figure 2, this angle has a "+" sign). Fixing the angle on the graph allows

us to correctly orient the measurement scale for specific indicators. Out of the sides of the square, the indicators can be fixed anywhere.

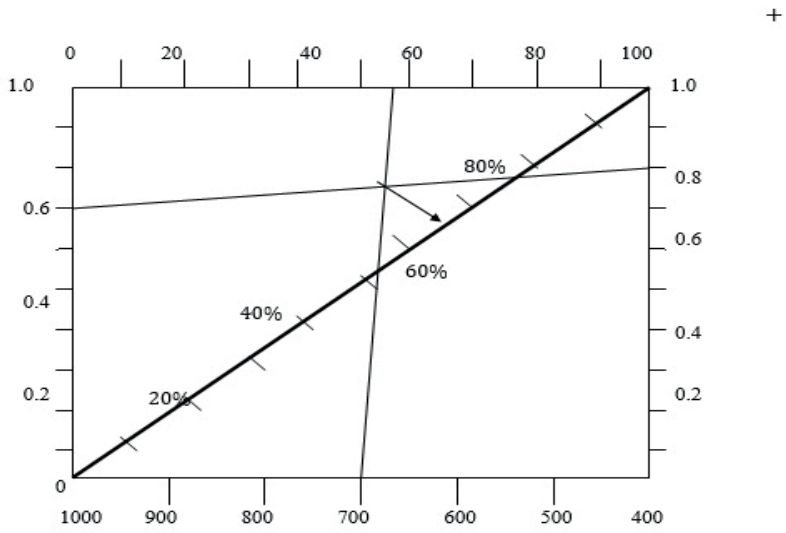

Fig. 2. The graph for the goals setting effectiveness evaluation at the enterprise

Another problem that needs further analysis is the use and comparison of priorities for determining the enterprise strategy. As we have previously mentioned, the priority of the goals of the strategic plan may differ from the priority of the goals of the current moment. Furthermore, this distinction can only refer to the goals of the first order. For example, unforeseen, drastic changes in the environmental requirements require the primary realization of several goals of the second and third order. Resulted from the enterprise goals restructuring, it is precisely the goals of this group to replenish the group of goals of the first order. Moreover, within this group, they will get priority, because they will require an immediate implementation. The very structure of goals and their prioritization is a guide to action for the formation of a strategic set of the enterprise.

At the time of the strategic set formation, all strategic guidelines can be broken up into groups depending on their belonging to one or another goal of the enterprise. Further, with the distribution of strategic goals according to their purposes, they, can be attributed to the goals first, second and third order (Fig. 3).

In the process of an enterprise strategic plan formation, when a strategic set of enterprises is well-known, the strategic goals of the first order are to be included in the plan in the first place. If the resources of the enterprise are not exhausted, and the strategic goals of the first order do not remain in the strategic set, then the goals of the second and third order are to be realized. This leads to the fact that in practically any time period of the assessment of the degree of achievement of the global goal in

different degrees will achieve the goals of different orders. Obviously, first-order goals will be implemented faster than the goals of the second and third order, and, accordingly, goals of the second order before the third. In the given figures, the length of the arrows characterizes the degree of achievement of the target in one of the moments when the evaluation and formation of the strategic set of industrial enterprises are carried out.

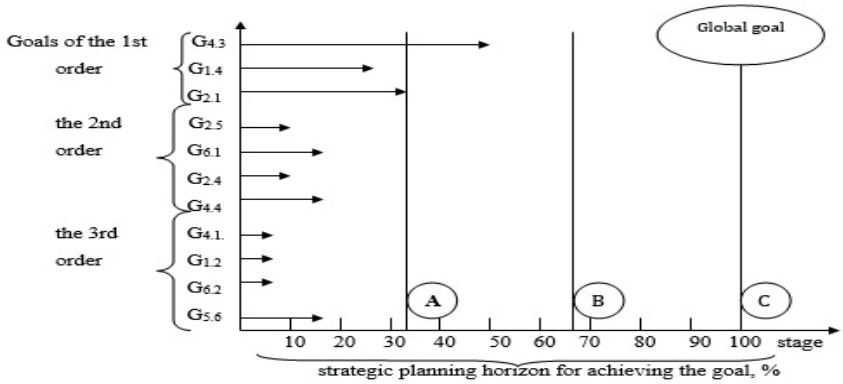

Fig. 3. Results of the goal achievement degree at the stage A

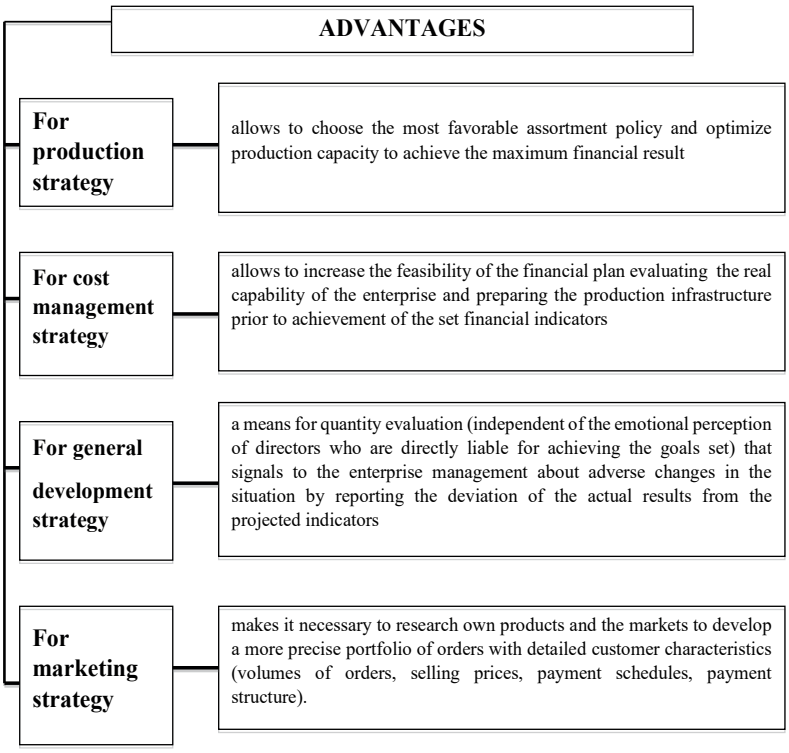

Fig. 4. Advantages of the system of flexible adaptive three-tier operational evaluation of strategy implementation efficiency

Such an assessment system has several advantages and, in conditions of instability, is one of the most advanced methods that significantly increase the efficiency of the strategy implementation of the enterprise (Fig. 4) [6].

Consequently, the use of the system of flexible adaptive three-tier operational evaluation of strategy implementation efficiency as a key management function allows us to anticipate all the actions to be undertaken for efficient implementation of the strategy.

Conclusions. The evaluation of the strategy implementation efficiency serves as the foundation both for optimization of strategic and operational decisions, and for an increase of the of the company's operation efficiency, as well as for improvement of the company strategies, reviewing the current tactics for their implementation to fully achieve the strategic goals of the enterprise.

Consequently, a complete, reliable and well-timed evaluation of the company strategy implementation, in terms of operational aspect, allows us to identify the weaknesses of the company strategy at the proper time, and instantly develop recommendations for adjusting the measures for its implementation in accordance with the requirements and changes in the strategic environment of the of the enterprise performance, which will result in obtaining of competitive advantages and the company's long-term efficiency.

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CURRENT STATE AND PROSPECTS FOR IMPLEMENTATION OF FACTORING OPERATIONS IN UKRAINE

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Annotation. *The state and problems of factoring development in Ukraine are analyzed, advantages and disadvantages of provision of factoring services by banks and financial companies are analyzed, the prevailing role of banking factoring in the Ukrainian market is argued. The importance of constructing an effective risk management system for factoring operations is substantiated. The analysis of the development of the market for factoring services provided by financial companies in Ukraine during 2016-2018 has been determined. The place and role of factoring in financial services provided by financial companies of Ukraine are determined. The distribution of factoring contracts by types of economic activity and sources of financing of concluded factoring transactions is considered. The main factors influencing the volume of factoring operations during the analyzed period are described. The main tendencies of the world factoring market development in 2018 are determined.*

Key words: *factoring, financial services, exchange rate, sources of financing, types of economic activity.*

Introduction. Factoring in Ukraine predominantly refers to transactions in which a bank or other financial institution that has the right to provide factoring services, repurchases receivables from another bank or lending institution, and subsequently independently collects this debt from the debtor. In the context of the economic situation that has developed over recent years, most factoring agreements are exactly the same [11]. These operations, however, are not factoring in the classical sense of this concept. Above all, classic factoring is a kind of financial service. Its main purpose is replenishment of working capital of the enterprise and creation of opportunities for expansion of sales. The essence of factoring is that the bank or other financial institution that has the right to carry out factoring transactions (factor) provides the client with a financing fee (usually up to 120 days) in exchange for the client's assignment of the factor of claim rights to debtors arising out of contracts deliveries, services, etc. In exchange for the right to claim receivables, the factor undertakes to pay immediately an advance to the client, the amount of which is usually up to 90% of the value of the deferred obligation, and the rest of the amount - after receiving the corresponding payments from the debtor. Payment of the services of the factor is carried out at the expense of the commission for the provision of financing or other payments, as well as annual interest for the use of money [3].

State of research. Factoring services for our country are new and, despite the rapid development of this segment of the financial services market in recent years, they are still not very widespread and even "incomprehensible" to most potential consumers. In

the native scientific literature, the study of the market of factoring services in Ukraine is underestimated, and some aspects of the organizational and economic mechanism of its functioning are not covered at all. At the end of the XX - the beginning of the XXI century there were new and rather significant long-term incentives for the development of the financial services market. From now on, interest has grown among foreign scholars to factoring services (F. Salinger, N. Ruddy, C. Mills, N. Davidson, B. Gap, W. Thomas, M. Foreman, J. Gilbert, M. Bikers, F. Salinberg, M. Khromov, S. Brunhild). Among the few native scientists who studied the specifics of the market for factoring services in Ukraine one can mention M. Bilyk, N. Tychovsky, E. Sklepovoi, O. Bondarenko, V. Smachilo and A. Ostafil. At the same time, it should be noted that most aspects of the factoring market of our country remain insufficiently researched.

Statement of principle provisions. The state of classical factoring in a given country also shows the level of economic development. According to Factors Chain International (FCI) [12], published in an annual factoring review, the global factoring market in 2014 was EUR 2 347.513 billion. The largest factoring turnover is in countries that according to the World Bank were among the top ten countries with the highest Gross Domestic Product in 2015: China (EUR 406 102 million), Great Britain (EUR 350 622 million), Italy (EUR 183 004 million)), The United States (97,670 million euros).

According to the results of the FCI study [12], the largest volumes of factoring transactions were observed in Ukraine in 2009, 2015, and 2016. Most factoring agreements comprise the financing of rights claims on bank loans. Thus, the level of factoring development is an indicator of the level of economic development and business activity of the business. In Ukrainian conditions, when loans are currently available to a limited number of enterprises (according to Ukrsibbank, no more than 5-10% of small and medium enterprises can serve a five-year loan, even under 16% per a year), classical factoring could be an affordable source of financing for business, but so far the market of classic factoring in Ukraine is experiencing not the best times [7].

According to the National Commission for the regulation of financial services markets (hereinafter - the National Financial Services Commission), in 2015 the volume of such contracts amounted to UAH 11.5 billion with UAH 16.56 billion of total factoring contracts, i.e. it is 80.5%. Such an imbalance in the structure of factoring operations is mainly related to the withdrawal of insolvent banks from the market and the crisis of non-payment of bank loans in connection with the devaluation of the hryvnia in 2014-2015. The number of concluded factoring agreements (Figure 2.2.) in 2016 and in the first quarter of 2017 allows us to talk about the growth of the number of factoring transactions in this period. Indicators of the first quarter of 2016 also give grounds for optimistic forecasts. In the 1st quarter of 2017, the contracts were signed at 1,177 more compared to the corresponding quarter of 2018. However, it is worth remembering, that only about 20% of these operations are factoring in the classical sense [9, p.54].

One more characteristic feature of factoring in Ukraine is that it is mainly financed at the expense of own funds of factors and at the expense of other source. The small share of bank loans in financing of factoring in 2015 further decreased compared to 2013.

Comparing the share of bank loans in the financing structure of factoring transactions in the first quarters of 2015, 2016, 2017 and 2018, it is possible to predict that in 2016, the share of bank loans in the financing structure of factoring operations will remain insignificant [10].

Considering this funding structure, the development of the market for classic factoring is significantly limited, as factors need to have a large amount of free money. It should also be noted that funds attracted from the population appeared in the financing structure of factoring transactions in 2015, however, only in the amount of 1.5 million UAH.

As a conclusion, it can be noted that the Ukrainian factoring market is characterized by an imbalance both in terms of the proportion of factoring transactions and in terms of sources of funding: more than 80% of factoring transactions are the financing of claims for bank loans, while classical factoring is not sufficiently developed yet. The main source of funds for the implementation of factoring transactions are the own funds of factors.

As for the value of factoring services, then the interest rate banks fluctuate at the level of 26-28% per a year, and in factoring companies - 25-35% per a year. Additionally, the client pays for a variety of fees from the amount of the assigned factor to the requirements - for setting the factoring limit (at the level of 0.5 - 1%), for servicing (0.5 - 2%), for the processing of documents, which are charged as a percentage of the amount of overhead (0.1-0.2%). In fact, the value of factoring services is almost equal to the cost of loans, however, in order to receive funding from the factor, a much smaller package of documents needs to be provided and there is no need to provide implementation in the form of mortgages or sureties [19].

The volume of international factoring in 2014 has increased by 21.2%, amounting to 5.7 billion euros. At the same time, export factoring amounted to approximately 5.3 billion euros, while imports is 379 million euros. The factoring service expands essentially in 2018 [21].

At present, factoring continues to prevail in the financing of trade agreements, which account for up to 80% of the total volume of global factoring. The share of European countries exceeds 70% of the total turnover of factoring, and among the European countries the United Kingdom retains 20%, where the most active factoring is still used in the textile industry (20% in the sectoral factoring structure). As an instrument of trading financing factoring takes in indicators of macroeconomic statistics. On average, Europe's turnaround factor is 6% of Gross Domestic Product. In a number of Mediterranean countries this figure reaches 15-20% [19].

Thus, considering the implementation of factoring it can be concluded that it has significantly decreased recently.This has reduced the turnover of funds, because the appearance and development of factoring services provokes an increase in the turnover of cash, since the enterprise temporarily releases financial resources that can be used effectively for a certain period of time.

Prospects for further research can be the development of strategic directions for the

development of organizational and economic support and also for the development of factoring in the native financial services market.

So, summing up the part, we can make the conclusion that factoring is defined as the transfer of funds to the disposal of the other party, which in turn undertakes to withdraw its claim. Some scholars tend to consider factoring as the sale of receivables, and most scholars believe that this is a transfer (factor-firm) the right to receive funds for the supplied product to the bank or the acquisition (factor-firm) of the right to claim money by the bank.

The use of factoring services enables enterprises to solve the problem of shortage of working capital; maintain the necessary nomenclature of the product range; increase sales; offer preferential terms of purchase of goods to its customers; to purchase materials from their suppliers at a lower price due to the receipt of funds immediately after the shipment of goods [19].

The Ukrainian factoring market is characterized by an imbalance both in terms of the proportion of factoring transactions and in terms of sources of financing: more than 80% of factoring transactions is the financing of claims for bank loans, while classical factoring has not been developed sufficiently yet. The main source of funds for implementation of factoring transactions are the own funds of factors [16].

At present, factoring continues to prevail in the financing of trade agreements, which account for up to 80% of the total volume of global factoring. The share of European countries exceeds 70% of the total turnover of factoring.

Untimely repayment of his debt by the debtor often leads to a lack of working capital from the supplier, which in turn may result in a decrease in the competitiveness of the enterprise and adversely affect its further development. In recent years, factoring services are increasingly popular in Ukraine. They help the seller to receive "live" money immediately after implementation. Correct understanding of the essence of factoring allows you to manage the debts of buyers and customers effectively and make settlements with them on advantageous terms. This contributes to the improvement of the financial condition of suppliers [5].

Thus, factoring is attributed to financial, banking (credit) services in Ukrainian legislation. There is no single approach to the interpretation of the essence of this concept among researchers. According to scientists, factoring is a tool for postponing payments; a kind of financial service; a kind of commerce transaction; both financial and non-financial operations; a process of assignment of debt obligations; a complex of services provided by the factor to the client, etc. Factoring is a brokering activity where a factoring company acquires the right to collect debts from its suppliers and customers for a fee. That is, the assignment of the right to collect receivables. The relationship between the entities is regulated by the agreement, which specifies the terms of the agreement, rights and obligations, the responsibility of the parties, the type of factoring, the amount of funding and payment for factoring service [4].

Thus, factoring is a complex of financial services provided by factoring departments of banks and specialized factoring companies to clients who sell their goods and services

on terms of deferral of payments, and which is the financing of supplies by purchasing the right of demand for receivables, administration of receivable accounts of buyers and customers, as well as insurance of credit risks for a certain fee, determined by the factoring agreement. Figure 1 shows the scheme of the sequence of the implementation of factoring operation.

The essence of factoring, like any other economic category, is disclosed through the functions performed by it. Therefore, it is appropriate to distinguish the main ones for a deep understanding of this concept: financing the supply of products and services during shipment on terms of postponement of payment; administration of accounts receivable (implementation of procedures for work with debtors, forecasting of collection terms, monitoring of timeliness of payment); cover the risks of non-payment of debts by debtors; carrying out the assessment of solvency of debtors, which is most demanded in transition economy.

The experience of applying factoring in practice shows that it is not rational to use for: 1) enterprises with a large number of debtors; 2) firms that work with subcontractors (for example, construction companies); 3) debt obligations of individuals; 4) enterprises that sell products under compensatory agreements [5].

The reflection of factoring transactions in accounting is very important for accountants, especially if the company uses actively this type of service. Insufficient accounting and tax accounting for factoring transactions can cause distortions in the financial and tax reporting of an enterprise. Due to the lack of clear methodological recommendations for the accounting of factoring transactions, there are problematic issues that companies decide by recording, based on their own experience and in accordance with legislative requirements. In practice, for the purpose of accounting, it is accepted to separate factoring with the right of regression and without the right of recourse. In practice, the scheme of accounting for these varieties of factoring can be the same. The difference lies in the need to display the supplier's obligations in the accounting records in case of non-payment of debt obligations by the debtor in factoring with regress [19].

The supporters of the profit-and-expenditure principle rely on the fact that factoring without the right of recourse serves as a transaction for the sale of customers 'and customers' debts, since, in addition to the right to claim the debt, risks and benefits are also transferred. That is, the debtors' debt goes to the factor balance as an asset from the client's balance sheet. The factoring service fee is the factor revenue and, accordingly, the cost of the client. Thus, the sale of accounts receivable should be reflected in the income and expense accounts. The display of income is proposed to make on account 733 "Other income from financial transactions", expenses - in the account 952 "Other financial expenses" [21].

The authors of the second approach suggest to reflect the assignment of debt claims to debtors as a sum of financing and include it in current payables. In this case, it is necessary to use the following accounting records: 685 "Settlements with other creditors" - reflection of financing; 92 "Administrative Expenses" - reflection of the

cost of financing; 951 "Interest on a loan" or 952 "Other financial expenses" - factoring costs in terms of commission interest. T.V. Omelyanenko, O.M. Ivashevskaya and I.P. Copanska offers to reflect the cost of paying for factoring services in the account 949 "Other operating expenses". G.V. Mysaka - in the account 95 "Financial expenses". But common in these approaches is the assignment of factoring commitments to off-balance sheet account 042 "Contingent Liabilities" [12]

O.V. Fartushniak and I.Yu. Pasichnyk propose the following chart of factoring accounting: the funding provided under the factoring agreement should be reflected in the account 681 "Payments for advances received"; the cost of paying for factoring services to account 952 "Other financial expenses"; to reflect the fact of transferring arrears of debtors to a mortgage in off-balance sheet account 05 "Guarantees and security provided" (using factoring with regress) [10].

N.S. Struk also proposes to use off-balance sheet account 05 when transferring the right to claim money. To reflect the funding provided, the researcher proposes to open a sub-account 607 "Funding received under a factoring agreement". This proposal is appropriate for factoring with the right of recourse when it is a provision of short-term financing.

It is worth mentioning that the use of the account 92 contradicts the definition of administrative expenses in P (C) BO 16 "Costs", since according to the methodology the expenses for the maintenance of administrative and managerial personnel, expenses for the maintenance of assets of general economic purpose, expenses for auditing, security and other services are reflected in this account [12].

To account for costs that include interest for using attracted funds applying factoring and factoring service fees, it is appropriate to apply Account 952 "Other Financial Expenses". In accordance with the Instruction on the application of the plan of accounts, the expenses related to the attraction of debt capital, including expenses related to interest accrual under lending agreements (except for bank loans) are recorded in this account. Considering that factoring relates to lending operations in accordance with Ukrainian legislation, this proposal is fully justified [13].

In essence, factoring is financing, therefore, in order to simplify the accounting, it is appropriate to reflect the creditor's replacement as follows: Debit 685 "Settlement of other operations" Credit 36 "Payments with buyers and customers"[15].

The question about the impact of accounting factoring transactions on the supplier's tax arises. In accordance with items 1.16.1.5 of the Tax Code of Ukraine, factoring transactions are not subject to value added tax. Factoring transactions are subject to taxation, which consist of assets that are different from currency values or securities [17]. According to the Decree of the Cabinet of Ministers of Ukraine "On the System of Currency Regulation and Currency Control", currency of Ukraine (including non-cash funds on accounts within Ukraine) and foreign currency [18] refers to currency values. Thus, when selling debt claims (the object of debt is currency values), the supplier-payer of value added tax in cash, the fact of assignment of monetary claims to the factor is not reflected in the tax accounting of the client [13].

There is a tax liability with value added tax on general grounds at the date of shipment of goods (services) from the supplying company (factor customer). It is reduces the revenue from the sale. This obligation is reflected in line 1.1 of the tax return and in Table 1 of addition A5. The supplier issues a tax invoice that does not need to be redefined by the factor. This tax invoice is legally valid for confirming the tax obligations of the supplier and the tax credit to the debtor. Assignment of debt claims does not affect the change of already charged tax liabilities with value added tax. No adjustments to the tax liability occur, and the fact of the assignment of monetary claims to the factor is not reflected in the tax accounting of the client [19].

The amount of the assignment of the right to the debt claim for factoring must be reflected in line 5 of the tax return with value added tax, as well as in Table 1 of addition A6 for the first event - the date of transfer of debt to the factor or the receipt of funds from the factor. Also, this operation should be reflected in the Unified Register of Tax Bills, where "BO" should be noted as the basis (based on the document of accounting).

In the case of assignment of the debt claim of factor with a discount on the value of such a requirement, the amount of tax liability accrued during the implementation, can not be reduced, because there is no change in the price of sales in the relations between supplier and buyer [20].

The Tax Code of Ukraine does not provide for a special mechanism for taxing factoring transactions. According to Art. 134 of the Tax Code, the object of taxation is the profit from a source of origin from Ukraine and abroad, which is determined by adjusting (increasing or decreasing) the financial result before tax (profit or loss), determined in the financial statements of the enterprise in accordance with the National Regulations (standards) of accounting or International Financial Reporting Standards, on differences that arise in accordance with the provisions of this Code [16].

Conclusions. Thus, factoring plays an important role in the economic relations between counterparties. It is an effective instrument for managing receivables and serves as an alternative to a bank loan. The use of factoring helps companies avoid crises, contributes to their further development, not only by accelerating the rotation of working capital, but also by supplementing with additional services that enable suppliers to save on labor costs and focus on production.

The tax legislation does not specify the tax treatment of factoring. The use of factoring services does not change the customer's tax records when selling goods (works, services), since factoring is not subject to value added tax. Scientific literature contains different approaches to reflecting factoring transactions. Due to the existence of a large number of alternative accounting options, enterprises should clearly define the methodology for accounting of factoring transactions in their accounting policies [23]. The substantiated accounting scheme of factoring on the basis of the current plan of accounting for enterprises and organizations makes clear the reflection of this transaction in accounting and significantly simplifies its management, ensuring reliable, qualitative and timely disclosure of information in the financial statements.

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PECULIARITIES OF FORMATION OF EDUCATIONAL SPACE SECURITY

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Annotation. *The article deals with the peculiarities of formation of educational security. The concept of educational security through the prism of its subject area of study is characterized. Its main components are defined, in particular: comprehensive educational institution security, medical component of educational process subjects' security, psychological component of the educational space security, ecological component of the educational space security, information component of the educational space security, economic component of educational space security. The directions of using the effective ways of education management which should be based on considered elements of educational sphere security are offered.*

Key words: *comprehensive educational institution security, educational space, subjects of the educational process, medical component of the educational process security, psychological component of the educational space security, ecological component of the educational space security, information component of the educational space security, and the economic component of the educational space security.*

Historical experience and the current tendency to reorganizing the international space show that sustainable development of the state is based on national security, which means continuous improvement of the complex of measures and institutions that guarantee the preservation of the territorial integrity of the country, based on the stable self-identity of the nation, culture and science, as a life that allows the state to withstand external and internal threats. And also it is based on the educational security (as a key component), which should be understood as the objective need of the state in the continuous modernization of the institute of education in the context of not only emerging external and internal threats, but also in the context of predicted ones.

The state and the authorities are faced with the issue of ensuring the national security, finding adequate responses to current challenges, and building national immunity to challenges, including on the basis of educational security, which should focus on the education system.

In the context of fulfilling the tasks outlined in the current National Security Strategy of Ukraine [1], the issue of determining the criteria for national security in the educational sphere becomes relevant. It should be noted that this problem has not been adequately developed, in spite of the obvious interconnectedness of the educational and security spheres. This is explained, in particular, by insufficient attention to international experience. An additional obstacle is the fact that, for many European democratic countries, national security issues have not been of paramount importance until recently.

It should be noted that the domestic educational school appeared in the depths of the state-political system, which is radically different from the modern one. That is why

the entry of the latter into new socio-economic conditions caused a lot of problems, the solution of which requires both new theoretical approaches to the economy of education, and the search for practical ways to ensure the survival and stable functioning of educational institutions in the context of the ongoing crisis socio-economic phenomena and globalization integrations.

Choosing the model for implementing the educational program, it is necessary to consider that any educational institution is a rather conservative system that is difficult to be quickly transformed. Therefore, any changes must definitely take into account the current experience, the traditions of the university and the peculiarities of the conditions in which the university operates (region, industry, political and economic situation) [12].

At the same time, educational security is an important indicator of the society development. The need to prepare a skilled workforce, necessary for modern economy in the conditions of the scientific and technological revolution, requires the expansion of the educational sphere. Formation of educational security is especially important because at present the level of development of education and science is one of the key criteria for assessing the sustainability of the development of territorial and socio-economic spheres [13].

The study of the problem of educational security is objectively linked with the consideration of the education crisis problem. Among the scholars who studied various subject areas of educational security, it is worth mentioning: Baieva I. A., Breus S. V., Gayazova L. A., Kyrylenko N. M., Kodzhaspirova G. M., Kotova N. S., Martyniuk V. P., Rubtsov V. V., Sytnyk H. P., Sovhira S. V.,Telnova O. V., Vasianovych H. P.

The category of educational security has different approaches to its interpretation: the satisfaction of educational needs from the regional to the national level, aimed at "improving the quality of intellectual development of people", "stability of the process of knowledge reproduction", "promoting and providing the opportunity to implement long-life education", "stable continuity of the process of modernization by educational institutions (schools, colleges, municipal educational complexes, etc.), the content of reproduction of knowledge" [2].

The concept of educational security should be considered in relation to the subject area of the study. If the aspects of security in the educational institution are considered, then the notion "integrated security of an educational institution" should also take place, which means the state of the educational institution's security against real and predictable social, technological and natural threats that ensure its safe functioning [6]. G. Kodzhaspirova notes that "the violation of security leads to the actualization of mechanisms aimed at the organization of survival in the surrounding reality, such as strengthening the tentative reflex, increasing anxiety, aggressiveness, readiness to defend [6].

The psychological aspect of the educational space security is considered by I. Baieva, Ye. Laktionova, L. Gaiazova, G. Kodzhaspirova, V. Rubtsov and others. They determine that the educational space is a psycho-pedagogical reality, which contains specially organized conditions for the formation of an individual, as well as opportunities

for development, included in the social and spatially substantive environment, the psychological essence of which is a set of activity and communicative acts and relations of the educational process participants. Fixation of this reality is possible through the system of relations of subjects that participate in it [9, p. 5]. Scientists are investigating the problems of psychological security by analyzing the situations that arise in the educational process. The aforementioned researchers [2, 4, 6] believe that psycho-traumatic situations directly or indirectly affect the physical and mental health of the individual. Psycho-traumatic situations in the educational process of an educational institution include:

• conflicts in relations between teacher-student, student-student, student-parent, etc.;
• the problem of adaptation in the educational environment;
• the atmosphere of competition between peers;
• excessive strictness and exactingness of teachers.

If the environmental aspect of the security of the educational space is considered, an attention should be paid to the study of S. Sovhira, who understands the environmentally safe educational environment as a system of psychological and pedagogical conditions, influences and opportunities that ensure the protection of the individual from the negative impact of environmental factors that determine the optimality of interaction with the world of nature [11, p. 3]. The author determines the reasons for changing the nature of the interaction of the individual and the world of nature, which influenced the reduction of protection from the negative impact of environmental factors in the educational process, among which there are:

• radical transformation of most activities in modern society;
• increasing the pace of changing the conditions of the educational process functioning with qualitatively different ones;
• general urbanization, exclusion of man from the natural world of nature;
• the rapid development of information technology, capable of replacing the natural educational space with virtual;
• excessive desire to standardize the expressive characteristics of objects and phenomena [11, p. 3].

Equally important is the provision of information security in the educational environment. If the scientists have been engaged with the problem of information security for a long time, the problem of information security of the informational educational environment remains poorly investigated and relevant in our time. The researcher N. Kyrylenko believes that the problem of information security in the field of education is particularly acute in connection with its informatization, as through the application of information and communication technologies there is a massive, global impact on a person in education [5, p. 150]. The author refers to the main factors of the negative influence of information on the modern educational environment:

• mass influences through modern information and telecommunication educational technologies in order to form a certain public opinion, cultural, moral level of development, behavioral mechanisms, etc.;

• the lack of real mechanisms for monitoring the quality of information available through modern telecommunication technologies, generating penetration into the educational space of large volumes of inaccurate information;

• the impersonal penetration of violence through the availability of modern telecommunication technologies [5, p. 150-151]. In modern legislation a number of acts have been adopted that are intended to regulate the problem of information security. However, they lack legislative definitions of "information security of society and people", legal mechanisms for its provision [5, p. 151].

Today there is no single approach to determining the economic security of an educational institution. Most often it is considered from the point of view of resource and protection approaches as a state in which the available resources are sufficient to prevent, weaken or protect against threats from the activities of the higher education institution [8, p. 195]. Among the threats to economic security S. Breus highlights the following:

• deterioration in the quality of higher education;

• outflow of qualified personnel from higher educational establishments;

• a decrease in the number of entrants, a non-transparent mechanism for allocating budget funds and reducing public financing;

• the intensification of competition between higher education establishments for entrants and between graduates in the labor market;

• lack of correspondence of educational programs of training specialists to current and future needs of economic security, taking into account world trends and European strategic priorities of Ukraine [3, p. 146].

Recently, the serious domestic problem is the intensification of competition for the Ukrainian student from the higher education institutions of foreign countries, caused by high tuition fees in the part of Ukrainian higher education institutions, corruption and the relatively poor quality of education. Significant relative and absolute growth of students from Ukraine is demonstrated by Canadian, British, Czech and Italian universities, and the largest increase in the number of Ukrainian students is observed in Polish universities. Of particular concern is that the intensification of "educational migration" from Ukraine takes place under conditions of an actual surplus of seats in domestic higher education institutions.

According to the provisions set out in the National Security Strategy of Ukraine, the state of the domestic economy, the imperfection of the system of organization of state power and civil society, socio-political polarization of society and criminalization of social relations, the growth of organized crime and the increase in the scale of terrorism create a wide range of internal and external threats to national security of the country. Obviously, these same phenomena represent a threat to the security of educational space.

The formation of a safe educational space should envisage, first of all, the use of effective ways of managing education, which should be based on the considered elements of the security of the educational sphere.

The most important direction of work on the formation of a safe educational space is the coordination of the activities of educational, medical and social protection institutions,

institutions of public order with a view, on the one hand, to meeting the needs of pupils and students of higher education in medical-psychological and social assistance in the case of health and social maladaptation, on the other hand, with the aim of developing effective measures to improve the system of preserving health and socialization of the younger generation, ensuring the security of participants in the educational process. To predict the security educational space and the successful development of students in a particular educational environment, there should always be an opportunity to assess the level of psychological comfort of all subjects of the process.

Another direction in formation of the educational space security should be ensuring the unity of action of all subjects of education and related fields, especially culture, medicine, ecology, social protection, safety of life support systems. This should be the only educational policy aimed at preserving and strengthening the physical, reproductive, mental, social and spiritual health of children and young people [13].

In the economic sphere, it is necessary to increase the share of budget allocations in the sphere of education, to ensure the investment activity of domestic and foreign business structures and their focus on financing of educational services, the development and reform of the education system, maintenance of life support systems and the strengthening of educational, methodological, material and technical basis of educational institutions.

The next direction should be the formation of the country's scientific and technological potential, the increase of research in strategically important areas of scientific and technical development of the educational space, the increase and diversification of pedagogical schools, involving all levels of the educational sphere into single world information and education space.

Ukraine's educational security in the general policy direction should include three main recommendations:

• realization of educational expectations and assessments of subjects vital for the protection of national security. With the support of the local government and industry partners, the state must not only formulate and modernize the state educational standards, but also act as a guarantor of the students' ability to acquire the skills and knowledge necessary to ensure the national security of the country at an appropriate level. In civil consciousness there should be included not the motives for obtaining education as it is but the quality of skills and abilities in science, technology, foreign languages, knowledge of world culture received at each educational stage, from the junior and high school to the professional college or higher education institution;

• definition of the effectiveness of one or another institution should consist primarily the success rate of graduates;

• creation and piloting of the National Educational Security program, in which the responsible for the results of education should be defined, a scale of skills and knowledge of the national graduate necessary for the protection of Ukraine's security should be developed [10].

Therefore, the main tasks in the field of securing the educational space are:

• development and introduction of normative-legal, scientific-methodical and organizational foundations of the educational system's activity in the formation of the educational space security;

• strengthening the experience of interagency, integrated and multilevel approaches in the formation of the educational space security;

• improvement of professional competence and attestation mechanisms of education workers in the field of formation of the educational space security;

• improvement of the mechanisms of attestation of an educational institution for the creation of medical and social conditions that ensure the safety and health of participants in the educational process;

• development of criteria for the effectiveness of the educational institution's activities in relation to the formation of the educational space security.

Formulating the essence of the security of the educational environment, it is considered as a state of the educational environment that excludes the influence of factors that can harm the educational system. Such security is a set of measures aimed at ensuring the state of the pedagogical protection of the educational system and its elements from external and internal threats [6], and contains the following main components:

• target component, which includes goals and tasks of training;

• content component that defines the system of requirements to the professional qualifications of the applicant of education, the nature of the organization and implementation of the actual learning process and the functionality of the teacher, as well as designing and implementing the training process;

• activity component that reveals the system of generalized technological bases of the design and implementation of training;

• effective component, containing a detailed description of the essential features of vocational educators.

Thus, the formation and professional development of the individual is due to the influence on it of the educational environment of the educational institution, which contributes to the students' education. A safe educational environment enhances the educational activities, that is, it makes a higher education process, which in turn leads to an increase in the quality of future specialists' training. Without providing the above-mentioned conditions, the process of creating the security of the educational environment will be significantly complicated. Therefore, as it was already mentioned, all subjects of the educational space should be involved in this process. The optimally functioning system of education in the educational space reflects the protection of vital educational needs and interests of subjects of education in various spheres of professional activity from dangers and threats.

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BREXIT'S INFLUENCE ON THE ECONOMY OF THE UK AND THE EUROPEAN UNION

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Annotation. *In the article the peculiarities of economical effect of Brexit for EU countries and Great Britain are considered. The main data as for the trade of goods and services and also an investment climate between two sides proves the essential costs which were caused by the Brexit. The trade between EU and the United Kingdom is great and according to its size is equal the transatlantic trade (between EU and USA). The essence and form, we hope free, trade agreement had been still discussing. But all this problem researchers agree that the main violation of trade connections and agreements will bring to the economical costs from both sides. Nevertheless, EU will have only disproportionately small part of general costs and not only because in the economical position , its in five times bigger then the Great Britain but also from the view on the fundamental reasons among which the increasing of market potential of the own enterprises. Other investigations of different agreements about free trade confirm the general assumption about the smaller side can get more from the elimination of trade barriers and more lose from its creation. It means that EU will have stronger positions during negotiations.*

Key words: *Brexit, European Union (EU), the Great Britain, free trade agreements, goods and services trade, direct foreign investments.*

United Kingdom voted on the 23rd of June of 2016 to withdraw from the European Union (EU) at the national referendum. 52 percent of the population supported this way of building their own future. The UK government officially informed the EU on the 29th of March of its intention to withdraw, thus initiating Article 50 of the EU agreement, which states that Britain will cease to be a member within two years. Thus, the date of Brexit becomes clear, but the nature of economic relations between Britain and the rest of European countries (hereafter referred to as the EU-27) remains uncertain.

The logic of the deployment of economic processes in such situations suggests that Brexit will have economic consequences for both parties, as the trade in goods and services between Britain and the EU-27 will no longer be as unproblematic as it has hitherto. The size of these economic losses is uncertain, but they are likely to be significant, since the trade passing through the Channel is currently very significant: 306 billion euros in exports of EU-27 goods to Great Britain, against 184 billion dollars in imports . From the point of view of the percentage of GDP, the EU-27 exports to the UK amounted to 2.5% of GDP, while Britain's exports to the EU-27 amounted to 7.5% of its GDP. For comparison, the transatlantic trade in goods is only 20% greater than trade through the channel [2, p. 31]. In terms of services, the amount is also substantial: 94 billion euros is export from the EU-27 to the UK, against 122 billion dollars in imports, thus, in this case, the United Kingdom is in surplus (although the statistics here are not so reliable).

Analysis of recent researchs and publications. Investigating Brexit's implications for the EU-27 economies and the United Kingdom, especially as to who has negotiating positions, one should turn to the works of R. Aikel and G. Felbermayr [1], E. Berrell, G. Mellado, B Van Dorsler et al. [7], Bush and Y. Mattes [3], F. Brews [4], M. Emerson, J. Pelcums, and others. [2], M. Loless and E. Morgenroth [6], H. Roy-Romagoz [8].

Formulating the purpose and objectives of the article. The purpose of the article is to analyze and assess the economic consequences of the UK exit from the European Union. This goal is realized in the following tasks: first, an overview of the general context of the economic effect of Brexit, and secondly, the analysis of the basic facts in the field of trade and investment; and, thirdly, the consideration of quantitative estimates of the economic effects of Brexit in combination with modeling techniques.

Presenting main material. While continuing to address the issue that was updated in the introduction, it should be noted that the volume of foreign direct investment (hereinafter - FDI) reaches serious amounts on both sides. The share of EU FDI in Great Britain is estimated at 985 billion euros or 8.3% of GDP, while the share of the UK to the EU-27 is generally somewhat lower by the value of 683 billion euros, but it is much larger relative to GDP (26.6%) However, there are signs that a significant proportion, perhaps more than half of these FDIs, are financial transactions aimed at optimizing the tax liabilities of transnational corporations.

The exit from the EU will affect not only trade, but also the legal status of a large number of EU-27 citizens living in the UK (at the end of 2016 - 3.35 million). The number of UK citizens residing in the EU-27 is much lower: 1.217 million, of which 400 thousand are retired, the rest - workers and their families, students.

Another economic effect of Brexit is that Britain will no longer make contributions to the EU budget of $ 9 billion. This may be offset to a certain extent by the permanent contribution of the United Kingdom if agreements are reached on ensuring a high level of market access or tariff revenues, provided that these relations are based only on the basis of membership in the World Trade Organization (WTO). The focus will be on trade relations and the distribution of expected losses from the exit from the EU internal market, which in turn will affect the negotiating positions of both parties.

Today there are two alternative extreme scenarios: first, Britain will join the European Economic Area (EEA) as a non-member state, as in the case of Norway, and, secondly, will not have preferential trade relations with the EU , which will indicate that the channel trade will be carried out only under the general rules of the WTO.

Between these alternatives, there are many opportunities for concluding free-trade agreements of various formats. However, T. May in his speech of 17 January 2017 significantly narrowed the focus by endorsing the "Comprehensive Free Trade Agreement" (CFTA). It is clear that if during the negotiations no agreement is reached after the application of Article 50 (2 years), then the default scenario with the WTO begins to operate. This means that the most plausible range of possible outcomes is outlined from the most optimistic, when it comes to CFTA, to the most pessimistic case with the WTO.

Regarding short-term economic implications, it should be emphasized that much work has been done to quantitatively model different Brexit scenarios, both from official institutions (the Treasury of Great Britain, the Organization for Economic Cooperation and Development, OECD) and independent economists. The performed work gave the cluster relatively constant results. Especially as regards the economic losses of the parties that are disproportionate in monetary terms in the ratio of 1 to 2 or 3 for the UK and EU-27, respectively. From the point of view of the percentage of GDP, the losses for the EU-27 will be about 10-15 times lower, taking into account the ratio of 1: 5 in GDP of Great Britain compared to the EU-27. For the European Union, losses are insignificant and amount to an average of 0.08% - 0.44% of GDP, according to optimistic and pessimistic scenarios, respectively. These amounts are modeled as summary data as of 2030, so the average annual loss amounts to 0.008-0.04% of GDP.

For the UK, average losses make up 1.31% and 4.21% of GDP, respectively, in optimistic and pessimistic scenarios, or 0.13% to 0.41% of GDP per year. Different models indicate that UK losses are higher than the average according to two models (OECD and UK Treasury), which recorded a negative impact on FDI, which to some extent redirected from the UK to the EU-27. According to their pessimistic forecasts, losses reach 7.5% of GDP, or 0.75% annually, which is significant in the macroeconomic slice. However, this FDI effect is not presented in the models designed for the EU-27, so it will need to correct the results as mentioned above.

Let's consider trade in goods between the EU-27 and Great Britain, which, in the case of the European Union, is a significant surplus. EU-27 exports to the UK amounted to 306 billion euros, while imports were only slightly more than half - 184 billion euros in 2015.

For comparison, we note that trade between the EU and the US has virtually the same order. In 2015, the EU exported 371 billion euros worth of goods to the US and imported about 250 billion euros. Both indicators are approximately 20% higher than the corresponding values for trade through the Channel. From this perspective, Brexit's influence may be just as important as the Transatlantic Trade and Investment Partnership (TTIP). Regarding the share of GDP, the EU-27 exports to the UK is 2.5%, while the UK exports to the EU-27 is 7.1%. From a position of import, the proportions are even wider, reflecting the Great Britain's trade deficit with the EU: UK imports from the EU is 11.9% of GDP, while EU-27 imports from Britain are only 1.5% of their GDP.

As for the sectoral distribution of trade flows, it should be noted that this distribution is very diversified. Among the leading export sectors from the EU-27 to the UK, the following can be distinguished: machinery and transport equipment (127 billion euros), of which road vehicles (59 billion euros), as well as other industrial goods (70 billion euros) , chemicals (51 billion euros), food (32 billion euros) and mineral fuel 11-9 billion euros). In the UK, there is a deficit in most sectors, especially in the automotive industry. The surplus mainly concerns mineral fuel and aviation [1, p. 37].

The volumes are also very significant: 94 billion euros of exports from the EU-27 to the UK and 122 million euros of imports. When the import and export of services are

combined, their total amount of EUR 306 billion is not much less than EUR 394 billion for the entire product turnover. The essential difference is that the UK has a significant surplus from the EU-27 at the expense of services (€ 28 billion), compared with a huge shortage of goods (€ 128 billion).

Services are a field where transatlantic trade is much more important than trade between the UK and the EU-27. In 2015, exports of EU services amounted to about 190 billion euros, and imports - almost 200 billion euros. Thus, the transatlantic turnover of services trade was about 2 times higher than through the Channel.

However, if we talk about the "mirror statistics" of trade between the EU-27 and Great Britain, then it really has big differences [2, p. 43]. According to the UK, the deficit of Belgian services to Britain is 1.8 billion euros, while according to Belgian sources - only 0.1 billion euros. The largest divergence concerned Ireland, where according to the UK, it has a large surplus of 6.1 billion euros, while according to Ireland, it has an even greater surplus of 11.5 billion euros. Unfortunately, official statistics, whether from Eurostat or national agencies, can not provide objective data, because the diverse flows of services are very difficult to record.

Industry data also exists in combination with service trade in the UK with the EU-27, but not a complete matrix across countries and sectors. With regard to the balance of trade in services, the main points are the UK surplus in terms of financial services (20 billion euros), deficit due to travel and transport (mainly tourism - 11 billion euros).

What is the situation with foreign direct investment? Worldwide FDI stocks are huge in both directions, with the EU-27 having an inflow of foreign investment of 7.033 billion euros, receiving 5.692 billion euros of domestic investment. In the United Kingdom there is a surplus of $ 1.386 billion. euro investment and roughly the same amount of domestic investment - 1, 431 billion euros.

Investments in the UK to the EU-27 at 683 billion euros are reasonably proportional to the global investment of 5692 billion euros to the EU-27. However, data from the EU-27 investment statistics in the UK looks unlikely: 985 billion euros of investment from the EU-27 account for a very large share (75%) of global investment in the United Kingdom, amounting to 1,314 billion euros. The source of this unlikelihood is obviously a huge amount of Dutch investment in the UK of 454 billion euros, due to the number of nominal investments in the Netherlands, which are in fact only interim investments in transit from other sources.

That is why it is necessary to pay attention to statistics on stocks and flows of FDI, which should be analyzed with caution, as they contain many internal contradictions.

A few words about attempts to simulate Brexit's influence. Among the official sources is the OECD, the British Treasury, the Bureau of Central Planning in the Netherlands. And three independent academic institutions and think tanks - London School of Economics, Open Europe in London and IFO in Munich. In a broad sense, this research group is a "modern state" modeling trade policy using both new and traditional methods. Although these models are not capable of reflecting all possible economic effects of Brexit, they are close to the consensus forecast for the size of the impact. Given that Britain's trade

with the EU-27 far exceeds its share of GDP than in the EU-27, it is hardly surprising that the economic implications for it are much more serious.

As a result of the simulation, we have several scenarios, among which are "optimistic", which assumes that Britain will resort to a regime close to the situation with Norway. The pessimistic scenario determines that the trade relations between Britain and the EU-27 are reduced to the terms of their membership in the WTO, and tariffs are set at the rates of the most favorable countries, which can be called "hard Brexit". Some models also report the impact on trade flows, estimate the decline of the EU-27 exports to the UK by 30%, from the last to the EU-27 - 22% [6, p. 17].

Taking into account the difference in the size of trade flows, this results in a reduction of only 2% of the total (worldwide) export of EU-27. The impact of Brexit on individual Member States such as Ireland and Belgium, of course, is estimated to be larger as both countries face a 4% and 3.1% reduction in overall exports. For Great Britain, Brexit's impact on total exports is much higher - 9.8%. H. Roy-Romagoz produces similar results, predicting that the fall of the EU-27 exports to Great Britain would amount to 3% in the WTO scenario and 1.7% in the Free Trade Area scenario (FTA). In the United Kingdom, instead, the total exports will decrease by 21.8% and 12.5% against the background of WTO and FTA scenarios [8, p. 11].

Another way to measure the EU-27 losses through Brexit is to use research conducted during the preparation of the TTIP that will be relevant to Brexit, namely to eliminate the WTO m.f.n. tariffs and reduction of non-tariff barriers. Comparison Brexit and TTIP is more interesting than it seems at first glance. The US economy is, of course, several times larger than in the UK, but the transatlantic trade has a similar pattern of cross-border trade. The transatlantic trade in goods in 2015 was only 20% higher than trade between the UK and the EU-27. So, you can talk about a certain level of comparison, but do not forget that the trade in services in the Atlantic doubled by its indicators exceeds the channel trade.

Investigating scenarios for TTIP gives grounds to conclude that eliminating only tariffs will not bring significant benefits. Taking into account the low average tariffs (less than 3%), the key to the disclosure of this potential is the elimination of non-tariff barriers. They consist mainly of customs procedures and regulatory restrictions at the border. TTIP will increase EU GDP by about 0.1% to 0.5%, due to the abolition of tariffs between the EU and the US and 0.4% of GDP due to a decrease (generally, twice less) of non-tariff barriers.

Another way to rate Brexit is to look at it through the prism of the mirror-goodness of EU membership. A considerable number of researchers demonstrate in their work significant profits from EU membership. If you agree with this position, then we can conclude that the models presented and described here may reduce the cost of Brexit. This is the study of the multiplicity of the effects of the common market, in which a mixed model of CGE / macroeconometry (Worldscan) was used to gain the benefits of EU membership of 10% of GDP and more [9, p. 55]. Another attempt was made by F. Campos, F. Corihelli and L. Moretti on the basis of a synthetic counterfeit for EU

countries that joined in 1973 or later: they receive an average gain of 12% of GDP (with the exception of Greece), more for the UK [5, p. 17].

Another variant of the counterfeit approach was proposed by F. Bruce, who compared Switzerland and Austria, taking into account their choice of market integration into Europe with obvious benefits for Austria [4].

The associated assessment method for Brexit is to consider the re-balances expected from existing or planned EU free trade agreements with other countries of the world. Exit costs can be derived from so-called impact assessments of the EU-Free Trade Agreements with Canada, India, Japan, Mexico and South Korea. The expected benefits of these agreements are related to different degrees of trade liberalization and different levels of development. However, the general trend is clear. In all these cases, the EU will receive only a disproportionately small share of the overall benefit - not only because it is economically bigger than its partners, but also given the greater market power of its enterprises. This means that the exit from these free trade agreements will lead to higher costs for the emerging countries.

Conclusions. Thus, having considered the problem of the Brexit economic effect for the EU-27 and the United Kingdom, the following conclusions can be drawn. Trade between the EU-27 and Great Britain has a similar scale with the transatlantic trade between the EU and the United States. Investment ties appear to be stronger than in the United States, but financial transactions, whose main goal may be the optimization of tax policy, is very much affected by the situation. For the EU, therefore, Brexit can have a comparative value (with the opposite sign), as in the case of TTIP. All available studies concur that Brexit will cause significant trade disruptions and lead to economic losses on both sides.

At the same time, the EU-27 will suffer only a disproportionately small share of total losses. This picture is clear from the standpoint of exploring the potential benefits of free trade agreements that the EU has or is negotiating with other countries. The relationship between economic potential and the possibility of negotiation, gives grounds to speak about at least two consequences. First, a few summits at the highest level show that the EU has a much stronger position in the negotiation process with regard to future economic agreements between it and the United Kingdom. As a result of the disruption of the agreements, it will suffer greatly, first and foremost, it. And also, in the UK, there may be difficulties in negotiating favorable trade agreements with large countries such as the US, Japan or China. The divorce process will further intensify the increase of Brexit's economic losses for the country due to their negative impact on investment decisions.

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MODELING OF INNOVATION PROCESSES IN HOTEL BUSINESS ENTITIES

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Annotation. *The article substantiates the necessity of modeling innovative projects of hotel business entities, which allow to adapt the investigated enterprises to dynamic changes in the environment of their functioning and increase their competitiveness.*

Key words: *hotel business entities, innovation, innovative project, innovative potential of the enterprise; innovative activity of the enterprise.*

Relevance of research. The area of innovation is comprehensive, it not only covers the practical use of scientific and technical developments and inventions, but also includes changes in the product, processes, marketing, organization. Innovation acts as a factor of change, as a result of activity, embodied in a new or improved product, technological processes, new services and new approaches to satisfying social needs [1]. Integration of Ukraine into the European and world economic space requires the provision of a new steps to the development of tourism, which will ensure the development of the subjects of the hotel business. Innovative activity in hotels occupy a significant place in the functioning of modern hotel business entities and provide support for the level of competitiveness.

In the conditions of constantly growing competition of subjects of hotel business in innovative processes it is expedient to build scenarios of future events, to simulate abstract logical constructions of innovative connections, thus providing steel production of the enterprise management process. Diagnosis of innovative capabilities and model construction is an important stage in strategic management of innovative processes.

In this regard, consideration of the issues of modeling innovative projects of the hotel business entities acquires scientific and practical importance.

Analysis of research and publications. The complexity of solving the problems of modeling innovation development of enterprises is connected with the ambiguity of theoretical approaches to the research of the innovation process. The analysis of scientific sources allows us to conclude that there is no common opinion about concept of the economic categories used in this theory. The concept of "innovation" is wider. The basic concepts of innovation activity are legally enshrined in the Law of Ukraine "On Innovation Activity". At the legislative level, it is determined that innovations are newly created (applied) and (or) advanced technologies, products or services, organizational and technical decisions of an industrial, administrative, commercial or other nature that significantly improve the structure and quality of production and / or social sphere [2, 3].

In foreign and domestic literature, a number of models of the innovation process are considered, such as: the model of innovative processes of enterprise management, the model of innovative technological processes, the model of innovative processes of providing services, etc.

Solving problems about innovative development of hotel business entities were at one time engaged by such scholars as: E.V. Barabash, M.G. Boyko, A.O. GlEbova, S.M. Zhuravlova, A.I. Kravchenko, O.E. Pauk, N.O. Kovalenko, A.G. Chernomazyuk and others [4-11]. Yet, the issue of modeling innovative projects of hotel business entities can be considered as little investigated.

Main study material. The hotel business entities of Ukraine in modern conditions operate in an environment of multidimensional competition, in which the efficient management depends on the timely introduction of innovations. The growth of competition in the hotel business requires the using of innovative methods of personnel management, material resources, information, implementation of infrastructure and technological and other innovations in the activity of hotel enterprises. The world has accumulated a large experience of successful business on the basis of the systematic introduction of innovations. It can not be rejected, it must be studied, carefully taken into development of the hotel business entities, considering national specifics. Innovations in the hotel business are economically feasible and effective, if they bring the hotel additional revenues, provide competitive advantages on the market, increase market share, reduce costs, improve the service process, increase the efficiency of work of separate units and hotel in general. It should be noted that the practical implementation of the strategy of innovative development requires the attraction of additional financial resources. In view of this, investments into the innovative activity of the hotel business entities should also be considered as one of the main factors in increasing the innovation activity of enterprises (IAE)

Innovative trends in the development of hotel business entities are the creation of new types of services, marketing activities, effective management, which are directly based on increasing investment and developing strategic plans.

The system of factors enhancing the innovative activity of Ukrainian business entities involves need to:

• increase of the innovative potential of the enterprise, the evaluation of which is proposed to be carried out in accordance with the methodology and using the system of indicators;

• consideration of environmental factors, the impact assessment of which involves determining the state of the external climate with the selection of adverse, neutral and favorable conditions;

• investing in innovative activities of the enterprise, which, depending on the object of investment, can be directed to increase the level of innovation potential by strengthening its resource or (and) organizational and managerial component; to achieve compliance of the operating innovation strategy of the enterprise with the optimal innovative development strategy and, thus, indirectly increase the level of innovation

activity of the enterprise as a whole;

• development of the strategy of innovative development of the enterprise, the successful selection and implementation of which is aimed at the use of opportunities and minimization of threats from the external environment (Figure 1). The system of factors innovation activity of subjects of hospitality.

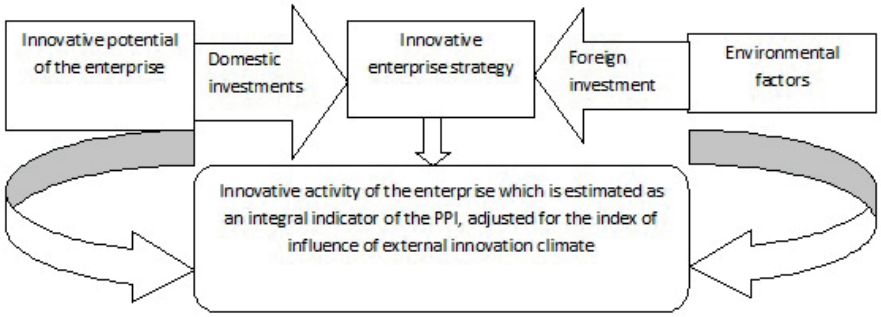

Fig. 1. The system of factors innovation activity of subjects of hospitality

In today's conditions, the role of hotel business entities in shaping and raising the level of innovative development of the state is growing. Further research needs to be developed to optimize investment in the innovative activity of Ukrainian business entities.

Attracting investments in IAE is a prerequisite for achieving the strategic goals of the enterprise. The definition of innovation-active enterprises is proposed as "enterprises developing and introducing new or improved products, technological processes, implementation of innovative products and other types of innovative activity ". The author of the research emphasizes that innovation activity of enterprises is determined by the appropriate strategy of its innovation development, the degree of availability of relevant resources in the innovation area, the quality of innovation management in enterprises, and the effectiveness of innovation activity depends on the effectiveness of state innovation policy and the development of innovation infrastructure of the country [13, p.60] In view of this, management of hotel business entities requires information on the directions and timing of investments, their economic efficiency.

Management of IAE can be defined as the process of creation, introduction and use in business activities of hotel business entities of innovative objects in the form of fixed and circulating assets, innovative materials, objects of intellectual property with new properties, as well as innovative management technologies.

The choice of investment directions is carried out in the conditions of limited financial

resources at its disposal. This stipulates the need to choose the best use of available resources in the management of IAE, which becomes possible through the application of a mathematical model for optimizing investment. This will allow choosing from the existing options of investment and innovation projects in accordance with the accepted criteria and certain restrictions of activity of the hotel business entities.

Optimization of the investment process in the IAE involves choosing such investment areas that would minimize specific costs while ensuring the highest possible level of IAE.

The purpose of the development and application of the economic-mathematical model of investment optimization is determined by the innovative development of the hotel business entities through the optimal allocation of the company's funds (borrowed and own) in financing innovative measures of different orientation and nature.

When constructing this economic-mathematical model it is necessary to carry out a number of tasks, in particular the following:

1) determination of the level of "opportunities for improvement" for each complex indicator;

2) formation of the target function of the model in accordance with the purpose of its development and application;

3) the definition of the main constraints that must be taken into account when investing in the innovative development of enterprises and their formalization;

4) monitoring the process of innovation development of the enterprise in order to correct the model (if necessary) and, as a result, ensure its dynamism.

In order to identify the priority directions of improvement of innovation activity, it is necessary to take into account both the levels of individual indicators of innovation potential and their importance.

The fulfillment of the tasks set for the formulation of the investment optimization model for the development of IAE was reflected in the following:

1) according to the results of the evaluation of the innovative potential of hotel industry enterprises, the indicators, which form the advantages of these enterprises in the context of their innovation development, as well as indicators, the level of which needs to be improved, are determined. In addition, the analysis of the results of the assessment of the innovative potential of the enterprise (IPE.) made it possible to identify the indicators that have the most significant impact on the level of innovation potential of the enterprises of the hotel industry.

According to this approach, the indicators of the innovative potential of the subject of the hotel business, for which the level of "opportunities for improvement", is the most necessary for the primary adjustment, is necessary.

2) the model of optimization of investments in the innovative development of enterprises is based on a formula that was modified to formulate the target function of the model (Fig. 2). We propose the target function of investment in IPE based on the results of IPE evaluation. Since the maximum (best) value of the group and complex indicators of the IPG (index of productivity growth) is "1", the difference between "1" and the

specific value of the indicator can be considered as a magnitude that characterizes the potential possibility of improving or increasing the level of a separate component of the IPG. At the same time, this value has a direct relationship with the efficiency of investments in raising the level of individual components of IPE.

We propose a further distribution of investments in the development of innovation potential in separate directions in proportion to the values of the "improvement opportunity" indicators.

3) the formation of an investment optimization model involves identifying the main constraints. In particular, when constructing an economics-mathematical model for optimizing investment in the innovative activity of the subject of the hotel business, the following restrictions should be taken into account:

• personnel - in developing the project and planning of innovative development measures it is necessary to take into account the possibilities of the enterprise in the context of its provision by the employees of a certain educational qualification level;

• financial - investing in innovative development requires significant financial resources. In view of this, it is necessary to assess the economic efficiency of the innovation project (measures), financial condition of the enterprise and alternative possibilities of attraction of borrowed funds;

• limited time; - when investing in the innovative development of hotel business entities it is necessary to focus on the minimum terms of implementation of all innovations;

• saving of natural resources and energy - innovations in the subjects of the hotel business must meet the criterion of environmental performance and resource saving, that is, as a result of their implementation, the negative impact on the environment and the volume of all types of resources should be reduced. The condition of limited financial resources may be represented by inequality:

$$I_s + I_{np} + I_{no} \leq ФІРП$$

where FIDS is a fund of innovative development of the subject of the hotel business.

4) monitoring the process of innovation development of the enterprise combines all elements of the model of optimization, taking into account the possibility of its adjustment. The purpose of the monitoring system is to ensure the dynamism of the process of optimizing investment in the innovation activity of the enterprise (Figure 2).

One of the main constraints in constructing an investment optimization model in the innovative activity of business entities is the size of the innovative development fund (FIDS), the formation of which is recommended by one of the proposed methods:

1) the residual method involves calculating the value of FIDS as a share of net profit, which may be aimed at the innovative development of the enterprise. It is advisable to use this method for hotel business entities whose financial situation is rather complicated, since under such conditions an enterprise can direct most of its available

financial resources to its own financial stability and solvency;

2) budget method, the content of which consists in the formation of the fund of innovative development of the enterprise through the use of own and attracted financial resources. Given the need to attract borrowed funds, this method is recommended for hotel business entities, whose financial situation is quite stable;

3) target method - involves determining the value of the fund for innovative development of the enterprise, in accordance with the ideal value of the objective function of the optimization model. The use of this method is recommended only if the results of the activity of the hotel business entity for several consecutive years are characterized by high profitability of activity, financial stability and solvency.

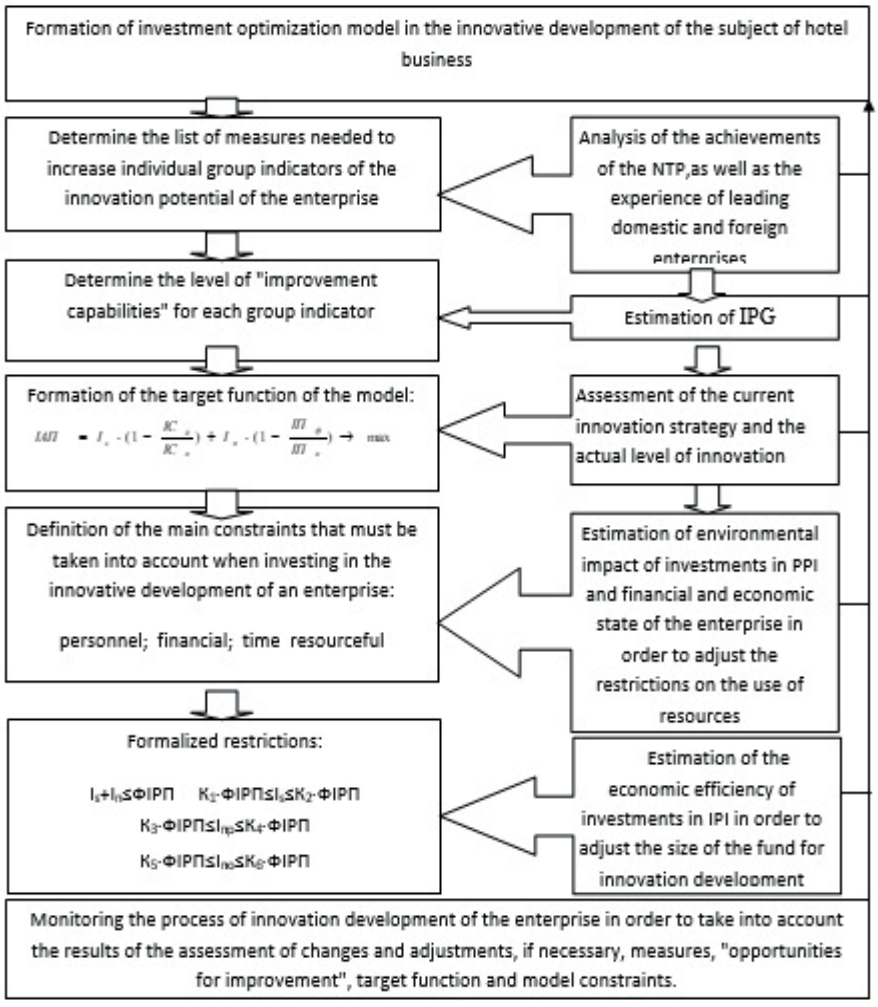

Fig. 2. Sequence of optimization of investment volume in innovative development of hotel business subjects [12].

It should be noted that it is the magnitude of the fund for innovative development of hotel business subjects that is the main limitation of the optimization model, based on which, with the use of additional information, a decision is taken on the choice of innovative projects. After determining the value of the FIDS, it is necessary to determine the proportions of the distribution of available cash in the direction of investment. The structure of investing in directions (restrictions) by the author is proposed to be determined by the results of expert evaluation.

Table 1

Expert assessment of the importance of investing in the strategy of innovation development and enhancement of the innovative potential of the subject of the hotel business

Areas of Investment		Experts											
		1	2	3	4	5	6	7	8	9	10	11	12
Capital expenditures on innovation strategy		2	3	3	1	3	3	2	2	3	2	3	3
Capital expenditures on increasing the level of PPI	Resource component	1	2	2	2	2	2	1	1	1	1	2	2
	organizational management component	3	1	1	3	1	1	3	3	2	3	1	1

Table 2

Definition of factors of investment in innovative activity hotel business on an expert assessment

Name of characteristics	Legend	Investment directions		
		Capital expenditures on innovation strategy	Capital expenditures on increasing the level of IPG	
			resource component	organizational management component
Sum of ranks	Si	30	19	23
Average amount of ranks	$\overline{S}$	24		
The square of the deviation	$(S_i - \overline{S})^2$	16	25	1
Dispersion	σ^2	14		
Average square deviation	σ	3,74		
Deviation with probability of 95%	$1{,}96 \cdot \sigma$	7,33		
Interval estimate of the sum of ranks	S_i*	22,67 – 37,33	11,67 – 26,33	15,67 – 30,33
Interval estimation of investment factors	K_i	0,07 – 0,38	0,27 – 0,68	0,16 – 0,56

The calculation of investment coefficients in IPE using methods [12] (see tables 1 and 2) allowed to formulate restrictions on the size of investment in IPE in certain areas.

The structural-logical scheme of the relationship of investment in the innovative development of the enterprise and the system of indicators of innovation activity of the enterprise is shown in Figure 3.

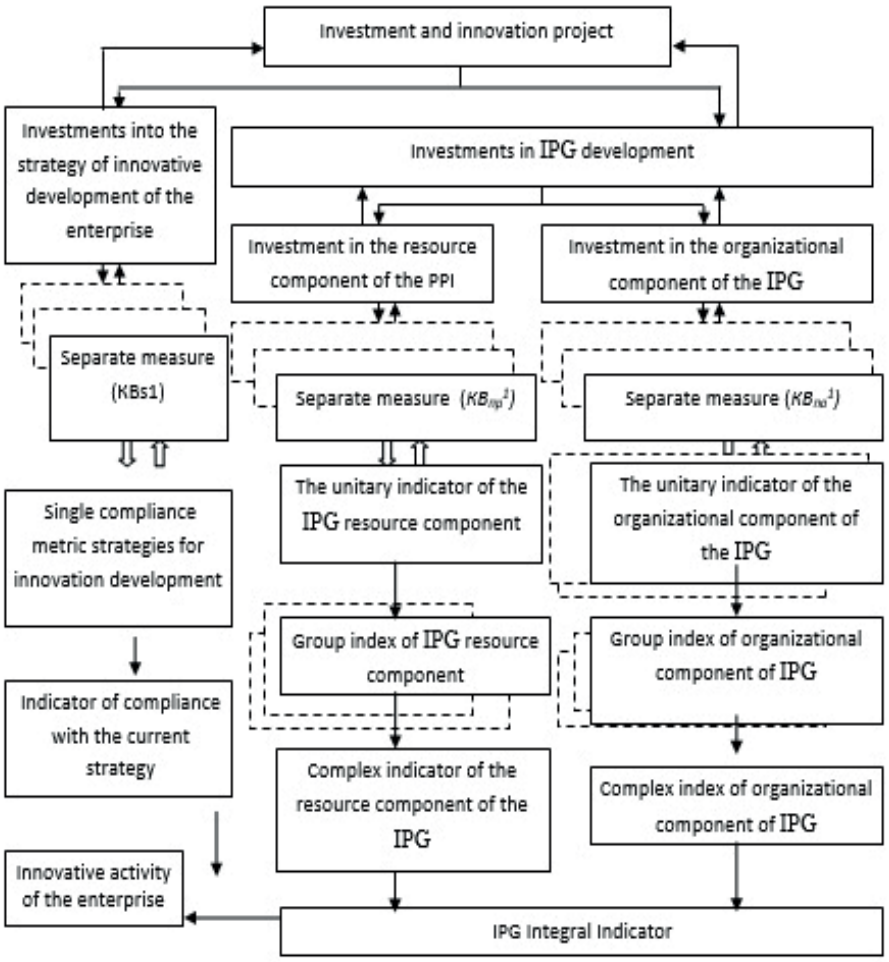

Fig. 3. Structural-logical scheme of the relationship of investment and the system of indicators of innovation activity of the subjects of the hotel business [12, p.14]

The detailing of the investment-innovation project to the level of an individual measure gives an opportunity to follow the nature and extent of the impact of each of them on the corresponding unit indicators of the IPG or the strategy of innovation development. The importance of the relevant individual, group and complex indicators makes it possible to assess the degree of influence of a specific measure (and the investment-innovation

project as a whole) on the level of innovation activity of the enterprise, as well as provide the possibility of forecasting the implications of the introduction of certain investment and innovation projects.

At the same time, in addition to the economic efficiency of investments in IAP, an environmental benefit is an important criterion for their expediency, the manifestation of which is the reduction of energy and resource costs through their more efficient use, as well as the transition to more environmentally friendly technologies.

Conclusions. In general, the application of the proposed model of investment optimization to increase the innovative activity of the subjects of hotel business will allow to justifiably choose the best investment directions and optimal amounts of investment. The basis of the target function is a mathematical description of economic objectives, taking into account factors and constraints, in particular, the available financial resources. The main factors and constraints that determine the effect of investments in IAP are formalized and presented as parameters of the optimization function.

The decision to choose the directions and sizes of investments in the IAP is accompanied by an assessment of the effectiveness of the implemented innovative projects and activities. Unsatisfactory results of evaluating the effectiveness of investments, changes in the external and internal environment of the hotel business determines the need to adjust the investment optimization model in the IAP, which ensures the dynamism of this model and, accordingly, continuous adaptation of investment programs in IAP to internal factors and factors of a changing environment. Optimization of the investment process in the IAP promotes the implementation of the company's innovation strategy by achieving its strategic goals, which ultimately leads to an increase in the financial efficiency of the activities of the hotel business entities.

At the same time, in today's economic conditions, when investing in IAP, it is necessary to take into account the limited resources, in particular, financial, which are at the disposal of the enterprise. The proposed economic-mathematical model of optimization of investment will promote better use of resources in the process of managing IAP.

Increasing attention to the problems of the formation, development and use of innovative potential is due to the fact that it is innovative development in modern conditions that is the main factor in achieving the strategic goals of the subjects of hotel business in Ukraine.

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THE QUALITY OF TRAINING AND DEVELOPMENT OF ENTERPRISE PERSONNEL AS THE ATTRIBUTE OF EFFECTIVE HUMAN RESOURCE MANAGEMENT

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Annotation. *The article is devoted to the research of the theoretical and practical issues of the quality of training and development of enterprise personnel as the attribute of effective human resource management. The necessity of using "training and development" concept to mark the transformation of enterprises personnel is justified. The role of training and development for enterprise's effectiveness was represented from three different positions. The concept of training and development quality was disclosed. The five parameters of training and development quality were proposed. The approach of providing the training and development quality was formed as a combination of competence and process approaches. Competence management was represented within the framework of Deming cycle.*

Key words: *personnel, training and development, quality of training and development, competencies, competency approach, quality management, process approach, investments in training and development.*

In terms of contemporary knowledge economy, the human factor is becoming a critical one in the development of world society. Humanization, processes of formation, development and gaining of human capital remain the key aspects of growth at all economy levels. In turn, inevitable and permanent changes in the business environment caused by the transformation in production methods, techniques and technologies, lead to the need for appropriate qualitative transformation of human capital and the development of labor potential of modern enterprises. Therefore, it can be argued that the successful functioning of the economy at all levels depends on the health, knowledge, skills, abilities and motives of the staff, and the growth of the economy at all levels - on the quality and speed of their build-up.

The modern concept of "personnel training and development" was formed under the influence of various economic, philosophical, psychological, social, cultural and educational trends. In order to provide a modern interpretation of the concept of "training and development of personnel" we turn to the analysis of basic philosophical categories "development" and "learning (training)". Thus, the philosophical essence of the notion of development lies in the implementation of irreversible, directed, regular changes in systems in which can act both – material and ideal objects, including the personality of a person. These changes can be manifested in such forms as: increasing complexity of

the system; improvement of the structure of the system; increase of internal resources of the system; qualitative changes that lead to an increase in the system's ability to adapt to external requirements; the emergence of new features, qualities, functions and capabilities, etc. The category of "learning" is primarily a didactic category and is interpreted as an organized, bilateral activity aimed at maximizing learning, maximizing awareness of learning material or the subsequent application of the knowledge, skills and experience acquired in practice.

In general, in Ukrainian economic science, various concepts are used to refer to the transformation of qualitative characteristics of human resources - "professional training", "personnel development", "professional development of personnel", "professional training of personnel" and others. In foreign business literature, the most common titles used to refer to the qualitative transformation of human resources in an organization is "learning and development" and "training and development" that corresponds to generally accepted acronyms of L & D and T & D.

Let us consider the four options of the interrelation of “personnel training” and “personnel development” concepts. Option 1 represents a widespread view is that the concept of "training" is seen as part of "development", since any training involves the development of knowledge, skills and abilities of staff. From point of view of option 2, "development" is a component of "training", because any development is learning, that is, it involves processes of knowledge acquisition, skills development etc. The concepts of "staff training" and "staff development" are considered non-intersecting within the Option 3: proponents of this approach include the acquisition of hard skills exclusively to personnel learning, and the formation of soft skills - exclusively to the personnel development. Finally, there is an option 4 where the concepts of "personnel training" and "personnel development" have a certain cross-sectional area, while retaining certain special features.

The role of T&D in human resource management of the enterprise is hard to be exaggerated. Thus, M. Magura [1] thoroughly explores the basic preconditions for increasing the role of T&D of personnel in enhancing the competitiveness of enterprises and organizational development. These prerequisites include the following needs of the enterprise in the modern business environment: achievement of the strategic goals of the enterprise, increase of the value of human resources, carrying out of constant organizational changes in response to changes in the business environment. In our opinion, these three circumstances are indisputable and require more detailed consideration.

1. Training and development of personnel is the most important means of achieving the strategic goals of the organization: effective work of the enterprise in the conditions of constantly growing competition is impossible without increasing the efficiency of work at all levels of the organization. The main obstacles preventing the achievement of higher work results are not only insufficient level of professional training of personnel, but also old approaches to work at different levels of the organization. These barriers can only be addressed through the development and implementation of a new policy for training and staff development, including a variety of training programs for all categories

of employees.

2. Training and development of personnel is the most important means to increase the value of human resources of the organization: due to the conditions of rapid changes in the market situation, talents, fresh ideas and creativity are needed to provide a high level of competitiveness of the enterprise as a whole. Organizations that are willing to invest money in training and developing of their employees can count on the fact that employees who have improved their level of training can solve more difficult tasks more easily and quickly; they will more often search and find the best answers to these questions, better to cope with the difficulties in work. Such employees will potentially be more loyal to the company, ready to work on full power. As the experience of the most successful domestic and foreign companies shows, investing in personnel, creating conditions for the growth of employees and increasing their professional potential give 2-3 times higher returns than funds aimed at solving purely manufacturing problems [1].

3. We should not forget about the fact that absence/lack of training and development of personnel makes organizational changes complicated or impossible. The presence of staff resistance to the process of organizational change shows that without conducting appropriate measures it is difficult to rely on loyalty, understanding and support of changes in order to further develop the enterprise.

The growing role of the processes of personnel training and development in the successful operation of the enterprise, the availability of benefits and risks, the need to attract resources and existing restrictions allow us to treat training and development of personnel as a business process. On the basis of the analysis of available information on current trends in the field of education and development, we propose to consider the concept of personnel training and development as an organized continuous business process that involves the formation, transformation or development of qualitative characteristics of personnel in order to successfully operate the enterprise in the current and/or future periods. But organizing T&D activities do not guarantee its impact on enterprise's success. Thus, all T&D organizational activities and procedures should ensure the quality of all T&D processes aiming on minimizing risks of investments in T&D.

According to the core essence of the quality, the quality of training and development (T&D quality) of the enterprise personnel is the correspondence of the qualitative characteristics of the personnel transformed as a result of T&D activities to the current and future needs of the enterprise; it is reflected in positive changes in labor behavior and work results. We propose to highlight the main parameters of quality, which, from our point of view, most fully reflect the essence and objectives of T&D:

1. Sensitivity: reflection of the results of training and development of personnel in the growth of socio-economic indicators of the enterprise.

2. Interconnection: the results of learning and development should be reflected in the current or future work of the personnel of the enterprise.

3. Reliability: The training and development activities of staff should help maximize knowledge acquisition, skills development and skills development.

4. Longevity: the results of training and development of staff should be fixed as long as possible in the labor behavior of the personnel of the enterprise.

5. Security: measures of training and development of personnel, as well as their motivational support should take place in adequate physical and socio-psychological conditions for staff - with the preservation of the optimal physical and mental load on the staff during the training, maintaining a favorable socio-psychological climate and relationships in the team.

The T&D quality requires the effective approaches to its providing. From the point of view of science and practice of human resource management, the most widespread and effective today becomes the competence approach; and in terms of science and practice of quality management it is a process approach. Let us consider each of them more detailed.

Competency approach involves consideration of most HR processes based on the concepts of "competence" and "competence". For the first time, the study of competence to predict the level of performance of work was proposed by the American psychologist D. McClelland, who in 1973 published an article "Measurement of competence instead of measuring intelligence" [2]. According to L. Spencer competencies are a set of powers, rights and responsibilities of an official, which he or she must use to perform one's functional tasks [3]. The most modern interpretation of competences is given by O. Bondarenko who defines them as individual characteristics, knowledge, skills, model of employee behavior, its values and motivators [4].

O. Bardadim defines a competent approach in HR management as a "technological tool for answering questions, as in ever-changing situations with a shortage of hard-working resources, an increasing and greater dependence of the organization on the qualifications of employees, not just maintaining the existing level of efficiency of the company, but also moving forward, to develop, to succeed in competition, to be better "[5].

Quite exhaustive, from our point of view, is the division of competences into groups and subgroups conducted by O. Sardak. The author distinguishes between four groups of competencies: professional (professional knowledge, professional skills and abilities), social (corporate identity, ethics, team efficiency, social interaction, social sensitivity), business (adaptive competences, communication skills, success in problem solving, customer orientation) and personal (creativity, innovation, motivation, orientation towards achievement, independence, strategic orientation, decision-making, formation of the labor process, delegation of authority, leadership qualities) [6].

The advantage of this grouping is its versatility: the list of groups of competences can be used for different positions and serve as a benchmark for drawing competency models. But one should take into account the fact that the competency model for each individual position should contain a limited number of competencies (on average 5-12) with a detailed description of each. The process of designing competency models is labor-intensive, but with such models, processes for attracting and releasing, motivating and evaluating, training and developing personnel are greatly simplified. In particular,

the results of staff assessment according to the models of competences make it possible to accurately determine the training and development needs of the personnel of the enterprise.

M. Parkinson [7] provides a list of requirements for effective use of competency models. According to these requirements, the competence should be:

• exhaustive: the list of competences should completely cover all important functions of work activity;

• discrete: a separate competence should relate to a certain activity that can be clearly separated from other activities;

• focused: competences should be clearly defined and specific;

• available: each competence must be formulated in an accessible way so that it can be used universally while avoiding ambiguity;

• congruent: competences should strengthen organizational culture and strengthen the long-term goals of the company;

• modern: competency models should be periodically updated and reflect the current and future needs of the enterprise.

Various aspects of a competent approach are investigated and regulated in the European Union at the state / interstate level. The key competences for the community in the European framework structure are: communication in native language; communication in foreign languages; mathematical competence and basic competences in the field of science and technology; digital computing competence; ability to study; social and civic competence; initiative and entrepreneurship; Cultural Education [8].

In addition, in the European Union there is a constant monitoring of "scarce" competencies, which are aimed at training and development of European enterprises. Thus, according to the research [8], the separate, training and development of the personnel of the European Union enterprises are aimed at the formation and improvement of the following types of competencies: work with clients, teamwork (business relations with colleagues, joint work, etc.), management skills (management and staff management, personnel planning, etc.), office management skills (time management, ability to issue invoices, etc.), general skills in the field of information technology (computer use, processing of collected data, electronics on-line magazine, simple internet, etc.), professional skills in the field of information technology (special knowledge or understanding, such as: development of web pages, complex programs, etc.). Such information is critical to making changes in secondary, vocational and higher education in order to overcome the imbalances between the labor market and the market for educational services, as well as for faster adaptation of staff to professional activities. In Ukraine, the latest statistical studies in the field of vocational training date back to 2013 and concern only the number of persons who have completed professional training and advanced training.

Consequently, the widespread use of a competent approach in the training and development of personnel transforms the competence of staff into the strategic factor of enterprise development. Successful businesses create new knowledge, skills, abilities,

transfer them to the company and quickly adapt to the challenges of the environment.

To ensure the quality of training and development of the personnel of the company within the framework of a competent approach, we turn to the standards of quality management and try to adapt the provisions of quality management for the processes of training and personnel development. Thus, all modern quality management postulates and the actual quality standards are based on a process approach based on the so-called Deming cycle, or the PDCA (Plan-Do-Check-Act) cycle. The PDCA cycle allows the organization to ensure that its processes are adequately resourced and managed and that the opportunities for improvement are identified and implemented. The standard DSTU 9001:2015 states that the application of a process approach within a quality management system enables understanding and constant compliance with requirements, process consideration in terms of creation of additional values, achievement of efficient functioning of processes, improvement of processes on the basis of evaluation of data and information: [9]. Each of the steps in the PDCA cycle involves performing certain actions and procedures. Let us apply the competency approach to training and development within the framework of Deming cycle. The results are shown in Figure 1.

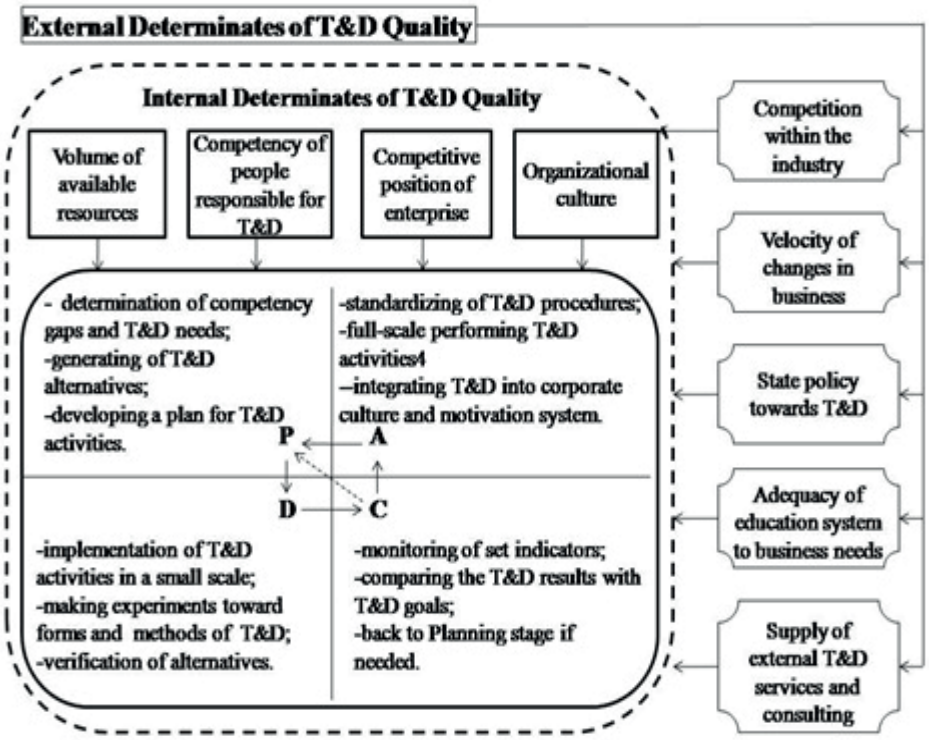

Fig.1. Competency-PDCA approach to T&D quality

Therefore, based on the features and positive characteristics of the competency

and process approaches, we propose to consider assuring the quality of training and development of the enterprise personnel as a combination of these two approaches. Competency approach reflects the qualitative characteristics of the personnel of the enterprise, and the process approach ensures the implementation of the principles of quality management. Each stage of the PDCA cycle is described in terms of overcoming the competency gap. In addition, we take into account the effect of internal and external factors, which determine the parameters of the competence gap formation and the ways to overcome it.

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EVALUATION OF THE MANAGEMENT OF SAFETY ACTIVITY BY INDUSTRIAL ENTERPRISES

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Annotation. *A scientific and methodological approach to evaluating the management of safety activities of industrial enterprises has been developed, which allows us to characterize the performance of the management subsystem (safety subjects), the security level of the managed subsystem (safety objects) and the effectiveness of making and implementing management decisions.*

Key words: *safety activity, assessment, indicator, integral indicator.*

Formulation of the problem. In Ukraine, entrepreneurial circles act as stimulants for the formation of the methodological foundations of the enterprises safety activities, which, in the face of increasing aggressiveness and difficult predictable changes in the environment, are trying to create new security systems that can preserve their business [1, p. 18]. A safety activity must be scientifically organized, because, unlike using only acquired experience, it makes a more rational use of available resources to achieve its objectives, plan and implement a set of protective measures for the appropriate adjustment not only for the security strategy, but also to the development strategy of the enterprise.

Analysis of recent research and publications. The development of issues of maintaining an adequate level of security of the enterprise is paid great attention by the domestic and foreign scientists, in particular: L. Abalkin, A. Arefieva, I. Binko, Z. Varnalii, O. Vlasiuk, T. Vasyltsiv, Z. Herasymchuk, V. Horbulin, V. Dukhov, M. Yermoshenko, Ya. Zhalilo, Z. Zhivko, O. Zakharov, V. Kovalov, G. Kozachenko, O. Liashenko, V. Martyniuk, V. Muntiian, E. Oleinikov, G. Pasternak- Taranushenko, V. Ponomarenko, Y. Pushak, N. Reverchuk, O. Tereshchenko, V. Franchuk, M. Shvets, L. Shemaieva, S. Shkarlet, V. Shlemko, V. Yarochkin and others.

Paying tribute to the scientific and practical significance of the work of leading scientists, it should be noted that in modern scientific literature and enterprise management practice, insufficient attention is paid to the problem of evaluating the management of safety activity of the industrial enterprises.

The aim of the research is the formation and testing a scientific and practical approach to the evaluation of the management of safety activities of industrial enterprises.

Presentation of the main research material. One of the modern directions in the field of ensuring the security of business involves the use of the concept of «safety activity of the enterprise». The author of this term can be considered V. Franchuk, who, together with his followers, substantiated the essence of safety activity and defined it as «... a form of active attitude of security subjects to a safety reality, the meaning of which is to make appropriate changes inside based on the assimilation and developing a

safety culture. That is, this activity is aimed at countering threats, restoring activities to protect corporate interests, preserving the integrity of processes or systems based on the assimilation and development of a safety culture» [2, p. 155].

Based on the definition of V. Franchuk, we believe that safety activity is characterized by the following key parameters:

• continuous process from the moment of foundation of the enterprise and before its liquidation;

• takes place in all aspects of the enterprise, which may be characterized by the possibility of risks and threats as the root causes of the decrease in the level of security;

• such activities should be resource-backed, that is, financial, material, labor and information resources;

• the result of such activity is the formation of a safe environment for the development of the enterprise.

Taking into account the definition of V. Franchuk, we consider that appropriate to clarify, supplement and present the interpretation of the term «safety activity of the enterprise» as follows: the enterprises activity, in cooperation with external security subjects, to ensure its own dynamic stability of functioning and the formation of safe development conditions through protection from the impact of external and internal threats and also risk minimization.

We believe that the use of the term «safety activity of the enterprise» is relevant and is determined by such important points:

• the existence of any socio-economic system, incl. enterprises are possible only in the case of ensuring its safety;

• achievement of interests, incl. for the company - making a profit, possibly in the case of development, which is impossible without the formation of safe conditions;

• the state undertakes to ensure the safety of the primary link of the national economy, but it is difficult to talk about the effectiveness of such activities in the current conditions of our country. In addition, the safe operation of the state does not provide opposition to all risks and threats;

• the principle of autonomy lies at the heart of business activity, which, on the one hand, limits the intervention of state authorities, and on the other hand, according to the theory of self-preservation, ensuring the security of an enterprise as a system is its main function;

• a safety activity is not analogous to an «operating», «investment» or «financial» one, it makes them work.

We believe that the enterprise should be considered as a complex socio-economic system, the existence of which is possible under the condition of the effective implementation of safety activities, that is, the implementation of targeted actions by the subjects on the objects to form a safe development environment. These actions do not have a momentary nature, they must be implemented systematically, and the direction and intensity of them are determined by the actual need, formed under the influence of the external environment and internal changes in the enterprise. This systematicity requires

an assessment not only of the state of the security objects, but also of the actions of the security subjects, that is, of the effectiveness for subsequent changes in the management of safety activities.

Focusing on the problem of ensuring a safe environment for development has revealed that in scientific works, attention is focused on assessing the level of economic security through the use of quantitative and qualitative indicators. The most common approaches include two: indicator and resource-functional. The first of these calls for the determination of a specific number of indicators and their comparison with limit values that correspond to a certain level of safety. The application of this approach has both its positive and negative sides. So, the simplicity of the calculations is combined with the complexity of an unambiguous interpretation of the results obtained through the multidirectionality of the selected indicators, the need for a systematic refinement of the limit values and the complexity of applying quality indicators. The other, resource-functional, is aimed at characterizing the efficiency of the use of available resources, which can be used to implement security measures, but in fact the processes of ensuring the necessary level of security in the enterprise remain outside the field of vision of the researchers.

Summing up the interim results, it can be argued that there are no approaches to assessing the management of safety activities, the existing ones can be used to assess the level of economic security or its functional components and require substantial improvement taking into account the specifics of the economic activities of industrial enterprises.

Returning to a specific task, we note that the assessment in the most general sense involves the collection of data, their construction, grouping, the definition of a number of indicators to characterize the state and dynamics of a particular phenomenon or process. This interpretation is relevant for the evaluation of the management of safety activities, which allowed us to develop an appropriate structural-logical scheme (Fig. 1).

Organizational support includes: compliance with the procedure for performing the steps and the sequence of assessment; coordination of actions between security subjects and a group of experts who conduct research; rational use of allocated resources and reducing the time of the assessment. The result of the formation of organizational support should be faster, rapid, systematic and targeted assessment.

Information support consists in obtaining complete, reliable, accurate and timely information on the status and processes that determine and influence the management of the safe operation of the enterprise.

Methodological support provides for the determination of a set of indicators that are appropriate to apply for evaluating the control subsystem, the managed subsystem, and the process of making and implementing management decisions.

So, for the evaluation of the control subsystem we have formed a set of indicators, which are conventionally divided into four groups: assessment of the personnel composition of the security subjects; evaluation of the organizational structure; management technology assessment; assessment of the impact on the managed subsystem.

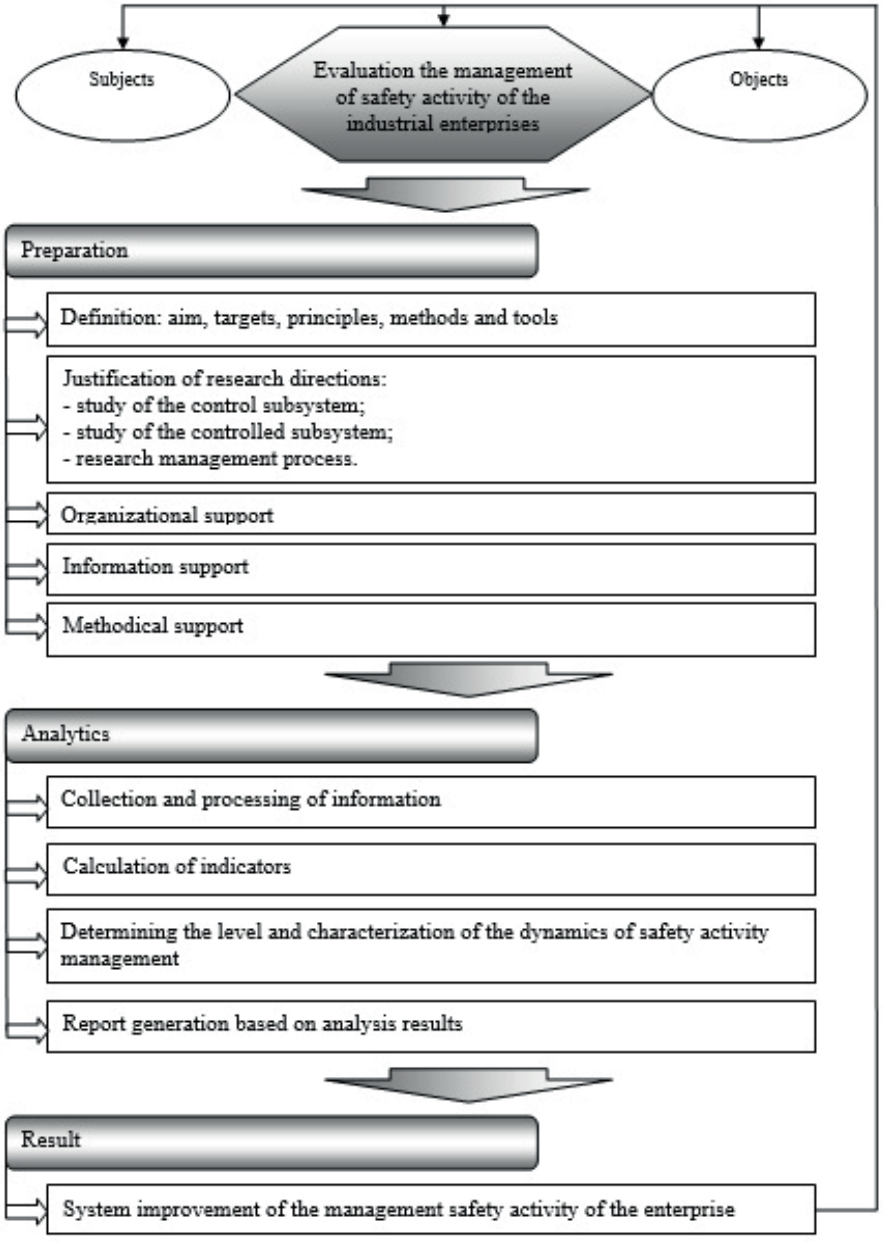

Fig. 1. Structural-logical scheme for evaluating the management of safety activity of the industrial enterprises, developed by the author

The managed subsystem is characterized by indicators in groups that actually determine the level of security of the key components for industrial enterprises of the economic security components: financial, personnel, technical and technological, power

and information. To evaluate management decisions, taking into account the intensity of such decisions taken by security subjects and the need for further implementation of approbation in industrial enterprises, it was proposed to use qualitative indicators, to determine which experts from the number of employees of relevant business entities were involved. Each group contains a certain number of indicators for which limit values are defined, which make it possible to characterize their levels as «low», «medium» and «high».

For approbation of the developed scientific and practical approach to assessing the management of safety activities of industrial enterprises, we have formed a set of such business entities, which are grouped by economic activity:

• food industry: PJSC «Mogilev-Podolsky KP» and PJSC «Etnoprodukt»;

• light industry: ecotextile PJSC «EkoTekstil», PJSC «MTF Mriya» and PJSC «TF «Rosa»»;

• chemical industry: PJSC «Lubnifarm» and PJSC «Firm Ellips»;

• machine-building industry: PJSC «Korosten MP», PJSC «Berdychiv MP «Progress»», PJSC «Pavlogradhimmash Plant».

The results of the evaluation the management of safety activities, which, in accordance with the established scientific and practical approach, provide for the determination of the level of a number of indicators in the context of controlling and controlled subsystems and management decisions are fully presented in Fig. 2-4.

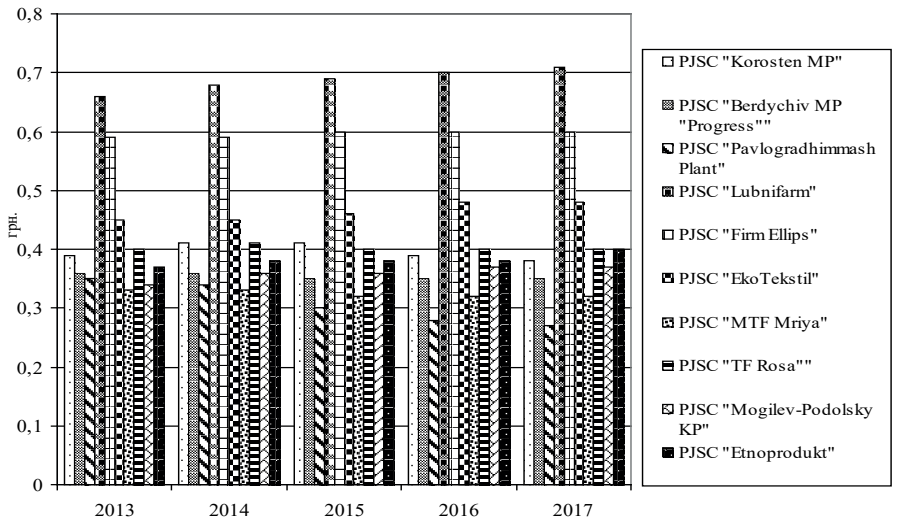

Fig. 2. The results of the evaluation of the control subsystem in the management system of safety activity of the industrial enterprises, calculated by the author

If we consider the fact that it is proposed to determine the performance by three levels: «low» (0.0-0.33), «medium» (0.33-0.66) and «high» (0.66-1, 0), then only

PJSC «Lubnifarm» (2013-2017) was characterized by high performance of the control subsystem. Low performance was typical for PJSC «Pavlogradhimmash Plant» (2015-2017) and PJSC «MTF Mriya» (2015-2017). As for other enterprises, the performance of this component of the management system for security policy activities was characterized as average. At the same time, the value of the integral indicator in quantitative terms, with respect to most enterprises, is located at the lower boundary of a certain interval. For example, regarding PJSC «Berdychiv MP «Progress»»: 2013-2014. - 0.36 and 2015-2017 - 0.35, therefore, relative to this group, it is advisable to talk about the average performance, taking into account the actual quantitative value, which is close to the «low» level. Only with respect to and PJSC «Firm Ellips» (2013-2014 - 0.59 and 2015-2017 - 0.6), can we clearly indicate the average performance of the control subsystem.

Careful analysis of the results of the assessment made it possible to identify common problems for the control subsystem that do not allow to achieve the required level of performance:

• for the control subsystem, as well as for the entire industrial enterprise, common characteristic is a high turnover rate, which, given the need for security subjects to possess special skills, negatively affects the performance;

• deficiencies the level of labor motivation and shortcomings in the organizational structure make it difficult for the security subjects to perform their tasks;

• imperfection of the current control mechanisms and insufficient use of expert assessment methods in the development and implementation of management decisions reduce the effectiveness of the control subsystem.

The results of the evaluation of the managed subsystem (Fig. 3) indicate a «high» level of security in relation to two enterprises: PJSC «Firm Ellips» (2013-2017) and PJSC «Lubnifarm» (2014-2017). The low level was determined in relation to PJSC «Korosten MP» (2017), PJSC «Pavlogradhimmash Plant» (2015-2017), PJSC «MTF Mriya» (2013-2016) and PJSC «TF «Rosa»» 2013).

Despite the fact that the assessment of the managed subsystem was based on determining the level of security in the context of the main functional components of economic security, it is possible to identify the main threats that negatively affect to the economic security of industrial enterprises:

• substantial dependence on external sources of financing and unprofitability of all activities, on which we focused attention above;

• insufficient stability of the labor collective and low level of labor motivation;

• a critically high level of physical and moral depreciation of fixed assets;

• insufficient level of protection of property and personnel;

• the lack of information resources and the insufficient level of information support of enterprise management.

The high level of efficiency in the development and implementation of management decisions (Fig. 4) was determined only in relation to PJSC «Lubnifarm» (2013-2017), and A was low for PJSC «Korosten MP» (2016-2017) and PJSC «MTF Mriya» (2015-2017). As for other enterprises, the level of efficiency, although it was defined in qualitative

terms as «medium», but in quantitative terms, is rather close to the lower boundary of the interval.

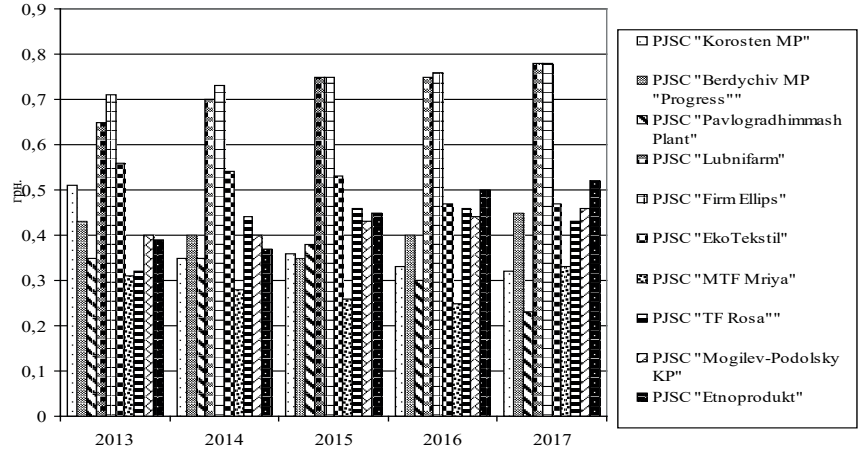

Fig. 3. The results of the evaluation of the managed subsystem in the management system of safety activity of the industrial enterprises, calculated by the author

According to the results of processing the expert survey, the following conclusions can be made regarding the most significant problems that reduce the effectiveness of the adoption and implementation of management decisions by security subjects:

• insufficient scientific validity;

• low level of optimality and complexity of solutions;

• insufficient timeliness of decision making, lack of alternativeness and control over implementation.

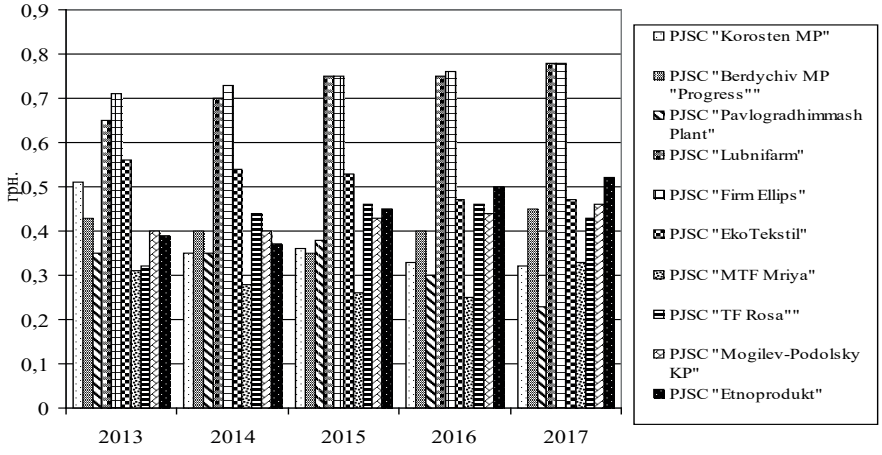

Fig. 4. The results of the evaluation of management decisions in the in the management system of safety activity of the industrial enterprises, calculated by the author

Conclusions. Approbation at industrial enterprises of various types of economic activity was carried out. It showed that the majority of them are characterized by insufficient performance of the control system, a low level of security under the controllable subsystem and the unsatisfactory efficiency of making and implementing management decisions in the safety activity management system. The results will be used as an informational basis for improving the management of the safety activities of industrial enterprises.

Considering the importance of safety activities for the functioning of each domestic enterprise, we consider it expedient to pay further attention to the deepening of theoretical and methodological guidelines and the justification of applied approaches for the implementation of safety activity of the enterprise.

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CAPITAL STRUCTURE CONSISTENCY ANALYSIS IN THE CONTEXT OF CAPITAL STRUCTURE THEORIES

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Annotation. *Companies are compelled to use various internal and external elements of capital in their life cycles. A particular business of course will use the resource with the help of which it can create a value generating process and thereby contribute to the growth of a particular commercial or trade sector. The response of trade competitors is also important in this period as if firms fail to provide the adequate response to the changes around them, they may easily fall victims to liquidation or a bankruptcy procedure, which as it can be admitted is not favourable for either the companies in the market or the consumers.*

According to several technical papers a business's income generating ability is influenced by its major decisions related to its financial decisions, internal and external financing options, financing strategies and forms as well as the basic principles and the capital structure of financing. As it goes, a company undergoes several life-cycles. As our business starts to evolve, increasingly more alternatives offer themselves to have the business continuity of our operation influenced, which we can use only to a certain extent as overuse would increase the risks inherent in business operation.

Continuity of the operation of small and medium-sized companies requires capital and it makes a difference where this capital comes from and in what ways. Capital structure theories help to gain a broader picture of this.

Key words: *life-cycle, financing, profitability, capital structure, capital structure theories.*

Literature review. Corporate financing is about nothing else but ensuring the required resources for the company's income generating ability (Zéman et al., 2016). In an efficient capital market the net present value algorithm cannot be used if considering financing decisions, therefore every investment is worth implementing that is profitable (Szemán, 2008). Myers (2001) viewed capital structure as being a combination of a company's financial means with which the company finances its investments in real assets.

According to Krénusz (2005) it is the distribution to owners and creditors of the income generated through the income generating ability of the company's assets. To enable the continuous operation and survival of businesses financial managers have to implement investments into projects the cash flows of which result in a positive net

present value. In addition a firm's value can be enhanced by such a capital structure and financing strategy that, provided the capital structure is optimal, reaches the maximum value. Several methods exist to evaluate the capital structure.

We can use the indicators related to the liabilities side of the business for using the various methods. Such are, for example, the capital leverage indicator(s) and the ratio of liabilities and their elements as well as the ratio of equity (Krénusz, 2005; Gál, 2013). Krénusz (2007) examined in his discussion the factors influencing the capital structure.

Hereafter we are going to briefly review the theories related to the capital structure. We derive the capital structure and capital structure theories from the classical propositions of Durand (1952) and co-authors Modigliani-Miller (1958), although several other theories have come into being since theirs about the factors influencing companies' resource structure. In our work we have examined the impact of three theories that contradict each other in several aspects. Among them are the trade off, the hierarchy theory and the peer pressure.

The trade off theory. Several researchers assume there is an optimal capital structure, equity-debt ratio companies follow or should follow, see Brealey–Myers (2005), Weston-Copeland (1995).

Accordingly the trade off theory suggests there is an optimal debt ratio that may explain the differences between the various sectors (Hegedűs et al., 2016). Leland–Pyle (1977) enhanced the theory and arrived at the conclusion that businesses had a target ratio the achievement of which could be determined as a long-term process. In addition the theory also assumes that, when considering the company's value, the management prefers the resource elements with the help of which tax saving can be achieved, see Herczeg (2009).

Financial difficulties may evolve irrespective of the fact that the theory possesses an interest tax defence, given that if the debt ratio size starts to increase, the company value drops (Lentner, 2017). Financial difficulties may emerge once the outside capital is inadequately paid on the debt drawn by the company. The size of the same may amount to 3-4% of the company's value. In Warner's (1977) view bankruptcy costs decline as the company's size increases at the same time they can amount to even 10 per cent of the company's overall value, see Gál (2013). The increase in leverage entails the present value of tax savings for a certain amount of time, however it also attracts the probability of the increase in financial difficulties until such time that the business reaches the optimal credit ratio, see Brealey–Myers (2005) and Lentner (2015).

The hierarchy (pecking order) theory. Having analysed a large company sample Donaldson (1961) established that the management of a business first uses its internal resources and they examine the floatation of shares only as the last option. In relation to the hierarchy theory we can also mention the works of Myers (1984), Myers-Majluf (1984), and Harris-Raviv (1991).

In his review Szemán (2017) arrived at the conclusion that businesses turned mainly to their internal resources for the reason of not incurring other costs if doing so (transaction and auxiliary costs). The previous hierarchy theories did not take these

factors into consideration. According to Szemán's (2017) view „ to ensure their resource needs companies first use their resources where transaction costs are the lowest and turn to new resources only when due to some reason the resources they used earlier drained". So, there is a strict hierarchy among resources."Brealey – Myers (1992) „Pecking order: the poultry's strong power hierarchy formed by pecking each other; pecking: pecking, nagging" Brealey- Myers (1992).

In 1984 Myers came up with yet another idea into which he involved as an additional factor the size of dividend payment in addition to internal financing. Considering external resources a business primarily prefers the issuance of bonds or credit drawing, followed by hybrid security and the possibility of stock floatation and its costs are considered only as the last recourse of action.

This theory does not assume that businesses were able to create their optimal capital structure. Such a cautious strategy of businesses is understandable yet the amount of the possible loss relative to competitors caused by it should not be disregarded.

The peer-pressure (herd mentality) theory. According to the theory businesses try to adapt their financing policy in comparison to their competitors, which is also influenced by industry practices, see Szemán (2008).

It is important to note, however that copying competitors' financing resource management can become hazardous. If we consider more carefully, even within a particular industry sector there can be great differences in regards to growth options and the risks of these options.

Here factors beyond our control have to be taken into consideration at times when the particular industry is changing. Let us take the example of the filling station having been in a monopolistic situation so far, which all of a sudden is up against competitors.

As a result the power of a business having operated solidly and with a high profitability for a long time is suddenly shaken and its profit may start to decline or float. In this case the management of the company has to change its financing policy, which can be done through altering the leverage, in this particular case the business will have to apply a lower leverage.

From a stock exchange aspect it is a highly favourable arrangement as it is a leverage arrangement that can be recommended for investment to investors, as it has an average leverage.

„Our anxiety about taking investment and financial decisions and, especially our loss and risk avoidance make us see more valuable the options others also consider favourable and it leads to herd mentality, i.e. investors massively follow the same direction (i.e. take decisions on the basis of a kind of assumption)" Jaksity (2004).

Conclusions and discussion. According to the methods covered by the analysis businesses can formulate their financing strategy and policy by choosing among three methods. Each method has its benefits and drawbacks. There is no method that would offer only benefits to the management of a business.

In our view the matter of selecting between this and the other method greatly depends on the size and capital stock of a particular business and also on its trade sector.

For example small shops will not follow the financing policy of a large stock company and vice versa.

In the trade off theory our business will have to assess the extent to which it prefers internal or external capital elements. Here one needs to be cautious in the realization that the value of a company can be increased only to a certain extent. In the hierarchy (pecking order) theory capital elements are ranked in a certain order where the use of one's own capital is considered to be the „cheapest" option. If considering the peer pressure (herd mentality) theory a business will contemplate to follow and take over the financing strategy of another business.

In our view a business will be able to become successful if merging the 3 methods and takes the most out of them in terms of both leverage and profitability in comparison to competitors thus reaching the best position. According to specialist authors, of course, there is not such a case, therefore our job is to create this theory and support it through the harmonization of the suitable method.

It is not going to be an easy job but, if the adequate business gets involved in a particular industrial sector, it may turn into an adequate initial base for anything that may become a novelty if considering capital structure theories.

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PUBLIC ADMINISTRATION

THE ROLE OF EDUCATION IN THE DEVELOPMENT OF PUBLIC ADMINISTRATION IN UKRAINE

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Annotation. *The role of education in modern society is difficult to overestimate. Leading foreign scientists point out that in conditions of the current geopolitical competition of the world leading countries for the intellectual resources that can provide up to 80% of the national wealth of the country, the one wins who places the education and quality in the center of the state development strategy in the internal policy. Education plays a dual role in shaping public values in society, particularly in Ukraine. Thus, the central role in the establishment of a public administration in Ukraine, and subsequently a new public administration in accordance with European tendencies, is to play an educational role as a socio-cultural institution, as a system of educational institutions, their governing bodies, educational standards that ensure the fulfillment of its human and humanistic functions.*

Key words: *education, public administration, human capital, human development index.*

Presentation of the main research material. The role of education in modern society is difficult to overestimate. However, education of proper quality is of a great value that meets the requirements of the individual, economy, and society in general, which promotes the development of personality, satisfaction of his educational, intellectual requests, provides an opportunity to strengthen the material well-being of a person and his family, and, finally, serves as the basis for economic growth of the country.

A fundamental breakthrough in the philosophy of education, quality education, took place after its recognition in education policy of states and at the level of public administration, not only pedagogical, but also managerial and, first of all, political, category [2].

Leading foreign scientists point out that in conditions of the current geopolitical competition of the world leading countries for the intellectual resources that can provide up to 80% of the national wealth of the country, the one wins who places the education and quality in the center of the state development strategy in the internal policy [5]. Thus, the level of intellectual potential of the country becomes an important condition of economic and political independence of the state, a factor of its survival.

As for intellectual potential, it is not just a set of abilities, talents, knowledge, qualifications, intelligence which belong to a person, and:

• knowledge that is used effectively in one or another sphere of socially useful

activity, which leads to an increase in labor productivity and economic growth;

• rational use of intelligence, which leads to GDP growth, national income, a certain employee's earnings;

• increasing incomes is facilitated by the activation of intellectual labor activity, which serves as the basis for the motivation of investing in the development of social intelligence.

To characterize the totality of developed in the result of investments productive abilities, personal traits and motivations of individuals that are in their ownership, are used in economic activity, contribute to the growth of labor productivity and, as a result, affect the growth of the earnings of their owner and national income, such a social and economic category as human capital is used.

Human capital in the broadest sense is an intensive productive factor of economic development, the development of society and the family, which includes an educated part of labor resources, knowledge, tools of intellectual and managerial work, place of existence and work activities that ensure the efficient and rational functioning of human capital as productive development factor. It is also a system of characteristics that determines the person's ability to create creative work for the purpose of making goods, services, added value, that is, the quality of the workforce of an individual, an aggregate employee of an enterprise, a firm, a corporation, a country, and manifested in the course of extended reproduction. Thus, the more perfect human capital is, expressed by the level of education, qualifications, knowledge, experience, the greater the human capacity for productive, high-quality work is [6].

Human capital can be defined as formed or developed as a result of investments and a certain stock of health, knowledge, skills, abilities, motivations and other productive qualities accumulated by people that is purposefully used in one or another sphere of economic activity, contributes to the growth of labor productivity and due to this affects the growth of the income of its owner [7].

An assessment of the level of human capital can be made on existing rating lists. The most popular is the Human Development Index. This is an integral indicator that is calculated annually for interstate comparison and measurement of living standards, literacy, education and longevity as the main characteristics of human potential of the studied territory. The index is published as part of the UN Development Program in Human Development Reports. Key Indicators for which the Human Development Index is determined:

• average life expectancy;
• duration of training;
• GDP per capita;
• level of social security;
• indicators of health and cultural development of the population;
• people's participation in decision-making;
• rate of crime;
• environmental protection [8].

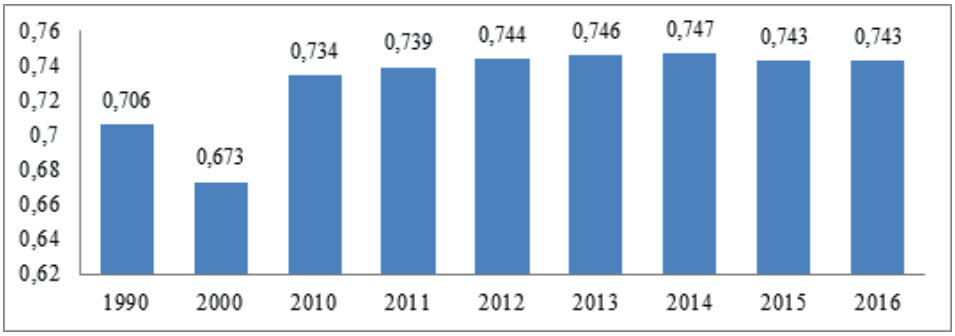

Fig. 1. - The value of the index of human development in Ukraine for the period 1990-2016 according to the data of the United Nations (Human Development Report 2016) [8]

Despite a certain recession from 2014 on indicators of the human development index, Ukraine has approved and implemented a comprehensive package of important reforms, such as health, education, social security, land reform and decentralization reforms, public administration reform, anti-corruption activities, law enforcement reform, as well as many other changes. The final result of these reforms should be progress in the field of human development for every citizen of Ukraine without exception.

It should be noted that, despite the fact that the Human Development Index is a very useful and indicative benchmark in the assessment of human development, it is not and cannot be an all-encompassing parameter, because it does not give an unambiguous assessment. However, comparisons with other countries and groups of countries make it possible to separate the pain points and the main trends in the development of factors behind these indicators. Improving the quality of education and equal access to it is one of the main tasks of the current state policy in education. The National Doctrine of Education Development states: "Quality of education is a national priority and a prerequisite for the national security of the state, observance of international norms and requirements of the legislation of Ukraine regarding the realization of the right of citizens to education" [9].

The National Doctrine of Education Development and the current legislative base determined the quality of the purpose of education, and state standards of education which are the quality of educational outcomes. The quality of the pedagogical process remains the subject of discussion, a field for scientific research and practical testing. The question of the quality of higher education is complex. This is the requirements of citizens who want to receive education, the requirements of employers to the level of training graduates of universities, as well as the world community. Education is the basic element of the formula for success. People today are no longer interested in knowledge themselves, it is important for them to use it in real life, whether they will contribute to self-sufficiency, life's personal success. Education that does not contribute to the success and well-being of the individual, as well as the economic development

of the state cannot be considered qualitative today. Consequently, the main thing is the institutional restructuring of education on the basis of a new effective interaction with the labor market, breaking the gap between the content of education, effective technologies, production needs. The search for output should be in the triangle "market of educational services - labor market - quality of training".

Undoubtedly, in order to create a modern competitive educational system, it is necessary to study and take into account the experience of other countries, first of all, the neighbors, which have been ahead of Ukraine in development. In our opinion, the study of the experience of educational reforms in the countries of Central and Eastern Europe, in particular the Czech Republic as a member of the European Union, is extremely important for Ukraine, as the problems of the corresponding transformations in education and the system of public administration of education in Ukraine in connection with joining the European educational space is extremely valuable, and the coverage, synthesis and comprehension of reforms in the Czech Republic makes it possible to correctly identify the strategy of educational reform, to take into account the advantages, disadvantages, ways of eliminating them, anticipate possible challenges, avoid mistakes etc.

State policy in the field of education of the Czech Republic is based on the implementation of the Constitution of the state, which was adopted by Parliament on December 16, 1992, and came into force on January 1, 1992. The article 2 of the Basic Law of the Czech Republic defines the general norm on the right of citizens to education: "Every citizen has the right to education". The basic principles of the modern education of the Czech Republic are formulated in the Charter of Rights and Freedoms, which, according to Art. 3 of the Constitution of the Czech Republic is an integral part of the constitutional system of the state

The active reform of the education system of the Czech Republic was launched after the adoption of the strategic document of the Ministry of Education, Youth and Sports in 2001. This legal act was published under the title "White Book. "People's Program for the Development of Education in the Czech Republic".

The program identified the strategic objectives of the state's educational policy, in particular:

• ensuring availability of all levels of education;

• achievement of the quality and functionality of education through the introduction of new progressive programs;

• optimization of educational management (decentralization, autonomization);

• extension of the term of study in secondary school, introduction of updated educational standards;

• creation of a system for assessing the performance of educational institutions at all levels of government through the introduction of an effective system for monitoring the results of studies, examinations, assessing the level of personal development and professional orientation of children and young people;

• improving the quality of work of a teacher, an educator, as well as the prestige of

teaching work.

When analyzing the state policy in the field of education of the Czech Republic, it should be noted that certain progress in the reform of the educational sector should be linked to the introduction of mechanisms for decentralizing education management, in particular, the management of school education at the regional level.

The tasks of the Ministry of Education, Youth and Sports of the Czech Republic as the central executive body are primarily:

1) determine the basic principles and objectives of public policy (Ministry ensures the implementation of state policy in the field of education, is responsible for, the concept and development of the educational system, developing laws and regulations of the Government relating to the educational sector, publishes regulatory and administrative provisions relating to the laws education, creates long-term plan of the educational system in the Czech Republic, develops a curriculum framework including standards, defines the requirements for general examination of final exams, assign recommendation marks to textbooks and texts and lifts it);

2) implementation of permissive functions for conducting educational activities (the Ministry enters schools and educational institutions in the register of educational institutions and excludes them from the register, acts as an appeal body for decisions of regional authorities and educational institutions, agrees to use an other language (than the Czech language) of instruction, provides, so-called, foreign school and territory of the Czech Republic permission to provide compulsory general education);

3) the establishment of generally accepted principles for financing school education (the Ministry establishes national norms for school financing, as well as binding standards according to which regional departments of education distribute state budget funds, and city departments of education with extended powers offer variants of distribution of budgetary funds, carries out inspections of the organs of education, educational institutions on the subject of implementation of development programs, educational outcomes and their quality,

provides funding for activities on audits of educational institutions, implementation of educational development programs, and controls the effectiveness of the use of funds provided by the Ministry of Education, Youth and Sports);

4) provision of education for pupils with special educational needs (the Ministry approves the opening of classes, departments, educational groups for children, students, students with a disorder of psychophysical development, agrees to provide a workplace for teacher's assistance);

5) provision of the general part of final examinations (provides methodological support for the common part for the final exam, checks the results of the joint part of the final exam (didactic tests);

6) implementation of the standard tasks of the founder in educational institutions, the founder of which is the Ministry, the collection of statistical data, recognition of the equivalence of the foreign certificate of education in the Czech Republic).

It is clear that solving the problem of quality and education development in the

public administration in Ukraine needs focused efforts of state authorities, local self-government, civil society institutions and education system as a social institution, which in turn becomes possible in the context of the implementation of public management in general and in the educational sphere in particular, more precisely, in the conditions of formation and development of more perfect forms of it, the so-called "good governance"and "multi-levelgovernance", the concept of which is being developed and is currently being disseminated in the countries of the European Union [1].

Education in the modern world is considered as a socio-cultural institution, a special sphere of social life, a peculiar socio-cultural phenomenon, as an essential characteristic of ethnos, society, human civilization, ways of their self-preservation and development.

Education plays a dual role in shaping public values in society, particularly in Ukraine. Given the above important role of education in the development of the country, provided political and economic independence of the state, education itself is a social value that has a promising value and should be considered as so-called strategic public management.

On the other hand, due to education and with the help of all its means and forms (formal, informal, self-education, etc.), a moral and ethical culture of a person is formed, public and social values are determined and created, training is provided for the life of a person, professional competence develops (administrative, communication, assessment, humanistic, strategic planning, etc.) of all subjects of public administration (public managers, public administrators, civil servants, representatives of local authorities, members of civil society, NGOs and citizens in general).

Ukraine has an adequate intellectual resource to implement a strategy of advanced development, based on science and education. But these opportunities can only be realized with the unprecedented concentration of material resources and competent strategic planning of concrete measures to implement the relevant scenario.

Thus, the central role in the establishment of a public administration in Ukraine, and subsequently a new public administration in accordance with European tendencies, is to play an educational role as a socio-cultural institution, as a system of educational institutions, their governing bodies, educational standards that ensure the fulfillment of its human and humanistic functions.

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PROSPECTS FOR MODERNIZATION AND DEVELOPMENT OF THE SYSTEM REGULATION OF CUSTOMS PROCEDURES

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Annotation. *Different ways of improvement of regulation system are noted. Much attention is given to examples of "single window" countries. The essay gives a valuable information on several data sources relative to different economical aspects. It is clearly introduced a risk management analysis called "Rita". Conclusion are drawn by achievement of implementing modern system of customs procedures.*

Key words: *customs procedures, customs services, customs authorities.*

In order modernization and development, countries should implement the new regulation system of customs procedures. The first new method would in trade facilitation is the reduction of bureaucratic obstacles in the movement of goods across borders. Secondly, Azerbaijan is perfect example of country, which successfully implements modifications in export and import operations. What should be learned from already successful countries that have been implemented new methods of development in customs procedures? Risk management and control as a new system of improvements.

Statistics in general. In the first two months of 2018, the State Customs Committee (SCC) of Azerbaijan transferred over 445.75 million manat to the state budget, which is 20.8 percent higher than the same period of 2017, the SCC reports. At the same time, the deductions for February amounted to 219.66 million manat. Last month, revenues from customs duties amounted to 58.98 million manat, VAT - 151.69 million manat, excises - 6.39 million manat, road tax - 2.6 million manat. Compared with February 2017, receives from customs duties increased by 16.8 percent, VAT - by 11 percent, excises by 19.2 percent, road tax - by 8.3 percent. The forecast for customs revenues to the state budget of Azerbaijan for 2018 is 2.43 billion manat. The official rate for March 17 is 1.7 AZN / USD [1].

Trade facilitation. To reduce the formalities, to collect only the information necessary to the state control bodies as quickly and easily as possible - this is the essence of trade facilitation. Simplification and reduction of the required procedures, data and documents, their harmonization with international standards, translation of documents and foreign trade processes into electronic form will greatly accelerate the movement of goods and information about them across borders. US experts about 40 years ago calculated that eliminating unnecessary bureaucratic procedures and paper flows would reduce the cost of trade operations by 7% in the US, and this was always a very large amount that society simply lost because of insufficiently streamlined processes. After analyzing all the forms filled in at the request of various institutions and having

compiled a list of data elements collected by US trade institutions, the researchers found redundancy in the amount exceeding 90%, i.e. Over 300 forms of documents included about 3000 data fields.

The Bureau of the International Trade Data System, which is implementing a "single window" in the United States, revised the existing system and developed a standard data set that includes fewer than 200 data items. In addition, this indicator now rarely contrasts with the original indicator in the amount of 3000 data fields. This change led to a sharp decrease in the time costs of participants in trade and transport operations, which had a positive impact on the US logistics rating.

The introduction of this practice in the system of customs administration will substantially reduce both direct and indirect costs in the passage of certain customs clearance procedures. At the same time, the legislation and the procedure for reviewing documents by agencies involved in the procedures for customs clearance of foreign trade transactions should be clearly regulated.

Azerbaijan modifications. The State Customs Committee (SCC) of Azerbaijan will continue work on further simplification of customs procedures in the implementation of export-import operations, Chairman of the State Customs Committee Aydin Aliyev said in an exclusive interview to Trend.

According to the Chairman of the State Customs Committee, this is one of the main priorities of the work of the customs committee. The SCC head noted that work is under way to develop the procedure for customs transit, according to the Convention on International Road Transport (TIR) and the application of electronic TIR procedures.

"To speed up the implementation of the New Computerized Transit System (NCTS), which will allow us to exchange information through bilateral agreements, we turned to the joint EU-EFTA committee, which is the governing body of the Conventions on the Common Transit Procedure and on Simplifying Registration in Trade goods ". On December 5 of last year, at the meeting of the joint committee in the capital of Norway, the city of Oslo, Azerbaijan's appeal was considered and a decision was adopted to award Azerbaijan the status of an informal observer, "the SCC head said. According to Aliyev, an ad-hoc working group was set up to bring Azerbaijani legislation into line with the requirements of the convention, the effective application of the customs guarantee mechanism during transit operations and, in general, the improvement of the skills of customs authorities. "All these actions are aimed at preparing for connection to the listed conventions and the application of NCTS," said the head of the State Customs Committee. Aliyev also noted that after the completion of the relevant technical work on the application of the TIR-EPD system in Azerbaijan [an application allowing TIR Carnet holders to send free electronic preliminary information on transportation to all countries of the route simultaneously], an e-TIR pilot project will use the fully electronic TIR procedure."I would like to emphasize that if earlier e-TIR projects were implemented only bilaterally between neighboring countries, the project, in which Azerbaijan will take part, will cover for the first time a greater number of countries involved in the corresponding transport corridor," the SCC head said [2].

The Single Window concept has already been introduced in countries such as Japan, Singapore, Sweden, the United States and Senegal. Recommendation No. 33 of the United Nations Economic Commission for Europe (UNECE) and the United Nations Center for Trade Facilitation and Electronic Business Operations (UN / CEFACT) was established on the basis of an analysis of the existing experience of these countries and international standards for the exchange of trade information. It gives a general idea of the concept of a "single window", describes the main types of "single window" systems, as well as the benefits of implementing this mechanism. In addition, it describes the algorithm of the key steps that need to be taken when creating a single window mechanism. The description of this scheme is as follows: the agency that adopted the documents enters the submitted data into a single database, access to which is provided to all agencies involved in the process of customs and border procedures. In this case, the departments enter their conclusions into the same database, and the coordinating agency (in our case, this is the customs body) on the basis of these conclusions makes the final decision on the release of the goods in the appropriate customs regime.

Successful outcomes. The most successful practice of applying a "single window" among European countries is the experience of Sweden and Finland. The Swedish "single window" mechanism, known as the "Virtual Customs Service" (VTS), provides for the possibility of electronic submission of customs declarations and applications for obtaining import and export licenses, including strategic products. The VTS can be additionally docked with the system of business operations of the subject of Foreign Economic Activity (FEA) and allows in an automatic mode to update the information stored in it taking into account changes in exchange rates, tariff codes and tariff rates. The "Single Window" also covers all the regulations relating to external trade, and allows traders to automatically receive updated information about the changes occurring via the Internet and / or SMS-services. The VTS can also provide interactive training courses and the possibility of forming a specialized customization or creation of personal virtual customs offices where all the data and procedures that each participant of foreign economic activity uses and considers relevant for their needs will be recorded.

The organizational structure itself can hardly be called difficult and ramified, it rather resembles a commercial firm, rather than a typical state bureaucratic machine. The department is subordinated to the Ministry of Finance, and in its structure it has only three levels - the general director, the subdivisions subordinated to him and four departments, divided by the main functions of the customs business.

As in the rest of the European Union, modern customs technologies are used in Finland. Back in 2000, the "Single Window" of Finland, the PortNet system, started operating in the customs authorities on the basis of international standards, which today serves the ports and contains information on all the calls for the last 20 years. With the help of an electronic system, the ship's agent or seaport terminal operator can provide all the necessary information to state authorities, create documentation and perform various functions. The system allows not only to carry out all formalities in the shortest possible time, but also allows you to track the goods. In addition, at the entrance the system

requests only three documents and, in addition, does not use closed communication channels, just the usual Internet.Later, AREX and ELEX systems were developed - electronic customs systems for processing trade declarations for imported and transit goods and for processing export declarations [3].

Also, since 2010, preliminary electronic information is working in Finland - the carrier is most often responsible for its filing. It allows you to control the timely arrival or departure of goods and the completeness of the information provided.Despite the fact that at first glance all these technologies seem to be simple, and not so innovative, they have a number of undeniable advantages. AREX is a completely free system in which it is enough to fill only the registration form via the Internet. Moreover, neither Portnet nor AREX use the digital signature, and do not create inconveniences for the foreign trade participant.many respects this was achieved due to the fact that the EORI system operates in the European Union - the Economic Operator Registration and Identification - the system of registration and identification of economic entities. In the framework of it, each subject of foreign trade activities - importer, exporter, carrier or warehouse owner, according to EU rules, needs to receive a special number by filling in the appropriate questionnaire. This number is permanent and is used for all foreign trade transactions and customs operations on the territory of the EU and is specified in the documents. Get it relatively easily - you need a statement and documents of a legal entity. EORI is widely used by customs and other authorities in exchanging information and also for risk analysis [1].

The systematic work on the implementation of SRA in the Finnish customs started in 2007. Now, risk management covers all the major customs processes that are conducted in the Office, as required by the WCO's World Trade Facilitation Framework. In 2009, the Finnish Customs created the National Risk Analysis Center (NRAC), which operates in Helsinki, Turku and Tornio and actively cooperates with the electronic customs clearance centers. It establishes general risk rules throughout the RMS, provides guidance on which product groups need to be closely monitored, and performs other analytical work and reports. In addition, he actively cooperates with other units of the customs authorities, who can provide him with important information in the field of company audit, customs control or police data.

Risk management analysis. The very system of risk management and control is called "RITA". In the framework of this, a risk analysis is carried out based on data on its foreign trade operations, as well as information from other customs services, mainly EU countries. Particular attention is paid to so-called behavioral risk analysis, in which the economic operator-exporter, importer, carrier or owner of the warehouse is assessed. At the same time, indicators of declarations, historical data on supplies, cooperating exporting companies and persons responsible for transit are taken into account [2].

New personnel at the Finnish customs is paid special attention. The multilateral department is directly involved in the customs business. In the structure of the Administrative Department there is a training department, which also has its own steering group. The training is divided into a general examination course, an initial training course

and additional vocational training and professional development. It is important to note that training is not only free, but employees also receive salaries for their studies.

After a new employee is recruited, for two months he passes a general knowledge course, and then - an initial customs training course and additional courses that can last from 2.5 to 3 years. The Office also has its own Customs School, which is located in Helsinki. At the same time, educational developers, instructors and teachers are involved in the educational process, including from the existing customs officers.

Thus, the customs of Finland is not without reason ranked fourth in the world. At the same time, it benefits from others not at the expense of advanced and innovative technologies, but due to the absence of bureaucracy, simplicity and brevity in many processes, as well as adherence to international standards. Finns managed to avoid duplication of the same functions in routine work and information interaction, to nullify the bureaucracy and, in fact, to make customs much more accessible for a participant in foreign economic activity.

Coordination Between National Governments. The Australian continent is known to the whole world not only for a favorable climate and diverse fauna, but also for one of the most effective customs services. We tell you in detail how the customs of Australia works and why it is effective.

Local customs authorities do not yet claim to be the best in the world, but they occupy rather high positions among other countries. According to the World Bank's assessment, given in the annual study "The Logistics Performance Index and Its Indicators 2016", Australians are on the 22nd place in terms of the level of provision of customs services. The country's office is famous for being one of the locomotives in the introduction of electronic technologies, as well as one of the most non-corrupt among the customs of other countries.

In due time the customs of Australia became one of the advanced countries that introduced modern customs technologies not only in the region, but also in the whole world. Positive changes in administration began in 1996, when the National Business Centers (NBC) began to be established in the country. They were engaged in the analysis and monitoring of trade turnover, coordination of customs activities and the development of the National Concept for the Development of Customs Authorities.

In 1996, a risk management system was adopted and implemented. Its main purpose was not the collection of customs payments or the suppression of offenses, but the assistance to a participant in foreign trade activities, based on its trade needs. The risk system in Australia allows you to provide access to information about cargo, links with importers and exporters, customs brokers, carriers and other industry actors.

As in the customs authorities of other countries, automated information systems are widely used. The main ones are the Automated Customs Information System (ACIS) and the Integrated Cargo System (ICS). They imply electronic customs clearance and declaration and exclude the need to present written permits and declarations. In addition, these systems allow, in the shortest possible time, to provide access to information about a participant in the foreign economic activity and the industry in which it operates.

In accordance with the Framework for Security and Facilitation of World Trade in Australia, the Australian Trusted Trader program is in place, which assumes voluntary confirmation of the company's reliability in the field of foreign economic activity in exchange for a number of advantages and benefits in the process of customs clearance.

Customs administration and exports. The main goal of the program is to improve the security of the supply chain and legalize trade. Among the basic requirements for the company - the availability of business number ABN (Australian Business Number), a two-year term of participation in foreign trade and financial stability. After completing the questionnaire on self-examination and obtaining a certificate of accreditation, the company receives a number of advantages over other participants in foreign economic activity.

In particular, priority service in the customs authorities on the issue of certificates and conclusions on the rates of duties, the assignment of the status of a participant in foreign economic activity with a low level of risk, and, as a consequence, a reduction in control. In addition, the firm receives a personal manager - an auditor who will oversee its work in terms of interaction with customs authorities, as well as a special logo that confirms the high level of trust of the customs authorities to the company, which has a positive effect on customer confidence.

At present, Azerbaijan has a rather low level of logistical development. Consequently, the activity of the customs service of Azerbaijan is mainly aimed not at simplification of customs formalities and acceleration of goods turnover, but on the implementation of qualitative customs control, which allows to identify violations of customs legislation with a view to realizing the fiscal function. Undoubtedly, the implementation of customs control in order to protect the national economy is for today the main task of the customs authorities, but the development of foreign trade and integration into world economic relations dictate other conditions related to the simplification of customs formalities. Having analyzed the results of customs administration from these approaches, we can say that we have a functioning customs service that is not very effective.

In the future, within the framework of the task in view, it is planned to create a joint electronic dossier, which will contain the most complete and comprehensive information on subjects of foreign economic activity, as well as their counterparties.

The Single Window for export and import clearing is an advanced tool for achieving the goals of trade facilitation and is defined as a system allowing all participants in trade and transport to submit the information required by the regulatory authorities for the implementation of import, export and transit operations, only in one place, in a single form and in one agency. A single window helps solve a key problem for simplifying trading procedures - submitting multiple documents with duplicate data only once, in one place and in a standard format.

Thus, a "single window" facilitates the simplification of foreign trade procedures, reducing non-tariff barriers to trade and saving money and time for all entities involved in trade and transport operations. According to the WCO framework standards, the "single window" principle best demonstrates the partnership approach in customs and

business relations, when the customs authorities create the most convenient conditions for controlling foreign trade transactions, including at checkpoints [3].

The state, when using the "single window" principle, also benefits from the following: elimination of the problem of income shortfall, more precise fulfillment of requirements by trading enterprises,the possibility of using advanced methods of risk management for control and law enforcement purposes, more efficient and rational allocation of resources, greater transparency and conscientiousness,

In such a system, there are obvious advantages for the business community, namely: reducing costs by reducing delays at checkpoints, reliable prediction of situations and predictable application and clarification of the law, efficient allocation of resources; transparency of procedures and processes, reducing pressure on the business, decriminalization of the environment, acceleration of customs clearance and obtaining permission for shipment, greater transparency and good faith.

It is expedient to release the declarant from the obligation to file information about customs declaration (on actual exportation and payments) to the tax authorities on a bumper carrier. In addition, it is possible to cancel the duties of a foreign trade participant to present the transaction passport to the customs authorities, since the agencies themselves will have to enter this information into a single electronic database.

A "single window" in foreign trade is, above all, a tool for good governance. It contributes to solving the problems of increasing the effectiveness of foreign trade, and combating corruption, contributes to achieving greater competitiveness of the country in the highly organized and technologically advanced economies of the countries of the modern world, and also helps to solve key problems of social development. It should effectively coordinate the work of different organizations. We must not forget that the "single window" is not a technical solution, but a complex organizational mechanism. A "single window" is not just a technical switch, but a kind of "intellectual" system in which data elements from one document (form) can be automatically used many times in other documents by other organizations. The international standards created and supported by the UNECE, the World Customs Organization and other organizations to identify data elements in a structural relationship among themselves are primarily necessary for inter-agency information exchange, in order to simplify the task of cross-border data exchange between systems of different countries in the future.

The transition of Azerbaijan to the innovative principle of economic development, the formation of favorable prospects for effective integration of Azerbaijan into the world economy, the change in the scale, nature and forms of foreign economic activity form the preconditions for improving customs activities and developing a strategy for the development of the customs service of Azerbaijan for the long term.

However, the influence of the main world economic factors in conditions of political instability causes the possibility of deterioration of the internal and external market conditions, a decrease in the volume of foreign trade turnover, a slowdown in the growth rate of the economy and investment activity, a decline in industrial production, and other negative economic and political phenomena, requires the correction of previously

adopted strategic decisions.

The need for improving the management system at the present stage is determined by many factors. This is the optimization of the number of management staff, its functions and organizational structure, the introduction of automated control systems, the development of decision-making systems.

Thus, the development of targets allows the establishment of a certain in our opinion, the introduction of these measures will allow:

1. Implement the transition from the Growth Strategy to the Growth Balancing Strategy;

2. Adequately to correct the directions and results of the activity of the customs body in the conditions of the changes taking place.

The mission of the Asian Development Bank (ADB) discussed with the State Customs Committee of Azerbaijan the possibility of the country's participation in the pilot project "Automated System of Customs Transit," the ADB Baku office told Trend on Friday.

According to the bank's representative office, the project is aimed at simplification of customs procedures for transit cargo transportation between the countries included in the program "Central Asian Regional Economic Cooperation" (CAREC).

The mission is aimed at discussing the possibility of participation of Azerbaijan, Georgia and Kazakhstan in this project. During the meeting with the representatives of the State Customs Committee of Azerbaijan, the parties discussed possible measures to simplify customs procedures for transit cargo transportation.

After joining in 2002 to the CAREC program, Azerbaijan invested about $ 3 billion in program projects. The Azerbaijani state allocated about $ 6 billion to carry out work on the development of the transport corridor within CAREC. Reconstruction of the East-West motorway by Azerbaijan within the CAREC program turned the country into a more efficient corridor between the Caspian and Black Seas, which promoted trade between Europe and Asia.

Thus, after analyzing the prospects for modernizing customs procedures, we can conclude that, thanks to their updating, countries will be able to get more money into their budget, which will help improve their financial systems.

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MEDICINE AND PHYSIOLOGY

HYPERANDROGENIC DISORDERS IN GYNECOLOGY, LITERATURE REVIEW

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Annotation. *In this article has been presented literature review describing gynecology hyperandrogenic disorders modern aspects. Hyperandrogenism is a multifaced syndrome that including not only the most common clinical signs in women as a hirsutism, acne and alopecia, but it is endocrine disorder that affect different organ system with significant metabolic and reproductive manifestations. The most commonly diagnosed hyperandrogenic pathology in reproductive-age women are ovulatory disorders and polycystic ovary syndrome (POS) which prevalence reach 20 %. The main treatment goal is suppression of ovarian androgens: administration of female sex steroids, in the form of either birth control pills or estrogens and progestins, or administration of gonadotropin secretion blocking agents. Present treatment recommendation including administration of combined hormonal oral contraceptives, spironolactone, metformin and bromocriptine.*

Key words: *hyperandrogenism, hyperandrogenemia, reproductive-age women, polycystic ovary syndrome, amenorrhea, metformin, oral contraceptives.*

The hypersecretion of androgens can be attributed to the ovaries, the adrenal glands, or the peripheral conversion of androgen precursors [1].

The manifestations of hyperandrogenism are detected and frequently classified relative to the medical specialty practiced by the attending physician [1]. For example, the dermatologist may note some of the cutaneous manifestations (acne, hirsutism, and alopecia), the gynecologist addresses the menstrual dysfunction (amenorrhea, oligomenorrhea, menorrhagia, and metrorrhagia) and the underlying ovarian dysfunction (anovulation, oligo-ovulation, pelvic pain, ovarian cysts, and infertility), the pediatrician deals with associated congenital adrenal hyperplasia (CAH) or ambiguous genitalia, the internist diagnoses the dyslipidemias, hypertension, and impaired glucose tolerance that may be associated with long-standing hyperandrogenemia, and the endocrinologist usually encounters patients with hyperandrogenism who have symptoms and signs of hirsutism, acne, and insulin resistance [1].

The most commonly diagnosed hyperandrogenic disoder in reproductive-age

women are ovulatory disorders and polycystic ovary syndrome (PCOS) [1]. PCOS has been estimated to affect 5 to 10 % of women in this age-group [1, 2] and according to the data of Yildiz B.O. et all [3] it prevalence could reach even 20 % of all reproductive-aged women when using Rotterdam criteria.

Hyperandrogenemia has been the common feature included in all three mainly proposed and employed diagnostic criteria put forward by the National Institute of Health in 1990, consensus criteria by the American Society for Reproductive Medicine (ASRM) and the European Society of Human Reproduction and Embryology (ESHRE) at Rotterdam in 2003, and more recently the Androgen Excess Society in 2006, which has asserted the inclusion of presence of clinical and/or biochemical hyperandrogenism to be imperative in diagnosis of PCOS [4, 5].

The diagnostic responsibility belong to the primary care physicians, pediatricians, and gynecologists, particularly those who deal with "adolescent gynecology," who first come in contact with these young patients [1].

Polycystic ovary syndrome has a strong genetic component as evidenced by clustering of PCOS in families as well as PCOS-like features in both male and female relatives of affected women [4, 6]. Although its exact etiology is unclear, PCOS is currently thought to emerge from a complex interaction of genetic and environmental traits [7]. Evidence from one twin-family study, providing by Vink J.M. et all in Germany [8], indicates that there is a strong correlation between familial factors and the presence of polycystic ovary syndrome. Familial prevalence of this syndrome and its associated phenotypes provides evidence of possible maternal transmission and genetic inheritance of this disorder [4].

The syndrome was first described by Stein I. F. and Leventhal M. L. in 1935 [9]. Over the past 25 years, internationally accepted diagnostic criteria have been developed for adults based on various combinations of otherwise unexplained hyperandrogenism, anovulation, and a polycystic ovary, which are all encompassed by Rotterdam consensus criteria [9]. These criteria generate 4 phenotypes, which fall on a spectrum of decreasing specificity and severity in Table 1 [9].

The first biochemical abnormality that was identified in women with PCOS was disordered gonadotropin secretion, with a prevalence of luteinizing hormone (LH) to follicle stimulating hormone (FSH) [10]. Studies of gonadotropin secretion in women with PCOS have established that women have augmented the release of LH in response to a gonadotrophin releasing hormone (GnRH) challenge with appropriate levels of FSH secretion [10, 11]. As the two cell theory of the ovary evolved, i.e., that the cal cells can only produce androgens under stimulation of LH, whereas granulosa cells can only aromatize androgens from this cells into estrogens under the influence of FSH, this preponderance of LH was thought to be the primary etiology of the syndrome [10, 11]. Excess LH led to excess thecal cell development and androgen production, but in the face of inadequate FSH stimulation of granulosa cell development and aromatase production, these androgens were not converted to estrogen leading to multiple abnormalities [10, 11].

Table 1

Diagnostic Criteria for PCOS in Adultsa [9]

1. Phenotype 1 ("classic PCOS")[b] a. Clinical and/or biochemical evidence of hyperandrogenism b. Evidence of oligoanovulation c. Ultrasonographic evidence of a polycystic ovary
2.Phenotype 2 (essential National Institutes of Health Criteria) a. Clinical and/or biochemical evidence of hyperandrogenism b. Evidence of oligoanovulation
3. Phenotype 3 ("ovulatory PCOS")[b] a. Clinical and/or biochemical evidence of hyperandrogenism b. Ultrasonographic evidence of a polycystic ovary
4.Phenotype 4 (nonhyperandrogenic PCOS) a. Evidence of oligoanovulation b. Ultrasonographic evidence of a polycystic ovary

[a] Rotterdam criteria; all involve exclusion of other causes of hyperandrogenism and anovulation.

[b] Androgen Excess–PCOS Society recognizes only hyperandrogenic phenotypes.

This theory explained the morphology of the ovary, hirsutism, and anovulation.

Androgen excess led to anovarian follicular arrest in the preantral stage, as estrogen is critical to the development and selection of a dominant follicle [10, 11]. Secondarily this resulted in the spillover of excess androgens into the circulating pool resulting in inappropriate feedback to the hypothalamic pituitary axis and a vicious feedback loop where excess LH leads to excess ovarian androgen production which in turn leads to further LH [10, 11]. Finally, the excess circulating androgen led to stimulation of the pilosebaceous unit increases sebum production, induces terminal hair differentiation, and in rare instances in the scalp lead to androgenic alopecia [10, 11].

In the ovary, steroidogenesis is a well-regulated process governed by the gonadotropins and signaling mechanisms occurring in the ovarian cells, androgen synthesis predominantly takes place in thecal cells which have LH receptors and subsequent signaling and activation of CYP17 enzyme convert pregnenolone and progesterone to dehydroepiandrosterone (DHEA) and androstenedione, respectively [4]. These androgens are further acted upon by CYP19 aromatase enzymes present in the follicle stimulating hormone stimulated granulosa cells to estrogens which are essential for normal physiological functions of the human ovary.

Histopathologically, polycystic ovaries typically consist of numerous follicles arrested primarily in the preantral and antral stages with thecal hyperplasia and follicular fluid accumulation subsequently forming cyst-like structures which line the periphery of the ovary giving it a string of pearls-like appearance [4, 9, 12]. Increased ovarian stromal volume along with many fluid filled follicles make these ovaries enlarged, a common morphological feature observed in PCOS women [4, 13]. In addition to thickened thecal layers, these follicles show increased steroidogenic activity [13].

The Endocrine Society advises clinicians to diagnose PCOS using the 2003 Rotterdam

criteria, although recommendations differ across guidelines [7, 14]. According to the Rotterdam criteria, diagnosis requires the presence of at least two of the following three findings: hyperandrogenism, ovulatory dysfunction, and polycystic ovaries [14].

Ovulatory dysfunction refers to oligomenorrhea (cycles more than 35 days apart but less than six months apart) or amenorrhea (absence of menstruation for six to 12 months after a cyclic pattern has been established) [7]. Uterine bleeding at intervals more frequent than 19 days or less frequent than 90 days is abnormal (Table 2) [9].

Table 2

Types of Abnormal Uterine Bleeding (AUB) Found in Adolescent PCOS [9]

Descriptor	Definition
Primary amenorrhea	Lack of menarche by 15 y of age or by 3 years after the onset of breast development[a]
Secondary amenorrhea	Over 90 d without a menstrual period after initially menstruating
Oligomenorrhea (infrequent AUB)	Postmenarcheal year 1: average cycle length >90 d (<4 periods/y) Postmenarcheal year 2: average cycle length >60 d (<6 periods/y) Postmenarcheal years 3-5: average cycle length >45 d (<8 periods/y) Postmenarcheal years 6 and more: cycle length >38-40 d (<9 periods/y)
Excessive anovulatory AUB	Menstrual bleeding that occurs more frequently than every 21 d (19 d in yr 1) or is excessive (lasts >7 d or soaks >1 pad or tampon every 1-2 h)

[a] Bone age of 15 y may be substituted for chronologic age in girls with earlier-than-average age at puberty onset.

[b] Encompasses frequent, intermenstrual, heavy, and/or prolonged AUB. Formerly termed "dysfunctional uterine bleeding."

A polycystic ovary is defined as an ovary containing 12 or more follicles (or 25 or more follicles using new ultrasound technology) measuring 2 to 9 mm in diameter or an ovary that has a volume of greater than 10 mL on ultrasonography, a single ovary meeting either or both of these definitions is sufficient for diagnosis of polycystic ovaries [14, 15].

AACE Hyperandrogenism Guidelines [1] showed that ovulatory dysfunction is common in young women with acne. In one study of women seen in consultation primarily for acne, 45 % of cases were associated with polycystic ovaries [1]. The presence of substantial numbers of terminal hairs on the lower back, sternum, abdomen, shoulders, buttocks, and inner thighs is considered abnormal [1]. Women with hirsutism may have increased levels of 5a-reductase [1]. Rapid onset and very high androgen levels should alert the clinician to the possibility of a neoplasm (adrenal or ovarian) [1].

In AACE Hyperandrogenism Guidelines [1] mentioned that virilization, characterized by clitoral hypertrophy, deepening of the voice, androgenic muscle development, breast atrophy, severe hirsutism, male pattern baldness, and masculine habitus, is associated

with severe hyperandrogenemia attributable to adrenal or ovarian tumors, hyperthecosis, or congenital adrenal hyperplasia.

Polycystic ovary syndrome treatment should be individualized based on the patient's presentation and desire for pregnancy [7]. Realized literature review demonstrated that most complete knowledges about discussed states treatment are presented in American Association of Clinical Endocrinologists medical guidelines "The Diagnosis and Treatment of Hyperandrogenic Disorders". One of the main proposed treatment goal is suppression of ovarian androgens: administration of female sex steroids, in the form of either birth control pills or estrogens and progestins, or administration of gonadotropin secretion blocking agents [1].

Combined hormonal oral contraceptives (OCs) are the most commonly used medications for the long-term treatment of women with PCOS and have been recommended by the Task Force and the Endocrine Society, the Australian Alliance, and the PCOS Consensus Group as first-line treatment for hyperandrogenism and menstrual cycle irregularities in women with PCOS [10, 16, 17, 18]. The use of third generation OCs in the treatment of ovarian hyperandrogenism appears promising in that little if any androgenic effect has been noted with desogestrel and norgestimate, the progestins used in these OC agents [1]. At AACE Hyperandrogenism Guidelines [1] noticed a major benefit of reduction in the incidence of endometrial and ovarian cancer in patients who use oral contraceptives [1]. Contraindications to their use may be a history of phlebitis, severe migraine, substantial weight gain, and the risk of increased insulin resistance [1]. Long-term use may mask severe ovulatory dysfunction, which may progress to anovulation and amenorrheic states that are more resistant to induction of ovulation [1].

Spironolactone is an antiandrogen that competes with testosterone and dihydrotestosterone at the androgen receptor level [1, 10]. The minimal dose should be 100 mg daily in divided dosage and may be increased to 200 mg daily as tolerated [1]. The combination of spironolactone and OCs is frequently used [1, 10]. The luteinizing hormone suppressive effect of OCs makes this combination treatment more effective than spironolactone monotherapy [1]. According to AACE Hyperandrogenism Guidelines [1] this combined drug strategy minimizes the frequently noted polymenorrhea when spironolactone is used alone. Some of the side effects include light-headedness, fatigue, mood swings, reduced libido, headaches, and mastalgia [1]. In patients with androgenetic alopecia, the use of spironolactone is effective in improving the rate of hair regrowth and preventing further scalp hair loss [1].

A survey of PubMed reveals > 30 meta-analyses of a randomized trial and > 70 systematic reviews covering the role of metformin therapy in the management of polycystic ovary syndrome, including ovulation induction, weight loss, menstrual control, miscarriage, and hirsutism [10, 19]. AACE Hyperandrogenism Guidelines [1] reported reduction in the manifestations of hyperandrogenism and improved menstrual function with administration of metformin. Metformin has been administered in conjunction with ovulation-inducing agents, such as clomiphene citrate, and has not been showed teratogenic effects [1]. Many studies have demonstrated the most dramatic

reduction in hyperandrogenism in obese subjects with PCOS; hence, the issue has been raised whether weight reduction alone accounts for this effect [1]. Questions have been posed about the reported efficacy of metformin in increasing insulin sensitivity in this type of patient because of the small numbers of subjects and questionable study designs in most reports dealing with this issue [1]. Recently, however, a carefully designed study suggested a definite positive effect of metformin in a relatively large population of patients [1]. The recommended dosage of metformin for treatment of hyperandrogenic states is the initiation of therapy with 850 mg (one tablet) in the morning with breakfast, and then increasing the dosage to 1,700 mg after 2 to 3 weeks in divided doses with breakfast and dinner [1]. Alternatively, metformin therapy can be initiated at 500 mg with dinner and increased to 500 mg twice and three times daily or to 1,000 mg twice a day as tolerated [1]. The most common side effects are gastrointestinal; they consist of bloating, nausea, vomiting, and diarrhea and frequently occur during initiation of treatment [1].

AACE Hyperandrogenism Guidelines [1] recommended for women with hyperandrogenism who have hyperprolactinemia using of bromocriptine, a dopamine receptor agonist, in a divided dosage of 5 to 7.5 mg daily [1]. Bromocriptine improves menstrual cyclicity in patients with hyperprolactinemia who have PCOS and may reduce some of the associated hirsutism, which is related to augmented production of adrenal androgen attributable to the hyperprolactinemia [1]. Treatment with bromocriptine should be initiated gradually so as to minimize initial light-headedness, hypotension, and nausea (vaginal or rectal administration can also reduce symptoms). Alternatively, use of cabergoline in dosages of 0.5 mg weekly or twice weekly may be associated with fewer side effects [1].

Hyperandrogenism remains an important problem because this multifaced syndrome including not only the most common clinical signs in women as a hirsutism, acne and alopecia, but it is endocrine disorder that affect different organ system with significant metabolic and reproductive manifestations. Hyperandrogenic disorders in gynecology consist of ovulatory pathology changes and polycystic ovary syndrome which prevalence reach 20 % in reproductive-age women. The diagnostic responsibility belongs to the primary care physicians, pediatricians, and gynecologists, particularly those who deal with “adolescent gynecology,” who first come in contact with these young patients that makes this syndrome multidisciplinary problem. Considering, that the strong influence of the gene component on development of discussed disease has already been proven, further development of gene medicine is possible to change modern treatment strategy.

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DEVELOPMENT OF CREATIVE ABILITIES IN FUTURE SPECIALISTS OF THE SOCIAL SPHERE IN THE PROCESS OF THEIR TRAINING AT THE INSTITUTIONS OF HIGHER LEARNING

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***Annotation.** The peculiarities of creative abilities of social sphere specialists and their development are discussed. The methods, techniques and forms of work when study in the institutions of higher learning are described. The foundations of formation of creative personality, professional creativity of future specialists are determined.*

***Key words:** creativity, creative personality, educational and creative environment, creative potential of the individual.*

Target settings. Over the last decade there has been a tendency to identify and investigate problems that affect the quality of obtaining higher education and contribute to the constant updating the training components by future specialists in the modern educational system. Among the important problems of the educational industry is the problem of training specialists for the social sphere, the specificity of which is in constant and direct communication and interaction with other people.

In the modern society, the training of specialists is oriented towards the formation of a person's creative thinking, needs to constantly improve them and independently replenish their knowledge. The training of the social sphere future specialists is intended to provide a high level of their education and social activity. Its aim is to develop ethical feelings, emotional culture and creativity that is, those qualities of the person who will contribute to raising the level of readiness of future professionals to perform their professional duties.

Innovative training of the social sphere future specialists requires priority changes in the formation of professionals of the new format, namely: creative, able to perceive and develop new ideas, ready to work in the environment of the interaction of different cultures with its growing mobility and democracy, capable not only to accumulate information, but also possess the ability to generate, implement, modify and distribute it.

The timely question arises as to the establishment of common principles for the

organization of the educational process: the individuation of education, its continuity, and the development of the creative activity of future professionals. Creativity is one of the most significant forms of human's psychic activity, which should be considered as a universal ability, ensuring the successful implementation of diverse activities. Creativity manifests itself as a special property of a person in his relation to subject activity, to other people and to himself. By mastering the phenomena of life in their own creative experiments, a person deeper understands his essence and integrity with the natural and social environment.

The dynamic transformations that take place in the socio-cultural and economical life of our country, increase the need for active and creative specialists who can independently nominate and solve various tasks under non-standard conditions. Today's education is based on an initiative-creative subject who independently analyzes a situation, chooses the aims and methods of their achievements, owns criticism and creativity.

The ability to transform experience obtained in the course of professional training is determined by a specialist's creativity in socio-economic sphere, which leads to the formation of such important qualities as tolerance, self-consistency, orderliness, ability to see and estimate situation from different sides, to overcome stereotypes in thinking and practical activities, variability of the decisions taken.

An analysis of recent researches and publications. Problems of forming a creative personality, professional creativity of specialists of different profiles are considered in a wide interdisciplinary context. Considerable attention in the modern psychological and pedagogical literature has been given to the questions of creative personality training (N. Guziy, V. Zagvyazinsky, V. Kan-Kalik, N. Kiychuk, S. Sisoyev, et al.), activization of educational and creative activity of students on the principles of creative pedagogy (D. Chernilevsky, O. Morozov), development of their creativity (E. Bazylevych, M. Nazarenko, et al.), creation of a creative educational environment in institutions of higher learning (K. Krechetnikov).

In psychology the substantiation of the notions creativity, creative work and activity, creative potential, types and structure of creativity, its criterion and principles of stimulation, stages and mechanisms of creative process itself became many scholars research subject (J. Adamar, K. Beittel, N. Kogan, S. Mednik, R. Sternberg, K. Taylor, E. Torrens et al.). domestic scientists - D. Bogoyavlenska, A. Brushlinsky, L. Vygotsky, M. Gnatko, E. Ilyin, A. Leontiev, B. Molyako, Ya. Ponomarev, S. Rubinstein, et al. made their contributuin to the problem-solving as well.

One of the tendencies of civilization development in the modern world is the demand of the society for creative personality with creative characteristics. Creativity is understood as the ability of a person to invent non-standard new ideas and approach to solving situations. Indeed, sub standard solution of problems, the ability to see something special in the ordinary, the ability to work in an unusual setting, quickly switch from one type of work to another – all these characteristics symbolize a person with a creative (divergent) thinking [6].

It is proved that creativity is considered as an important component of a professional's

personality, and professional creativity is connected with the ability of a person to find quickly and effectively apply non-standard, original creative decisions in professional situations, self-realization in a profession, and find enjoyment in it.

Thus, the use of creative tasks in the educational process contributes to the formation of the professional qualities of future professionals, produces an aspiration for independent thinking, the manifestation of his own initiative, the desire to make something new, better and better. At the same time, responsibility increases not only for their successes, but also for the results of collective labor, an adequate self-assessment of the personality, their capabilities, merits and limitations is formed.

In order to uncover the potential of students in the educational process, a collage technique (from french-gluing) was used, where the paper is pasted from various magazines or drawings of pictures, details on a certain topic. In addition, the collage can be supplemented by different records. The most common presentation and at the same time attracted the features of this method for the participants: beauty, brightness, spectacle, liberty, and most importantly - a huge pace of freedom.

The problem of creativity is considered by scholars within the framework of reflexive-humanistic psychology of collaborative work, introducing the concept of "creative uniqueness". It contains the idea of self-affirmation of a creative personality. Creative uniqueness is a process and a result of the development by a man his unique individual identity in the process of creativity as a necessary condition for the realization of his creative potential [2].

Problem definition. A contemporary social practice needs is a creative, initiative, self-sufficient, responsible expert in the social sphere who is able professionally build his relationships with people, adequately assess himself as a professional, ready for permanent professional development, further self-knowledge and self-realization in professional activity. In accordance with this, one of the important tasks of institutions of higher learning is the training of such a specialist.

On the basis of the above, we can formulate the task of the study: to reveal the peculiarities of the development of creative abilities of the social sphere future professionals in the process of studying in higher education institutions and involve them in active creative work, creating conditions for the full realization of the personality in the educational process, which can ensure the formation of important qualities that are the basis of professional and creative attitude.

Presentation of the main research material. Numerous investigators have tried to formulate the main qualities of any creative person. For all the variability of the wording, everyone says about the same thing: a creative personality is a free person, and a free personality is a person capable of being himself, to hear his "I". In the process of creativity a person acquires spiritual freedom, goes beyond the concrete, limited situation of being. Man, deprived of the ability to think creatively, to recognize, loses the sense of his individuality. Therefore, in the process of vocational training of future specialists of the social sphere, the emphasis should be on the development of individual and creative abilities of students, the conscious professional self-determination, professional mobility,

and adaptability to changes in the conditions of psychological activity.

The formation of creative personality is not provided automatically, as a result of a simple participation in the creative process, but at the expense of a well-meaning pedagogical leadership, timely assistance, in-depth analysis and friendly atmosphere. The teacher must strive in the learning process to create a creative atmosphere, an atmosphere of freedom and cooperation. The educational process should be organized as a creative activity of students through the formation of creative abilities in future specialists in the social sphere. As evidence suggests that creativity is a productive human activity, it is capable of giving birth to qualitatively new inventions of material and spiritual values of social significance, activity aimed at improving and enriching development [3, 7].

That is why the training of a modern specialist in the social sphere should be related to the image, the professional profile of the communicative and creative personality of the teacher, the prevention of his emotional burnout, the techniques of managing his own time and the methods of professional and personal self-education, etc.

Man can not just live and do his job; he must find the purpose in which his work and profession, and most importantly, she and her actions occupy a certain place in the profession, acquire a valuable change. Future psychological creativity can become such a point, because creativity gives energy, inspires, activates the activity of two brain pupils, balances the logical and intuitive processes of thinking, processes of accumulation and energy consumption, improves the physical, psychological, intellectual and spiritual condition of a person, promotes maximum self-realization (C Sysoev, V. Klymenko, V. Molyako).

The educational and creative environment as a compulsory personal and constructive factor is built on positive attitudes, on cultural universities, forms the ability to participate in creative and transformational social changes, "gives birth" to a new type of person with an innovative perception, tolerance and individualism, and great opportunity for progressive personality transformation.

The educational and creative environment of higher educational establishments should lead to charitable innovation changes, develop a heuristic potential, become an inexhaustible source of life-creativity of each of its participants, and act as an opportunity for the most complete self-realization of both teachers and students. The role of a teacher in creating an educational and creative environment is, of course, great. His position is the creation of conditions for the learning of these knowledge through the study, application, generation or residence of knowledge by future creative professionals of the social sphere in the process of their independent cognitive activity. In real practice of teaching for some teachers it looks like a revolution in a professional world view. This implies a change in stereotypes, pedagogical consciousness, the formation of new installations by teachers, new ideas about their role and the city in the process of vocational training of students - future professionals.

In our time, the priority direction in education is the education of a creative person capable of self-realization in rapidly changing socio-economic conditions. Creation of a supportive socio-psychological climate in the cultural and educational environment

of the institution of higher learning, aimed to development of the future specialist creative thinking in the social sphere involves the formation in the students skills of self-awareness of their own creative abilities, potential capabilities, skills and abilities of self-management by creative behavior in the relevant social environment.

In the course of study different methods to develop the creative abilities of future professionals are used. The main way of forming creativity is to formulate creative tasks and tasks that give a high degree of freedom in their resolution. Particularly effective is the use of creative tasks in a collective activity, which helps to determine the degree of activity of each student, his desire to participate in the general creative activity, the culture of communication and the peculiarities of relationships within the group.

Application of such technology requires the translation of the communication of the participants to the subject - the subject basis, "we processes" contribute to the support and development of the interests of one another and the subject of general work. The peculiarity is that participants exhibit self-esteem, initiative, learn to purpose-building, planning, organizing and self-control. The use of creative tasks in collective activity contributes to the enhancement of activity, the development of a sense of sociability, mutual assistance, the acquisition of communicative experience.

Independent students' activity becomes a source of creativity, search if it is facilitated by the installation of a teacher, which directs him to self-reflection of the purpose of action and search of answers, induces the participants to think, think and seek. In addition, due to the nature of the future professional activity, search activity is well shown in the researches of V. S. Rothenberg and V. V. Arshavsky, is the key to the stability of a man in stress situations [8].

Thus, the use of creative tasks in the educational process contributes to the formation of the professional qualities of future specialists, produces aspiration for independent thinking, the manifestation of his own initiative, the desire to make something new and better. At the same time, responsibility increases not only for their successes, but also for the results of collective labor, an adequate self-assessment of the personality, own capabilities, merits and limitations is formed.

In order to uncover the potential of students in the educational process, a collage technique (from French -gluing) was used, where the pictures from various magazines or drawings, details on a certain topic are stuck on a paper. In addition, the collage can be supplemented by different records. The most common presentation and at the same time attracted the features of this method for the participants are as follows: beauty, brightness, spectacle, liberty, and the most important is a huge pace of freedom.

This technique is economical in time and materials, collages can be made either individually or in a group. The main thing in collage is the opportunity to express one's thoughts, ideas, and understanding of the topic. This is also the original invitation to conversation practically on any topic, the space of fantasy, the discovery of different views and opinions. So, at classes students were given the task of performing a collage on the theme "Features of the creative person". The participants prepared interesting works and expressed their interest in discussing the psychological peculiarities of the

creative personality. Collective activity as it has been shown by numerous observation, allows each member of the group to show the degree of one's interest and activity in the work. Summarizing the benefits of collage technique, we can say that it is available and can provide equal opportunity for everybody, enhance self-esteem, expand creativity, develops the ability to express one's feelings and thoughts, and show the originality and uniqueness of a student's personality.

Traditional methods of teaching can serve as an effective techniques to develop students' creativity. For example, there is a question-and-answer method that has received the most widespread use in the practical activity of the institutions of higher learning. Students prepare questions on themes of the lectures that contribute to the development of their creative abilities, create a basis for the formation of strong and solid knowledge, activate their independent work, master course content. At the same time, it is necessary to strive for the future specialists to learn ask such questions which allow the narrator to remind the material previously studied, find out the depth of the material assimilation, show the creative dignity of the speaker.

This direction of a teacher's work with the students allows to increase the effectiveness of group studies, establish feedback "the teacher - the students" during the study of the topic, promote the activation of thinking, increase responsibility, development of creative self-development, which, of course, will come in handy for students in their future professional activities. The creative use of the traditional question-and-answer method dramatically changes the situation at the lesson itself - each student takes the most active part in discussing the problems that in its turn causes interest in the discipline under study.

Such an educational form of work as a dispute is especially effective for increasing the problem-creative nature of learning.

It should be organized whenever an in-depth study of issues organically related to the topics studied with a view to further creative thinking of facts, laws, and practices are necessary. The opinions of the participants in the public debates become for the teacher either a correct point in the presentation of a new material or subject of critical assessment.

"Brainstorming" method has also become widespread in the development of creative abilities of students. Its main idea consists in sharing among the different people the generative part of the mental act and the part of the supervisory-executive (one participant generates hypotheses with the prohibition of any criticism, while others evaluate their actual significance later).) On its basis, the method of "connecting diverse in one" was created. It involves teaching students the ability to generate analogues of different types and other ways, which allows to see a familiar in an unfamiliar and unfamiliar in familiar.

It is also necessary to pay attention to the "case-method", which is the most effective and common method of the students' active cognitive work. The method of specific situations analysis develops the ability to analyze the reality and production tasks. Faced with a specific situation, the student must determine whether there is a problem in it, in

what it is, and determine one's own attitude to the situation.

The use of active learning methods, game modeling and training activities determines the relationship between the creative nature of the student's cognitive activity and the creative orientation of professional work under modern conditions.

Practical placement helps students in one or another way to engage in a self-search, join pedagogical creativity and master different methods of research. Obviously, the tasks with concrete set-up questions, oriented on a deep, thoughtful application of theoretical knowledge in their own practical activities, become good supporters for creative search in their professional activities.

Formation of creative activity is a continuous process. Only systematic interaction of its participants, sequence in the formation of practical skills, develops steady habits, needs in the cognitive activity, facilitate successful activation in creative work, have a beneficial effect on the professional training of the future specialist in general.

The development of creative potential of students in the educational process will be more effective if the teacher supports the student's initiative and creates their self-reliance. In the process of learning, it is desirable to rely to positive emotions on the maximum level, it is necessary to stimulate the aspiration of students to independently choose the goals, tasks and means of their solution, as a person who is not accustomed to act independently, assumes responsibility for the decision, loses the ability to creative activity .

Researches show that predisposition to risk is one of the fundamental features of a creative personality, therefore, it is desirable to encourage in a fairly wide range predisposition to risky behavior and prevent the formation of conformal thinking. It is necessary to form the sensitivity to antilogies, apply more widely problem-based teaching methods, and in this connection the most important condition for the development of students' creativity is their research activity.

For successful development of students' creative activity, a teacher should himself be a creative person, have a general and pedagogical culture, and high scientific potential. The instructor must search for means and efforts for the development of creative abilities and other qualities of the student's personality, permanently attract students to scientific discussions, solve those scientific problems that personally significant for him; see in their students the nearest mates and co-workers, etc.

The auxiliary forms of the educational process in the institutions of higher learning, through which the students and learners acquire additional knowledge, skills and habits that deepen the knowledge of the basic sciences, expanding the horizons, also contribute to the development of creative activity of students. For example, elective courses, optional classes are able to fill, expand the capacity of the learning process in order to develop an individuality, creative orientation of students. With the help of elective courses and classes special programs are implemented that deepen knowledge, expanding the possibilities of educational professional orientation, specialization in certain types of activities.

The various scientific societies, creative associations, studios also provide an

opportunity for enrichment with new knowledge, where it is possible to get new facts, conclusions, generalizations. This is facilitated by free study, accompanied by the consideration of related issues, short discussions, expression of individual thoughts. Competitions, Olympiads, conferences are a real form of development of personality, revealing creative possibilities of students, their knowledge and certain skills.

The auxiliary forms of students' training allow us to combine the decisions of educational and creative developmental tasks, unite the students in the classes, fill the gaps, deepen ones' own positions and creatively improve themselves, developing special skills.

Creative personality is the result of all the way of life of a student, the result of his communication and common activity, his own activity. The development of creativity is inextricably linked with the upbringing of an active life position, which is determined by worldview views and socio-moral norms that are interrelated and mutually complementary.

Consequently, the main goal of education and learning is to create a professionally and socially competent personality capable for creativity and self-determination in a climate of a modest world, which should develop responsibility and desire for creation. Priority of the educational tasks decision in the system of educational activity is defined as "a focused process of education and training in the interests of a man, society, state".

The structure of the innovative activity in an institution of higher learning should include motivational, creatively-creative and technological component. With the development of scientific and technological progress, the amount of information compulsory for assimilation is increasing. The information is fast growing and requires constant updating. It follows that learning, which focuses primarily on remembering and preserving the material in memory, is only partially capable to meet modern requirements. Hence, the problem of the formation of such qualities of thinking that would allow the student to independently master the steady flow of new information, the development of such abilities that were preserved and after the completion of education, provided the opportunity for people not to retreat from accelerated scientific and technological progress. New methods and approaches to education, which could teach students how to study independently, find and learn the necessary information, think creatively are needed. The role of the teacher is to direct and summarize the work done by the student, point out errors in the process of performing tasks.

Conclusions. The teacher's creativity is most often associated with the discovery of new principles, methods, receptions, means of solving of the educational professionally-creative tasks. Students act as partners of the teacher's creativity. Therefore, the personality of the teacher and his creative potential are the leading factors in the improvement of educational process and the creative development of students. The higher is the creative potential of the students, the more complex are the professional-creative tasks appearing before the teacher. Consequently, there is a need for self-improvement, mobilization of one's own creative abilities, the desire to experiment, conduct pedagogical search for new creative solutions. The effectiveness of individual's creativity upbringing under

other equal conditions will be more effective if the teacher, in mutual relations with the student, will show optimism and faith in his strength and creative ability.

In our opinion, creative self-realization is the assertion of the future specialist himself as a unique personality, realization and development of his creative abilities in the process of vocational training.

Every future specialist in the social sphere must become a creative person, revealing the creative potential of the personality of the specialist, creative self-realization in the professional activity is an important indicator of the growth of his professionalism. Awareness of practical skills considered as characteristics of the creative potential of the future specialist personality and formation of readiness for creative professional activity is the basis of qualitative education of the modern social sphere.

Thus, modern life requires from a person not routine, habitual actions, but mobility, flexibility of thinking, rapid orientation and adaptation to new conditions, creative approach to solving problems. The individual's creative skills should be recognized as the main part of his intellect, and the task of their development is one of the most important tasks in the upbringing of a modern human being. In this regard, the most important prerequisite for improving the efficiency of work in the institutions of higher learning is the creation of the necessary conditions for creative learning by each student, the formation of his creative thinking and independent activity.

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MICROBIOLOGICAL CHARACTERISTIC OF THE EXPERIMENTAL USE OF "AUTOBIOTIC" ON THE MODEL OF ANTIBIOTIC – INDUCED DYSBIOSIS IN OLD RATS

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Annotation. *The results of the use of autobiotics in laboratory rats are described. It is shown that early correction of intestinal dysbiosis in rats against the background of using an autobiotic. More pronounced antagonistic properties of autobytic strains of lacto-and bifidobacteria relative to potential-patogenic microorganisms – one of the factors in the development of the dysbacteriosis clinic – have been revealed.*

Key words: *autobiotic, dysbacteriosis, gut microflora, therapy.*

Introduction. The human microbiota is the aggregate and a ratio of the symbiotic microorganisms, inhabiting an organism – bacteria, archaeal and eukaryotic microorganisms, which have (take) a considerable effect on the human physiology and health. The gut microbiota (a part of the gastrointestinal tract, GIT) is the most numerous and studied. The intestinal microbe forms the collective system of genes, consisting of the trillions of microorganisms, which constantly exist and changes in a gastrointestinal ecosystem. The interaction between a human body and microbiomes is very complicated and multifactorial [1, 5].

The gut microbiota actively affects the transformation processes of the molecules of proteins, fats and carbohydrates, synthesis of vitamins in the GIT, intestinal peristalsis regulation of, takes part in the processes of detoxication, regulates permeability of some substances through the mucous membrane of the gut. Studying of the interrelation between the gut and the brain, that is the so-called gastrobrain axis (gut-brain-axis), by means of which the brain has an impact of the function of gastrointestinal tract and the last one – vice-versa, is modern and relevant [1, 3]. At the same time, the main basic components of the microbiota-gut-brain axis is the central nervous system, neuroendocrinal and the neuroimmune systems, the autonomic nervous system, and the system of the nerve ganglia of the intestines and the gut microbiota. These components form a complex multiple-factor network, by means of which the signals from the brain can affect not only the motor, sensory and secretory activity of the intestines, but also its

microbiota. And on the contrary, visceral signals from the microbiota-mediated area of intestines, significantly influence brain functions [6].

The signaling pathway of the microbiome – CNS axis is functioning by means of the studied regulatory mechanisms of nourishment and saturation. Changes in the dietary intake of the organism affect the availability of various nutrients for the intestinal microflora and, its qualitative and quantitative structure changes appropriately [1, 8].

It is important to emphasize that the probiotics bacteria, applied at certain human diseases and morbid conditions colonize the intestines, can affect the central nervous system through the products of a number of neurotransmitters and biological substances: serotonin, melatonin, gamma-aminobutyric acid (GABA), catecholamines, histamine and acetylcholine. A part of these substances is capable to take effect not only on the mesenterial, but, first of all, on central nervous system [4].

The results of practical studying of the interaction of the microbe-intestines-brain are also extremely important in development of the principles of prevention and treatment of not only intestinal disorders, but also such pathogenetic difficult diseases of the central nervous system as schizophrenia, Alzheimer's disease or Parkinson's disease.

But at the present stage of medical science intestine dysbacteriosis (dysbiosis) is considered first of all, as a clinical set of disorders of the macroorganism that is characterized by the changes of the quantitative and qualitative structure of the microbiota (microbiocenosis disorders). Our research was devoted to studying of the separate tasks of the issue. The determination of the condition of the GIT microbiocenosis changes of laboratory rats in dynamics of the reproduction of experimental dysbacteriosis of the II degree, and the use of "autobiotic" with the medical purpose, – the agent, which contained the representatives of its own indigenous intestinal microflora of laboratory animals, became the purpose of this work.

Materials and methods. Modeling of thee gut microbiota dysbiosis or intestinal dysbiosis of the II degree was caused by the results of the previous researches of the gut microbiota of elderly people and the patients, suffering from Alzheimer' s disease according to which in these patients the development the intestinal dysbiosis of the II-III degree dominated [9.10].

Experiments have been made with the quantity (n = 25) of white not pedigree rats (at the age of 26 ± 1 month), with respect for all norms and rules of carrying out experiments with animals (reference). The control group consisted of the white rats aged 25 ± 0.3 months (n = 16). Before the beginning of the experiment (dysbacteriosis modeling), inoculation of excrements of intact white rats of differential and diagnostic, selective and special media for the purpose of determination of the quantitative and qualitative structure of their gut microbiota were carried out. The animals before the beginning of the experiment, taking part in research conditions of intestines dysbiosis served as control. The animals, included in the experiment were divided into 3 groups. The first group was made by old rats (n = 6) with the physiological dysbacteriosis of the II degree, associated with the age. They kept a standard diet of the vivarium, and in addition, within two weeks (daily once up to 12 h. per day) they were orally taking the autobiotic

solution (108 CFU), made of their own strains bifidus- and/or lactobacteria, isolated from the animals before carrying out experiments with the animals.

In the experimental animals of the 2nd and the 3rd groups the development of experimental intestinal dysbiosis of the II degree was induced. For this purpose a therapeutic dose (0.2 ml) of the solution of ciprofloxacin antibiotic was the white rats were intraperitoneally introduced within 7 days. After that, in addition, the animal of the second experimental group (n = 8) within two weeks (daily, once time during the first half of the day) was orally taking a mix of the pharmaceutical pro-biotic drugs, containing lactobaciteria (the microbic mass of live lactobacteria of L. plantarum or L. fermentum, frozen-dried) and bifidus bacteria in the volume of 15 ml, containing bifidus bacteria and lactobacteria in the number of 108 CFU/ ml.

In the third group (n = 8) instead of a probiotic within two weeks the solution of an autobiotic was introduced in the volume of 15 ml; it was made of its own strains bifidum- and/or the lactobacteria (108, CFU each strain), isolated from the animals to modeling of intestinal dysbiosis [patent № 10/2366].

The choice of a pro-biotic agent for the animals of the second group and an autobiotic – for the animals of the other groups was based on the results of the bacteriological research of the quantitative and qualitative structure of the indigenous microbic gut flora on the 3rd day of determination of the clinical symptoms of dysbacteriosis. According to the results of disco-diffusive method pro-biotic strains of Bifidumbacterium spp. and Lactobacillus spp., were used as bioindicators, while modeling dysbacteriosis (in the animals of the 2nd and 3rd groups), who were sensitive to the effect of ciprofloxacin (d of the zone of growth inhibition of cultures ≥ 22 mm).

For the purpose of treatment of dysbiotic changes a probiotic (the 2nd group) or an autobiotic agent (the 3rd group) with the quantity of bacteria of the indigenous microbiota, corresponding to 0.5 units, diluted in the sterile distilled water was applied. (According to McFarland's standard).

During the whole experiment the physical activity, body weight of the animals, their appetite (an amount of the eaten food), the nature of their stools were studied. On the 3rd, 5th, 9th, 14th and 17th day of the experiment the samples of animal's excrements for carrying out microbiological by the intestines microbiocenosis research were collected.

The samples of excrements (one from each rat of all three groups) were collected in sterile containers and bacteriological researches on a standard technique were conducted at once [11]. The sample of excrements was weighed, homogenized in 0.85% sodium chloride solution, obtaining the initial cultivation 10-1. 9 tenfold dilutions in physiological solution (before cultivation 10-10) were made of it. Then the cultivation with tenfold dilution of excrements right after their preparation was carried out.

The statistical data processing was carried out by means of the computer STATISTICA (Statsoft) program. The reliability of differences between the studied groups was determined by Student's t-test after the analysis of the division on normality. The distinctions, corresponding to the value of the error $p<0,05$, were considered statistically reliable.

For the integrated assessment of the microecological microflora characteristics the following indicators were used: species richness index (SRI) – the average quantity of the species, which are a part of the biocenosis; stability indicator (S) – identification of a share of different types in the structure of the biocoenosis (S = (p / P) x100%, where S – the stability indicator, p – the number of examinations, containing the studied species; P – the total number of examinations). Interpretation was carried out according to the following data: >50% – the constant species; 25-50% – additional species view; <25% –accidental species, and a range of the opportunistic microorganisms (OM) [2].

Results and their discussion. In the analysis of the data of bacteriological and mycologic researches of the gut microbiota of research age animals the significant changes in the structure of the microbiocenosis in comparison with the results of the study of intact animals have been revealed. In all old rats dysbacteriosis of the II degree was observed; the quantity and frequency of identification of the representatives of both obligate and transitory microflora changed. In spite of the fact that bifido-and lactobacteria, had appeared as a part of the gut microflora in all experimental animals (S = 100%), their quantitative contents in compliance decreased – bifidobacteria to lg 6.9 ± 0.2 against lg 8.7 ± 0.3 CFU /g in intact animals, and lactobacteria – lg 5.4 ± 0.1 against lg 7.5 ± 0.3 CFU /h. Except such changes in the quantitative and qualitative structure of the indigenous microbiota, namely bifido- and lactobacilli, in all studied rats of the second (II) group against the background of ciprofloxacin antibiotic application, the reduction of the quantity of Escherichia coli with the normal enzymatic activity by 1.23 times (to lg 5.3 ± 0.2 CFU /h) ($p<0,05$) in comparison with the indicators of intact animals was observed and at the same time ($p<0,05$) the quantity of microorganisms of Escherichia coli with the reduced enzymatic activity and quantity of OM – Proteus spp., Klebsiellaspp., Pseudomonas spp., S. aureus and opportunistic pathogenic fungi of the genus Candida considerably increased in 55% of the studied species of animals.

Studying the results of the observations, concerning the physical activity, body weight of animals, appetite (an amount of the eaten food), the nature of stools it should be noted that in the majority of laboratory rats with intestinal dysbiosis, , reproduced by using of the ciprofloxacin and other research groups, the phenomenon of polyfecalia was observed, in 62 5% of cases – a change in the consistence of stools, in 86.4% – bad appetite, in 68.2% – weight reduction by 30 ± 1.2% ($p<0,05$).

In the rats of the first (I) research group after introduction of per os of the autobitic strains of Bifidumbacterium spp. and Lactobacillus spp. their quantity increased on the 9th day of the experiment to the next indicators: bifidobacteria to lg 7.3 ± 0.4 CFU /g; lactobacteria – lg 6.2 ± 0.3 CFU/g, that is 1.15 times more than before autobiotic treatment. The complete restoration of the studied indicators of the indigenous gut microflora of the rats from the first (I) group to the indicators of intact animals was observed only on the 14th day. Besides, in the rats of the first (I) research group ($p<0,05$) the quantity of OM of the genus Klebsiella, Proteus and Escherichia coli with the low enzymatic activity authentically decreased on the 9th day of the experiment. On the 14th day of the experiment in 66.7% of the rats of this group in the gut microbiota

the representatives of Escherichia coli with the low enzymatic activity were completely absent. The evident facts testify to the high level of the antagonistic activity of autobiotic strains of Bifidumbacterium spp. and Lactobacillus spp. in relation to OM that has been proved in in vitro experiments. Besides, when studying the level of the adhesive activity of Bifidumbacterium spp. and Lactobacillus spp. strains, separated from the rats of the first group on the 14th day of the experiment it hadbeen determined that 87.3% from them showed the average or high level of adhesion to cells.

While examining the general condition of the white rats of the first (I) group, it has been revealed that on the 16th day from the start of the autobiotic intake all the animals of this group were observed to have their completely restored weight, dyspepsia symptoms disappeared, and the other functions of animals were within norm.

All the experimental animals of the second (II) and the third (III) research groups after the effect of ciprofloxacin, which was used for the purpose of dysbacteriosis modeling showed bad appetite, and 68.2% – weight reduction by 36 ± 1.4%. The dynamic research of the changes of the structure of the gut microflora of animals, against the background of the carried-out treatment by various agents showed that in rats of the second (II) group, the quantity of Bifidumbacterium spp. and Lactobacillus spp. authentically did not increase on the 9th day of the experiment, that is on the specified scheme of probiotic introduction. The reliable ($p<0,05$) increase was observed only in the animals of this group on the 14th day, but it did not reach the quantitative indices of intact animals. At the same time, on the 9th day in the rats of the second (II) group a reliable ($p<0,05$) decrease in the quantity of opportunistic microorganisms (OM), including the representatives of Escherichia coli with the low specific enzymatic activity in intestines was observed. Besides, in all the animals of this (II) group, having coagulase-positive staphylococcus during the initial stage of the experiment they were already absent on the 17th day of the experiment.

While studying the adhesive and antagonistic activity of pro-biotic strains of Bifidumbacterium spp. and Lactobacillus spp. in relation to OM separated from the excrements of the animals of the second group it has been determined that they owned either the low, or average level of the activity and at the same time the high level of the antagonistic activity concerning Proteus spp., Klebsiella spp., Pseudomonas spp., S. aureus and the low level of antagonism concerning the fungi of genus Candida. The longer period of the gut microbiota restoration of the second group of animals in comparison with other groups is explained by it. It is also necessary to note that in the animals of the second (II) group dyspepsia symptoms were observed up to the 13th -14th day (normalization took place on the 15th -16th day) of the experiment, and appetite restoration – on the 17th day of the study.

In experimental animals of the third (III) group after the oral administration of autobiotic strains of Bifidumbacterium spp. and Lactobacillus spp., that is “Autobiotic”, the restorative dynamics of the quantitative and qualitative structure of the gut microbiota of animals was the following: a reliable ($p<0,05$) increase in the quantitative contents of bifido- and lactobacteria, according to lg 8.1 ± 0.3 CFU/h and lactobacteria – to lg

6.4 ± 0.3, CFU. A reliable ($p<0,05$) reduction of the quantitative contents of OS on the 13-14th days of the experiment. It should be noted that in 25% of the rats of this group, Escherichia coli with the low enzymatic activity was sowed in high concentrations till the 9th day of the experiment, and ($p<0,05$) the indicator of their isolation authentically decreased on the 14th day of the experiment.

The analysis of the adhesive and antagonistic activity of Bifidumbacterium spp. and Lactobacillus spp. strains(autobiotic) in relation to OM, separated from the animals of the third group has showed that 100% of strains of these bacteria owned the average or high level of adhesion and the low level of the antagonistic activity, concerning the studied representatives of OM.

The complete restoration of the consistence of fecal boluses, the appetite of the animals and the physiological activity of rats of the third experimental group was detetermined on average on the 14th day of the experiment (from the 10th to the 15th day of the experiment).

An important microecological indicator that can characterize the intestines microbiocenosis homeostasis in general is species richness index (SRI). In the analysis of the material from the laboratory animal of all the groups SRI was counted for the representatives of OM. After the carried-out treatment it has been determined that in the first (I) group of laboratory animal SRI fluctuated ranging from 1.6 up to 1.8 r.u (reference units).; in the second (II) – from 1.7 to 2 and only in the representatives of the third (III) group – 1.4 to 1.7.

Conclusions. Thus, the obtained results demonstrate the that oral application of eubiotic strains of Bifidumbacterium spp. and Lactobacillus spp. (Autobiotic) against the background of intestines dysbiosis of the II degree in laboratory rats promotes the faster homeostasis restoration of the gut microflora, overcoming dysbiosis and its consequences, which confirms the restoration of separate physiological functions of the organism of experimental animals and the activity of separate microorganisms' functioning.

For this reason, the development and use of autobiotic therapy is an urgent task of the present stage of gastroenterology.

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MEDICO-SOCIAL AND GENDER AND AGE-RELATED FEATURES OF ACUTE SINUSITIS PHARMACOTHERAPY

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Annotation. *It was determined that acute rhinosinusitis is a sufficiently widespread disease in the otorhinolaryngology of Ukraine, especially in Kyiv, Kharkiv and Rivne regions, and with the lowest prevalence in the Zaporizhzhya and Kirovograd regions for the research period of 2012-2017. It has also been found that acute rhinosinusitis affects men as and women with an average age of 37.0 ± 5.5 and 42.0 ± 24 respectively. Modern approaches to the pharmacotherapy of acute rhinosinusitis are carried out in accordance with the protocol for the provision of medical care to patients and are comprehensive and directed at the main components of the etiopathogenesis of the disease. But it is necessary to update the approaches to treatment of acute rhinosinusitis constantly, taking into account the latest researches on pharmacotherapeutic support of patients.*

Key words: *the incidence of acute rhinosinusitis, regions of Ukraine, pharmacotherapy of acute rhinosinusitis*

The problem of acute inflammatory diseases of the upper respiratory tract, acute rhinosinusitis, in particular, is one of the pressing problems of modern otolaryngology. In recent years, there has been an increase in the frequency of nose and sinus disease, which is manifested by an increase in absolute (morbidity and prevalence). Rhinosinusitis is more often the cause of persistent headache, discharge from the nose, which significantly impairs the patient's quality of life; In addition, this pathological process can provoke a number of complications, among which the most common meningitis and brain abscess [1].

Attention is drawn to the high frequency of diagnostic errors in the examination of such patients, therefore, more than 70% of patients with complications of sinusitis do not receive adequate therapy on time, and after being admitted to hospital, indications for emergency surgical intervention are determined [2].

The main complaints of the patient are directed to nasal congestion, nasal discharge or postnasal flutter, pressure sensation, overflow and pain in the sinuses area, general weakness, reduction or loss of smell, possible toothache and sore throat, etc. An important aspect in collecting the history of the disease is the information on the presence of severe symptoms (fever ≥38 ° C and purulent discharge from the nasal cavity for more than 3 days), information on traumas and upper respiratory tract infections, as well as data on allergies (allergic rhinitis) and bronchial asthma [3].

Epidemiological studies conducted in many European countries have shown that the incidence of allergic rhinitis has grown tenfold in the last decade [4]: the results of

these studies indicate that 10-15% of the population suffer from the AR in developed countries [5]. In this case, AR is more common in urban residents, which is associated with an increase in air pollution in metropolitan areas. It has been established that AR can provoke development of other diseases of the respiratory tract and ears: yes, in 24% of cases, AR is a risk factor for the development of acute and chronic middle ear otitis, and in 28% of cases, chronic rhinosinusitis [6]. Thus, it may be noted that one of the important factors in the development of rhinosinusitis is allergic rhinitis, which is typical for residents of large cities.

The purpose of the study was retrospective analysis of the acute rhinosinusitis incidence in different regions of Ukraine, the gender- and age-related analysis of patients with acute rhinosinusitis, and identification of modern pharmacotherapy trends.

Materials and methods of research. The research was based of data from the statistical reporting of the SI "Center of Medical Statistics of the Ministry of Health of Ukraine" about the level of primary morbidity and prevalence of acute rhinosinusitis in adults for the period 2012-2017 [7]. Regarding the assessment of the gender-age characteristics of patients with acute sinusitis, an analysis of medical cards of inpatients (form №003/o) was carried out in the number of 431 (fixed gender and age). The study used bibliosemantic and medical-statistical methods [8]. A comparative analysis of European and World standards of acute rhinosinusitis treatment was conducted.

Research results. Analysis of the medical statistics center data on the prevalence of rhinosinusitis in Ukraine for the period from 2012 to 2017 in the adult population identified several contradictory information (Fig. 1). Thus, the prevalence of the disease varied from 427.3 cases per 100,000 population in 2014 to 468.7 cases in 2016 when analyzing data for 6 years of research. Data on the prevalence of acute rhinosinusitis in Sevastopol, the Autonomous Republic of Crimea and parts of the occupied territory of Ukraine since 2014 were not determined.

In the analysis of data it was determined that the highest prevalence of acute rhinosinusitis among the population was registered in Kyiv 1095.7 cases per 100,000 population - on average for 6 years period.

Also, high rates are typical for Kharkiv and Rivne regions during the entire research period. In the Kharkiv region 984.0 cases per 100,000 population were registered in 2012, and this figure increased to 1028.3 cases in 2017. Nevertheless, in the Rivne region we observed a tendency towards a decrease in the prevalence of acute rhinosinusitis during the research period. There were 799.5 cases in 2012, then 614.0 cases per 100,000 population in 2017, but still the indicator was quite high compared to the other regions of Ukraine.

In the Dnipropetrovsk region, we recorded a significant increase in the prevalence of rhinosinusitis from 510.8 cases in 2012 to 754.5 cases per 100,000 population in year 2017.

Thus, analyzing the data obtained, we noted the contradictory nature of acute rhinosinusitis development related to the region (Kharkiv and Dnipropetrovsk oblasts and Kyiv). We note the correlation of the metropolis majority and the number of cases.

However, in such an industrialized region with an increased level of allergenization of the population as Zaporizhzhya region, the level of acute rhinosinusitis disease is reduced.

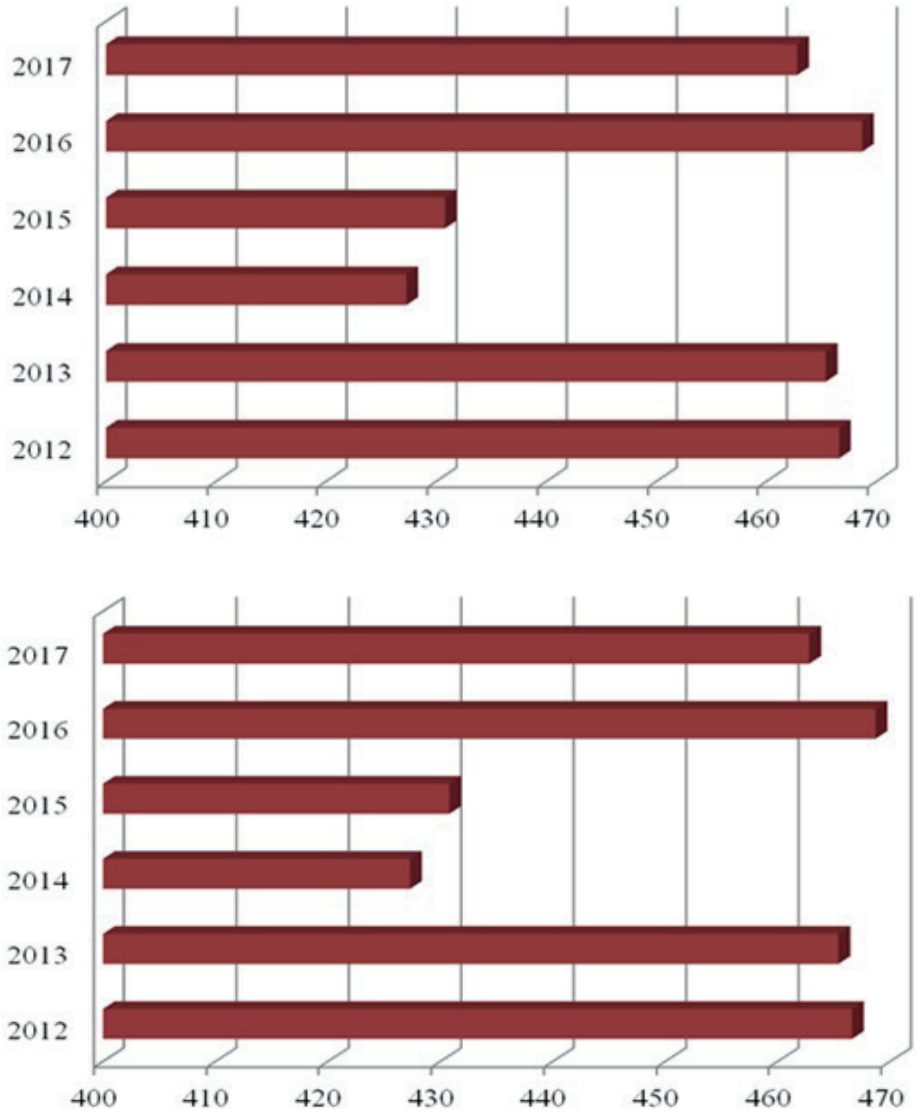

Fig. 1. Indicators of acute rhinosinusitis prevalence in Ukraine from 2012 to 2017.

The lowest level of acute rhinosinusitis is observed in 2012 in Zaporozhye (188.2 cases per 100,000 population) and Kirovograd (268.2) regions. Analysis of data in 5 years, has shown a similar trend of 207.7 and 264.6 cases per 100,000 population, respectively, for these regions.

The parameters of the age and gender clinical picture can be described as follows. So, when analyzing 431 medical cards, it was revealed: 233 middle-aged people 37 ± 5.5 and 198 women 42+ 2.4 years old. Thus, it may be noted that there is no gender and age difference between patients with acute rhinosinusitis.

It was also observed that in patients with acute rhinosinusitis one of the most frequent complication is a genyantritis observed among men (77 cases) and women (62 cases), which corresponds to 33.0% and 31.3%, respectively, among all patients. The ratio of hemi-sinusitis, frontitis and pansinusitis ranged from 1.5% to 5.8%, without significant difference between men and women.

It is known that there are following types of acute rhinosinusitis in the clinic nowadays: viral, postvorous and bactericidal. Thus, the pharmacotherapy of acute rhinosinusitis (ARS) is a comprehensive and directed to the main components of the etiopathogenesis of the disease in accordance with the medical care guidelines (Table 1).

Table 1

Drugs with the proved effectiveness in treating ARS (according to the requirements of evidence-based medicine) [9]

Treatment	Recommendations
Antibiotics	Yes (in acute bacterial rhinosinusitis (ABRS))
Topical corticosteroids	Yes (only in post-viral MS)
Topical corticosteroids in combination with a/b	Yes (only in ABRS)
Systemic corticosteroids in combination with a/b	Yes (only in ABRS)
Irrigation therapy	Yes (as symptomatic therapy in all types of ARS)
Phytotherapy	Yes (at viral and post-viral RS)
Nonsteroidal anti-inflammatory drugs	Yes (at viral and post-viral RS)
Acetaminophen (paracetamol)	Yes (at viral and post-viral RS)

However, modern scholars, family physicians and otorhinolaryngologists continue to seek optimal treatment for acute rhinosinusitis, depending on the etiology and clinical features of the disease, taking into account evidence-based medicine and the emergence of new randomized clinical trials. For example, in Spain, not only the features of acute rhinosinusitis pharmacotherapy were studied, but also the need to determine the impact of the disease upon the quality of patients life. The importance of monitoring of this category of patients for further clinical maintenance and differential diagnosis of complications, including neoplasms is also discussed [10].

Researchers from the People's Republic of China found that comparison of ARS treatment with ceftriaxone and amoxiclav (825 mg / 125 mg) in 120 patients, registered a significant pharmacotherapeutic advantage of ceftriaxone (1000 mg) by 3-4 day of the disease [11].

In Germany, researchers analyzed the use of local corticosteroids in patients with acute rhinosinusitis and polyps in the nasal cavity. The study involved 26,768 patients

with acute rhinosinusitis and 516 patients had nasal polyps. The use of corticosteroids in patients with acute rhinosinusitis has been found to be ineffective, however, in the complex pharmacotherapy of nasal polyps with rhinosinusitis, they are first-line agents with high efficacy [12].

In a study of macrolides use in patients with acute rhinosinusitis by Chinese scientists, it was shown that in the presence of macrolides antibacterial activity, a low proportion of efficacy was observed [13].

In Iran, a systematic review on the evaluation of the herbal medicines efficacy and safety for the treatment of patients with acute rhinosinusitis was conducted and published. The result of this study has shown that some medicinal plants can be sufficiently effective in the complex treatment of acute rhinosinusitis [14].

Conclusions. Thus, it was determined that acute rhinosinusitis is a sufficiently widespread disease in otorhinolaryngology of Ukraine, especially in Kyiv, Kharkiv and Rivne regions, and with the lowest prevalence in the Zaporizhzhya and Kirovograd regions for the research period of 2012-2017. It has also been found that acute rhinosinusitis affects both men and women with an average age of 37.0 ± 5.5 and 42.0 ± 24 respectively. Modern approaches to the pharmacotherapy of acute rhinosinusitis are carried out in accordance with the medical care guidelines and it is a complex treatment directed to the main chains of etiopathogenesis of the disease. However it is necessary to update the approaches to acute rhinosinusitis treatment constantly, taking into account the latest researches on pharmacotherapeutic support of patients.

Prospects for further research. The next stage of our research is the study of clinical and economic rationale for the acute rhinosinusitis treatment at the level of inpatient and outpatient care.

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CLINICAL AND MORPHOLOGICAL SUBSTANTIATION OF ELIMINATING OF THE ALVEOLAR BONE DEFECTS USING BIOACTIVE LONG-ACTING COMPOSITE "MEDICAL GLUE"

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Annotation. *At the present stage periradicular chronic inflammatory lesions contribute to the development of odontogenic cysts of jaws and is a leading factor in the partial or total loss of teeth, which leads to changes in the morphology of the alveolar bone of the jaws and adjacent tissues with the formation of bone defects. The purpose of this study was to substantiate of eliminating of the alveolar bone defects using bioactive long-acting composite "Medical Glue". The study involved 42 patients (w-15, m-27) with radicular cysts of the jaws, an average age was 33.8 ± 9.1years. Additional method of study was computed tomography (CT) with the determination of the size of lesions of bone tissue, an X-ray density assessment of the bone tissue in the cystic defect on the Hounsfield index (HU). According to the density of bone regenerate on 12 months after the operation, this figure was 369.2 ± 47.7 units HU (p = 0.38 versus 370.8 ± 84.7 units HU in a blood clot group), indicating a compliance of terms and phases of material`s biodegradation and reparative osteogenesis, its biocompatibility and efficacy.*

Key words: *odontogenic cyst, alveolar bone defects, bioactive composite, folic acid, implantation, biodegradation, computed tomography, reparative osteogenesis.*

Introduction. At the present stage periradicular chronic inflammatory lesions contribute to the development of odontogenic cysts of jaws, a quantitative advantage of which is given to radicular and residual cysts (up to 84%), which during exacerbation stage cause abscesses, phlegmon, periostis and osteomyelitis of the maxillofacial area, and is a leading factor in the partial or total loss of teeth, which leads to changes in the morphology of the alveolar bone of the jaws and adjacent tissues with the formation of bone defects [1, 2, 4, 5, 6].

From a biological point of view, the restoration of the alveolar bone integrity is prevented by a number of interrelated factors: the preservation of pathogenic microflora, the inhibitory effect of the epithelium on the regeneration of bone tissue, low reparative potential of solid tissues of the periodontal complex due to the absence of osteogenic precursor cells of the bone marrow in this region [3,7].

The correlation between the size of the bone defect, the term and the quality of its

healing is proved. The size of the pathological bone defect more than 10 mm worsens the conditions for reparative bone regeneration and increases the risk of complications in the early stages and remote postoperative period [8]. In addition, large periradicular defects are sometimes accompanied by displacement of teeth, which can be continued throughout the healing period and depends on the anatomical structure, localization and functional load of the teeth [1].

According to modern clinical protocols, elimination of defects of the alveolar bone is preferred to the surgical methods of directed bone and soft tissue restoration, which involves the use of: free auto-bone graft and / or connective tissue graft to fix it on the alveolar sprout, bone substitute materials, including synthetic bioactive composites, membranes, distraction methods, and a combination of these methods, etc. [9, 10, 11, 12].

On the basis of the Institute of Macromolecular Chemistry of the National Academy of Sciences of Ukraine, Kyiv, the bioactive long-acting composite based on polyurethane mesh – Medical Glue (MG) has been received, which has the ability to dissolve, as well as polymerize in the bone cavity, takes its form and forming adhesive bond on the polymer–bone–soft tissue boundary [13].

After polymerization, the microporous structure (pore size: 231 – 806 μm, interconnected mesopores: 45 – 270 μm) of the composition contributes to stability and gradual penetration of the newly formed tissues back into the depth as the material biodegrades, the adhesion of blood cells and regenerative cells to its surface (Tabl. 1), the diffusion of biological fluids, which creates a potential opportunity to optimize conditions for the course of reparative osteogenesis

Table 1

Dimensions of cells and cellular elements (μm) by V.I. Sevastyanov, 1999

Erythrocyte	7,5	**Lymphocyte**	4,5-12
Neutrophil	9-12	**Monocyte**	12-18
Basophile	9	**Platelet**	2-3
Eosinophil	12-17	**Fibroblasts**	20
Collagen fibers	length – 300 thickness – 1.5	**Macrophage**	10-30

It has characteristics of strength and microstructure, close to the natural spongy part of the bone. The biocompatibility of the composite is due to the proximity of the chemical composition of the urethane group – CO-NH – to the peptide group of proteins [13, 14].

The process of biodestruction of the bioactive composite MG occurs as a result of a combination of non-enzymatic hydrolysis and cellular resorption of the polymer in two major groups of cells: macrophages that phagocyte microparticles of polymer and giant cells of foreign bodies that penetrate the implant through lysis and its separation into fragments.

According to radioisotope analysis, biodegradation products are gradually removed

from the body through the urinary system and the gastrointestinal tract without accumulation in the liver and kidneys [15].

Folic acid (vitamin B9, N-pteroyl-L-glutamic acid) manifests its biological activity by forming tetrahydrofolic acid, which is very important for the further synthesis of nucleic acids (RNA and DNA), increases the binding of nitric oxide synthase and its synthesis that will influence to the angiogenesis, release from free radicals, protection against oxidative modification of human low density lipoprotein and improvement of antioxidant protection of cells [16, 17].

The study of the biocompatibility and bioactivity of folate-containing composites conducted on white laboratory rats showed good adhesion and strength characteristics, for a long time (up to 30 days) retained their structure during implantation, did not cause a chronic inflammatory reaction. After 30 days there was a gradual germination of the connective tissue deep into the polymer implant. The duration of the replacement of the polymer composition with bone took place within 6–8 months [18, 19].

Purpose. To substantiate of eliminating of the alveolar bone defects using bioactive long-acting composite "Medical Glue".

Materials and methods. The study involved 42 patients (w-15, m-27) with radicular cysts of the jaws, an average age was 33.8±9.1years, with no bleeding disorders, severe liver and kidney diseases, or allergic reactions to medical drugs. The patients were treated at the Dental Medical Center of Bogomolets National Medical University.

The diagnosis of the disease was verified on the basis of data from a clinical examination, aspiration of cystic fluid with cholesterol crystals through the root canals of causative teeth, and computed tomography (CT) on the Planmeca ProMax 3D machine.

Clarified the patients' complaints, the cause and duration of the disease, the characteristics of its course, the presence of concomitant pathology were found out. An objective examination took into account the state of transitional fold, percussion and mobility of the teeth, the degree of displacement of the crowns of the teeth, the presence of the Dupuytren's symptom, the presence of the periodontal pocket and its connection with the cystic defect, the data of dental pulp test (DPT).

Additional method of study was computed tomography (CT) with the determination of the size of lesions of bone tissue, an X-ray density assessment of the bone tissue in the cystic defect on the Hounsfield index (HU) [20].

All patients received pre-endodontic treatment of root canals and their filling with zinc-oxide-eugenol cement with gutta-percha filling material. The next day, a Cystectomy operation was performed with apicoectomy of the teeth and retrograde filling of root canals with MTA (mineral trioxide aggregate). The pre-and postoperative antibiotic complex, anti-inflammatory therapy (Cyprinol 750 mg – 2 times a day, Movixicam ODT 15 mg – 1 time a day) was prescribed for 5-7 days.

In the main group, after removal of pathological tissues and retrograde filling of root canals, the bone defect was filled with bioactive long-acting composite MG. In the comparison group – a blood clot.

The evaluation of the clinical study results was carried out according to general

clinical and radiological examination methods (measurement of the volume of the periradicular defect and the density of the newly formed bone regenerate according to CT data). Repeated CT scans were performed 3, 6, 12 months after surgery.

The analysis of the obtained research results was processed by the method of variation statistics using the MedStat and EZR v.1.35 for Windows 8.0 computer-aided software for medical statistical calculations.

Results and discussion. The patients were divided into 2 groups: the main group – 11 persons, the comparison group – 31 persons. The average age is 33.8±9.1 years; the average size of the bone defect is 1.26±0.29 cm3.

The majority of patients – 40 (93,8 %) included in this study had complaints about the change in the color of the crown/s of the tooth/teeth and the periodically occurring dull ache in the protruding area, and its slow increase in size.

The average duration of the disease in patients of both groups was approximately the same and was in the main group 2.8±1.8 years, and in the comparison group – 2.1±0.9 years.

In patients of both groups, the defects of the alveolar process were mainly localized in the frontal area of the maxilla – 27 (64.3 %) persons, of which in the main group were 7 (63.6 %), and in the comparison group, 20 (64.5 %) persons. The remaining 15 (35.7 %) patients from both groups had radicular cysts in the following areas: the lateral and frontal areas of the mandible were respectively 8 (19.1 %) and 4 (9.5 %) persons, the lateral area of the maxilla was 3 (7.2 %) person. All patients did not have periodontal pockets in the areas of teeth, the roots of which had a connection with cystic defect.

An assessment of the condition of the mucous membrane was shown in 8 (72.7 %) patients in the main group and in 19 (61.3 %) of the patients in the comparison group, the presence of an explosion in the size of 1 to 2 cm in diameter in the area of the alveolar process of the jaw in the projection of the roots of causative teeth During palpation it was dense or dense-elastic consistency, somewhat compliant, painless. Dupuytren's symptom was positive. Palpation of the transitional fold in the area of these teeth was painless, color of the mucous membrane is unchanged. None of the patients showed any periodontal pockets.

In 18 (58.1 %) patients of the comparison group and in 2 (18.2 %) patients of the main group, scars from the fistulas that functioned earlier were found. Scars from previously performed cystectomy were detected in 3 (7.2 %) patients among all the subjects. Palpation of the transitional fold in the area of causative teeth was painless in 36 (85.7 %) patients, and 6 (11.1 %) patients noted slight pain during palpation.

According to objective data, in 1 (9.1 %) of the patient in the main group and 1 (3.2 %) of the patient in the comparison group, the vertical displacement of the causative (11) tooth was detected 1.2 mm below the level of the adjacent (21) tooth. In 15 (48.4 %) patients in the comparison group, there was a diagnosis of convergence and divergence of teeth, among which 2 patients (6.5 %) of patients revealed a vestibular displacement of causative tooth to 1.2±0.3 mm in relation to adjacent teeth.

A slight pain and discomfort during percussion were noted by the majority of patients

in the main and comparison groups, respectively 8 (72.7 %) and 24 (77.4 %) persons. The percussion of the teeth was painless in 3 (27.3 %) patients in the main group and 7 (22.6 %) patients in the comparison group.

Mobility of the causative tooth of the 1st degree was diagnosed in 2 (18.2 %) patients in the main group and 16 (51.6 %) in the comparison group.

According to the DPT, 100 % of the patients in both groups had indices ≥100μA, indicating no viable pulp in the causative teeth. During endodontic treatment of teeth, 32 (76.2 %) patients of both groups were aspirated with a light straw colored liquid containing cholesterol crystals.

After a series of CT images after endodontic treatment, the teeth were of the usual shape and size, the crown part was partially restored with a filling, root canals were traced along the entire length, hermetically filled with a contrast filling mass to the tops of the roots.

Patients in both groups had focal lesions of bone tissue of the jaws in the projection of the apex of the teeth roots, which were approximately the same in patients with the main and the comparison group and were respectively 1.26±0.29 cm3 and 1.19±0.32 cm3. Along the contour of the focal lesion, the bone density enhancement was visualized.

In the main study group, the operation of cystectomy with apicoectomy of the teeth was carried out and the cystic defect was filled with bioactive long-acting composite "Medical Glue." After removal of pathological tissues, the walls of the bone cavity were treated with the antiseptic solution – Dekasan 0,02%. The, the filler (folic acid) and the accelerator of polymerization were sequentially added to the phial with glue base, mixed for 30 seconds until small bubbles appeared, and injected into the cavity of the bone defect. The mucoperiosteal flap was placed in place, tightly pressing the material that filled the defect, after which the wound was sutured with a 5/0 polyamide thread. Aseptic pressure bandage, cold. Postoperative antibiotics use, anti-inflammatory therapy.

Table 2

Changes of the frequency of edema and hyperemia in patients in the main group

Index		Abs. (%)			The level of significance of the difference, p
		2nd day	5th day	7th day	
Edema	no	–	7 (63,6)*	11 (100)*	<0,001
	yes	11 (100)	4 (36,4)	–	
Hyperemia	no	–	7 (63,6)*	10 (90,9)*	<0,001
		11 (100)	4 (36,4)	1 (9,1)	

Note: when compared, the Cochran criterion for related samples is used; for posterity comparisons McNemara's criterion is used, taking into account the Bonferroni correction, is used: * - the difference from the index on the 2nd day is statistically significant (p <0,05).

There was a tendency for a faster reduction of postoperative inflammatory symptoms in patients of the main group: 5 days, 7 (63.6 %) patients had no edema and hyperemia, whereas in most of the persons in the comparison group, 23 (76.7 %) were edema and hyperemia persisted and significantly decreased mainly on day 7. In the main group for 7 days, almost all patients had no edema and hyperemia, which remained in 7 (23.3 %) patients in the comparison group and were over at 9-10 days (Tabl. 2). This served as the basis for the removal of sutures in shorter terms in the main group, an average of 5.5±0.9 days, while in the comparison group, this figure was 6.6 ± 1.0. The difference between the groups is statistically significant (p=0.001 by the Mann-Whitney criterion). Thus, the filling of the postoperative cystic defect of the alveolar bone can accelerate (p=0.001) the healing period, on average by 1.1 days compared with the control group.

The complications in the early postoperative period were only in the patients in the comparison group: the suture line disruption was in 1 (3.2 %) person, the suppuration of the wound – 1 (3.2 %) person.

At follow-up examinations 1 month after surgery, patients had hardly noticeable scars at the site of intervention, the mucosa was pale pink in color, without visible pathological changes, even gingival margin.

In the patients of the main group, there was no displacement of teeth after osteotomy and apicoectomy, while in 3 (9.7 %) patients in the comparison group, a vertical displacement of the teeth was revealed, the roots of which prolapsed into the cavity of the bone defect. After 3 to 6 months, 11 (35.5 %) of the persons in the comparison group showed a hernial mucosal ingrowth at the area of postoperative bone defect.

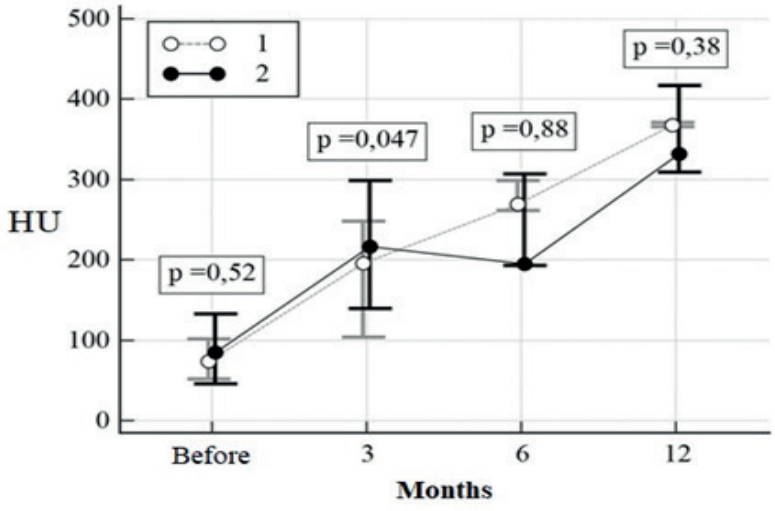

Fig. 1. Dynamics of changes of the roentgenological density index of the newly formed bone in patients of the comparison group (1) and of the main groups (2).

Among 16 (51.6 %) patients in the comparison group, the teeth mobility of the 1st degree disappeared for 1 month in 2 patients, while in 14 (45.2 %) patients, the teeth mobility of 1st degree was maintained for up to 3 months. After 6 months, the mobility of the teeth was absent in all patients in the comparison group.

Palpation of the transitional fold at the postoperative area and percussion of the teeth in all patients was painless.

According to CT data, the structure of the newly formed bone regenerate gradually changed and acquired signs with a characteristic trabecular structure. After 3, 6, 12 months the radiological density on the Hounsfield scale was similar in patients of the comparison group and in the main groups (Fig. 1), indicating similarity of the course and terms of reparative osteogenesis.

The structure of the newly formed bone regenerate gradually changed and acquired roentgenological characteristics of the typical trabecular structure, marked an appositional growth of bone tissue, roentgenological density according to the Hounsfield scale increased.

Conclusions. The applied technique of the surgical method for elimination of bone defects of the alveolar processes by the bioactive long-acting composite MG allowed to accelerate ($p = 0.001$) the period of soft tissue healing, on average 1.1 days (95 % confidence interval (CI) 0.5 days – 1, 8 days) compared with the group with the blood clot and allowed to decrease ($p=0.02$) the risk of complications, in particular, postoperative teeth displacement and hernial ingrowth of the mucous membrane to the area of bone defect, to 9.1 % (95 % CI 0 % – 35.9 %), (relative risk (RR) = 0.18 (95 % CI 0.03 – 0.99).

According to the density of bone regenerate on 12 months after the operation, this figure was 369.2±47.7 units HU ($p=0.38$ versus 370.8±84.7 units HU in a blood clot group), indicating a compliance of terms and phases of material`s biodegradation and reparative osteogenesis, its biocompatibility and efficacy.

The obtained data suggest that the bioactive long-acting composite MG has a high level of biocompatibility, gradual biodegradation, expressed adhesion and strength properties, and in terms of clinical and instrumental studies, it contributes to faster postoperative healing of alveolar bone defects and reduction of risks and number of complications compared with blood clot

An important part of successful and predictable treatment of periradicular defects is a combination of biologically justified concepts and methods with clinical application of modern equipment, tools and materials.

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PARODONTAL STATUS OF PATIENTS ON SUGAR DIABETES OF TYPE I

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Annotation. *On the background of diabetes mellitus, stomatological diseases are diagnosed among 87-100 % of patients. Particular importance in the pathogenesis of generalized periodontal diseases in diabetes mellitus is given to diabetic microangiopathies, neuropathies, immune disorders, and also to local factors of the risk of the disease. 102 patients with type I diabetes mellitus aged 18 to 54 years were examined. Also to determine the prevalence of periodontal disease, degree of severity and course.*

It was established that the severity of generalized periodontal diseases depends not only on the increase in the duration of type I diabetes, the severity of its course, but also on the presence and simultaneous exposure of the main local risk factors, which, of course, contributes to the further progression of periodontal diseases.

Key words: *type I diabetes mellitus, periodontal status of patients, gingivitis, generalized periodontitis, prevalence.*

Introduction. Diabetes mellitus is a common endocrine disorder characterized by severe metabolic disorders [4]. Despite improved diagnostic methods of the disease and the availability of high-quality drugs used in combination therapy combined with monitoring the effectiveness of treatment, the vast majority of patients have a decompensated state of diabetes, which increases the risk of development and progression of diabetic complications [4]. On the background of diabetes mellitus, stomatological diseases, the most common of which are periodontal disease, are diagnosed in 87-100 % of patients [6,7]. Currently, the pathogenetic relationship between diabetes mellitus and the development of periodontal pathology is established. At the same time, the issue of the influence of inflammatory and dystrophi-inflammatory diseases of periodontium on the course of diabetes mellitus is being studied in depth, which is manifested primarily by an unstable glycemia in patients, an increase in insulin resistance of tissues [1,6,11].

Particular importance in the pathogenesis of generalized periodontal diseases in diabetes mellitus is given to diabetic microangiopathies, neuropathies and immune disorders [1,6]. It is known that the microcirculatory passage of the periodontal is an active zone of hemodynamics, therefore, specific irreversible pathological changes in periodontal vessels occur much earlier than in vessels of other organs, which leads to a violation of the vascular wall permeability, the emergence of tissue hypoxia, the

deterioration of metabolic processes in periodontal tissues [1, 6,8,9]. In addition, high concentration of glucose in the oral and aspartic fluids, xerostomy in combination with insufficiency of phagocytic function of polymorphonuclear leukocytes and decreased immunoglobulin formation in patients with diabetes mellitus leads to progressive growth of parodontopathogenic microflora. Hyperglycemia leads to a reduction in the synthesis of collagen fibroblasts, an increase in its breakdown, which causes destructive changes and a violation of reparative processes in periodontal tissues. At a decompensated state of diabetes, a high level of inflammatory mediators in the ash fluid was detected, and in the bone tissue there was a disturbance in the structure of osteons, high activity of osteoclasts and a decrease in the activity of osteoblast, a decrease in the content of alveolar process of such chemical elements as calcium, phosphorus, silicon, magnesium, potassium and sulfur, which leads to the predominance of bone resorption processes [3,6,7,10,12].

At the same time, local factors contribute to the onset and progression of inflammatory and dystrophic-inflammatory processes in periodontal tissues on the background of diabetes mellitus, in particular: dental deposits (microorganisms and their products of life), carious cavities in the teeth (cranial and approximative), poor quality restoration, reveal mechanical, chemical and biological damage to the periodontal disease, the presence of anomalies of bite and abnormalities of the position of individual teeth, small spitting of the cavity of the mouth, anomalies of attachment of the bridle of the lips, tongue, scrotum irregularly made orthopedic and orthodontic structures, which together contribute to a significant functional overload of periodontal tissues in certain areas, the development of traumatic occlusion [1,3,5,7]. The presence of traumatic occlusion leads to an increase in the detrimental effect of parodontopathogenic microorganisms, the rapid progression of destructive processes in the periodontium [5,7].

Nevertheless, in recent studies of authors, the issue of the prevalence and peculiarities of the clinical course of generalized periodontal tissue diseases on the background of type I diabetes mellitus, taking into consideration the combined effect of the main local and general risk factors of the disease, is still insufficiently highlighted.

The aim of the study is to determine the prevalence of periodontal tissue diseases and assess the periodontal status of patients with type I diabetes mellitus.

Materials and methods of research. 102 patients with type 1 diabetes mellitus, medium and severe, with a disease duration of 2 to 37 years old were examined, including 43 (42.2 %) women and 59 women (57.8 %) aged 18 to 54 years old. In the examination of patients, the state of compensation for type 1 diabetes mellitus was measured based on glycosylated hemoglobin (HbA1c), duration of the disease and the presence of diabetic complications by monitoring the history of the disease. The state of periodontal tissues was evaluated according to PMA indices (papillary-marginal alveolar Parma, 1960), Papillary Bleeding Index PBI bleeding (Papillary Bleeding Index; Muhlemann, 1977), exudation from periodontal pockets, periodontal pectoral depth indices, epithelial attachment loss (VE), gum recession (GF Beloklytska, 2011) [2]. The assessment of the bone tissue condition of the alveolar appendix was performed using orthopantomogram and stent dental X-rays. The diagnosis was established according to the taxonomy of

periodontal diseases for MF. Danilevsky (1994). The condition of oral hygiene was determined using the OHI-S (Green-Vermillion, 1964) index, which includes the plaque index (DI) and the dental index (SI) index. Patient interviews were conducted using a questionnaire developed on the basis of World Health Organisation recommendations and included questions about the course of diabetes mellitus and integrated therapy of the disease, the nature of nutrition, the presence of bad habits, the self-assessment of gums and teeth, the detection of major complaints and the frequency of visits to a dentist, adherence hygiene of the oral cavity taking into account the objects, means. Statistical processing of the results of the study was carried out using the standard statistical package of Microsoft Excel 2013 data, the probable statistical difference was determined by Student's t-criterion, the value of the correlation between the indicators was calculated for Pearson.

Results of the research and their discussion. The analysis of the results of the monitoring of the history of diseases showed that the compensated state of type 1 diabetes mellitus was detected in 15 subjects (14.7 % of the total number of subjects), the average value of glycosylated hemoglobin HbA1c in these patients was 6.7±0.21 % , the subcompensated state (the average value of the glycosylated hemoglobin index HbA1c was 7.3±0.10 %) was 17 patients (16.7 %), the decompensated condition (mean value of glycosylated hemoglobin HbA1c was 10.0±2.37 %) – 70 people (68.6 %). All subjects (100 %) had a history of diabetic complications.

The prevalence of generalized periodontal disease in the examined patients is 100 %. At the same time, the prevalence of chronic catarrhal gingivitis (HGG) among all the surveyed was 22.5 %, the highest rate was in individuals aged 18 to 34 years with a duration of diabetes mellitus from 2 to 23 years (40.4 %), and the lowest – in persons aged 35 to 44 years with a disease duration from 5 to 10 years (6.1 %). However, most commonly among patients who were examined, regardless of age group, generalized periodontitis (GP) of varying severity was diagnosed, its prevalence was 77.5 % and depended somewhat on the duration of diabetes, in particular if the disease lasted for more than 10 years, as well as severity its course, the presence of late diabetic complications, such as macro- and microangiopathy, nephropathy and osteoarthropathy.

Among 15 patients (14.7 % of the total number of surveyed) with compensated status of type 1 diabetes and duration of the disease from 2 to 12 years old, generalized chronic catarrhal gingivitis was diagnosed in 8 patients (7.8% of the total number of patients), generalized periodontitis of the initial degree – 4 persons (3.92 %), generalized periodontitis of the I degree – in 2 (1.96 %) patients, 1 examination (1.0 %) had a generalized periodontitis of the II degree (Table 1).

Among 17 patients (16.7 % of all contingents surveyed) who had a subcompensated condition of type I diabetes, the duration of the disease was from 5 to 20 years, generalized chronic catarral gingivitis was detected in 7 people (6.9 % of the total the number of patients with diabetes mellitus), 2 patients (1.96 %) – generalized periodontitis of the initial degree, 5 persons (4.9 %) – generalized periodontal disease of the 1st degree and generalized periodontitis of the 2nd degree in 3 (2.94 %) patients. (see Table 1).

Among the surveyed, the highest number was made up of patients with decompensated state of the disease, they were 70 (68.6 % of the total), the duration of the disease between them ranged from 4 to 37 years (Table 1). Among these patients, generalized chronic catarral gingivitis was 8 persons (7.8 % of the number of patients with diabetes mellitus), generalized periodontitis of the primary level – 12 patients (11.7 %), and 23 patients (22.5 %) had periodontal disease I degree, 16 patients (15.7 %) had generalized periodontitis II degree and 11 patients (10.8 %) had a generalized periodontitis III degree).

Table 1

Periodontal status of examined patients with type I diabetes melitus

Degree of Compensation for Diabetes Type I Diagnosis	Diagnosis								
	Chronic Catarral Gingivitis, n=23, абс. (22,5%)	GP, Initial degree,n=18, абс. (17,7%)		GP, I degree, n=30, абс. (29,4%)		GP, II degree, n=20, абс. (19,6%)		GP, III degree, n=11, абс. (10,8%)	
		Chronic Flow	Symptom Sharpening	Chronic Flow	Symptom Sharpening	Chronic Flow	Symptom Sharpening	Chronic Flow	Symptom Sharpening
		n=14, abs. (13,7%)	n=4, abs. (3,9%)	n=17, abs. (16,7%)	n=13, abs. (12,7%)	n=11, abs. (10,8%)	n=9, abs. (8,8%)	n=5, abs. (4,9%)	n=6, abs (5,9%)
Compensation State (14,7%)	8 (7,8)	4 (3,92)	0 (0,0)	2 (1,96)	0 (0,0)	1 (1,0)	0 (0,0)	0 (0,0)	0 (0,0)
Subcompensation State, n=17 (16,7%)	7 (6,9)	2 (1,96)	0 (0,0)	4 (3,92)	1 (1,0)	1 (1,0)	2 (1,96)	0 (0,0)	0 (0,0)
Decompensation State, n=70 (68,6%)	8 (7,8)	8 (7,8)	4 (3,92)	11 (10,8)	12 (11,7)	9 (8,8)	7 (6,9)	5 (4,9)	6 (5,9)

Thus, in all patients (100 %) with a compensated condition of diabetes mellitus type I, the chronic course of generalized diseases of periodontal tissues was diagnosed. Among those surveyed with subcompensated type I diabetes mellitus in 14 patients (82.4 %), the most frequent chronic period of periodontal disease was detected, and in 3 cases (17.6 %) – an acute course. Among persons with decompensated condition of type I diabetes, the chronic course of periodontal disease was noted in 41 persons (58.6 %), and

29 cases (41.4 %) were exacerbated.

The analysis of the data of the survey of patients showed that 31 patients (30.4 % of the total number of subjects) had complaints of aching pain, itching, burning in the gums, and severe edema, as well as significant bleeding gums during tooth brushing. Among 56 people (54.9 %) there were complaints of only bleeding gums during the use of solid food, brushing teeth, periodic emergence of aching pain, and also the mobility of teeth. At the same time, 53 people (52.0 %) assessed the condition of their gums as "satisfactory", 40 people (39.2 %) – as "bad", 9 persons (8.8 %) – as "good". In addition, 65 people (63.7 %) indicated that periodically at home, self-treatment of periodontal diseases using various phytopreparations in the form of rinses, oral trays and applications, 37 (36.3 %) were repeatedly referred to hospitals for conducting physiotherapy treatment. However, all patients with type I diabetes needed periodontal treatment.

In the course of the examination, a large number of non-mineralized and mineralized tartar and sublimate dentures were detected in all patients. At the same time, 32 people (31.4 %) noted a change in the relief of the gums with bright hyperemia, edema of the interdental papillae and gingival margin. In 70 patients (68.6 %), the interdental papillae and gingival margin were slightly hyperemic with cyanotic shade, roll-shaped, loose consistency.

The evaluation of the periodontal condition in patients with type I diabetes mellitus according to the PMA index showed that the average value of this indicator in 23 (22.6 % of the total number of subjects) with chronic catarral gingivitis was 34.2±2.45 %, which is corresponds to the average degree of severity, in 14 patients (13.7 %) with generalized periodontitis of the initial degree, chronic course – 43.2±2.77 %, which indicates the average severity of symptomatic gingivitis, in 4 patients (3.9 %) with generalized periodontitis of initial degree, an acute course – 60,4±3,29 %, this is a severe degree of symptomatic gingivitis, in 17 patients (16,7 %) with generalized periodontitis of the 1st degree, chronic course – 45,6±2,27 %, which corresponds to the average degree of severity, however, with the exacerbation of the disease, which is diagnosed in 13 people (12,7 %), the rate was 64,7±1,68 %, which characterizes the severity of symptomatic gingivitis, in 11 patients (10.8 %) with generalized periodontitis II degree, chronic course – 46.2±2.17 %, indicating an average degree of severity, with the sharpened course of generalized periodontitis II degree, which was detected in 9 patients (8.8 %), the index of PMA was 67.3±1.87 %, in 5 people (4.9 %) with generalized periodontitis III degree, chronic course – 62.4±2.24 %, and in its sharpened course, which had 6 persons (5.9 %), – 76.2±2.86 %, while the last three indicators correspond to a severe degree of symptomatic gingivitis.

The average value of the bleeding index of the gingival papillae of RBI in persons with chronic catarral gingivitis was 1.48±0.18 balls, with generalized periodontitis of initial degree, chronic course – 1.57±0.25 balls, with the sharp course of this disease – 2, 75±0.23 ball, in patients with generalized periodontitis of the I degree, chronic course, the index was 1.64±0.19 balls, in the sharp course – 2.76±0.16 balls, in persons with generalized periodontitis II degree, chronic course – 1.63±0.20 ball, escalation –

2.88±0.30 ball, in patients with generalizo anime periodontitis degree, the index was equal to, 1,72±0,37 points and 2,90±0,40 points (Table 2).

Table 2

Index assessment of periodontal disease in patients with type I diabetes mellitus

Diagnosis, number of examined	PMA (Papillar-marginalalveolar) %	PBI (Papillar Bleeding Index) points	Exudation of PC (Plastic Crown)	Dept of PC, mm	VEP, mm	VEP, mm
Chronic Catarral Gingivitis, n=23	34,2±2,45	1,48±0,18	0	0	0	0
GP of initial degree, chronic course, n=14	43,2±2,77	1,57±0,25	0	0	0	0
GP of initial degree, accelerated course, n=4	60,4±3,29*	2,75±0,23*	0	0	0	0
GP of the I degree, chronic course, n=17	45,6±2,27	1,64±0,19	1,35±0,14	3,27±0,22	4,33±0,18	1,40±0,37
GP of the I degree, the accelerated course, n=13	64,7±1,68*	2,76±0,16*	2,27±0,20*	3,84±0,35	4,62±0,16	1,14±0,20
GP II degree, chronic course, n=11	46,2±2,17	1,63±0,20	1,40±0,13	5,63±0,17	7,74±0,23	2,30±0,22
GP II degree, acute flow, n=9	67,3±1,87*	2,88±0,30*	2,53±0,12*	5,96±0,24	7,91±0,15	2,02±0,13
GP of the III degree, chronic course,n=5	62,4±2,24	1,72±0,37	1,42±0,17	7,51±0,14	10,7±0,21	3,43±0,11
GP of the III degree, the accelerated course, n=6	76,2±2,86*	2,90±0,40*	2,62±0,11*	8,08±0,27	11,0±0,36	3,21±0,20

Depth of PC (Plastic Crown) in patients with chronic course of generalized periodontitis I degree was 3.27±0.22 mm, VEP – 4.33±0.18 mm, recession of the gums – 1.40±0.37 mm, exudation from PC – 1,35±0.14 points, with the escalated course of this disease – 3.84±0.35 mm, 4.62±0.16 mm, 1.14±0.20 mm and 2.27 ± 0.20 ball, respectively. In patients with generalized periodontitis II degree in chronic course, the depth of the PC was 5.63 ± 0.17 mm, VEP – 7.74±0.23 mm, recession of the gums – 2.30±0.22 mm, exudation from PC – 1,40±0.13 balls, under the intensive course, the corresponding indices were 5.96±0.24 mm, 7.91±0.15 mm, 2.02±0.13 mm and 2.53±0.12 ball. In patients with generalized periodontitis of the III degree, in its chronic course, the depth of the PC was 7.51±0.14 mm, the CEP was 10.7±0.21 mm, the recession was

3.43±0.11 mm, the exsudation from the PC – 1.42±0.17 ball, for the intensified course of action, the figures were 8.08 ± 0.27 mm, 11.0±0.36 mm, 3.21±0.20 mm and 2.62±0.11 ball, in accordance.

The index assessment of oral hygiene in patients showed that 39 people (38.2% of the total number of surveyed) had a satisfactory level of hygiene, with an average OHI-S hygienic index of 1.5±0.1 points, 45 people (44,1 %) had an unsatisfactory state of hygiene with an index of 2,4±0,1 ball, in 18 people (17,7 %) there was a poor level of hygiene with an index value of 2,8±0,2 points, in any patient with a good level of hygiene of the oral cavity was not found any.

However, in patients with CCG, the average value of OHI-S hygiene index was 1.78±0.12 points, which corresponded to unsatisfactory levels. The subjects were found to have a predominantly mild and pigmented plaque, and an over-rigid tooth-stone (Table 3). In subjects with primary hypertension in the chronic course, the mean value of the OHI-S index was 1.90±0.12 balls, with an intense flow of 2.42±0.23 ball, which also corresponded to the poor state of oral hygiene. In patients with acute gastro-intestinal tract, a large number of soft and mineralized over-plain tooth deposits were diagnosed. The average value of this indicator was 2.34±0.18 points, which was an indicator of an unsatisfactory level of hygiene in the examined patients with a GP of the first degree and a sharp increase of 2.67±0.39 points, which corresponded to a poor state of hygiene. During the examination, there was a large number of soft and pigmented plaque, as well as over-edges, less elaborate toothpastes. In patients with GP II degree, chronic course, the average index value was 2.70±0.25 points, in its sharp course – 2.79±0.47 points. However, in persons with a GP of the III degree, a chronic and acute course, the worst condition of oral hygiene with the corresponding values of the index was 3.64±0.89 points and 3.88±0.74 points. They found a large number of soft and pigmented plaque, solid, and elongated tooth decay.

Table 3

Condition of oral hygiene in patients with type I diabetes mellitus

Diagnosis, the number of surveyed	DI Index	CI Index	OHI-S
Chronic Catarral Gingivitis, n=23	1,22±0,06	0,56±0,05	1,78±0,12*
GP of initial degree, chronic course, n=14	1,03±0,05	0,87±0,07	1,90±0,12
GP of initial degree, accelerated course, n=4	1,51±0,17	0,92±0,15	2,42±0,23*
GP of the I degree chronic course, n=17	1,08±0,12	1,26±0,10	2,34±0,18*
GP of the I degree acute flow, n=13	1,46±0,19	1,21±0,18	2,67±0,39*
GP II degree chronic course, n=11	1,09±0,12	1,61±0,11	2,70±0,25*
GP II degree acute flow, n=9	1,14±0,18	1,65±0,24	2,79±0,47*
GP of the III degree, chronic course, n=5	1,53±0,37	2,11±0,46	3,64±0,89*
GP of the III degree, acute flow, n=6	1,72±0,31	2,16±0,39	3,88±0,74*

Notes: * – a significant difference between the indexes in the examined patients with varying degrees of severity and the course of periodontal diseases ($p<0,05$).

It should be mentioned that in the decompensated state of diabetes mellitus, severe form, labile passage with a tendency to hypoglycemia and cytoacidosis in patients with an accelerated course of generalized diseases of periodontal tissues there was a marked hyperemia and significant edema of the interdental papillae, ash edge, as well as alveolar gums, the highest the degree of bleeding of the gums, the presence of purulent exudate's in periodontal pockets, and a pronounced tendency to periodontal abscesses, as indicated by parodontal their indices. Thus, in the state of decompensation of type I diabetes mellitus, the average value of the PMA index in patients with GP II degree, an acute course was 65.7±1.34 %, RVI – 2.72±0.28 ball, exudation from PC – 2.46±0.15 points, and in the state of subompensation of type 1 diabetes, the values of indices were 58.6±2.41 %, 2.33±0.35 points, 2.28±0.26 points, respectively. In patients with a GP of the III degree of acute course that was diagnosed only in persons with type I diabetes in a state of decompensation, the average value of the PMI index was 76.2±2.86 %, and the RVI was 2.90±0.40 points, exudation from the PC is 2.62±0.11 points.

Conclusions. Thus, in patients with type I diabetes, the prevalence of generalized diseases of periodontal tissues was found to be 100 %, with the prevalence of chronic catarral gingivitis being 22.5 %, and the generalized periodontitis of various degrees of severity – 77.5 %. In the surveyed in the state of compensation for type I diabetes mellitus only the chronic course of diseases of periodontal tissues was revealed. Patients in the state of subcompensation of type I diabetes are most often diagnosed with chronic course of periodontal diseases, the prevalence of which was 82.4 %, and much less – acute course, prevalence – 17.6 %. In patients with a condition of decompensation of type I diabetes, the chronic course of periodontal disease was detected in 58.6 % of the examined individuals, and acute – by 41.4 %. It was established that the severity of generalized periodontal diseases depends not only on the increase in the duration of type I diabetes, the severity of its course, but also the presence and simultaneous exposure of the main local risk factors, which, of course, contributes to the further progression of periodontal diseases.

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COMPARATIVE ANALYSIS OF THE INTRAORAL APPLIANCES FOR DISTALIZATION OF THE UPPER MOLARS (LITERATURE REWIEV)

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Annotation. *Orthodontic treatment requires many compromises, especially in patients with Class II malocclusions. One of the most spread strategies to correct Class II malocclusions is using a non-extraction protocol in children. The aim of this method of treatment is to move the maxillary molars in distal direction using some appliances for molars distalization. There are many types of devices for upper molar distalization. Several of them for are discussed in the issue. Many famous distalizers have side effects - loss of anchorage, as they cause mesialization of premolars and protrusion of incisors. That's why, increasingly the microimplants are applied for distalization.*

Key words: *Class II malocclusion, molar distalization, anchorage loss.*

Class II malocclusion is one of the most frequent malocclusions and is estimated in one-third of all orthodontic patients. This malocclusion is defined as an anteroposterior discrepancy with dentoalveolar or skeletal change or combinations of both [27].There are different approaches to treatment of Class II malocclusion. One of the most popular techniques in growing patients with good facial balance and jaw relationship, minimum to moderate crowding is distal movement of maxillary molars to achieve Class I molar and canine relationship.

The ability to effective distalization of the first maxillary molar to gain space for correcting the discrepancy often is the best decision to resolve clinical problem. However, case selection is critical, since the space that can be gained to achieve Class I molar and canine relationship and to relieve crowding, if any, by distally moving the maxillary first molars is more or less limited [33].

Before treatment it should be taken into consideration the patient's cooperation, especially when headgear, Class II elastics or removable appliance are planned to be used. For many years Headgear was used for distalization of the upper molars, but here the success of treatment depended on the good cooperation of the patient, i.e. the establishment of the traction and wearing the device for the recommended 12-14 hours a day. Headgear is rejected by number of patients due to esthetic and social concerns [9].

Some other methods, besides headgears have been used: Class II elastics, and removable appliances for distalizing the maxillary molar. The obstacles mentioned above devices of being dependent on patient cooperation inspired many investigators to develop new intraoral devices and techniques for distal movement of molars. That is why one of the most important requirements for the successful treatment is compliance appliances.

Noncompliance treatment modalities eliminate the dependence on patient cooperation; however, bodily molar distalization has not been achieved with most techniques.

It is important that distalized first molars must be held in obtained distal position, and the remaining maxillary teeth are retracted to reduce protrusion, resolve overbite, close spaces and achieve Class I canine relationship. Molars position can be retained with a variety of devices (modified plastic retainers, headgears, modified Nance appliance, fixed appliances with stopped wires). It would be an advantage if the same appliance that works as distalizer could also act as an anchoring unit for retraction.

The searching for methods for molars distalization, independent of patient cooperation, was the inspiration to develop fixed intraoral appliances, such as Pendulum, Pendex, Distal-Jet, Jones Jig, First class appliance etc. Intraoral distalizers work different and promote various results during distalization [1]. Another important point is the type of anchorage which can be performed in deciduous molars or premolars, supported by two or four teeth [22].

The literature highlights the fact that when distalizing devices are used the anchorage loss, depending on the type of appliance. This is the result of the protrusion force, accompanying the distalization movement, acting on the anterior anchorage unit [3, 21].

Sfondrini et al. critically evaluated different appliances used for upper molar distalization and found that most non-compliance appliances were associated with mesial movement or tipping of the incisors [34]. Similar conclusions were noticed by Antonarakis and Kiliaridiswho systematically reviewed the effects of noncompliance distalizers [1]. They found that distalization of molars is related to unavoidable loss of anchorage, which was observed as premolar mesial movement and incisor mesial crown and tipping movements.

Technique of moving molars back when applying some of these devices involves using as an anchorage the unit in the frontal part of the palate (a modified Nance plate) and/or the first or first and second premolars (in the case of the appliances with rings or bent arms attached by any composite material on the teeth). Thus, the anchorage loss would consist in anterior displacement and leaning of premolars and inclination or protrusion of incisors. Nevertheless, anchorage loss going together with increases in overjet and clockwise rotation of the mandible caused by the elongation of molars may take place with some devices like Headgear or elastics [6, 12].

Some recent researching has introduced skeletal anchorage devices. Two types of these devices (i.e. screw type and plate type) are used clinically as absolute anchorage devices; they do not require cooperation by the patient. Anchorage support can be currently accomplished by mini-implants fixed on the palate, thereby promoting skeletal anchorage and minimalizing adverse effects that are characteristic of intraoral distalizers [29].

In 1992 Dr. James Hilgers described Pendulum, an intraoral device for correcting Class II molars relationships by distalizing upper first molars [15]. This appliance has undergone many changes to become more efficient, more stable, more functional and convenient for the patient. There are indications and contraindications for using this kind

of device for molar distalization. It should be taken into account that the distalization produces a backwards and downwards mandibular rotation, causes an increase the mandibular plane angle and facial convexity angle. The distalization also affects the increase lower 1/3 facial height. So, these effects are favorable in patients with deep bite when an open bite is developed during distalization [7, 16, 20, 22]. In Pendulum appliance, the force is applied occlusally in relation to the molar's center of resistance. Therefore, the molars are not distalized in a bodily way, but distal tipping is expected [34].

Several studies found that significant distal-crown tipping and intrusion of these teeth follow during distalization of the maxillary first molars [6, 12, 18]. Anterior anchorage loss was an invariable finding of some studies. A significant amount of incisor labial tipping, producing an anterior anchorage loss which represented 24-29 % of the space opened between molars and premolars. Accordingly, distal molar movement corresponded to 71-76% of that space [5, 6]

Therefore, the Pendulum appliance can be detrimental for the patients who cannot tolerate maxillary incisors advancement (i.e. existence of thin labial bone, deficient gingival height, or severe incisor proclination).

Mesial movement of the first premolars as well as mesial tipping and extrusion were also observed in another studies [37].

It has provoked many researchers to modify this appliance and minimize the loss of anchorage. Therefore, the objective of the present study was to minimize the anchor loss in pendulum appliance by modifying it by soldering a 19 gauge wire on to the banded both first and second premolars [25].

In the cases with maxillary constriction the Pendex appliance can be applied. This kind of appliance is a modification of the Pendulum . The modification consisted of adding the middle screw, laterally extending the upper arch of teeth in order to prevent crossbite while reversing molars. The source of distalizing force in this appliance is rear springs TMA with Helix [5]. Its effectiveness when concerning the distalization of molars is comparable to the effectiveness of cervical extraoral traction [37].

The indication for using the Pendex is cases with cross bite and Angle Class II on molars caused by anterior position of the upper first molars. These are so called seeming Angle Class II, resulting most often from the premature loss of the primary teeth and causing a loss of space in the upper dental arch. Due to the danger of proclination incisors, the cases of protrusion of these teeth should be avoided. However, it is worthy to consider the benefits of this appliance when it comes to retrusion of incisors. The Pendex is an effective, convenient and independent of patient cooperation appliance for upper molars distalization. In the course of treatment, the distal inclination of the first molars crowns and a certain degree of anchorage loss of the first premolars and incisors should be taken into account.

Monika Koul et al. (2018) showed the research where the main goal was to evaluate the stability of the Pendulum appliance, anchor loss, distalization of the maxillary molars, and the movement of the anchoring teeth anterior to maxillary first molars [25].

In the study group was 20 patients (13±2 years old) with Class II molar relationship and moderate space deficiency. The results were following: maxillary first molar was distalized by an average of 4,48 mm with a distal tipping of 6°, second premolar and first premolar also showed distalization by an average of 3,92 and 2,97 mm, respectively.

Distal-Jet is another appliance for molar distalization, that consists of acrylic Nance button, supported by attachments on the first premolars.There is also a bayonet wire inserted into the lingual sheath of each molar band. A clamp-spring assembly around the tube, exerting a distal force on the molars. In an in-vitro study, Kinzinger and Diedrich presented that the distal jet coil-spring systems for molar distalization produced almost translatory tooth movement in the sagittal plane with uprighting effects on the dental root over a simulated distalization section of 3 mm based on a constant distalization force of 200 cN, mixed with a mesial tipping moment. In the transverse plane, a force continually directed toward the buccal part and a mesially rotating moment produced combined buccal movement and therapeutically unwanted mesial and inward rotation of the permanent first molar [23].

Ashod Karad et al. showed a research in which maxillary molars were distalized with the distal-jet appliance in patients with dental class II malocclusion with a different eruption stages of second molars [19]. The sample was 22 patients, where 13 patients had fully erupted second molars, 5 patients with partially erupted and 4 patients with not erupted second upper molars. In this study the authors reported that the maxillary first molars were distalized by an average of 4,29 mm, tipped distally by 6,66°, with a significant amount of extrusion, i.e., 1,45 mm. The most significant changes were observed in the position of upper incisors. There was a significant increase in the angulation of incisors (2,84°) with respect to horizontal plane resulting in increased overjet (0,86 mm) and decreased overbite (0,98 mm). They also showed evidential labial movement (1,89 mm), with mild extrusion which was insignificant. The results of this study with the distal jet are rather similar to the results of First class appliance by Papadopoulos et al.with a related amount of distalization (4 mm), anchor loss (1,86 mm), increased overjet (0,68 mm) and no change in the vertical dimension of incisors. However, greater amount of distal tipping of molars (8,56°) was observed with First class appliance [30].

Another study talks about evaluation the skeletal, dental and soft tissue changes produced by Pendulum and Distal-Jet appliances [31]. After 5 months of upper molar distalization and following cephalometric parameters were used to assess the effects of maxillary molar distalization, namely, anteroposterior skeletal (SNA/SNB/ANB), vertical skeletal (face height ratio/Frankfort mandibular plane [FMA]/angle formed between Maxillary plane and Mandibular plane (MM)), interdental (overjet/overbite), maxillary dentoalveolar, and soft tissue parameters. In general treatment changes among the two groups of patients treated with Pendulum and Distal-Jet, the anteroposterior skeletal changes were not statistically significant, vertically FMA angle increased by 1.79°±2.25° and overbite reduced by 2.38±1.83 mm. The maxillary first molars were distalized by an average of 4.70±3.01 mm (Upper 6 [U6] to pterygoid vertical [PTV]). The maxillary central incisor labial tipping increased to an average of 1.61±2.73 mm

and cant of upper lip increased by 3.40°±5.88° are statistically significant (P<0.05). The results of this study show that these two distalization techniques (Pendulum and Distal –Jet) in growing children produced significant effects on anchor unit. There was an increase in FMA angle, significant bite opening, proclination of the maxillary incisors and increase in the cant of the upper lip.

Other studies regarding comparison between Pendulum appliance and Distal-Jet with concurrent full-fixed appliances present that during molar distalization, the pendulum subjects demonstrated significantly more distal molar movement and significantly less anchorage loss at both the premolars and the maxillary incisors than did the distal jet group. At the end of comprehensive treatment, the maxillary first molars were 0,6 mm mesial to their original positions in the distal jet group, and 0,5mm distal in the pendulum group. Nevertheless, total molar correction was identical in the 2 groups (3,0 mm), and both appliances were equally efficient in achieving a Class I molar relationship at the end of treatment.

Simultaneous edgewise orthodontic treatment during molar distalization in the distal jet group cut the overall treatment time but produced significant flaring of both maxillary and mandibular incisors at the end of treatment [8].

In 1992 Jones and White introduced an open coil appliance, named Jones-Jig [17]. This device produce more distal-crown tipping of the molars and significant mesial tipping of the anchorage unit.

The Jones Jig and cervical headgear comparisons were made by Brickman et al. [4]. They recorded differences in the changes of final position of the maxillary incisors between the cervical headgear and the Jones Jig sample. The results, however, were not statistically significant. The variability of the above mentioned results could be connected with differences in sample size and mean age, type of malocclusion, and additional use of Class II elastic modules mixed with headgear. Although advantages of the Jones Jig include minimal patient compliance and ease of fabrication and use, such appliance is recommended to be used in cases where mesial movement and protrusion of the anchorage unit during intraoral distalization can be tolerated.

Gulati et al. announced significant hinge opening of the mandible that appear from excessive extrusion of the maxillary molars [13]. Thus, they recommend only patients with normal or low mandibular plane angles to be treated with such appliance. Obviously, it would be contraindicated in cases of excessive vertical growth.

Due to the fact, the line of force action in this appliance lies occlusally and buccally in respect to the molar's center of resistance ,the molars can be distally tipped and rotated, whereas the premolars can be mesially tipped. The reports of other authors have corroborated these side effects [4, 13, 14].

Few studies have investigated the dentoalveolar and skeletal post-distalization changes induced by the Jones-Jig and the Pendulum appliance and reported varied results [17, 24, 32]. The Pendulum and the Jones-Jig apply the palate and premolars for anchorage. The first one delivers 200–250 g of force which is almost three times more than the force delivered by Jones-Jig which is 70-75g [12]. The study result showed

that the both appliances were effective in molar distalization (3,85 mm in the Pendulum group and 2,75 mm in the Jones-Jig group), even if the Pendulum required less time for distalization (16 days less than Jones-Jig) [35].

The mesial movement of the anchorage units of premolars and incisors was the same for both appliances. Mesial movement of the anchor unit was unwanted side effect that could occur with any conventional intraoral distalizing appliance. This finding was in accordance with the study by Ghosh and Nanda and Brickman et al. [4, 12]. To maximize anchorage, these appliances can be used with implants [2].

The group of appliances for upper molar distalization which act together with mini-implants solve the problems connected with the anchorage loss. Mini-implants have been combined with some appliance such as Pendulums or Distal Jets, to strengthen anchorage and avoid labial flaring. Indirect anchorage is a different arrangement.

The goal of in-vitro study was to test clinically the efficiency of the skeletonized distal jet supported by extra mini-screw anchorage and to compare the results with the in-vitro series of measurements [19, 26]. A discussion of the anchorage loss share in the total movement in the sagittal plane can be found in the literature, hence of the quality of the supported by mini-screw periodontal anchorage setup, in comparison to other conventional intraorally anchored, noncompliance distalization devices.

It was presented the difference regarding the anchor unit between some studies conducted by Ashod Karad et al. and some researches, in which mini-implants were used with dual-force distalizer [19]. There was revealed very high distalization amounts (5,9 mm) [28].

The premolars and anterior teeth followed the distal movement of the molars with no loss of anchorage. Similar results were observed with lever arm and mini implant system, which control the point of force application and produce the desirable three-dimensional control of molars during distal molar movement [26]. The results of this study, based on the analysis of pretreatment and postdistalization lateral cephalogramsof 22 patients with class II malocclusion treated with the distal jet appliance, showes that the maxillary first molars were distalized by a significant amount into a class I relationship. However, in the process of distalization, the distal jet did produce certain undesirable and reciprocal effects on incisor position with minimal impact on the facial soft-tissues [19].

To remedy problems with anchorage loss, various intraoral distalizing mechanics mixed with palatal implants or TSAD have been used because it is possible to distalize the maxillary molars without anchorage loss by using absolute anchorage more efficiently than ever [2]. The TSAD is defined as a device that is temporarily fixed in bone for reinforcement of orthodontic anchorage.Because a TSAD is stable, it provides absolute anchorage. To date, many distalization appliance designs incorporating TSADs have been developed. They range from the skeletal anchorage system (SAS) with miniplates placed in the zygomatic region in the maxilla or retromolar region of the mandible. Although might be effective in moving molars distally, an in-depth analysis is needed to investigate also other aspects of distalization, such as a rate and duration of molar

movement. Therefore, the objectives of this systematic review were to evaluate the effectiveness of the distalization of molars with distalizers supported with TSADs and to compare the effectiveness of TSAD reinforced distalizers with tooth-borne noncompliance distalization appliances [11]. The skeletonized distal jet appliance, supported by extra mini-screw anchorage, allows translatory molar distalization. Although the anchorage design combining 2 mini-screws at a paramedian location and the periodontium of 2 anchorage teeth does not offer the quality of stationary anchorage, it achieves greater molar distalization in total sagittal movement than conventional anchorage designs with an acrylic button [10]. When mini implants are used in the front part of the palate, anchorage loss has been eliminated in this way but retraction of the anterior teeth is limited due to the proximity of the palatal implant to the roots of the anterior teeth.

Taking up the challenge of non-extraction treatment, which involves the selection of the appropriate distalization appliance, it should be taken into consideration some very important factors, such as: age of the patient, growth pattern, risk and damage to soft, dental and periodontal tissues, protrusion or retrusion of the upper incisors, the presence of second upper molars, degree of patient cooperation and his/her main complaints and expectations.

Conclusions. One of the significant difficulties in treating patients with Class II molar relationship is the need for distalization of maxillary molars into a Class I relationship. Pendulum, Distal Jet and Jones-Jig are the most usable and compliance independent appliances which has gained general acceptance. It was found to be one of the effective molar distalizing appliance, however, anchor loss, mesialization of the premolar, buccal inclination and protrusion of mandibular have been one of the main problems. To resolve problems with anchorage loss, various intraoral distalizing mechanics together with palatal implants or TSAD can been used because. That's give possibility to distalize the maxillary molars without anchorage loss by using absolute anchorage more efficiently than ever.

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