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Section 1. Geography

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GLOBAL WARMING OF CLIMATE AND DESERTIFICATION OF LAND

Abstract. Climate as the main component of the natural environment, has a decisive influence on all processes occurring on the surface of the Earth's planet and on the conditions of existence of all living organisms, including the development of human society. Science in its entire long history cognizes in detail the fundamentals of climatic phenomena, scientists seek to identify their predictive parameters in order to develop optimal methods to protect our civilization from possible extremely negative climatic cataclysms.

Keywords: global warming, climate, cataclysm, desertification, landscape.

The problem of global warming in recent decades has attracted increasing attention of scientists all over the world and has become the subject of widespread discussion in the United Nations. Environmental scientists and climatologists are making alarming predictions about the possibility of negative environmental and social impacts of climate change.

Against the background of negative processes occurring in the environment (desertification, reduction of biological and landscape diversity, deforestation, etc.), such processes as global warming, depletion of the ozone layer, environmental pollution with radioactive waste, etc. are intensified. Cataclysms occurring in the world have become the subject of discussion at various conferences and forums, according to the results of which various environmental documents of international, regional and national levels were adopted.

Climatologists believe that the cause of accelerated climate change is thoughtless human activity in relation to nature, in particular excessive consumption of energy resources.

For the first time, the problem of global climate change was raised at the Stockholm Conference on the Environment in 1972, and in 1983 the World Commission on Environment and Development (UNEP) was established at the UN.

In 1992, at the International Conference on Sustainable Development in Rio de Janeiro, an agreement was reached on stabilizing the concentration of greenhouse gases in the atmosphere. Kyoto Protocol appeared, obligating industrialized countries to reduce their emissions, and ratified by 184 countries. Nevertheless, the volume of CO_2 emissions from year to year increases and nowadays there are more than 30 billion tons of CO_2 emissions per year. The particular moment is that 75% of these emissions are produced by developed countries [1–5].

According to the forecasts of climatologists, the rise in the temperature of the atmosphere by 2 °C could still be acceptable for normal life, while higher values will certainly lead to an ecological catastrophe. The Brazilian conference in 1992 recommended

to industrialized countries reduce emissions by 40% until 2020 compared with 1990, but unfortunately, this decision remained on paper.

In December 2009, representatives of more than 100 countries took part in the 15th UN World Conference on Climate Change in Copenhagen (Denmark), where they discussed the future of the Earth's atmosphere in connection with this global phenomenon. Adopted document obliged all countries to strictly follow the relevant recommendations of preventing the global warming, the results of which not only determine the state of the environment, but also the fate of humanity.

In modern conditions of human activities by the end of the twenty-first century the average temperature of the air on a global scale may increase by 7 °C, which will increase the aridization of the climate and lead to the desiccation of the soil layer of the earth. Global warming has a particularly negative impact on the ecosystems of arid territories, which occupy more than 30% of the Earth's land. In Central Asia, intensive melting of glaciers in the mountains, more frequent droughts on desert pastures and irrigated lands, a decrease in river flow, the volume of seas and lakes, and the impoverishment of flora and fauna are already observed.

There are data that make it possible to fairly accurately reflect the current state of the Earth's atmosphere, in particular, the presence of temperature changes, the reduction of glacier area and snow cover, and the rise in the level of the World Ocean. Over the past 80 years, the average temperature of the earth's atmosphere has risen to 10 °C, and the sea level has risen by an average of 15–20 cm. Climatologists assume that the climate warming process will be uneven: in some regions the amount of precipitation will increase, and prolonged drought will become more severe in others. Global warming estimation is mainly based on the average annual temperature of the surface layer of atmospheric air above the continents. This process is expressed primarily in the increase in average air temperature, the increase of drought hot days, a decrease in the total volume precipitation, sharp thaw and frost, floods, landslides, avalanches, etc [1–5].

Targeted studies of climate processes in Central Asia have been conducted since the second half of the twentieth century. The obtained data allowed us to reveal the irrefutable facts of the beginning of changes in various climatic indicators and to establish the presence of positive trends in the air temperature series. This allows to conclude that climate change towards its warming can be traced throughout the Aral Sea basin both in the cold and in the warm period of the year. The result showed us the intensive aridization of the flat areas of Central Asia, as well as decrease in the amount of precipitation and an increased incidence of drought. The desertification processes are intensified directly on the lands of the Aral Sea region. In the mountainous part of the territory of the Aral Sea basin, a steady decrease in snow reserves and an increase in glacier melting are observed. Over the past 50 years, their area has decreased by 19, and the volume – by 37%. Evaporation in the area of the Aral Sea area compared to the mid-twentieth century increased by 20%. All this indicates the onset of the initial stage of climate change in the direction of its aridization. Thus, the concern of scientists and government officials about the climate change and the possible negative effects on ecosystems and the socio-economic life of Central Asia is well founded.

The countries of the Aral Sea basin make a significant contribution to the implementation of the proposals of the UN Convention on Environmental Protection. Over the past decades, with the participation of the Global Environment Facility, the United Nations Environment Program and the United Nations Development Program, the countries of the Aral Sea basin have implemented and are implementing joint projects in the fields of conservation of biological and landscape diversity, sustainable management of land, water, forest and pasture resources, combating desertification and etc.

Since 1993, the International Fund for Saving the Aral Sea and its subdivision – the Interstate Coordination Water Management Commission, as well as the Interstate Commission on Sustainable Development, have been successfully operating in Central Asia.

Climate change was devoted to the Central Asian Conference, held in January 2018 in the Kazakh city of Almaty. The main purpose of the workshop was to achieve mutual understanding in the development of actions to mitigate the effects of climate warming. The countries of the Aral Sea basin are gradually implementing national programs in this area, systematically conducting an inventory of emissions and sinks of greenhouse gases, as well as assessing the vulnerability of the national economy, especially agro-industrial complexes, to develop scientifically-based technologies to mitigate the effects of climate warming.

It should be noted that the preliminary data on climate warming in Central Asia confirm the evidence of the beginning of this global process. However, the causes and interrelationship of the ongoing climate change have not yet been clarified. Consequently, it is rather difficult to scientifically substantiate the onset of climate change on a global scale, at least until there is a firm belief that they are not a manifestation of short-term climatic phenomena and processes. However, in any case, decision makers and humanity as a whole should be prepared for any negative manifestations of nature.

Conclusion

Sustainable socio-economic development of the world community can be achieved only when its interests are consistent with the laws of nature. At present, the level of human development has reached the scale of activities, that are comparable to changes in natural conditions. A Russian scientist, Academician V. I. Vernadsky, wrote about this: "To meet the requirements of the global climate observing system, the following points are necessary: a) monitoring the climate system and the response of natural components to its change; b) the use of climate information in the interests of socio-economic development; c) improvement of scientific research in the field of climate modeling and forecasting".

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Section 2. Geology

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THE MULTI–VECTOR RESEARCH IN THE EXPLORATION OF MINERAL DEPOSITS

Abstract. A spatial analysis of the curvature of exploration wells was carried out. Ways of replacement of the actual bore axis broken line.

Keywords: coal seam, exploratory well, directional shooting, angular parameter, related measurements.

The development of human society is unthinkable without the use of mineral raw materials. People searched for deposits of minerals and mined mineral raw materials for their needs. With the increasing demand for mineral raw materials, methods of exploration and development of mineral deposits began to improve.

Exploration and development of deposits is associated with the excavation of mine workings; there is a need for various measurements and the so-called surveying surveys.

The mine surveying service of coal mines in the process of detailed exploration (pre-exploration) of mine fields constantly solves the problems of geometrization of deposits.

The geometrization of mineral deposits includes a set of field observations, measurements, calculations and graphical constructions that are carried out with the aim of geometric representation of the form, conditions of occurrence and spatial distribution of mineral properties.

The main results of exploration of coal deposits are presented in vertical geological sections (Figure 1) and hypsometric plans of the seams, which are used in calculating reserves, designing, constructing and operating mining enterprises.

The accuracy and reliability of geological sections and hypsometric plans depend on the complexity of the geological structure of the mine field or site, the detail and quality of exploration work, the methodology of structural constructions and the accuracy of determining the spatial coordinates of the points of intersection of layers (layers) with wells.

When drilling, the trunks of most exploratory wells are bent. Under the curvature of the well understand the deviation of its axis from a given direction.

If the curvature occurs only in the vertical plane, then we speak of zenithal curvature, if the well is curved only in the horizontal plane, then this curvature is called azimuthal. In practice, both types of curvature are most often found everywhere, the axes of their wells are usually irregular spatial curves. To do this, special instruments – inclinometers – are lowered into the well, with the help of which, at a certain interval *L*, the angular parameters of the well axis are determined at the points of measurement (shooting).

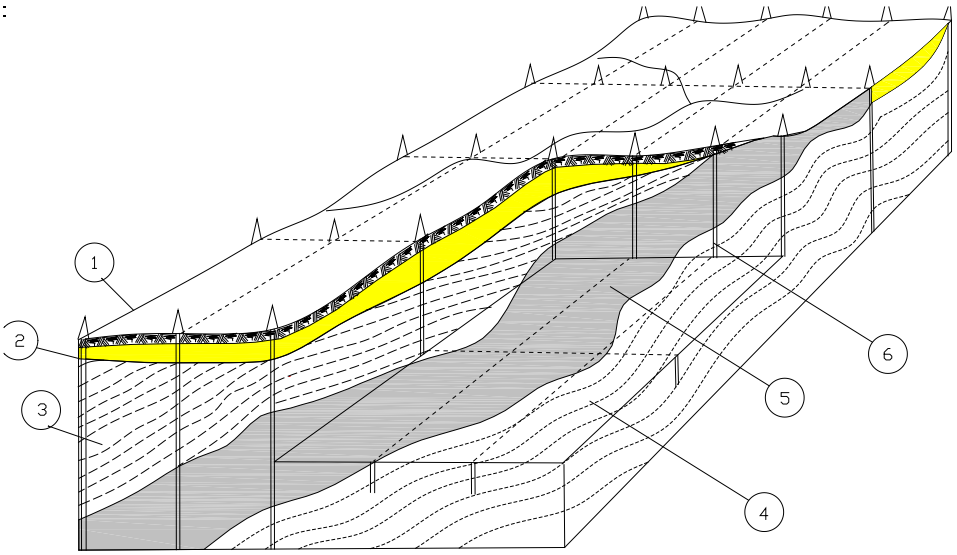

Figure 1. Vertical geological section: 1 – surface of the earth; 2 – sandstone; 3 – mudstone; 4 – siltstone; 5 – coal seam; 6 – exploratory well

When taking a survey, the spatial position of the axis of the exploration well is usually determined by two angular parameters: the zenith angle θ or the true (magnetic) azimuth α.

During the inclinometric survey, the depth of the measuring point along the axis of the well is recorded. The ultimate goal of well survey is to determine the spatial coordinates of the meeting points of exploratory wells with coal seams and rock layers of the rock mass within a mine field or coal field (Figure 2).

Currently, when processing the results of inclinometric surveys, the actual axis of the well is replaced by a broken line.

If through each broken line to draw vertical planes and sequentially deploy them on one common plane, then we get the axis of the well in projection onto the expanded vertical plane. The projection of a broken line on a horizontal plane gives a plan of the axis of the well.

Replacing the actual axis of the well with a broken line can be done in one of three ways:

1. The measured angles and extend over the entire interval to the next measuring point. The coordinates of the wellhead are determined and the numerical values of the coordinates of all points of the inclinometric survey are calculated using the general formulas:

$$x_n = x_y + \sum_1^n li * \cos\alpha i * \sin\theta i$$

$$y_n = y_y + \sum_1^n li * \sin\alpha i * \sin\theta i$$

$$z_n = z_y - \sum_1^n li * \cos\theta i$$

2. The measured angles and extend to half the intervals up and down from the measurement point:

$$x_n = x_y + \sum_1^n \frac{li + l_{i+1}}{2} * \cos\alpha i * \sin\theta i$$

$$y_n = y_y + \sum_1^n \frac{li + l_{i+1}}{2} * \sin\alpha i * \sin\theta i$$

$$z_n = z_y - \sum_1^n \frac{li + l_{i+1}}{2} * \cos\theta i$$

3. The measured average values of the catch and from two adjacent measurements, apply to the entire interval between the measurement points:

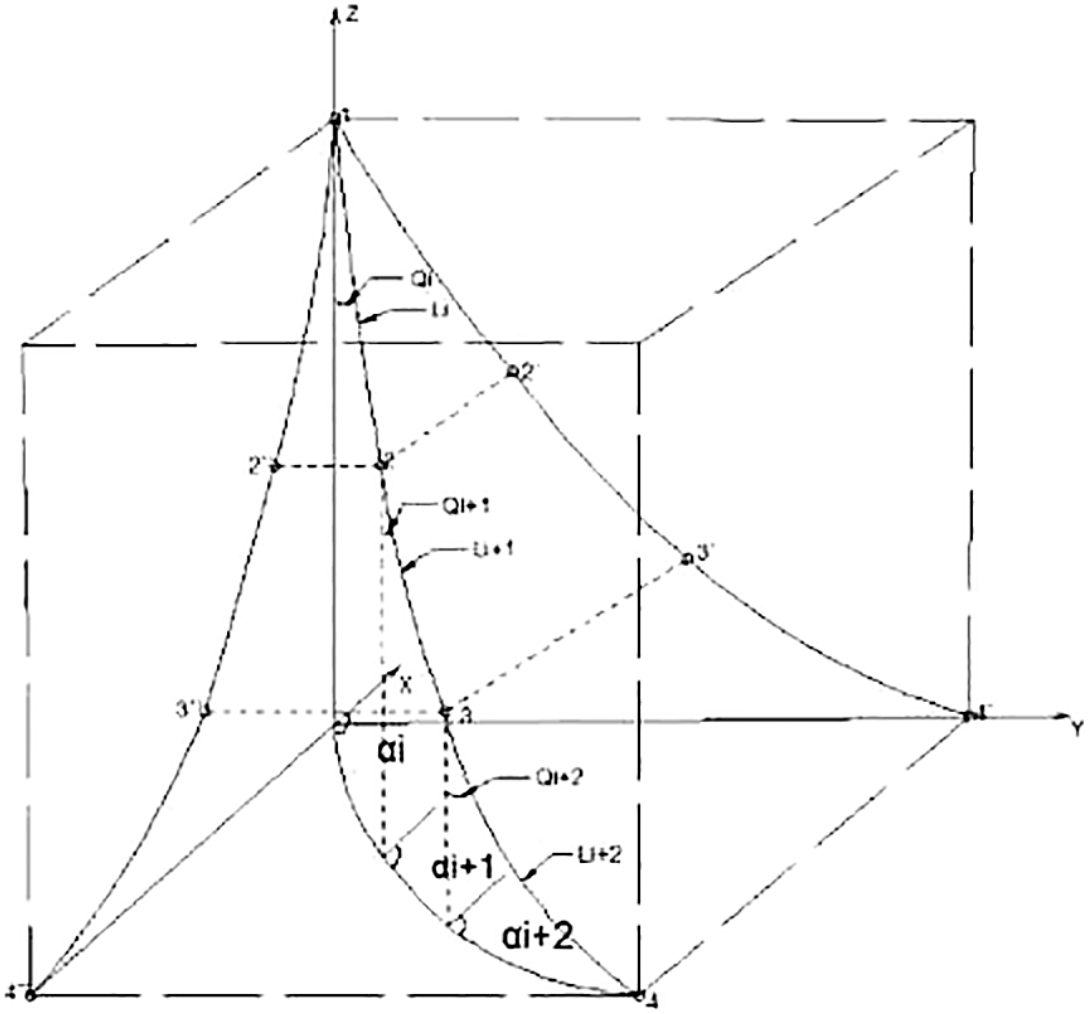

Figure 2. Inclinometric survey of a curved well

$$x_n = x_y + \sum_1^n li * \cos\frac{\alpha i + \alpha_{i+1}}{2} * \sin\frac{\Theta i + \Theta_{i+1}}{2}$$

$$y_n = y_y + \sum_1^n li * \sin\frac{\alpha i + \alpha_{i+1}}{2} * \sin\frac{\Theta i + \Theta_{i+1}}{2}$$

$$z_n = z_y - \sum_1^n li * \cos\frac{\Theta i + \Theta_{i+1}}{2}$$

Thus, in accordance with the theory of errors, the errors in determining the coordinates of the points of inclinometric surveys are calculated as the mean square errors of the function of the measured values.

The accuracy of the application of contour lines when projecting the reservoir surface onto the horizontal (isohypsum plot) and vertical (isolog plot) is evidenced by the constructed error ellipses in the horizontal and vertical planes at each of the points of the inclinometric survey.

The next stage in the work will be the determination of the errors of the planned and altitude positions of the meeting points with the formation for each of the three calculation methods, a comparative analysis of the influence of these errors on the accuracy of the construction of geological sections, as well as the hypsometric plans of the layers.

Preliminary calculations show that the most accurate are the graphs constructed using the third method. Moreover, the second and third methods give similar results, and the error of the first method exceeds the error of the other two by several times.

Section 3. History

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THE ROLE AND IMPORTANCE OF AZERBAIJAN IN THE FOREIGN POLICY OF THE BUKHARA PEOPLE'S SOVIET REPUBLIC

Abstract. This article covers the issues of interstate relations of the Bukhara People's Soviet Republic with Azerbaijan in 1920–1924. After the establishment of Soviet power in Bukhara, the government of the republic maintained economic and cultural relations with the Soviet republics and foreign countries. In the external relations of the Bukhara People's Soviet Republic, relations with Azerbaijan were important. The Republic of Transcaucasia has become an important bridge for entering the foreign market. For this, the BPSR departments were used in Transcaucasia. Sales departments established trade relations with trade organizations of foreign countries. Azerbaijan had become one of the important allies of the BPSR in economic and cultural relations. The article on the basis of archival materials reveals bilateral relations between Azerbaijan and Bukhara.

Keywords: XX century, Central Asia, Transcaucasia, RSFSR, Bukhara People's Soviet Republic, foreign relations, New economic policy, Azerbaijan, embassy, political, economic, cultural relations, Baku, Batumi, wholesale, Turkey, Iran, Western Europe, trade departments, the elimination.

The study of external relations has always been considered one of the pressing issues in historical science. The history of friendly relations between the Uzbek and Azerbaijani peoples goes far back centuries. The study of relations between Bukhara and Azerbaijan is one of the urgent scientific problems in the history and historiography of Uzbekistan. In Soviet times, this topic was considered one of the forbidden. After the collapse of the USSR, it became possible to study this problem using previously banned historical documents.

After the overthrow of the power of the emir in late August and early September 1920, Bukhara became drawn into the sphere of interests of the Russian Bolsheviks. The Bukhara People's Soviet Republic that existed in 1920–1924 was important for spreading the ideas of communism in the East.

In the spring of 1921, the New Economic Policy began to be introduced in the RSFSR. This policy gave some freedom to the republics that were under the influence of Soviet power. Economic needs and devastation, as a result of the military operations of the Soviet troops, forced the BPSR government to seek new partners. One of the main directions in the foreign policy of the BPSR government was the establishment of comprehensive ties with the republics of Azerbaijan and Georgia. The territory of these republics was considered the only bridge connecting Bukhara with Turkey, Iran and the countries of Western Europe. The initiator of the establishment

of interstate relations with Azerbaijan was the head of the BPSR government F. Khodjaev, a prominent statesman repressed by the Stalin regime in 1937. In turn, the Azerbaijani government sent its ambassador Ali Rizo Narimonov to Bukhara in the summer of 1922, which was received on August 27 by Prime Minister F. Khojaev [1, No. 99].

F. Khojaev in October 1921 sends a government telegram addressed to the Minister of Foreign Affairs of Azerbaijan in order to establish political and economic ties between the two republics [2, No. 52]. The Azerbaijani side agreed to establish diplomatic relations with Bukhara [2, No. 52]. The BPSR Government sends its representative to Baku, headed by Mahmoud Said Ahrori, to Baku [3, P. 203]. Cooperation between Bukhara and Azerbaijan was mainly carried out in economic, political and cultural directions. On December 15, 1921, it was decided to organize BNSR trade missions in the cities of Baku, Batumi and Tbilisi [4, P. 191].

The trade mission in Baku began its activity on April 4, 1922. Bukhara karakul, leather, intestines, carpets, alfalfa seeds and other goods were supplied to the Azerbaijani market. [5, P. 27]. Political events taking place on the territory of Transcaucasia influenced the activity of the trade mission of Bukhara. With the formation of the ZSFSR, the main department of the trade mission was transferred to Tbilisi from October 4, 1922. Trade departments in the cities of Baku and Batumi were subordinate to the main department. [5, P. 15].

Despite the enormous difficulties, economic ties between Bukhara and the Caucasian SFSR gradually developed. January 3, 1923 A. Tursunkhodzhaev was appointed official representative of Bukhara to the government of Azerbaijan. He was tasked to establish direct relations with the Department of External Relations of the Caucasian SFSR, for close political and economic relations with the republics of the Caucasus [5, P. 30]. Representatives of Bukhara and the government of the republic have always paid great attention to the role and importance of the Caucasian SFSR in the foreign policy of the BPSR. Therefore, the plenipotentiary representative of Bukhara A. Tursunkhodzhaev paid great attention to the development of bilateral relations.

The political situation in Transcaucasia influenced the relations of the two republics. With the formation of the Caucasian SFSR, the political representation of Azerbaijan in Bukhara was abolished. Despite political changes in the Caucasian SFSR, BPSR representatives in Baku continued their activities. The BPSR trade office in Baku carried out trade operations with state, cooperative and private enterprises of Azerbaijan and foreign states. Products exported to a foreign market were to be sold for Russian and foreign hard currency. The trade mission also had the right to organize joint-stock mixed companies in the Transcaucasia and neighboring places, as well as negotiate with foreign companies in concessions for the processing and irrigation of Bukhara lands [6, P. 3]. The BNSR trade office in Baku was engaged in the sale of Bukhara products not only in the local but also in the foreign market. Various agricultural products were supplied to the foreign market in the form of astrakhan, cotton, silk, leather, licorice root, intestines and others. For the needs of Bukhara, products were bought from the Soviet republics and from abroad in the form of clothing, food, textile products, medical supplies, and household equipment. To carry out cooperation with foreign firms, the trade representative drew up business contracts with firms and private entrepreneurs of the Caucasian SFSR [7, P. 43].

On February 15, 1923, on the orders of the Nazirate (Ministry) of Foreign Affairs of the BPSR, A. Tursunkhodzhaev was appointed diplomatic representative of Bukhara in Azerbaijan. The head office of the trade mission was moved from Tbilisi to Baku [7, P. 4].

With the development of trade relations, the financial representation of the trade representative is strengthening. In July 1922, the representative office had 279.211.000 Soviet money, 1.620 Russian gold rubles, 250.000 Georgian bonds, 3 Turkish gold liras,

50 francs. In addition, there were stocks of products in the form of 1.260 pounds of alfalfa, 9.000 pieces of raw leather, 30.000 pieces of processed leather, 20.000 pieces of goat skin, 324 pounds of wool, 262 pieces of carpet [8, P. 38].

Bukhara sales representatives have established close relations with the Baku technical bureau "Rude", which was engaged in the supply of intestines abroad. On February 9, 1923, "Rude" purchased 104,000 pieces of guts at a price of 30 kopecks of the Russian gold ruble per piece [5, P. 12]. Economic cooperation between the two republics expanded especially in the spring of 1923. On May 14, 1923, a joint-stock company for the cultivation and purchase of licorice root "VIAN" was formed, which was organized by the commissariats of industry, trade and agriculture of Azerbaijan [9, P. 3]. The main capital of the company amounted to 800.000 rubles, of which 375.000 rubles were invested by the Foreign Trade Commission of Azerbaijan. The main goal of this society was the joint use of the licorice root processing plant in the city of Chardzhui [9, P. 8]. On May 15, 1923, it was decided to enter the BNSR into the joint-stock company.

The trade mission actively participated in the famous Baku fair. Traditional Bukhara agricultural and livestock products were sold at the fair. For the needs of Bukhara, various industrial goods were purchased [10].

The trade mission at that time focused mainly not only on expanding trade relations with Azerbaijan, but also on exporting Bukhara products, especially karakul, abroad, preferably to the English market [11]. Using trade opportunities of Azerbaijan, sales representatives carried out work on the electrification of the city of Bukhara [10].

The trade mission actively participated in the famous Baku fair. Traditional Bukhara agricultural and livestock products were sold at the fair. For the needs of Bukhara, various industrial goods were purchased [10].

The Bukhara Trade Representation was engaged in the acquisition of agricultural equipment and military uniforms for Soviet troops from foreign firms [12]. American firms operating in the Transcaucasus were also drawn into trade cooperation. July 12, 1923 from the American company received 700 million banknotes of the ZFSFR at the disposal of the BNSR trade mission [11]. BPSR sales representatives intended to establish and develop trade relations with the Republic of Ter, Armenia and the North Caucasus [13].

Azerbaijan was important for the Bukhara Republic and in establishing cultural ties with Turkey and Germany. Baku was considered an important place for sending Bukhara youth to the above countries. In 1922, students from Bukhara sent to Turkey arrived in Baku [14]. The Republic of Azerbaijan also helped in preparing students. On May 4, 1922, students of 5 people under the leadership of Muhiddin Rafik arrived in Baku [15]. On December 26, 1921, Professor Atamanov arrived in Bukhara from Baku to assist in the creation of a state university with its own special library, the amount of which amounted to 36 million rubles [16].

After the formation of the USSR, the abolition of all organs of the BPSR begins, not only abroad, but also in the Soviet republics. In the spring and summer of 1923, the liquidation of all state institutions of the BPSR begins, including in Azerbaijan. On July 9, 1923, the diplomatic mission of Bukhara in Baku was abolished [11]. Good intentions were not destined to come true. By strengthening the policy of sovietization and the state demarcation of 1924 in Central Asia, the BPSR ceased to exist.

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Section 4. Medical science

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FEMALE AGING AND SUPERVULATION INDUCTION FOR IVF

Abstract. In this study the efficacy of the recombinant and urinal gonadotropin usage in women of late reproductive age during ovarian stimulation with the gonadotropin-releasing hormone (GnRH) antagonists has been investigated.

Keywords: in-vitro fertilization, ovarian stimulation, reproductive age.

Introduction. Research on factors contributing to infertile marriages has shown that in almost every second couple (44.3–52.7%) the infertility is caused by the pathology of woman's reproductive system, in 6.4–19.4% of cases it is caused by the pathology of man's reproductive system and in 34.2–38.7% of couples the infertility is due to pathology in both spouses [1; 5]. Age is an important factor influencing the effectiveness of in-vitro fertilization and embryo transfer procedures as it determines the quantity of retrieved oocytes, quality of transferred embryos and number of successful pregnancies. Administration of complex IVF and embryo transfer procedures in women older than 38 years of age significantly improves the efficacy of fertilization and allows women to try to use their own ovarian reserve to full extent. Insufficient effectiveness of the methods to recover natural human fertility has started development of new supplementary reproductive techniques, in particular in-vitro fertilization method, the effectiveness of which varies between 28.5 to 32.5% [2; 3]. Therefore, in recent years more attention has been given to refinement of the extracorporeal fertilization methods in order to increase their effectiveness [3; 4; 5]. Fujimoto et al. have studied a group of women over 40 years of age and found that only 16% of women between the age of 40 and 42 years gave birth to healthy newborns, whereas women over 43 years could not become pregnant (6). Such factors as the duration of infertility, age of a spouse, age at the beginning of the marriage, history of surgical operations on the uterus were statistically insignificant. The authors have concluded that positive results can be achieved in women between 40 and 42 years of age given they have low levels of the follicle stimulating hormone (FSH), normal menstrual cycle and no history of surgical operations on ovaries. In summary, despite increasing administration of supplementary reproductive techniques that can facilitate pregnancy conception in almost every 3rd infertile couple, a development of new methods to increase the effectiveness of expensive in-vitro fertilization and embryo transfer procedures remains highly relevant. The effectiveness of IVF, i.e. occurrence of pregnancy conception, currently does not exceed 35–40%, moreover, about one third of the induced pregnancies usually ends with the abortion on early stages. The causes of negative results very often remain unknown. Therefore, further research is needed on the possibilities to improve the effectiveness

of in-vitro fertilization by optimizing examination and preparation of women with endocrine forms of infertility.

The aim of the study: to investigate the effectiveness of the recombinant and urinal gonadotropin usage in women of late reproductive age during ovarian stimulation with the gonadotropin-releasing hormone (GnRH) antagonists.

Participants and methods. The protocol of ovarian stimulation with the GnRH antagonists has been used in this study. From the 2–4 day of the menstrual cycle the 1st group of patients (main group) was given a recombinant FSH –Gonal-F (Merck Serono, Italy) (Fig.1). The 2nd group was given a urinary FSH – Menopur (Ferring, Germany) (Fig. 2).

The initial dose of the gonadotropin in both groups was 150–250 IU depending on the measures of ovarian reserve. The duration of the usage varied from 6 to 16 days in the 1st group and from 6 to 12 days in the 2nd group. The daily dosage was corrected depending on the follicles' growth measured on ultrasound scanningUltrasound monitoring was performed on the 1st day of the beginning of ovarian stimulation, on the 5–6 day of stimulation and further every other day till the day when the ovulatory dose of the human chorionic gonadotropin (HCG) was given. GnRH antagonists – Orgalutran (Merck, USA) were given subcutaneously in daily dose of 0.25 mg after the leading follicle had reached 13–14 mm in diameter. The trigger of final follicular maturation, i.e. the ovulatory dose of the HCG – Ovitrelle (6500 IU) (Serono, Switzerland) was given after at least 3 follicles had become >17 mm in diameter. All patients received Utrogestan 600 mg per day intravaginally until positive or negative results of pregnancy test were obtained. Pregnancy tests were made by measuring blood levels of β-subunits of the HCG on the 14th day after the embryo transfer. Test results were considered positive if β-subunits levels were >20 IU/l (biochemical pregnancy). Ultrasound examination to confirm presence of clinical pregnancy was performed on the 21st day after the embryo transfer and further management strategy was determined.

Results: Duration of ovarian stimulation in the recombinant gonadotropin group (main group) was significantly longer than in the group that received urinary gonadotropin (comparison group). Specifically, in the main group the duration of stimulation was 9.3 ± 0.2 days, whereas in the comparison group it was 8.6 ± 0.3 days. Additionally, in the comparison group the trigger of final follicle maturation was given earlier than in the main group (on the 10.5 ± 0.3 and 11.4 ± 0.2 day respectively, $p < 0.05$). Ultrasound monitoring revealed that during gonadotropic stimulation the number of growing follicles was higher in the main group – 7.5 ± 0.5 and 5.7 ± 0.5 in the main and comparison groups respectively ($p < 0.05$). There were no statistically significant differences between the two groups in the quantities of retrieved oocytes, overall dose of gonadotropins taken by women, numbers and days of ovarian punctures.

Table 1.– Measurements of the gonadotropic ovarian stimulation in patients of both groups (M ± m)

Measurement	Main group	Comparison group	p
1	*2*	*3*	*4*
Summary dose of gonadotropins, in IU	2035.4 ± 93.9	1947.6 ± 131.4	
Duration of stimulation, in days	9.3 ± 0.2	8.6± 0.3	<0.05
Number of growing follicles	7.5 ± 0.5	5.7± 0.5	<0.05
Day of triggering the final follicular maturation, in days of menstrual cycle	11.4 ± 0.2	10.5± 0.3	<0.05
Frequency of ovarian puncture, in%	97.8	93.8	

1	*2*	*3*	*4*
Day of ovarian puncture, in days of menstrual cycle	13.3 ± 0.3	12.8 ± 0.3	
Average number of retrieved oocytes	6.4 ± 0.5	5.6 ± 0.7	
Frequency of ovarian punctures with zero oocytes retrieved, in%	7.6	6.3	
Frequency of stopped cycles of stimulation due to the absence of follicular growth, in%	1.1	0	

Table 2. – Correlation of the ovarian response to stimulation with age and hormone levels (M ± St)

Parameter	low ovarian response	4 or more oocytes retrieved	P
Age, in years	38.8 ± 0.5	37.6 ± 0.3	< 0.05
FSH levels on the 2nd day of menstrual cycle, in nmol/l	7.8 ± 0.4	6.4 ± 0.2	< 0.01
Anti-Mullerian hormone (AMH)	1.2 ± 0.2	2.2 ± 0.2	< 0.005

Chances of obtaining a sufficient or 'weak' response of ovaries in women of late reproductive age are presented in (Table 2) of retrieving 4 or more oocytes were higher in the main group (OR = 1.35, p < 0.05).

Table 3. – Chances of retrieving a certain number of oocytes in women of late reproductive age

Number of oocytes retrieved during the puncture	Study groups		OR	p
	Main	Comparison		
1–3	32	13	–	> 0.05
	34.8%	41.9		
4 and more	60	18	1.35	< 0.05
	65.2%	58.1%		

During the measurement of the b-HCG blood levels on the 14th day after the embryo transfer, biochemical pregnancy was detected in 18 (24%) women from the main group and in 9 (32.1%) women from the comparison group. After 1–2 weeks during the ultrasound scanning a fetus was observed in 21.3% (16) of women from the main group and in 28.6% (8) of women from the comparison group. Differences in pregnancy onsets between the two groups were not statistically significant.

Table 4. – Effectiveness of the carried out treatment in two study groups

Pregnancy rate		Main group	Comparison group	Total
1	*2*	*3*	*4*	*5*
Biochemical pregnancy	n	18	9	27
	%	24	32.1	25.9
Presence of the fetus on ultrasound scans (implantation coefficient)	n	16	8	24
	%	21.3	28.6	23.3

1	*2*	*3*	*4*	*5*
Single child delivery	n	7	4	11
	%	9.3	14.3	10.7
Twins delivery	n	1	0	1
	%	1.3	0	0.9
Abortion	n	2	0	2
	%	12.5	0	8.3

Dynamic relationships between the FSH, AMH and pregnancy onsets in 3 age groups of women are presented in (Fig 1). It is noteworthy that in a subgroup of women between 37–39 years of age the frequency of pregnancy onsets was higher than in two other subgroups (34–37 years and 40–43 years).

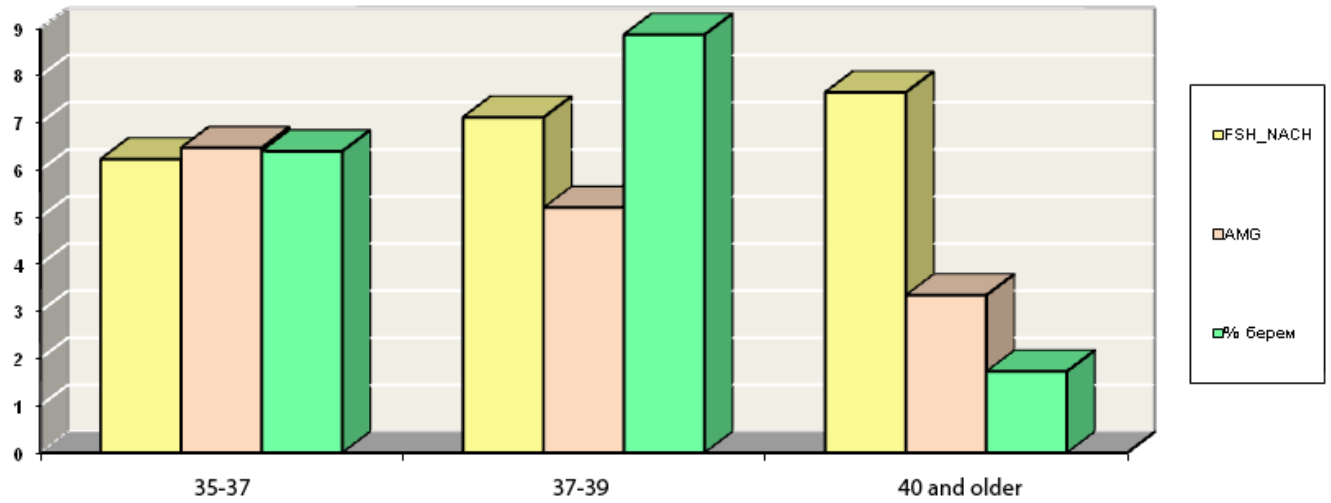

Figure 1. Dynamic relationships between the blood levels of FSH, AMH and the frequency of pregnancy in 3 different age groups

Complex assessment of pregnancy prognosis after the ECF/ECF+ICSI programme in women of late reproductive age.

A scale to assess overall probability of clinical pregnancy in women of late reproductive age undergoing ECF/ECF+ICSI programme was developed using the classification tree method.

Table 5. – The prognostic index scale of clinical pregnancy prediction in women of late reproductive age undergoing the ECF/ECF+ICSI programme

Parameter	**Value**	**Point**
1	*2*	*3*
Age, in years	Age ≥ 40	0
	Age < 40	1
History of induced abortions	Present	0
	Absent	1
Ovarian function insufficiency	Present	0
	Absent	1

1	*2*	*3*
History of tubectomy	One-sided	0
	No	1
	Two-sided	2
FSH, in IU/l (on the 2ndd.m.c.)	≥ 6.5	0
	4.5–6.5	1
	< 4.5	2

3 points was a transition score that can be considered as a threshold. The probability of clinical pregnancy in women who score 4–5 points was 21.8 times higher than in women who have 0–3 points; at 6–7 points the probability increased by 120 times ($p < 0.001$) in comparison with patients who have 0–3 points. In order to assess probabilities of biochemical pregnancy the following scale has been developed:

Table 6. – The prognostic index scale of biochemical pregnancy prediction in women of late reproductive age undergoing the ECF/ECF+ICSI programme

Parameter	**Value**	**Point**
Age, in years	Age ≥ 40	0
	Age < 40	1
History of induced abortions	Present	0
	Absent	1
Ovarian function insufficiency	Present	0
	Absent	1
Chronic salpingo-oophoritis	No	0
	Yes	1
Duration of embryo cultivation	2. 4. 5 days	0
	3 days	1
FSH, in IU/l (on the 2ndd.m.c.)	FSH ≥ 6.5	0
	4.5J	1
	FSH < 4.5	2

Similarly to the previous scale, 3 points was a transition score that can be considered as a threshold. The probability of biochemical pregnancy in women who score 4–5 points was 20 times higher than in women who have 0–3 points ($p < 0.001$); at 6–7 points the probability increased by 159 times in comparison with patients who have 0–3 points.

Conclusions: The quantity of retrieved oocytes and quality of in-vitro fertilization and cultivation show negative correlation with the basal levels of FSH and positive correlation with AMH. Inhibin B blood levels are correlated with the quantity of class 'C' embryos on the 3rd day after fertilization. In patients of late reproductive age recombinant FSH and urinal gonadotropin are equally effective in stimulation of ovaries, fertilization of oocytes and successful pregnancy conceptions. In patients who were given urinal gonadotropin, on the day of triggering the final maturation of oocytes the levels of the luteinizing hormone were 2 times lower than in women who were given recombinant FSH. Use of urinal gonadotropin was characterized by shorter duration of stimulation. Also, the thickness of the endometrium during the embryo transfer to the

uterus was higher in the urinal gonadotropin group. The frequency of pregnancy onsets was dependent on the overall score on the prognostic index scale of clinical pregnancy prediction in women of late reproductive age undergoing the ECF/ECF+ICSI programme. 3 points is a transition score that can be considered as a threshold. The probability of clinical pregnancy in women who score 4–5 points was 21.8 times higher than in women who have 0–3 points; at 6–7 points the probability increased by 120 times ($p < 0.001$) in comparison with patients who have 0–3 points.

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THE IMPACT OF UTERINE FIBROIDS ON THE EFFECTIVENESS OF ICSI IN WOMEN OF ADVANCED REPRODUCTIVE AGE

Abstract. This publication presents the results of a study conducted among women of older reproductive age on the impact of uterine fibroids on the effectiveness of ICSI.

Keywords: uterine fibroids, in vitro fertilization, advanced reproductive age.

Introduction. Uterine fibroids are a common gynecological problem among women of reproductive age, and there are conflicting reports of their impact on fertility and pregnancy outcome. This is a common cause of gynecological consultations in most hospitals, as well as the most common benign genital tract tumor associated with insufficient fertility and early pregnancy loss in women of reproductive age [3].

According to a 2010 world health organization report, 20–25% of women suffer from myoma, and an estimated 235 million women worldwide are affected, representing 6.6% of the world's female population [2].

The relationship between myoma and fertility is observed, but the responsibility of infertility fibroids remains unclear and controversial [3].

Myomectomy is an alternative to hysterectomy for women who want to preserve their uterus, regardless of their fertility desires. Removal of fibroids should be considered if they are thought to be associated with severe mental bleeding, pelvic pain and / or pressure symptoms, and in some cases reproductive health problems [4].

Fibriod of the uterus – heterogeneous tumor composition, size, location and quantity; Differences in any of these factors can affect woman's fertility. Recommendations as to which infertile women with uterine myoma could benefit from myomectomy are varied, given the potential risks and consequences of surgery. A number of studies have been conducted to determine the effect of fibroids on fertility, with widely disparate data, and many of the studies suffer from methodological shortcomings. Studies are often poorly planned and often uncontrolled or historically controlled, analyses often do not correct for important mixed variables, sample sizes are usually small, and conclusions are often given that are not supported by available data [1].

The relationship between myoma and infertility has been clarified in numerous studies of patients with art, which have been summarized in several meta-analyses and systematic reviews. Although abnormal transfer of gametes and blockage of the fallopian tubes are bypassed by assisted reproductive technologies (art), fibroids can also disrupt fertility, altering the susceptibility of the endometrium, thereby adversely affecting embryo implantation and reducing the chances of pregnancy [2].

The location of the fibroid is crucial in the results HERE. In particular, submucosal fibroids significantly reduce implantation and pregnancy HERE. It was found that submucosal fibroids, which distort the uterine cavity, carry a relative risk of 0.3 for pregnancy and 0.28 for implantation after art compared with infertile women without fibroids [1].

Research result. Interesting results were obtained when calculating the data of patients with uterine myoma. According to different estimates of R are very consistent. So, the dose of gonadotropins for

ovarian stimulation is much higher in the presence of fibroids in patients. The number of follicles and further oocytes is higher in patients without uterine fibroids. And also, the number of correctly fertilized zygotes with two pronuclei is almost 2 times more in patients without uterine fibroids. The total number of embryos is also higher in patients without fibroids, in particular class b embryos.

Also, a significant difference was obtained in the number of oocytes obtained. From patients with uterine cancer received 22 of the oocyte(75,86%), no uterine fibroids – 87 oocytes (92,55%).

The same relationship is observed in the group of patients with myomectomy. Puncture of patients with myomectomy resulted in 11 oocytes, without myomectomy – 98 oocytes.

Interesting results were obtained when calculating the data of patients with uterine myoma. According to different estimates of R are very consistent. So, the dose of gonadotropins for ovarian stimulation is much higher in the presence of fibroids in patients. The number of follicles and further oocytes is higher in patients without uterine fibroids. And also, the number of correctly fertilized zygotes with two pronuclei is almost 2 times more in patients without uterine fibroids. The total number of embryos is also higher in patients without fibroids, in particular class b embryos.

We studied a significant difference in the higher dose of gonadotropins consumed in myomectomy, as opposed to non-operated patients. So when myomectomy takes on average 2437.67 ± 241.15 IU of gonadotropins during stimulation. And with the stimulation of patients not operated for fibroids 1953.57 ± 80.35 IU.

Also, a significant difference was obtained in the number of oocytes obtained. From patients with uterine cancer received 22 of the oocyte(75.86%), no uterine fibroids – 87 oocytes (92.55%).

The same relationship is observed in the group of patients with myomectomy. Puncture of patients with myomectomy resulted in 11 oocytes, without myomectomy – 98 oocytes.

Summary. The presence of myomectomy in the history of patients can lead to an increase in the dose of gonadotropins for stimulation, which increases the financial cost of the stimulation Protocol. However, fibroids are mainly present in women of reproductive age, and there is a higher prevalence of fibroids in women aged 30–40 years. Thus, age is a critical factor determining the reproductive outcome in women with myoma. In the absence of uterine fibroids, patients received significantly more oocytes. The presence of myomectomy in the history does not affect the quality of oocytes, embryos.

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PERSONALIZED APPROACH TO THERAPY OF PATIENTS WITH UNSTABLE ANGINE CARDIACITY WITH ANXIETY-DEPRESSIVE DISORDER

Abstract. on the basis of the Samarkand branch of the Republican Scientific Center for Emergency Medicine from 2018 to 2019, 123 patients with a diagnosis of unstable angina were examined. The average age of patients with NS was 62.2 ± 14.08 years. To solve general clinical problems, patients were conditionally divided into 2 groups: group 1 patients in comorbidity with anxiety-depressive syndrome and group 2 patients without anxiety-depressive syndrome. There were more patients with anxiety-depressive syndrome than patients with NS without comorbid pathology, which amounted to 60.88% of patients. Studies have shown that anxiety-depressive syndrome in patients with unstable angina is an important prognostic factor for the progression of NS, which affects the prognosis and outcome of the disease. The inclusion of paroxetine in the standard therapy regimen reduces the level of pro-inflammatory cytokines, regulates the cytokine imbalance, increases the effectiveness of therapy, and reduces the rate of poor prognosis and outcome in patients with anxiety-depressive syndrome.

Keywords: coronary heart disease, unstable angina pectoris, pro-inflammatory cytokines, anti-inflammatory cytokines, anxiety-depressive syndrome.

Introduction. To date, the attention of the scientific community has been drawn to the study of the relationship between cardiovascular diseases, namely coronary heart disease (CHD), and pathological mood disorders such as anxiety and depressive disorders. according to experts of the World Health Organization (WHO), by 2020, depression will occupy the second place, after IHD, among the causes of disability in the world [2; 3; 5].

Data from various studies show the prevalence of depression in the population of older age groups, which ranges from 9 to 30% [1; 4; 8]. In particular, among patients with coronary heart disease (CHD), depression is more common than in the population, making up, according to various sources, 18–65% [8; 9]. Various studies highlight several important risk factors for the development of affective disorders in somatic diseases.

Research Kozolova S.N. and her co-authors (2010) shows that when comparing markers of cytokine inflammation in patients with coronary artery disease depending on the presence or absence of affective disturbances in the anxiety-depressive spectrum, results were obtained that increased the level of pro-inflammatory cytokines IL-6 and TNFα in individuals with comorbid pathology. Thanks to the data from this study, we can explain the reason for the possible high mortality of patients with coronary artery disease with the presence of affective disorders [2; 4].

Thus, literary sources state the relevance of this work and the need for further study of the problem of anxiety-depressive syndrome in patients with coronary artery disease. In addition, it is necessary to conduct early screening of patients with coronary artery disease for the presence of depression for timely

treatment. A timely approach to the treatment of patients with NS will make it possible to predict the progression of the disease, which will improve the results of treatment of coronary heart disease and increase the quality of life of patients in this category.

Objective: To study the etiopathogenetic significance of the influence of anxiety-depressive syndrome on the progression of unstable angina and develop methods for diagnosing and predicting the development of cardiovascular complications.

Materials and research methods: 123 patients with a diagnosis of unstable angina were examined on the basis of the Samarkand branch of the Republican Scientific Center for Emergency Medicine from 2018 to 2019. The average age of patients with NS was 62.2 ± 14.08 years. To solve general clinical problems, patients were conditionally divided into 2 groups: group 1 patients in comorbidity with anxiety-depressive syndrome and group 2 patients without anxiety-depressive syndrome. There were more patients with anxiety-depressive syndrome than patients with NS without comorbid pathology, which amounted to 60.88% of patients.

During the study of patients with NS, it turned out that the male gender prevailed, and amounted to 57% of patients, which is consistent with many published data. When distributed by sex among patients with NS with anxiety-depressive syndrome, it turned out that 39.84% of women than men prevailed. When studying age-related characteristics, patients with NS are more likely to be between the ages of 50 and 59 years, which in general is 30.89% of the total number of patients, while 17.1% of the same age category were patients with NS with anxiety-depressive a syndrome.

When examining patients, the following were used: HADS Hospital Scale (The hospital Anxiety and Depression Scale Zigmond A. S., Snaith R. P., 1983). And also the Spielberger – Hanin scale

(State-Trait Anxiety Inventory-STAI, 1976), developed by Spielberger C. D. and adapted by Khanin Yu. L. Wexler for the evaluation of cognitive functions (Wechler D., 1945).

Laboratory examination included: determination of lipid profile, cardiospecific enzymes, interleukin-1, interleukin-4, interleukin-10, tumor necrosis factor-α serum. Blood samples were taken from the ulnar vein in the morning, from 8.00 to 11.00, on an empty stomach. In the course of the study, a comorbid state was found in 60.88% of patients with NS. Of these groups of patients using the HADS hospital scale, it was found that, in 59.39% of patients, subclinically expressed anxiety / depression, in 40.60% of patients, clinically expressed anxiety / depression. In addition, the Spielberger – Khanin scale showed us that 40.60% of patients with NS suffer from situational anxiety, while 33.83% of patients have even personal anxiety.

The results of the study showed that in patients with NS in comorbidity with anxiety-depressive syndrome, LDL and OH were higher by 19.5% and 38.2%, respectively, while HDL and PTI were 12.1% and 7.0% lower level of control, which indicates a violation of lipid metabolism in patients with NS in comorbidity with anxiety-depressive syndrome. in patients with NS in comorbidity with anxiety-depressive syndrome, changes in the level of cardiospecific blood enzymes of MV CPK were associated with the presence of anxiety-depressive disorder. So, in patients with no anxiety-depressive disorder, the activity of CPK and MV CPK exceeded the control by 21.8 and 15.2% ($P < 0.05$ and $P > 0.05$), and in patients with anxiety-depressive disorder – by 36.8 and 83.3%. In patients with NS in comorbidity with anxiety – depressive disorder, lower levels of echocardiography are noted. So LVEF amounted to 42.8 ± 1.20%, CDI – 65.5 ± 2.42 ml/m^2, CSI – 33.6 ± 2.21 ml/m^2. Accordingly, in patients with anxiety-depressive disorder, the incidence of elevation and / or depression of the ST segment is 18.9% higher than the incidence of T wave inversion by 14.7%.

When studying the cytokine status, a contrast difference was revealed between patients with NS in

comorbidity with anxiety-depressive syndrome and patients with NS without comorbid pathology. The level of pro-inflammatory cytokines IL-1β exceeded 21.6 ± 0.04 pg/ml and TNFα by 30.8 ± 0.12 pg/ml. In contrast, anti-inflammatory IL-4 and IL-10 decreased by 5.7 ± 0.65 pg/ml and 6.6 ± 0.04 pg/ml, respectively.

Patients with NS with anxiety-depressive syndrome by random sampling were divided into 2 groups. Group 1 consisted of 40 (54.05%) patients with unstable angina with anxiety-depressive syndrome who received conventional conventional therapy (CT). The 2nd group included 34 (45.95%) patients who, in addition to traditional therapy, received the drug paroxetine at a dose of 0.04–0.08 g/day. The follow-up was 2 months.

Conventional therapy included intravenous nitrate infusion for 12–24 hours, followed by sustained-release nitrates, antiplatelet agents, anticoagulants, cardioprotectors, beta-blockers, ACE inhibitors or ARA drugs, as well as statins.

Studies have shown that after 2-month traditional therapy (1st gr.) And treatment with the inclusion of paroxetine (2nd gr.) Unidirectional changes in biochemical parameters in the blood of patients with NS were recorded. In this case, the most noticeable changes occurred in patients of the 2nd group. In patients of the 1st group, at the end of treatment, the content of total cholesterol, LDL, VLDL and TG, as well as the cytokine status did not change significantly.

In patients of the 2nd group, the level of total cholesterol, LDL, VLDL and TG decreased by 14.8, 16.3, 11.07 and 12.9% ($P < 0.05$). The indicators of cytokine status improved significantly in patients of the second group, they reached those values that were in patients with NS before the attack. The indicators of pro-inflammatory cytokines (IL-1β, TNFα) in the 2nd group almost 2 times after the use of paroxetine decreased to the level of control.

It should be emphasized that in patients of the 1st group, all indicators of nitrogen-carbohydrate-cholesterol metabolism after 2 months of therapy practically did not differ from the initial figures. In patients of the 2nd group, practically all indicators significantly differed. At the same time, in the 2nd group, most indicators of nitrogen-carbohydrate and cholesterol metabolism of blood serum, as well as in the membranes of red blood cells, had significant differences from the data of the patients of the 1st group and practically did not differ from the control.

Therefore, there is a definite relationship between prognostic indicators and anxiety-depressive syndrome. In the 2nd group, by the end of the 2-month therapy, a significant decrease in the frequency of anginal attacks was noted, which contributes to a lower intake of nitrates. In patients of the 1st group who received only traditional therapy, angina attacks practically did not decrease.

Conclusions: thus, studies have shown that anxiety-depressive syndrome in patients with unstable angina is an important prognostic factor for the progression of NS, which affects the prognosis and outcome of the disease. The inclusion of paroxetine in the standard therapy regimen reduces the level of pro-inflammatory cytokines, regulates the cytokine imbalance, increases the effectiveness of therapy, and reduces the rate of poor prognosis and outcome in patients with anxiety-depressive syndrome.

This allows us to recommend including them in the standard therapy regimen to correct the psychological state of patients with unstable angina pectoris, as well as to resolve the cytokine imbalance, which will help increase the effectiveness of treatment, improve the prognosis and quality of life of patients.

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ENDOTHELIAL DYSFUNCTION AS ONE OF THE CAUSES IN THE DEVELOPMENT OF PRETERM LABOR

Abstract. Endothelial dysfunction is considered as a universal non-specific link in the pathogenesis of many diseases. The purpose of this study was to identify the features of regulation of endothelial function in pregnant women with a risk of premature birth. We examined 66 pregnant women with a habitual history of miscarriage (a risk group for premature births) in the dynamics of the gestational period (32–36 weeks). The control group consisted of 14 women with a physiological course of pregnancy at the same gestational age. The determination of DE in the blood was carried out by J. Hladovec, a tissue plasminogen activator (t-PA) using HUMAN reagents by ELISA. Studies have shown that all pregnant women with a risk of premature birth have a higher content of DE in the venous blood compared with the control group. Thus, in pregnant women with a risk of premature birth, we observe, against the background of endotheliocyte dysfunction, an increase in both anticoagulation factor and plasminogen activity inhibitor.

Keywords: endothelium, dysfunction, premature birth, systemic inflammatory reaction

Introduction. Endothelial dysfunction is considered as a universal non-specific link in the pathogenesis of many diseases. The development of endothelial dysfunction may be associated with a systemic inflammatory response [1; 2]. Tissue plasminogen activator (t-PA) is a specific marker for the development of endothelial dysfunction, through its endothelial cells are involved in the regulation of the hemostatic function of the endothelium [4]. It has now been established that hyperhomocysteinemia is a risk factor for vascular pathology, since even at low concentrations homocysteine (HZ) has a pronounced cytotoxic activity against the endothelium, induce apoptosis of endothelial cells [5; 6]. The manifestations of endothelial dysfunction, the direction and severity of changes in the formation of individual endothelial factors in various diseases differ [3; 4].

The purpose of this study is to identify the features of regulation of endothelial function in pregnant women at risk for preterm birth.

Materials and methods. We carried out a survey of 66 pregnant women with a habitual miscarriage in anamnesis (risk group for preterm birth) in the dynamics of the gestational period (32–36 weeks). The control group consisted of 14 women with a physiological course of pregnancy at the same time of gestation. Pregnant women held clinical and laboratory research methods. The age of the examined pregnant women ranged from 21 to 28 years. Analysis of the frequency and nature of extragenital diseases in the examined women showed a high frequency of their occurrence, in particular, SARS-81%, pathology of ENT organs –24%, diseases of the gastrointestinal tract –30.5%, diseases of the urinary system-35.5%. Determination of entodelia dysfunction in the blood was carried out by the method of J. Hladovec [6], tissue plasminogen activator (t-PA) with HUMAN reagents by ELISA. The level of homocysteine (HZ) and annexin A-5 was determined on a ROSH CO-

BAS-411 instrument using test systems. Statistical analysis of the results was carried out in the package of applied licensed programs Microsoft Office 2010, Statistica for Windows 6.0 and MedCalc v 7.4.4.1.

Results and discussion. Studies have shown that all pregnant women at risk for preterm birth have a higher content of entodelia dysfunction in the venous blood compared with the control group ($p < 0.05$) (Table 1).

Table 1.– The content of endothelial dysfunction markers in venous blood in pregnant women with preterm birth

Groups	Endotheliocytescells/μl	Thrombomodulin (ng/ml)	Homocysteine μmol/l	PAI-1 plasminogen activator inhibitor (U/ml)	Annexin A-5 (ng/ml)
Healthy n = 14	2.01±0.17	4.73±0.56	9.14 ± 0.79	4.41±0.33	0.87±0.09
Pregnant women with preterm birth n = 26	6.98±0.71	11.38±0.87*	19.02 ± 1.28	12.94±1.73*	5.41±0.98*

*Note: * – reliability of values of p < 0.05 when compared with baseline values*

Endothelial factors affecting fibrinolysis include a tissue plasminogen activator inhibitor (t-PA). When studying the blood levels of pregnant women with preterm birth of a plasminogen activator tissue inhibitor, data were obtained indicating that with this pathology of pregnancy, an increase in the content of specific PAI-1 is observed, increasing when compared with the group of women with physiological pregnancy. It was found that an increase in the level of PAI-1 was observed in 10(28.2%) pregnant women, with the physiological course of gestation and in 72(87.8%) pregnant women with preterm labor. Studies have shown that an increase in the blood content of PAI-1 in most pregnant women with preterm labor indicates the development of hemostatic and adhesive forms of endothelial dysfunction due to the combined effects of vascular wall damage factors such as adhesive proteins and platelet hyperactivity. Thus, in pregnant women with preterm birth, we observe, against the background of endothelial dysfunction, an increase in both the anticoagulant activity factor and the plasminogen activity inhibitor.

This condition apparently leads to the depletion of the level of natural anticoagulant-antithrombin III, an increase in the level of D-dimeter in the blood and is one of the reasons for the development of a thrombophilic state and trobotic complications during preterm birth. Noted various factors of damage to the vascular wall are accompanied by intensification of apoptosis and increased levels of annexin A-5. According to modern concepts, the important role of apoptosis in the development of thrombophilic states is associated with a high procoagulatory potential of apoptotic cells and microparticles (phosphatidolserine). It has now been established that PAI-1 and thrombomodulin have properties to inhibit apoptosis. In pregnant women with preterm birth, an increase in the levels of inhibitors of apoptosis of annexin A-5, PAI-1 and thrombomodulin can be regarded not only as an indicator of endothelial dysfunction, but also as a compensatory process aimed at reducing the severity of thrombophilia, including by reducing the thrombogenic potential of endotheliocytes, undergoing apoptosis. As a result of the research, it was found that all pregnant women compared with healthy women had a significant increase in the blood level of annexin 5 by 2.7 times when compared with pregnant women with the physiological course of gestation and 6 times compared with pregnant women with preterm birth. Since annexin A-5 is formed in the endothelium, it can be assumed that the damage and apoptosis of endotheliocytes leads to an increase not only in annexin A-5 in the blood, but also in the level of disqualified endotheliocytes, where its level exceeded the original values by 3.5 times.

It is known that the staged increase in the aggregation and coagulation parameters of blood coagulation in pregnant women with a physiological course of pregnancy reaches maximum values by the 3rd trimester, but is not accompanied by the activation of intravascular coagulation. This is mainly due to the sufficient activity of natural coagulation inhibitors that prevent the progression of blood clots and the consumption of the main components of coagulation. At the same time, in preterm birth, we observe an imbalance in the hemocoagulation system due to endothelial cell dysfunction and the cellular link of the hemostasis system.

Consequently, the results of our research indicate that the study of the dependence of endothelial dysfunction on the profile of factors affecting the endothelium is a promising direction in the development of methods for the prevention and treatment of preterm birth.

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TREATMENT OF HEPATORENAL SYNDROME TYPE I DEPENDING ON THE STAGE OF ACUTE KIDNEY INJURY

Abstract. This research is aimed to to improve the treatment method of type I hepatorenal syndrome in alcoholic liver cirrhosis by selecting the dose of terlipressin. depending on the degree of kidney failure ont the background of acute kidney disease. The study enrolled 109 patients. which were divided into 2 groups and examined in the dynamics of treatment. The results have shown that complete response rate was 81.7% in group 2 compared to group 1 which showed a low response rate of 66.7% ($p < 0.05$). relapse of the disease occurred in 40.1% in group 1 and in 23.2% in group 2($p < 0.05$). short term survival was also significantly better in group 2. Thus. correction of terlipressin dosage can improve the results of treatment. prevent the development of irreversible changes and reduce mortality in patients with hepatorenal syndrome.

Keywords: hepatorenal syndrome. alcoholic liver cirrhosis. terlipressin.

Introduction. Hepatorenal syndrome (HRS) is a potentially reversible form of renal failure that occurs in patients with cirrhosis and ascites. In accordance with the hypothesis of peripheral arterial vasodilation; HRS is caused by a strong vasoconstriction of the renal arteries in response to decrease in the effective volume of circulation [2]. Renal vasoconstriction is mediated by renin-angiotensine and sympathetic nervous systems and non osmotic vasopressin release. Reduced effective circulating volume is a consequence of the pronounced splanchnic vasodilation and low cardiac output [1]. The average life expectancy in untreated patients with HRS lasts about 2 weeks. so liver transplantation is a treatment of choice [5. 6]. However. patients with HRS have a high mortality rate while awaiting transplantation. Moreover. survival rates after liver transplantation are lower in patients with HRS than in patients without it [6]. Use of splanchnic arterial vasoconstrictors leads to the improved kidney function in type 1 HRS [3. 8]. Terlipressin. a vasopressin derivative. is the most common vasoconstrictor in Europe due to its efficacy and convenience. and has the ability to improve kidney function in 40%-50% of patients [11]. However. currently there are quite few studies on the terlipressin dose effectiveness and on recommendations for adjusting its dose. depending on the degree of kidney failure (KF) at HRS type I by the classification of urinary system diseases. approved at the V Congress of Nephrologists of Ukraine (Vinnytsya. 2017) [10].

Objectives. The aim of this study was to improve the treatment method of type I hepatorenal syndrome in alcoholic liver cirrhosis by selecting the dose of terlipressin. depending on the degree of kidney failure ont the background of acute kidney disease in such patients.

Matherial and methods. A total of 109 patients were examined in this study. HRS was diagnosed by the criteria of EASL Clinical Practice Guidelines for the management of patients with decompensated cirrhosis [4]:

All enrolled patients with ALC and HRS were prescribed albumin (Albumin-Biopharm 20%;

OOO Biopharma Plasma Ukraine) intravenously (i/v). 1 g/kg per day on the first day of treatment and 20–40 g/day – in the next few days. They were divided into two groups: Group 1 (control group) (n = 27) – received terlipressin (Remestip 0.1mg/ml. Ferring-Lechyam a.s. Czech Republic) at the standart dosage of 3 mg/24 hours by continuous intravenous administration for 7 days; Group 2 (study group) (n=82) received terlipressin (Remestip 0.1mg/ml. Ferring-Lechyam a.s. Czech Republic) in the individual dosage corresponding to the stage of kidney failure: Subgroup 2.1. KF stage 1 (n=25) – terlipressin at a dose of 3 mg/24 hours by continuous intravenous administration; Subgroup 2.2. KF stage 2 (n=29) – terlipressin at a dose of 6 mg/24 hours by continuous intravenous administration; Subgroup 2.3. KF stage 3 (n=28) – terlipressin at a dose of 12 mg/24 hours by continuous i/v administration.

The stage of KF in the context of acute kidney disease was determined by the classification of diseases of the urinary system approved at the V Congress of Nephrologists of Ukraine (Vinnytsia. 2017): stage 1: glomerular filtration rate (GFR) ≥ 60; stage 2: GFR = 16–59; stage 3: GFR ≤15 [7]. GFR was calculated using CKD-EPI formula. ml/min/1.73 m^2 [7].

The response to treatment was evaluated every 48 hours. in case if serum creatinine decreased by less than 25% from baseline. the dose was gradually increased to 12 mg/24 hours. The risk of short term mortality (within the first 29 days) was prognosed by MELD score (Model for End-Stage Liver Disease) [9].

Statistical processing of the study results was carried out using the program package STATISTICA 15.0. To assess the difference between groups. Student's t-test for independent samples was used. To measure the degree of linear dependence between the values of the indices in the groups. the Pearson correlation coefficient (r) was used for parametric values. and the chi-square criteria (χ^2) for nonparametric ones. The assessment of patients' survival was performed using the Kaplan Meier method. The statistics are given in the format M±σ. The level $p < 0.05$ was accepted as statistically significant.

Results. At the time of the study onset. there were no significant differences in clinical and laboratory data between two groups. GFR. serum Na and daily urine volume significantly improved in group 2. as compared with group 1 ($p < 0.05$). There was no statistically significant difference in the number of points by the Child-Pugh scale before and after treatment in both groups ($p > 0.05$). whereas MELD score was significantly reduced only in the second group ($p < 0.05$) (table 1).

Table 1. – Clinical and laboratory data of patients with hepatorenal syndrome on the background of alcoholic liver cirrhosis

	Group 1 (n=27)		Group 2 (n=82)	
	Before tratment	After tratment	Before tratment	After tratment
Systolic blood pressure. mm H	72.37 ± 6.69	84.78 ± 8.03*	68.75 ± 7.09	80.58 ± 9.93*
GFR. ml/min	25.24 ± 8.26	48.82 ± 14.04*	24.42 ± 6.84	35.01 ± 13.08*/**
Urine volume. ml/day	637.35 ± 164.73	1214.74 ± 424.5*	588.67 ± 113.99	935.32 ± 441.36*/**
Serum Na. mmol/L	119.73 ± 34.83	132.64 ± 5.05*	121.36 ± 34.41	128.57 ± 21.07
Child-Pugh score	12.79 ± 1.49	11.09 ± 0.91	11.92 ± 2.12	11.06 ± 2.41
MELD score	34.87 ± 6.05	28.23 ± 7.18*	35.24 ± 5.65	33.42 ± 8.01**

*Note: * – the difference is significant in comparison with the indices before treatment ($p < 0.05$)*

*** – the difference is significant in comparison with the indices after treatment in group 1 ($p < 0.05$)*

Our study reported a complete response rate of 81.7% in reversal of HRS in group 2 compared to group 1 which showed a low response rate of 66.7% ($p<0.05$). Relapse of HRS occurred in 40.1% in group 1 and in 23.2% in group 2 ($p<0.05$). Short term survival was significantly better for group 2 patients (54.9%) as compared to group 1 (37%) ($p<0.05$) on intention to treat analysis (table 2).

Table 2.– Response to vasopressor therapy in patients with hepatorenal syndrome on the background of alcoholic liver cirrhosis

	Group 1 (n = 27)	**Group 2 (n =8 2)**
Complete response	18(66.7%)	67(81.7%)*
Recurrence of HRS	11(40.1%)	19(23.2%)*
Short term survival (3 months)	10(37%)	45(54.9%)*

*Note: * – the difference is significant in comparison with group 1 ($p < 0.05$)*

Our results suggest that terlipressin in correct dosage may perform better. likely because it promotes vasoconstriction in both systemic and splanchnic blood vessels. and also dilates intrahepatic portal vessels. reducing portal hypertension on the very initial stages. Accurate dosage of terlipressin allows to manage the violation in kidney blood flow and to correct the kidney function depending on the degree of kidney failure ont the background of acute kidney disease caused by HRS.

Conclusions. Thus. the result of this study confirms the higher clinical efficacy of the proposed method of treating HRS type I depending on the stage of KF in the context of acute kidney disease in patients with ALC. as compared to the standart therapy. Correction of the terlipressin dosage can improve the results of HRS treatment. prevent the development of irreversible changes and reduce mortality in these patients.

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Section 5. Pedagogy

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IMPORTANCE OF DEVELOPING OF EDUCATIONAL AND COGNITIVE INTEREST IN STUDENTS USING INNOVATIVE INTERACTIVE TECHNOLOGIES IN GEOGRAPHY CLASSES

Abstract. This article describes the possibilities of achieving the result through the use of interactive technologies in geography lessons, as well as the development of the educational interest of students. A phased methodology for teaching students during the lesson and beyond has been proposed. The article proposes ways of solving issues and problems in working with students.

Keywords: The educational process, efficiency, creativity, productivity, result, thinking.

In our republic new system of education has been formed – it is another step towards achieving world standards of education. Changes in education system lead to large-scale changes in teaching and development process of our children. Mastering innovative technologies by the teacher will help to correctly organize the educational process and develop intellectual, professional, moral, spiritual, civic and other qualities in students. If we want to be a competitive state, we must certainly develop our literacy in every sense of the word. The problem of education and development originates from the works of Ya. A. Kamensky. In his pedagogical research he says that it is necessary to pay attention to the natural distinctive features of the child and always remember the skills of the child. Of course, school time is unique and precious for the life of each student, because it is during this period that a cognitive interest in the environment is formed. Therefore, the school education is the main lever of continuing education for our children, which is a very complex and responsible work. School not only gives knowledge, but is essential part of general development, formation of oral speech, reading skills, correct perception of the environment, objective thinking, analysis skills, teaches to compare, prove, and develops conversational skills. The skills of primary school students are developed in two ways. First, is by receiving knowledge, skills, habits and practical development of them. Second, is by creative activities. The educational activities differ from creative activities in that in creative activity, the students search for new methods of translating their ideas into reality. They try to solve issues by their own new way. In both cases, students solve two different

issues and goals. For example, during the educational process, exercises aimed at the formation of certain skills are performed, and in the creative, the main goal is exploration of creativity and interest in the process. If the educational activities develop general skills of the students, then creative activities develop individual skills. As the great educator V. O. Sukhomlynsky said, for lesson in the life of students to not remain just a lesson it should be made interesting. If we achieve this goal, only then the school will be the center of the spiritual world, and the teacher is the guardian of this valuable center, and the book is an invaluable treasure in this world. A typical and simple lesson is like a low-calorie meal, and this in turn does not give strength to a person. Interesting lessons are new discoveries, creativity, methodological researh, authority and make students feel the sense of self-worth and fulfillment. For teachers to manage all the students in the class, they should try to answer the following questions: "What can I do?", "What should I do?", and the attempt, in turn leads to result, and the result to a practical implementation.

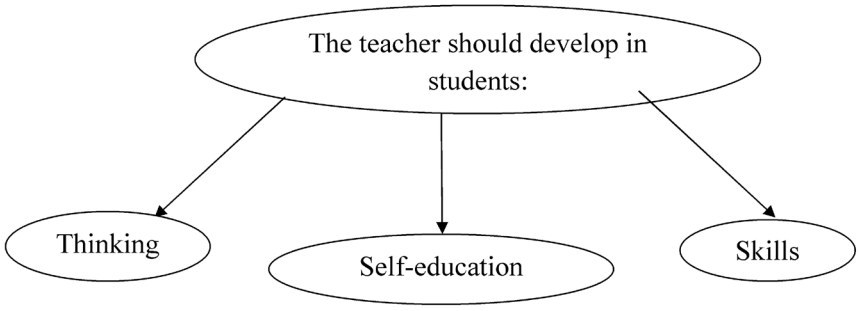

Figure 1. Teachers should set the following tasks for themselves:

The measurement of practical reality is the quality of knowledge. [3] Currently, researchers of innovation processes say that innovation practice is not an introduction to something new, but only an addition to pedagogical, creative and research functional results. Of course, every child is different in the development from any other, one has well-developed auditory skills, the other – thinking, and the third – imagination. Middle school students do not immediately show talent and determination. I believe that it is teachers who must work purposefully with each student to develop their thinking, talent, determination, and creative activity, because this is precisely what affects the life path of students. The goal of our profession is to reveal the hidden talents and opportunities of our students, as a result of creative work to see the talents in them and develop them further, to determine the development paths to the subject and with the help of these works to make students participate in the lessons. The rapid development of science and technology every year, of course, had its effect in the life of the elementary grade students. It makes the proposal of new innovative technologies and effective methods in the development of independence and creative skills of middle school students the urgent issue. Self-education of students requires systematic work on themselves. Currently, we do not devote time to the subtlety of spiritual self-development of students. Students should be able to draw up a plan, content, purpose and organize self-education process. And it is responsibility of the teacher to give them advice, directions, show the way [2]. The following goal was set for middle school students: developing self-learning by learning activities, increasing interest in learning. School, pedagogical and psychological practices prove that the creative abilities of students are formed using different games in the preschool stage. The development of the thinking of middle school students, first of all, depends on the interesting activities at school. A game for children can be a complex activity. Students are able to gain knowl-

edge through games. They can develop their knowledge gained during lessons. Games should have their own goals, plans, educational sense, visibility and differences. Properly organized game lessons help expand thinking, worldview, change character for the better, build willpower and increase interest in education. In the process of the game, the reasoning of students is refined and deepened. This means that the game not only develops the students' acquired knowledge, but also becomes an active way of knowledge acquisition, during which, under the guidance of a teacher, students gain new knowledge. By organizing and managing the game, the teacher affects each student. The participating students will be interested in being on an equal footing with the rest, and will obey the rules of the game.

In order to achieve the highest interest in the subject, teacher should guide and answer all questions that are beyond the power of students. Since if the student does not have an interest in particular classes, then there is a probability the student will not master the presented material. Only the student that are able to understand all the material presented will be able to participate in classes. The active perception and understanding of reality begins with independent techniques and didactics. In order to receive knowledge, student needs to independently study the topic, and be able to analyze it. It is necessary to be able to mentally go over the foundations of the law of science, nature and society. Daily development of students' knowledge by different information plays a big role in the learning process.

Teachers carry a big burden of giving modern knowledge and education to students. "The productivity of the educational and educational process depends on the teacher" – [1] Y. Altynsarin. His wise words to this day have not lost their value. The students have ability to develop themselves and their knowledge, they have passion for something. In order to achieve a certain goal, a person must be able to think reasonably, make independent decisions and conclusions. If before the student was a listener, now he becomes an explorer, a thinker, proving thoughts and the teacher plays a large role as the organizer of this change. The main goal of knowledge is to help students learn about themselves, arouse interest, and give new spiritual strength. If you look at the demand, then the educational process is not only to give knowledge but also the main obligation of the teacher to give integrated general knowledge. Our society requires us to fully educated people. For this, the work with each student on each subject is important to awaken the educational and cognitive interest of students. It is proved that training devices this is the basis of all innovative knowledge.

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TEACHING LEGAL ENGLISH IN ALBANIA

Abstract. This article focuses on teaching Legal English in Albania. It aims to highlight the principles of teaching Legal English. Can continuous training of the teachers help them to facilitate this process? Can the identification of different styles of learning help students to meet their learning needs? What are some of the most common challenges of teaching Legal English?

Keywords: Teaching Legal English, Teachers' Training, Principles, Learning Styles.

1. Introduction

Teaching Legal English is considered to be a real challenge for the ESP teachers. While teaching, the teachers should always focus on the goals and objectives they want to achieve. Identification of the students' needs plays an important role as well in achieving these objectives. The success of teaching Legal English depends on the planning, the teaching methods, the professional skills of the teachers, the audio- visual aids available to them and their use in the classroom. Students who attend the Faculty of Law, at the University of Tirana, in Albania study Legal English. They have two classes a week, both semesters in the first year. During these classes they are given the opportunity to deal with different topics such as civil law system, common law system, tort law, contract law, criminal law etc.

2. Teachers' training

Teachers need to be trained and updated with the recent developments in technology and teaching methodologies. Teachers need to share their experiences with each other, and eachers who belong to different cultures. ELTA Albania (English Language Teachers' Association) has been active since 2002. It was founded by a dedicated group of teachers, who were aware of the immediate needs of teachers for training, collaboration, integration and increased professionalism. The mission of this association is related to the promotion of cooperation between teachers, their training and professional development. Cooperation of teachers enables them to discuss about the problems they face during teaching. Only through training the teachers, the society can achieve the growth of the standards of teaching and an improved quality of teaching. Through teachers' training the students' performance can be improved. During the years ELTA has organized numerous workshops and conferences whose goal has been related to the training and qualification of teachers. Publication of "The Ultimate Teacher – Educating the Future Today" journal has had many positive effects, as it has become the voice of the teachers for various problems that affect teaching. Numerous articles are published in this journal by Albanian and foreign English teachers. Apart from cooperation with other colleagues and different qualifications which are necessary for the teachers, there are also some basic principles of teaching. These principles can help the teachers in every moment especially those teachers who do not have sufficient experience in this field.

3. Principles of teaching Legal English

According to Elizabeth, M.E.S [1], some of the principles are as the following: (Elizabeth, M.E.S, [1, 1]).

- **Clearly defined objectives** – Before planning ahead the class, the teacher must first determine the objectives he or she aims to achieve. Then, the teacher selects the material and the methods of teaching. If the teacher does not define the objectives, then teaching can't be effective at all as it could deviate from the subject and can turn into a free hour conversation without achieving any goal. The teacher should try to adhere to the objectives with the aim to fulfill them.
- **Presenting a model** – Teachers serve as a model for students. Students tend to be affected by any model that is offered and these influences affect their future. When teachers are aware of the fact that in most of the cases students consider them as a model to follow, then they try even more to improve themselves by becoming better teachers and people as well. They try to improve their way of communicating with students, their way of helping weak students become better students and helping students become better human beings.
- **Selection of materials** – The material that will be used in teaching should be carefully selected. In most cases the material is selected long before the academic year starts, by enabling the teachers to assimilate the material themselves initially. In this way the teachers may be able to transmit the students their knowledge.
- **The level of knowledge** – It is necessary that the selected teaching material starts with simple things and then it goes on with more difficult notions and concepts. So knowledge that is taught to students should start from the simplest to the most difficult. This means that the degree of difficulty will increase. There should not be a lack of balance regarding knowledge by starting with the most difficult notions.
- **Activities** – Traditional teaching methods in which the students just stay sitting and listening in a passive way are not effective. Any subject can be taught by implementing a teaching method, which involves students in different activities that provide them the opportunity to be more active, acquire new knowledge quickly and not to get bored during class. The activities during the class stimulate and encourage students to collaborate with each other by stimulating in this way the spirit of cooperation with others.
- **Planning** – The planning principle leads to an effective teaching. What does this mean? This means that every teacher should plan in advance the activities that will develop in the class, the method that will use, predict the questions and problems that may arise during the class, provide answers to these questions, solutions to problems, anticipate the needs and demands of students, etc. Effective planning involves five basic components: well-designed curriculum, learning objectives, teaching and learning activities, assessment mechanism and evaluation methods to check the student understanding of the topic (R. Manjula, [5, 384]).
- **Differences between students** – Students are different. A good teacher should take care of all the students by paying the same attention to all. It is often necessary to apply differentiated teaching, which can be achieved through various methods and strategies to meet the needs of the students in the classroom.
- **The principle of connectivity** – A good teacher tries to establish a connection between teaching and real life. According to John Dewey, education and life are just two different names for the same phenomenon. Education which does not prepare students for life is meaningless. Assume that students study mathematics. The teacher must prepare them to use this knowledge in everyday life

situations. If a student uses his knowledge in his daily activities, then as a result, he will feel pleased and even more motivated to learn. English teachers should aim to achieve the same. The student should be able to speak English with his family, friends and teachers.

4. Problems in teaching Legal English

One of the best initiatives of the University of Tirana in Albania is teaching English for Specific Purposes in those faculties where English is studied as a foreign language. Students need to study English for Specific Purposes in compliance with the branch in which they continue their university studies. Students in the Faculty of Law study Legal English. In Albania, students start studying foreign languages at an early age. English prevails on these languages due to globalization and its dominance in the world. Despite the demands of the students to improve their knowledge further, teaching Legal English is characterized by numerous problems. Many students haven't studied English as a foreign language in High School, but French. The lack of their knowledge in General English makes the acquisition of new specific knowledge even more complicated. Due to the lack of knowledge, for them it is very difficult to achieve the same objectives as the rest of the students, who have spent many years studying English. The students have very little knowledge in English and face many difficulties regarding the ability of speaking, reading, writing and listening. The study of English for Specific Purposes requires good general knowledge of this language, as they facilitate the learning process in the case of Legal English. However, having an experience of ten years as professors of Legal English at the University of Tirana, in the Faculty of Law, from 2009 onwards, we can say that teaching Legal English presents some difficulties that can be faced successfully by aiming at a more effective teaching. Another problem is related to the different levels of students within the same class. Some students belong to the average level, while some others to a higher level. In such cases there is a great need for differentiated teaching with students who consequently require different objectives set by the teachers. For those students who had a high level of English, the achievement of maximum objectives was required in terms of legal English, while for students of lower levels the achievement of basic objectives was required. Some words in General English have a different meaning from the ones in Legal English. (Jeremy Walenn, [7, 12]) Some other issues of teaching Legal English are related to: (Neena Dash & M. Dash, [2, 31]).

1. The lack of competent teachers – One of the problems that education is facing nowadays is the lack of qualified Legal English teachers. This issue is reflected in the lack of knowledge of the students. The lack of qualification directly affects the quality of teaching. The solution of different difficulties that teachers face in the classroom can be achieved only through training and qualifications. Most Legal English teachers have very little knowledge in the legal field. This lack of knowledge on the part of teachers is reflected in the cases when students ask questions about a legal concept, and teachers are not able to give a clear explanation. Lack of knowledge is accompanied by a feeling of insecurity on the part of the teachers, but when this uncertainty is transmitted to the students, then, the professional side of the teachers can be questioned by the students. However, students should be aware of the fact that English teachers are teachers of language, and they have got a degree in the field of linguistics, not in the field of justice.

2. Grammar-While teaching English a very big attention is paid to grammar. This transforms the class not only in a boring one for students, but also turns them into passive students during the class especially in those cases when there is a lack of activities which attract their interest and foster the ability to speak. Even when studying Legal English just like in the case of studying General English, students seek to enrich their grammatical knowledge. In some cases this perseverance of the students makes the teacher leave the objectives set for teaching the specific lan-

guage. However, the objectives of the teachers are related to dealing with the acquisition of legal concepts, vocabulary enrichment and development of the students' skills. Grammatical knowledge comes second, without forgetting their importance and role while learning a language.

3. The use of traditional methodology- The methodology and materials used by teachers are another problem in teaching Legal English. Although today there are many techniques, methods, materials that help the teachers to make learning more interesting and more effective, most teachers still use traditional teaching methods. The absence of the audio-visual facilities in the classroom is felt not only by students, but also by teachers. Through the use of technology learning becomes more diverse, more interesting and more interactive.

4. Assessment of students-The assessment system is a problem in itself. Often students are not valued as they should, and above all assessment does not reflect clearly the student's level of achievement in terms of the four basic language skills regarding speaking, listening, reading and writing. Assessments are more focused on the knowledge they have about the language, rather than the language skills that students possess. In some cases assessment is not objective, but rather subjective. The teacher is influenced by the attitude of the student in the classroom and makes the assessment on the basis of this attitude.

5. Teaching Legal English through translation-Some teachers think that the best method to teach students a foreign language is applying the translation of words in their mother tongue. By using this method during the class, students have little opportunity to speak English. Many teachers apply this method. Translation stimulates students to express themselves more in their mother tongue than in English. One of the primary challenges the teachers face is the translation and adaptation of legal terms in Albanian. Many words of Legal English are borrowed words from Latin, French or other languages. In some cases there are no Albanian counterparts of these words.

6. Differences between students

Students who want to study a foreign language often have different ages since the aim of their studies is different. Despite the different reasons and objectives, students who want to study a foreign language are divided into two main categories: adult students and young learners.

Students who belong to the first group have some characteristics in terms of learning. Adults who belong to the beginner level:

– May have abandoned their studies a long time ago;

– May have their own ideas regarding the way they study;

– Are highly motivated;

– Have immediate needs to learn in a short period of time and for specific purposes;

– Have high expectations from these studies;

– Need to improve their knowledge as quickly as possible;

– Don't often express the deficiencies they may have;

Students who belong to the second group also have several features:

– They are enthusiastic and curious;

– They aren't aware of the advantages of studying and mastering a foreign language or they do not pay attention;

– Their imagination is more developed than that of the other students who are older;

– Students of this group express more freely than the students of the first group.

According to Richards and Lockhart [3], cognitive styles can be thought of as predispositions to particular ways of approaching learning and are intimately related to personality types. Differences in people's cognitive styles reflect the different ways people respond to learning situations. According to them:

– Some people like to work independently, while others prefer working in a group;

– Some people like to spend a lot of time planning before they complete a task, while others spend

little time planning and sort out problems that arise while they are completing a task;

– Some people can focus on only one task at a time, while others seem to be able to do several different tasks at once;

– Some people feel uncomfortable in situations where there is ambiguity or uncertainty, while others are able to handle situations where there is conflicting information and opinions;

– When solving problems, some people are willing to take risks and to make guesses without worrying about the possibility of being wrong, while others try to avoid situations where there is such a risk;

– Some people learn best when they use visual cues and write notes to help them remember, while others learn better through auditory learning, without writing notes.

H. Reinders suggests that it should be placed an emphasis on the role of cosciousness in the learning process (Hayo Reinders, [6, 37]). According to Reinders, students are not conscious of some aspects of their way of learning or their current knowledge.

J. C. Richards & Ch. Lockhart [3] suggest that differences of this kind reflect the cognitive styles of four different types of learners; who are characterized by the following learning styles: (J. C. Richards & Ch. Lockhart, [3, 60–62]).

1. Concrete learning Style – Learners with a concrete learning style use active and direct means of taking in and processing information. They are interested in information that has immediate value. They are curious, spontaneous, and willing to take risks. They like variety and a constant change of pace. They dislike routine learning and written work, and prefer verbal or visual experiences. They like to be entertained, and like to be physically involved in learning.

2. Analytical learning Style – Learners with an analytical style are independent, like to solve problems, and enjoy tracking down ideas and developing principles on their own. Such learners prefer a logical, systematic presentation of new learning material with opportunities for learners to follow up on their own. Analytical learners are serious, push themselves hard, and are vulnerable to failure.

3. Communicative learning Style- Learners with a communicative learning style prefer a social approach to learning. They need personal feedback and interaction, and learn well from discussion and group activities. They thrive in a democratically run class.

4. Authority-oriented learning Style- Learners with an authorityoriented style are said to be responsible and dependable. They like and need structure and sequential progression. They relate well to a traditional classroom. They prefer the teacher as an authority figure. They like to have clear instructions and to know exactly what they are doing; they are not comfortable with consensus-building discussion.

According to Johnson (1996), there is a significant correlation between a student's character and his/ her academic achievements. (B. R. Parida, [4, 81]) Some people feel happy when they learn something new and don't fear the mistakes they can make, but others fear mistakes which lead to avoiding new things. It is more difficult to the latter to get adapted to learning new methods, with new strategies and activities that stimulate learning a language. Students come to the class with their opinions about their abilities for the acquisition of a foreign language. Their opinions can be positive and motivating, but also negative and not encouraging. According to Richards and Lockhart [3], they are systems of student opinions that influence the conception of learning and the way they interpret the learning in the classroom environment (Richards & Lockhart, [3, 58]). In class we observe how students try to answer as satisfactory for the teacher questions, but their anxiety observed the reaction of other students in class. Class creates situations where the student, the fear of the error, closes its shell and refuses to participate in organized activities during class. They create fear psychosis of learning. They begin to feel insecure about their ability to learning even reach so far as to think that they are unable to acquire knowledge about the English language losing faith in their abilities and thus confidence in itself. This situation

makes them not included in the class more, not active anymore, because of fear of the reaction of other students in class. What should the teacher do in such cases? The teacher must make it clear to students that:

- They need time to learn and that learning process is a gradual process, which is realized step by step and not within a single day.
- Errors are a way to learn things correctly. Errors are precisely the ones that give us the opportunity to learn, develop our capabilities and improve our knowledge of the language. Teachers should make clear to students that there is nothing wrong if they are wrong in their answers.
- Asking for help really helps. When students do understand a concept, teachers should encourage them to ask.

Conclusions

Teaching Legal English can be very challenging for teachers. They need to be specialized in ESP. They also need to be trained and updated with the recent developments in technology and teaching methodologies. Teachers need to share their experiences with each other. Only through training the teachers, the society can achieve the growth of the standards of teaching and an improved quality of teaching. The principles of teaching legal English can help the teachers to improve the way they teach. Planning ahead is vital for the teachers in order to achieve the objectives. If the teacher does not define the objectives, then teaching can't be effective. Teachers should not forget that they serve as a model for their students. Teachers should start from the simplest concepts to the most difficult ones. Every teacher should plan in advance the activities that will develop in the class. The principle of connectivity is very important. Teachers should try to establish a connection between teaching and real life. During the class, differences between the students should be taken into consideration. Teaching Legal English is characterized by numerous problems. The lack of qualified Legal English teachers directly affects the quality of teaching. The objectives of the teachers should be related to dealing with the acquisition of legal concepts, vocabulary enrichment and development of the students' skills intertwined with grammatical knowledge. Teachers should try to use technology in their classes. Through the use of technology learning becomes more diverse, more interesting and more interactive. Teaching Legal English through translation prevents the students from expressing themselves in English. Regarding assessment teachers should try to be very objective. Identification of different learning styles help the teachers to improve teaching Legal English.

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Section 6. Political science

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DEVELOPMENT OF MODERN INNOVATIVE BASES OF DEMOCRACY AS A LEADING FACTOR OF ENHANCING THE POSSIBILITY OF SOVEREIGN POLITICAL DEVELOPMENT

Abstract. This scientific article analyzes the importance of the conceptual ideas put forward in the Address of the President of the Republic of Uzbekistan to the Parliament of December 28, 2018. Special attention is paid to their importance in raising large-scale reforms to a new level in the country, carried out on the basis of the Strategy of Action. The article also highlights the issues of deepening globalization processes occurring in the world and the complex international situation that has developed under its influence, the need to take into account the international situation in the process of implementing independent political development, the main tasks of further improving the effectiveness of the political system, democratization of society at the current stage of our country.

Keywords: President's Address, democracy, innovation policy, parliament, executive power, state power optimization, smart management, economic renewal, digital economy.

We know that today, developments as a result of global changes and trends are taking place on the international scene putting new and more complex requirements to the possibilities and conditions of the sovereign political development.

Such kind of features of the modern life, in turn, cause the degree of international strategic stability to be extremely low. Therefore, the conditions of development in the modern life are becoming more complex. As a result, nowadays, the task of updating the countries' conceptions of political development, based on the need to apply the most modern principles of democracy, is becoming more and more urgent.

It should be noted that the values of democracy, which has its own two-and-a-half-year history, are still preserved as the most comprehensive and guaranteed source of human progress.

We should pay a special attention to the fact, that the head of our state Sh. Mirziyoyev proposed high level of pragmatic ideas for the further implementation and further development of democratic reforms in our country.

Its essence is to accelerate and increase the effectiveness of democratization processes by expanding the new political, legal and practical foundations for the deep implementation of democratic principles of democracy in the political system of our society.

President of the Republic of Uzbekistan Sh. Mirziyoyev said: "Today, life itself requires us to achieve the most important goal, defined in our Con-

stitution,– comprehensively ensuring the interests of the person.

In order to ensure the interests of a person, it is first of all necessary to talk with people, to communicate with the people, to know well their concerns, aspirations and aspirations, life problems and needs" [1, p.14].

Nowadays, thanks to the direct initiative of the head of our state and the introduction of the system of communication with the people in our country, the glorious foundations of deliberative democracy, modern and effective, have begun to work. Because of this, a great range of modern opportunities have been created for the broad development of our country.

We know that at the same time, with the launch of the Strategy for further development of the Republic of Uzbekistan there has been made a step towards a qualitatively new level of development of the country. Thanks to the reforms that consistently take place in our country in five key areas since 2017, and, in essence, cover the perfect basis of modern development, today, our country has immense opportunities to take a worthy place among the world's most developed nations.

According to the Decree of the President of the Republic of Uzbekistan of February 7, 2017, "The Strategy of Action is implemented in five stages, each of which provides for the approval of a separate annual State program for its implementation in accordance with the declared name of the year" [2, p.6].

In this regard, it should be noted that over the past few years the planned tasks in five priority areas of the Strategy have been fulfilled. As a result, today, the political, economic and social conditions of our country have been growing in unprecedented size. As a result, there has been expanded the potential capacity for the implementation of promising plans for further deepening reforms.

As the Head of our state Sh. Mirziyoyev said: "Naming 2018 the Year of Support for Active Entrepreneurship, Innovative Ideas and Technologies, we implemented 76 thousand projects for 21 trillion soums and $1 billion under the corresponding State program, which indicates the scale of our work, which we started with good intentions" [3].

The most up-to-date principles of consistent development of the Strategy of Action in the conceptual conclusions and initiatives submitted by the President of the Republic of Uzbekistan Shavkat Mironovich Mirziyoyev to the Oliy Majlis on December 28, 2018 and the historical significance of the life of the country have been reflected in it.

It is obviously true that the appeal reflects the big challenges associated with the implementation of an innovative state policy that reflects the most current requirements of the modern life, which reflects the urgent needs of our country's development and renewal, and the achievement of great success, based on modern mechanisms and principles of democracy. At the same time, the leading principles and philosophy of implementing innovative policies were shown in line with the hopes and aspirations of our people.

In the end, globalization is seriously advancing in the international arena, and the potential for sustainable development is largely difficult due to global competition in all areas of the world's development, including political, economic, social, scientific and technological advancement. The outer influence of competition is affecting the process of domestic innovation policies [4, P. 12].

Moreover, the political situation associated with the occurrence of a new world of modern secular order has further compounded the complexity of the international relations system.

Nowadays, globalization has strengthened its intensity. The scope of the activities of non-state actors is increasing [5, P. 113].

This situation objectively implies the need to create opportunities for consistent implementation of innovative policies so that States can steadily move forward from the path of sustainable development.

As the President of the country Sh. Mirziyoyev said: "Today we live in a rapidly changing time. In the

world, the struggle of interests, competition, and the international situation are intensifying.

In drawing up a program of action for the next year, we must identify clear and specific priorities for our development, given this difficult situation in the international arena" [3].

The President's new Address to the Oliy Majlis sets out the principles of the reforms based on the ideas and ideas of democracy and the means of reforming the comprehensive innovation policy.

Indeed, it is possible to implement an innovative state policy, which will only meet modern requirements and requirements, effectively using democracy and its modern mechanisms.

In this regard, the President's Addressreflects the following points: "We will never turn from the path of democratic reforms. No matter how difficult it may be, we will only go forward – to new, even higher boundaries" [3].

The President's Address notes that the priority of the implementation of democratic rights and freedoms of citizens is at the heart of modern state policy in our country: "Our highest goal is that every person in Uzbekistan, regardless of his nationality, language and religion, live freely, in peace and prosperity, be satisfied with his life" [3].

Modern world experience shows that democratic, innovative public policy involves the integration of all spheres of public life, including public administration, economy, social sphere, science, and culture. At the same time, the need for innovative activity in all areas of society is strongly intertwined.

In this regard, it is worth noting that according to the initiative of the President of the Republic of Uzbekistan, "the new Year of Active Investments and Social Development" for the upcoming New Year 2019 has opened new opportunities for the realization of the Program of Development, covering all spheres of our life.

The development of the social sphere at the same time is a strong economy. In its turn, powerful resources have been created to achieve the glorious goals of independent democratic development of the country through social development.

As the Head of our state noted:"Only by actively attracting investments, by introducing new production facilities, will we achieve accelerated development of our economy.

A positive results in the economy will consistently solve the accumulated problems in the social sphere. …

In 2019, it is planned to absorb almost 138 trillion soums of investments from all sources, which is 16 percent more than in 2018.

Compared with the current year, the volume of foreign direct investment will increase by almost 1.5 times and will reach 4.2 billion dollars. Due to this, 142 modern enterprises will be commissioned" [3].

One of the most important issues in the application was that the modernization of the economy, which is an important aspect of innovation policy now, is raising to a qualitatively new level and a strong place among the strongest countries with high competitiveness in the production of competitive products.

In this regard, the Cabinet of Ministers has been tasked by the head of our state to develop the Concept of social and economic development of the country until 2030.

It is well known that the idea and principles of innovative policy are primarily a consistent implementation of state policy decisions aimed at stimulating and supporting innovation processes.

In this connection, it should be noted that the President's Address set a task to formulate a model of the most economical and up-to-date economy in the world and provide guarantees for its implementation.

As our President noted: "We should develop a national concept of the digital economy, providing for the renewal of all sectors of the economy based on digital technologies, and on this basis, introduce the program "Digital Uzbekistan – 2030".

The digital economy will allow for the growth of gross domestic product by at least 30 percent and

dramatically reduce corruption. This is confirmed by analytical studies of reputable international organizations" [3].

It is well known that in the modern world, incentives and support for the digital economy are the most important components of the innovative policy.

International experts have pointed out that economic activity, based on the use of digital, information and communication technologies.

According to the term "digital economy" was introduced in 1995 by Nicholas Negroponte, a specialist in information technology at the Massachusetts University of Massachusetts. Simultaneously, the digital economy is seen as a leading factor in maintaining the intensity and security of the economy in the current period. The best way to introduce innovations into the economy is also reflected in the digital economy.

It is important to emphasize that the task of raising the economic potential of our country to a higher level is accompanied by the further democratization of the political system of our society, its unprecedented increase in the effectiveness of the public administration system, and the introduction of innovative technologies in the political administration system.

The quintessence of innovation policy consists of rebuilding statehood and governance on the basis of the most advanced principles of democracy and to maximize the country's scientific, economic, social and cultural potential.

In particular, in the context of new models of democracy, which today are conceptually reflected in their all-embracing conceptions of "Democracy Demonstration", "Democratization of Democracy", "E-democracy", "Mobility Democracy" the essence of democratic mechanisms and their use of the essence of the relationship between political government and society.

These ideas have deeply enlarged the scope of democratic cooperation in the society on a large scale by modern requirements, and their harmonization with real political processes" [6, P. 5].

The concept of the Presidential Address focuses on the issues of improving the effectiveness of their activities through consistent democratization of the activities of state bodies operating in the country.

The implementation of innovation policy implies the development of organizational and functional foundations of political institutions in line with modern requirements.

As our President said: "The introduction of modern, rational management – a key condition for the implementation of the tasks" [3].

In this regard, the application has outlined the main objectives of the Legislative Chamber of the country, the principles of further development of democratic roots, expansion of its power.

The head of our state noted that Parliament should strengthen its activities in making important decisions and controlling the implementation of laws.

Today, according to the Constitution, the Parliament approves the candidature of the Prime Minister, but does not participate in the appointment of ministers. Therefore, members of the government do not feel due responsibility to Parliament. In this regard, I propose to introduce the practice of approving members of the Cabinet of Ministers by the Oliy Majlis … This practice should be introduced in the field, for the leaders of regional and district organizations [3].

Based on these ideas, the implementation of the task of promoting the authority of the central and local representative bodies in the country based on democratic principles will be implemented. As a result, the citizen's direction will be strengthened.

In the Presidential Address there are mentioned some of the key ideas that are critical to the governance: "to optimize the executive system, continue administrative reform and widely apply modern management methods in public administration." In this context, the role of the executive in the

implementation of large-scale reforms has been further enhanced.

It should be noted that the Address of the President of the Republic of Uzbekistan reflects the methods and principles, which are based on the most modern requirements for expanding the innovation bases in public administration.

As it is noted in the President's Address: "Taking into account the opinions and suggestions of citizens, we must continue to reform the public administration system and gradually move to the principles of advanced state management and "smart" management.

This means that from now on, state institutions will work directly with citizens. State bodies should be the assistants of the people, including entrepreneurs" [3].

It should be noted that the conceptual bases of sustainable development of the country and the modern mechanisms of their guaranteed implementation are reflected in the ideas of the President of the Republic of Uzbekistan. In this way, the new foundations and potential opportunities of the country's development were further strengthened.

In the idea of contemporary development, a special place has been given to the issues of human capital development, its thinking and its potential to innovation in society. The human factor is now seen as a powerful source of renewal and modernization, which is stronger than ever before.

In the Presidential Address we can see that it is payed a special attention to the issue of increasing the culture, life expectancy and the most important ability of the people of our country as a person.

In this historic document, the head of our state based on the principle of raising the national culture of our people and on the basis of which the qualitative indicators of the social potential of our society are new. Its essence is the following:

First of all, it was based on the rational ground of the renewal and promotion of leading foundations of the national idea of our society on the basis of modern requirements and needs and directing its results to the country's comprehensive development.

As the President noted: "It is necessary to develop a national idea, which is a source of inspiration and strength for us in achieving our lofty goals.

We need to strengthen our national self-awareness, study the ancient and rich history of our Motherland more deeply, step up research work in this direction, fully support the work of humanitarian scientists" [3].

Indeed, in today's political philosophy of development of our society, the priority is the realization of the interests of the human being in a guaranteed and comprehensive way, identifying individual freedom and perfection as a noble goal. This approach meets the most demanding modern standards of society.

In today's democracies' ideas, the rule of the society is strongly influenced by the development of the human and its potential.

Our President underlined: "We all understand well that reform is an update, a change. In order for the reforms to give a positive result, our whole society must change, above all, we ourselves, the leaders. If a person changes, the country will change" [3].

So, it must be said that a special place in science, education, and science has been allocated to the members of our society in modern thinking, with a view to achieving a high level of understanding of the priorities and development goals of the country, with a sense of belonging to the ongoing reforms.

The head of state said that there is a wise word in our people that education and training begin with the cradle. Only enlightenment can lead a person to perfection and society development.

Therefore, state policy should be based on the principle of continuing education, i.e., the kindergarten and continuity of the whole life.

Therefore, we have to focus on human capital and mobilize all the opportunities".

In this regard, it should be noted that the Decree of the President of the Republic of Uzbekistan of January 17, 2019 "On the State Program for the

Implementation of the Strategy of Actions on five priority directions of development of the Republic of Uzbekistan in 2017–2021 in the "Year of Active Investments and Social Development" was a crucial development strategy.

The concept has been upgraded with the decree. In this regard, it is consistently implemented that the people are consistently implemented.

The Decree of the President of the Republic of Uzbekistan "On measures to further improve the system of work with the problems of the population" of January 17, 2019.

In particular, as stated in the Decree: "Starting from February 1, 2019, along with the existing system of work of the People's Admissions, with the appeals of the population, a new system providing for the identification and solution of the People's Receptions of problems through the courtyard bypassing the direct work of state bodies with the population" [7].

Now the principles of the state bodies' activity are radically updated on the basis of the new glorious and realistic ideas expressed in the Presidential Address. The main goal is to introduce the most effective and effective principles of humanism and human rights in our country.

In this process, the rule of the nation will be stronger. In the system of democratic dialogue between the government and society, the status and activity of the citizens of the country are enhanced.

Such kind of positive changes will lead a quick and continuous development of our independent country.

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Section 7. Psychology

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IMPORTANCE OF PSYCHOLOGYCAL DIFFERENTIAL DIAGNOSIS IN NEUROTIC SYNDROME FOR CLINICAL PRACTICE

Abstract. In recent years, somatic medicine specialists have begun to encounter a phenomenon for them, namely the bodily symptoms of dysfunction without somatic terrain in practice. In terms of diagnosis itself, /it means recognition/ the purpose of psychodiagnosis is determined by the need to detect and recognize the various deviations from the normal social functioning of the subject. In this sense, psychodiagnostics is a process of assessing the development and condition of the individual.

Keywords: psychodiagnosis, clinical practice, neurotic syndrome, psychosomatic.

The importance of psychodiagnostics in the recognition and differentiation of conditions that cause a number of forms of social maladaptation and dysfunction of the subject is essential. In many cases pathological phenomena / psychopathies or psychopathic similar phenomena /, character deformations / accentuations of the character /, partial or partial disturbances of important mental functions or personal changes caused by inadequate socialization of the personality are detected. It is the detection of abnormalities in the functioning of the subject and their typologization that is central to the diagnosis of various developmental abnormalities and pathological mental conditions, and this contributes to the formation of differentiating diagnostics with the most practical application.

Recognition of these phenomena requires the development of methods and means for examining anomalous subjects, as well as methods for analyzing and summarizing the results obtained. The widespread entry of psychodiagnostics into clinical psychology, psychiatry and social pedagogy, etc. allows the creation of a unified system for the diagnostic examination of anomalies. At the same time, the synthesis of knowledge from these fields reveals more and more criteria for differential diagnosis, that is, for the diagnosis of abnormalities and abnormalities with similar symptoms or clinical picture [3].

The idea of unity between the mental and the physical dates back to antiquity and has for centuries mediated approaches to explaining the disease [5].

It is a clear fact that when this unity is broken, it significantly reduces the quality of life of the individual in all aspects of his or her functioning [2].

The problem of the psychosomatic interrelationship is as old as human existence itself. For millennia, human societies have been trying to unravel the invisible connections between body and soul and provide explanations that are consistent with their knowledge of the moment and their conception of the world at large [1].

Some patterns of regression of neurotic disorders and physical suffering have been observed. In the beginning it decreases and gradually the asthenia is

affected, the sleep normalizes, the appetite rises, the affective tension is softened, the subjective experiences are deactivated. The most intractable and resistant are the hypochondriacal complaints and the vetted disorders [4], which are often the reason for the "somatic specialist" to be misled that in fact there is bodily dysfunction without virtually any bodily syndrome or pathological noxa. It is in such moments that it is essential to have a differential psychological diagnosis performed by the appropriate clinical specialist to confirm or reject the existence of a neurotic syndrome that has caused bodily symptoms without virtually any physical injury or illness.

Clinical psychologists evaluate and determine functional diagnosis in terms of intellectual level, cognitive, emotional, social and behavioral functioning, as well as mental and psychological disorders. Diagnosis should be formalized using commonly accepted criteria such as criteria for assessment at intellectual level or psychiatric diagnoses (ICD-10, DSM), or unformalized, such as diagnosis of familial or group dynamics, where applicable a certain theoretical model.

There are the following types of psychological diagnostics: cognitive processes, intellectual abilities, emotional state, personality tendencies and their disorders in various diseases. [1] It is of interest in the specifics of the present development:

- Psychological diagnostics of the current emotional state (anxiety level, anxiety states, depressive tendencies, angry-aggressive tendencies), personality specifics and behavioral models, disorders of adaptation in response to various diseases;
- Psychological diagnostics of resources for coping, partial or full restoration of the capacity for social and professional functioning;
- Psychological diagnostics of the dynamics of the disease, the effect of the treatment, the recovery of the patient and his reintegration into the community;
- Psychological diagnosis of the consequences and resources for coping with post-traumatic conditions (psycho-traumatic life events; physical, sexual and psychological violence; disasters, catastrophes, etc.) [1].

The purpose of any study in psychosomatics is to look for psychosomatic and somatopsychic changes, which, according to their dynamics and frequency of manifestation, can be monitored as the development of the symptomatology and undergo appropriate therapy. In summary, such somatopsychic characteristics are:

– easy irritability;
– confusion;
– decreased concentration of attention;
– hypochondrial phenomena;
– sleep cycle disorders – wakefulness;
– sexual dysfunction.

In patients with predominant diseases of the gastrointestinal tract, the psychological characteristics are the following:

– tendency to self-isolation;
– carcinophobia;
– increased irritability;
– complaining;
– attention disorders in pain periods.

In patients with predominant psychosomatic characteristics, the following issues are observed:

– insurance projections;
– neuroticism;
– dysthymic manifestations;
– attention deficit disorder;
– intrusiveness;
– hypochondrial phenomena;
– reduced working capacity.

Common to both groups are the following symptoms:

– carcinophobic experiences;
– adynamia;
– hypochondria;
– depressive disorders.

No norms related to impaired intelligence and perceptual representations have been reported for the study and the investigated persons.

The psychological profile of the disease warrants a faster and more accurate orientation in the differential staging of each case studied, and hence a more accurate working diagnosis. The holistic approach embedded in the theoretical, methodological and research plan of the study proves in practice that the classical psychological and psychopathological symptomatology, correctly accounted for in the behavior of each patient, significantly reduces the risk of diagnostic errors. plan and increases success in choosing a treatment model.

In fact, the assessment of psychosomatic risk is the verification of the common symptoms in somatopsychic and psychosomatic conditions, the analysis of their recurrence and the measurement of their intensity.

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A TRANSFORMATIVE APPROACH TO TREATING REPRODUCTIVE PROBLEMS IN COUPLES IN FERTILE AGE

Abstract. This article addresses a clinical phenomenon for the 21st century, namely infertility, with the author's idea that this problem has not only a medical aspect, but corresponds to the emotional, behavioral and social well-being of couples with a reproductive problem. In this regard, a complex transformative approach is proposed in the treatment of couples with a reproductive problem, which, using the mechanisms of cognitive functioning, influences and enhances the overall quality of life of couples with a reproductive problem. Finally, the emphasis is on the idea that, at the start of the assisted reproduction process, the couple with reproductive problems should be included in psychological counseling, which will, on the one hand, limit the emotional problems encountered during assisted reproduction and, on the other, increase the likelihood that assisted procedures will produce the desired result.

Keywords: infertility, reproductive problem, transformative approach, psychological counseling.

Infertility is the inability to naturally conceive, bear or birth of a healthy baby. The definition of WHO based on 24 months of unsuccessful attempts at conception is recommended as a definition used in clinical practice and research across disciplines. Infertility affects 10–15% of reproductive age couples worldwide [3; 4]. In recent years, couples seeking specialized help with reproductive problems have increased dramatically. Although behavioral scientists are working toward the importance of the emotional state of subjects with reproductive problems, there is still scarce information and research on the effectiveness of psychological interventions on this population, of course there is evidence to support the use of psychotherapeutic interventions. The emotional state in which these subjects fall is associated with emotional disturbances that lead to increased levels of anger, depression, anxiety, marital problems, and a sense of worthlessness among couples becoming parents. In general, clinical studies show that couples with reproductive problems, women manifest higher levels of negative experiences than their male counterparts, which is explainable given the anthropological features of the female gender and the main mission of women, namely to become a mother. and. On the other hand, a number of research studies support the hypothesis that distress correlates with a lower pregnancy rate among women undergoing reproductive treatment. Since psychological factors play an important role in the pathogenesis of infertility, research into this is an important task in influencing and managing this problem, which has cultural and social impact.

The success of a complex work related to this phenomenon is not only a set of medical interventions, but a holistic approach including medical, psychological and social aspects. The work is about incorporating a complex model that aims not only to resolve medical dysfunction, but to radically influ-

ence the behavior of reproductive deficits, changing their lifestyles and enhancing their quality of life.

In recent years, the number of couples seeking assisted reproduction has increased significantly. This is due to the fact that many women of fertile age have delayed conception for a long time due to economic and social reasons, as well as the fact that medicine has advanced rapidly and evolved in this field – developing newer and more successful techniques for treating infertility as well as raising awareness of the services available. It is these possibilities of modern medicine in the field of assisted reproduction that have raised the awareness and, on the other hand, inspired those who have been researching the psychological consequences of infertility. Very often, however, reproductive medicine professionals do not consider the relationship between the reproductive problem and the psychological problems of the couple undergoing assisted reproduction; and the prolonged exposure to infertility treatments for the couple's mood and well-being. However, there is evidence to support the use of psychotherapy interventions in couples with reproductive problems.

The question is why infertility has a psychological effect on the couple. Undoubtedly, parenting is one of the major transitions in adult life, for both men and women [4]. The stress of not being able to fulfill this desire for a child is associated with emotional problems such as anger, depression, anxiety, problems in marriage and feelings of futility. Increasing anxiety in the couple's emotional experiences correlates with heightened sexual dysfunction and social isolation, which in many cases is not accounted for by medical professionals directly involved in assisted reproduction. Relationships within a couple are often broken especially when a pressing decision is needed to resolve a medical problem. In many cases, couples experience stigma, a sense of loss and reduced self-esteem in a situation of infertility. Although proven women experience more emotional suffering associated with the phenomenon of infertility than their male counterparts, both partners experience a sense of loss of identity (identity) and show marked feelings of defect and incompetence. Women who are trying to conceive often report a clinical degree of depression, similar to women who suffer from cardiovascular disease or cancer. Even couples who have undergone assisted reproduction face considerable stress, often developing into distress. A number of studies support the hypothesis that emotional distress and relationships are greater in couples where the reproductive problem is due to the male partner. Therefore, the psychological impact of infertility can be devastating for the couple.

Factors affecting psychological stress.

A study done in Sweden shows that three separate factors contribute to the psychological stress that women and men experience as a result of reproductive problems:

1. "having a child is a major focus in life"
2. "women's role and social pressure"
3. "effect on social life"

It has been proven that women have a more severe reproductive problem than men [5].

How does infertility affect the couple's behavior?

Stress, depression and anxiety have been described as common consequences of a reproductive problem. A study done at St. John's Medical Center Ivan Rilski " – Tutrakan, Bulgaria in the period 2012–2017. shows that the incidence of depression in couples with reproductive problems who have entered an assisted reproduction program is significantly higher than in fertile controls and ranges from 38–72%. During the same period, it was reported that anxiety was significantly higher in couples with reproductive problems compared to the general population, with 92% of couples with reproductive problems manifesting clinically significant anxiety both at the beginning of assisted reproduction and during the process. Another interesting study on the territory of the medical center is that 15% of women, even before having undergone assisted reproduction, had previously experienced conditions with symptoms of depression, panic disorder or other psychological problem, which in turn supports the

hypothesis that psychological factors can also affect reproductive capacity. Although reproductive deficits affect the couple's psychological well-being, it is important to note that different psychological factors, in turn, affect the reproductive capacity of the two partners. The mechanisms by which depression can directly affect infertility include the physiology of the depressive state, such as elevated prolactin / so-called levels. mood hormone /, disorders of the hypothalamic-pituitary and adrenal axis, as well as thyroid dysfunction. Changes in immune function associated with distress and depression can also adversely affect reproductive function. It is time to point out the need for additional clinical studies to differentiate the direct effects of depression and anxiety from related behaviors, e.g. low libido, tobacco use, alcohol and some surfactants, as well as lifestyle and nutrition, which can also impede the reproductive process. Because stress and distress are associated with a number of physiological changes, this increases the possibility of a history of high levels of cumulative stress correlating with recurrent depression or anxiety, which can also be considered as a cause of reproductive problems.

Over the course of 9 years of psychological work with couples with reproductive problems, I have found that many of the couples with reproductive problems are stuck in the process of assisted reproduction with already increased levels of psychological suffering associated with infertility, but on the other hand, I recognize that the process itself assisted reproduction also in many cases increases the levels of anxiety and symptoms of depression and distress. Since the process of assisted reproduction from a medical point of view is difficult for the couple and is associated with physically less pleasant experiences, each subsequent stage affects the psychological well-being of the couple, as well as leads to negative changes related to their behavior and life. especially social exclusion due to low self-esteem based on depressive experiences.

In this regard, the team working with couples with reproductive problems was challenged with how to respond to adverse psychological conditions, which further complicate the positive outcome of purely medical interventions. At that time, a comprehensive approach was devised that focused entirely on couples with reproductive problems. The idea behind the complex approach was taken from nature, just as a cacophony turns into a beautiful butterfly, and the team performing assisted reproduction as a whole influences the change of the couple. Using psychological techniques for counseling and support, both individual and group, orientation towards the process itself, change in behavior both within and outside the couple, change in eating patterns, physical activity and social activity. Since the idea is in the transformation from a personality with impaired emotional and behavioral functioning to a person with a satisfying sense of self and behavior, as the cacao is transformed into a butterfly through transformation, we called this method transformative. Basically, the approach to the transformation of couples with reproductive problems is based on cognitive concepts that directly influence the motivation and realization of human behavior. The cognitive psychological direction underlies the circular relationship between the body and the psyche. This relationship is a platform for the psychosomatic treatment approach. The cognitive trend is based on the basic theoretical construct, which has been applied for more than three decades, has shown its effectiveness and underlies the modern development of the model of "cognitive vulnerability" of the patient. This vulnerability corresponds to the dominance of dysfunctional beliefs about the world, about themselves and others, which not only disrupts the social functioning of the individual, but also determines the high risk of bodily dysfunction and disorder [1].

It is common for couples with a reproductive problem to experience feelings of loss, anxiety, depression and isolation. The psychological impact of infertility is real and affects both men and women. In women, infertility causes problems with self-esteem, guilt and sadness. Hormone therapies also

have a strong influence on emotions, which makes it difficult to cope with even the small obstacles and challenges in everyday life. Men diagnosed with male infertility factor often consider the diagnosis as a threat to their masculinity or worry that they will not be able to continue their family genetic lineage. Relationships within the couple can be affected if both partners begin to view sexual contact as a mandatory requirement, performed on a timely basis, rather than an intimate and loving act. Financial stress, differing opinions about the extent to which infertility treatment can be continued, and changes in relationship dynamics can also contribute to increased stress and the psychological challenges of the reproductive problem.

As Van den Akker points out, the focus on sexual reproductive health is not a privilege but a necessity [2]. People are sexual beings throughout their lives, and sexual and reproductive health care should focus on improving their lives and personal relationships, not limiting themselves to counseling for a separate assisted reproductive procedure.

According to the WHO, prevention and care for reproductive health are seen as a secondary problem in public health, especially in countries with low social status [3].

It is an indisputable fact that stress has an important effect on reproductive function in a purely physiological aspect [5; 6]. Most studies on stress and assisted reproduction have found a link between higher levels of stress and a lower rate of pregnancy and childbirth [7]. Exposure to stress itself is even directly related to the inability to conceive and is considered to be the most common reason for interruption of fertility treatment [8].

The main objective of the emotional counselor in this context is to promote informed reproductive decision-making as well as psychological / emotional / health and well-being throughout all stages and aspects of the reproductive process. The support offered includes reproductive counseling, psychological intervention in infertility, follow-up and care during the various psychological stages of assisted reproduction treatment, couples therapy. In general, reproductive deficits in couples in modern times are not only a medical problem, but also bring emotional, behavioral and social negatives to the couple. For this reason, couples with a reproductive problem need a complex and transformative approach during the implementation of medical assisted reproduction activities, which leads to an increase in the couple's quality of life.

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Section 8. Agricultural sciences

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EFFECT OF TILLAGE METHODS ON PRODUCTIVITY OF FORAGE CROPS UNDER DIFFERENT TILLAGE PRACTICES IN KARAKALPAKSTAN

Abstract. Conservation agriculture practices greatly influence the environment on positive way. Crop rotation is main the principle of CA while short-term cereal-legume crop rotation system is good for farmers and good for the environment as well and also have a great potential to increase agricultural production through implementation of no-till practices. Additionally, short-term crop rotation system can improve soil quality by increasing soil organic matter levels in the upper layers of the soil. Within a crop rotation, different root systems influence different soil horizons and improve the efficiency of the soil nutrient use. In general, the soil structure becomes more stable (Bot and Benites 2005; Suleymenov and Akshalov 2009). The experiment was conducted with the use of randomized complete block design with three replications. Plot area is 100 m^2 (20*5). Analysis of variance (ANOVA) used to determine year, treatment and forage yield effect. Crop production under no-till method had a little higher or similar yield compared to the crop yield under conventional tillage. Maximum forage yield of 16340 kg/ha-1 was recorded under no-till pearl millet in 2015 while minimum forage yield, 819 kg/ha-1, was produced by forage pea conventional tillage also in 2016. The results show that introduction of conservation agriculture as a no-till forage crop production will help livestock producers to have access to low-cost forage resources and thus improve the efficiency of livestock production in Uzbekistan, and perhaps in other Central Asian countries as well. This beneficial aspect of crop rotation with integration of livestock sector should be further investigated in the Aral Sea basin.

Keywords: Crop rotation, no-till, dry matter yield, cost benefit analysis.

Introduction

The Autonomous Republic of Karakalpakstan (KK), which is located at the tail – end of the Amudarya River, and includes its delta into the Aral Sea was one of the main rice-producing regions in the Republic of Uzbekistan. After 1991, focus of

agricultural production of Karakalpakstan did not change, it remains the largest rice-producing region in Uzbekistan, but the productivity of agriculture itself has decreased by 40.0–50.0% due to the increasing soil salinity, leading to billions of Uzbek Soums in annual losses.

Three successive years of drought (1999–2001) have inflicted serious damage on the agricultural sector of Karakalpakstan. Gross production of the three main crops – rice, cotton and wheat fell by 75% and 52%, respectively, in 2001 as compared to 2000. Cotton still dominates irrigated cropping but not to the same extent as in the 1980s. Cereal crops have largely replaced cotton, although potatoes, fruit and vegetables are important in some areas, as private markets have expanded. Alfalfa growing area has decreased considerably in the last 10 years (1994–2004). Sorghum, proso millet and sunflower mostly grown by private sector in Karakalpakstan.

Rice, cotton and wheat are grown either continuously or in crop rotation together. Before independence, cotton was grown in rotation with alfalfa; three years of alfalfa followed by six years of cotton, which has already led to marginal and hardly sustainable soil fertility management. Crop rotation with fodder legumes or pulses is extremely important for soil health and management of plant diseases. The absence of alfalfa in present crop rotations has diminished humus in the soil and considerable micronutrients. It has also eliminated natural soil humus content and removed the soil structure benefits derived from alfalfa's root system.

Conservation Agriculture (CA) is defined as a concept for resource-saving agricultural crop production that strives to achieve acceptable profits, high and sustained production levels while concurrently conserving the environment. CA is based on enhancing natural biological processes both above and below the ground. Interventions such as mechanical soil tillage are reduced to an absolute minimum, and the use of external inputs such as agrochemicals, nutrients of mineral or organic origin are applied at an optimum level that does not interfere with or disrupt the biological processes. Conservation agriculture system helps to conserve the soil resource by retaining leave plant material on the soil surface along with crop rotation. Thus, crop rotation with dual-purpose forage cereals and legume crops can be good for both, farmers and environment.

As already mentioned in previous paragraphs limited number of forage crops grown by the private sector in Karakalpakstan – mostly sorghum, proso millet and corn. Private farmers use old varieties of sorghum and millet and their seed production is not properly organized. Forage crop yield is low because of poor agronomic practices e.g. sub-optimal seeding rate and fertilization. The above-mentioned problems limit forage production for livestock during the winter period. Growing forage crops for fresh fodder, hay, silage have potential to reduce the feed gaps experienced by many smallholders. There is an opportunity to introduce Sudan grass, field pea, pear millet under no-till to the existing crop production system in the region.

Crops differ for the quantity and quality of the residues they produce, and thus for the effect on soil properties. For example, leguminous crops and oil crops produce fewer residues that decompose faster, have a lower C/N ratio and are easier to manage during direct sowing than cereals. A well-planned crop rotation will help in insect and disease control and will help in maintaining or improving soil structure and organic matter levels. A well-planned crop-rotation system under conservation agriculture can help producers avoid many of the problems associated with traditional tillage such as increased perennial weeds, plant diseases, insects etc. Using a variety of crops, we can reduce weed pressures, spread the workload, reduce and combat soil erosion. Legume crops in the rotation have become more valuable with the increased cost of nitrogen due to their nitrogen fixation capacity. Research and experience have proved that a good crop rotation will ensure more consistent yield and increase profit potential.

Materials and methods

Uzbekistan has extreme continental type climate, with hot dry summers, unstable weather in winter, and a wide range of variation in seasonal and daily temperatures. The desert and steppes are characterized by short winters with thin and unstable snow cover, and hot dry dusty summers. The mountains (over 600 m asl) have high precipitation (up to 600 mm per year).

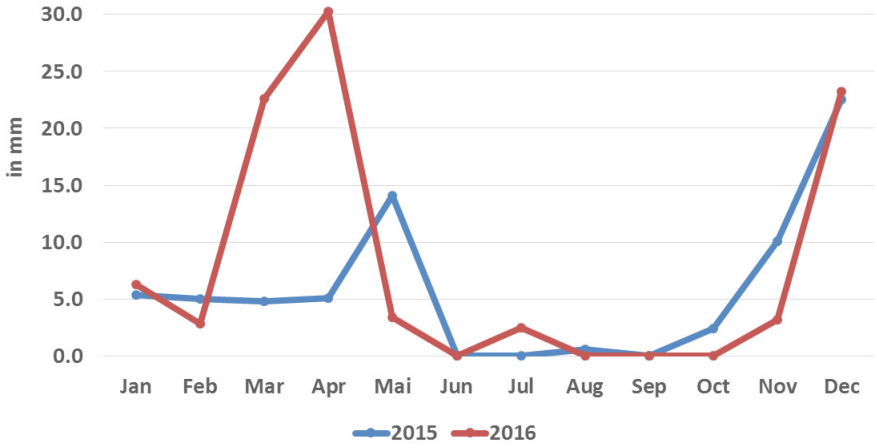

Figure 1. Mean annual precipitation, Chimbay (2015-2016)

According to the data of the Chimbay Meteo Station, located in Chimbay district, the annual long-term precipitation is 110 mm, distributed as 18 mm in fall (September- November), 60 mm in winter (December-March), 24 mm in spring (April-May), and 8 mm in summer (June-August). The year 2016, in contrast with 2015 was characterized by favourable weather conditions for agricultural crops growth and development. First rainfalls occurred in the middle of the autumn of 2015. It negatively affected the germination of winter wheat and, as a result, percentage of germination was less compare to the observed in other years. In general, the winter of 2015 was favourable crops growth and development and warmer than usual and almost without snow (Figure 1).

The average temperature in Chimbay district in summer was ranged from +25.2 to +28.7 degrees C (the highest temperature can be more than +40 degrees C) and the highest air temperature was recorded (28.8^{0}C) in 2015. In winter there are frosts through the district. During the winter season the air temperature in January month went down – 10.0 degrees C in 2016. (Figure 2).

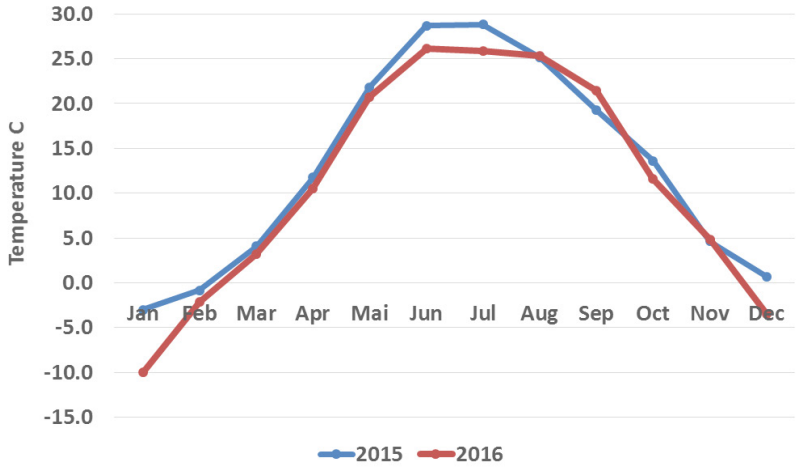

Figure 2. Average air temperatures in Chimbay district (2004-2006)

A cereal-legume crop rotation experiment initiated in 2015 in Shakhob farm, Korauzak district, Karakalpakstan. Within this study five forage crops, received from the germplasm collection of ICRISAT-ICARDA and collected in Uzbekistan, Kazakhstan and Tajikistan, have been evaluated for dual purposes under no-till and conventional tillage (dry fodder and grain) to enhance fodder availability during winter season in Karakul demonstration site, Korauzak district in Karakalpakstan.

The field was ploughed to a depth of 25–27 cm under traditional tillage, which was followed by harrowing, leveling, and opening the furrows at 70 cm spacing while in no-till permanent beds used to sow all crops. Planting rate for each crop was as follows: Pearl millet 5 kg ha-1, sorghum 12 kg ha-1, maize 35 kg ha-1, sudan grass 15 kg/ha and field pea 80 kg ha-1 in both tillage methods. Each plot consisted of 8 rows, 20 m long. At 10 days after planting, seedlings were thinned to single plants spaced at 10 cm in pearl millet and 7 cm in maize. Fields were fertilized with 120 kg/ha of ammonium nitrate 4–5 days after sowing, with a second application of ammonium nitrate applied at the rate 80 kg/ha at 30 days after the sowing, leading to a total 200 kg/ha of ammonium nitrate (nitrogen 34%) application. Hand weeding was done twice, first 10 days after sowing and then at 30–32 days after sowing. Post-planting irrigation was done twice, first irrigation 10 days after sowing and second irrigation 35 days after sowing.

The experiment was conducted with the use of randomized complete block design with three replications. Plot area is 100 m2 (20*5). Analysis of variance (ANOVA) used to determine treatment and forage yield effect. Proposed models for crop rotation are as follows:

– No-till – sorghum, maize, pearl millet, Sudan grass and field pea.

– Traditional tillage – sorghum, maize, pearl millet, Sudan grass and field pea.

Results:

There are a few number of experiments conducted to study the role of crop rotation in weed suppression under conventional agriculture systems with herbicides. They studied the impact of different type of herbicide used rather than other factors associated with crop rotation. Liebman and Gallandt (1997) reported that rotation without herbicides have generally more diverse systems with lower density of problem weeds but a greater diversity of weed species (Lovett Doust et al., 1985). This is reasonable, since the variation in cultural practices during the rotation will tend to disrupt the life cycle of each particular weed species but create niches for a greater variety of species.

ANOVA (analysis of variance) shows that crops dry matter yield was significantly affected by years, crops and tillage methods (<.001). Our findings are in line with Košutić et al. 2005 reports where grain yield of winter wheat among conventional, conservation and no-till treatments did not significantly differ.

Table 1.– Analysis of variance

Source of variation	d.f.	s.s.	m.s.	v.r.	F pr.
Year.TILLAGE.CROPS	19	1.05E +09	5.54E + 07	5.85	<. 001
Residual	40	3.78E + 08	9.46E + 06		
Total	59	1.43E + 09			

Crop rotation is the main principle of conservation agriculture. Short-term cereal-legume crop rotation system have a great potential to increase agricultural production through implementation of no-till practices. Some newly introduced forage crops are performed well under both no-till and conventional method in spite of serious drought and salinity in the experimental site.

Dry matter yield under no-till method had a little higher or similar yield compared to the conventional

tillage (Figure 3). Dry matter yields of studied crops ranged 819–16340 kg/ha1. Maximum dry matter yield of 16340 kg/ha-1 was recorded under no-till pearl millet in 2015 while minimum forage yield, 819 kg/ha-1, was produced by forage pea conventional tillage also in 2016. Finally, our results emphasize the necessity of taking into account the NT method in the cultivation of corn, pearl millet, sudan grass in the irrigated conditions of Uzbekistan to stabilize forage production in the region. The results show that no-till practices are feasible for the production of forage crops dry matter yield.

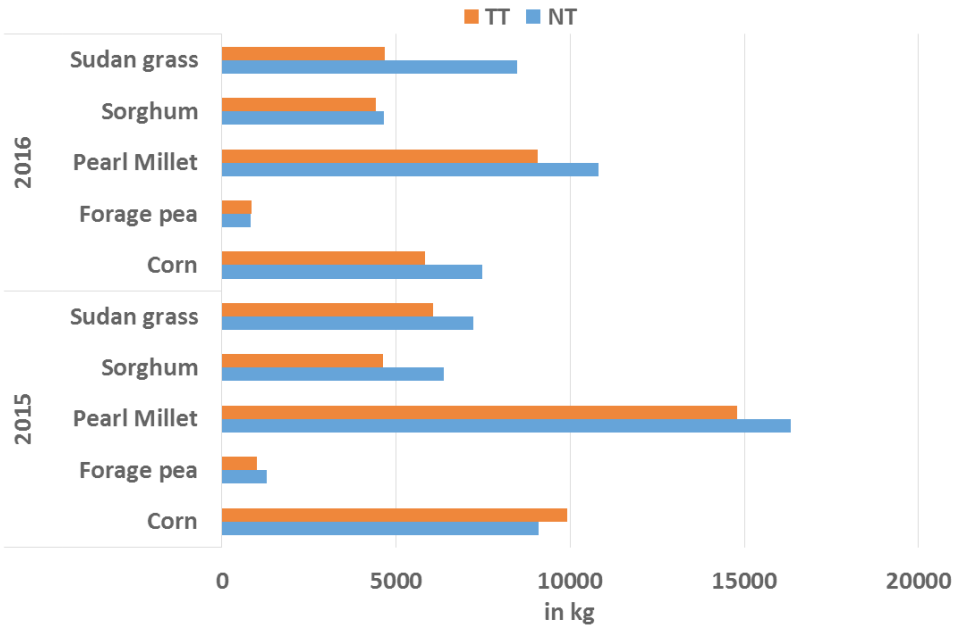

Figure 3. Effect of tillage method on dry matter yield of different forage crops (2015–2016)

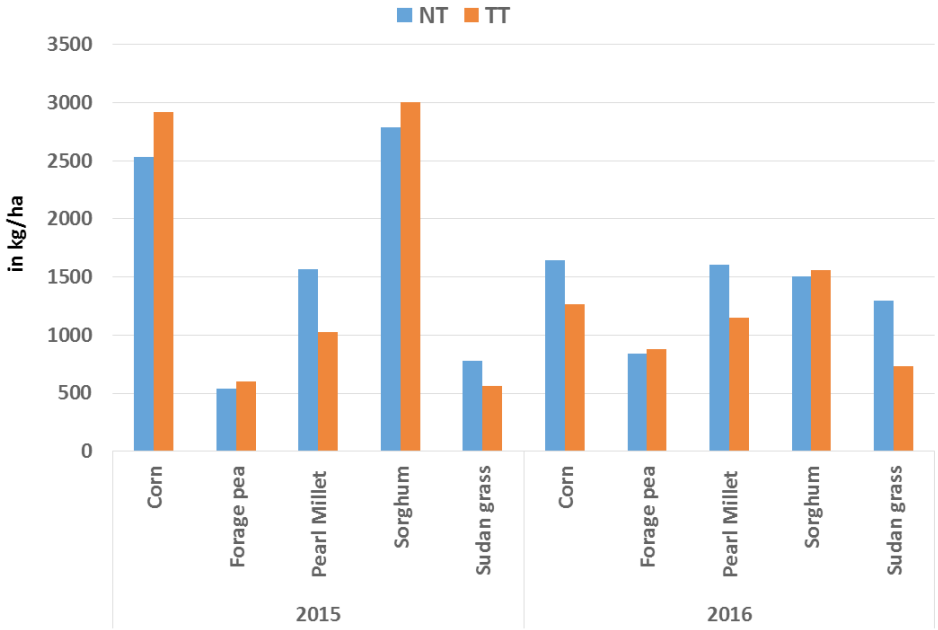

Figure 4. Effect of tillage method on grain productivity of different forage crops (2015–2016)

Based on our experiment it was found that the forage crops grain yield was higher when the crops grown under no-tillage system in 2016 (Figure 4). The highest grain yield (3002) was recorded in 2015 with traditional tillage with sorghum while the lowest (563) was recorded in 2015 with traditional tillage in Sudan grass.

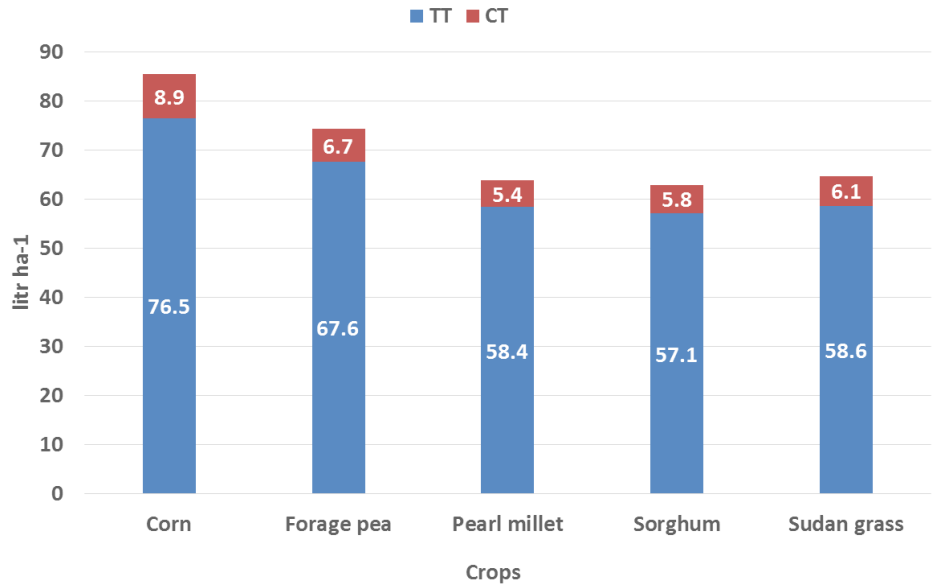

Figure 5. Spent fuel for tillage and planting, l/ha

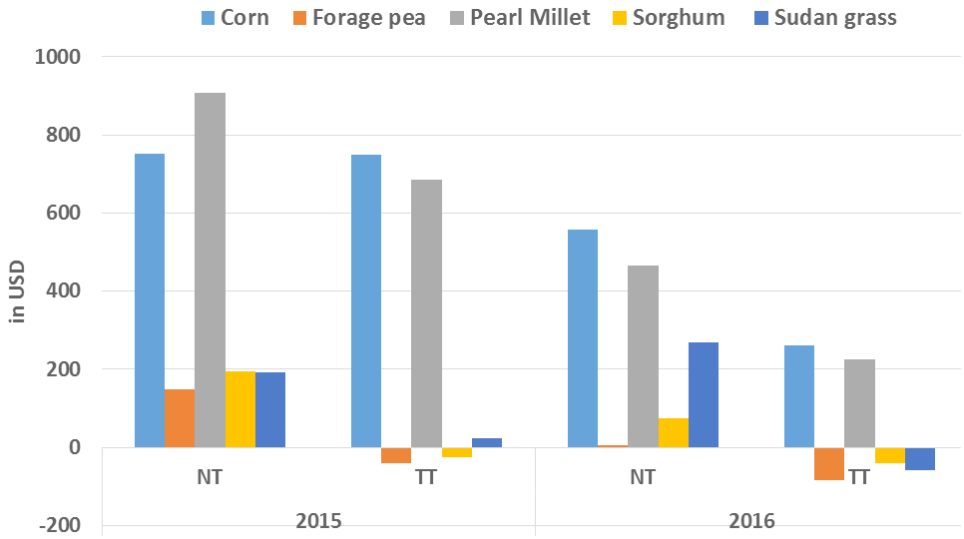

Figure 6. Cost-benefits of different forage crops under no-till and conventional till (2015–2016)

As figure five presents, no-till demonstrated advantages in terms of conservation of energy and labour resources. As fuel for producing agricultural products has become expensive farmers in Uzbekistan has already started alternative ways how to decrease fuel consumption. The lowest fuel consumption (5.41ha-1) was obtained with no till Pearl millet, which was 54.0 litres lower than conventional pearl millet. Fuel consumption per ha was 76.5, 67.5.6, 58.4, 57.1 and 58.6 litres under traditional tillage system for Corn, Forage pea, pearl millet, sorghum and Sudan grass while in no-till Corn, Forage pea,

pearl millet, sorghum and Sudan grass had 8.9, 6.7, 5.4, 5.8, 6.1 litres respectively.

Cost benefit analysis of tested forage crops under different tillage methods in drought and salt affected regions of Aral Sea basin was conducted to estimate economic returns of tested tillage methods for forage crops production. The highest profit was recorded under conventional tillage of Pearl millet – USD907/ha^{-1}, while negative profit was under conventional tillage for Forage pea – USD –59/ha^{-1} (Figure 6).

Conclusions

The results obtained in this experiment for different methods of forage crops cultivation indicate that tillage reduction in surface irrigated production systems reverberate in the same positive way in terms of production profitability and sustainability of crop production. New crop rotations with the use of forage crops are recommended to livestock producers to ensure feed for the winter period. The new forage crops under no-till practices can help to improve soil fertility and increase crop productivity. In addition, developed crop rotation schemes including forage crops were recommended to decrease forage shortage during the winter period. The results show that introduction of conservation agriculture as a no-till forage crop production will help livestock producers to have access to low-cost forage resources and thus improve the efficiency of livestock production in Uzbekistan, and perhaps in other Central Asian countries as well. This beneficial aspect of crop rotation with integration of livestock sector should be further investigated in the Aral Sea basin.

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DEVELOPMENT OF THE TECHNIQUE OF OPTIMIZATION OF COMPOSITIONS OF HEAVY CONCRETE USING THE METHODS OF FINAL ELEMENTS

Abstract. This article is devoted to the study of issues related to the scientific substantiation of the techniques and methods of optimization, the creation of a computer-aided design system for heavy concrete compositions using numerical simulation. In a comparative aspect, numerical algorithms have been developed for solving problems of physically nonlinear deformation of structures made of structural materials, which make it possible to efficiently use the capabilities of computer technology.

Keywords: composite materials, methods of mathematical statistics, mathematical modeling, structural simulation modeling.

Relevance. The modern level of development of construction technologies necessitates the presentation of the physic-mechanical properties of composite materials in the form of mathematical dependencies on their internal structure and external factors acting in given conditions of operation of structures. The mathematical description allows to identify the factors that ensure the formation of an effective structure of materials, as well as to evaluate the durability and reliability of building structures without long and expensive field experiments. The greatest complexity in mathematical modeling is represented by cement composite materials: the structure of mortars and concretes, which determine their properties, is multi-layered and polyfunctional and requires a characteristic approach.

The currently used methods of mathematical statistics as the main tool of theoretical research, based on the results of experiments, often do not allow establishing the physical nature and patterns of the relationship of structure with properties. Analytical methods for describing the dependence of the properties of cement compositions on their structure in the form of deterministic dependencies are practically inapplicable to systems that have a multilevel probabilistic nature [1–2].

A description of such complex-structured systems associated with the representation of the distribution in volume, mutual orientation and conjugation of individual components of the structure, as well as their collaboration at various levels, is possible through the use of numerical methods, which

constitutes the technology of structural-imitational modeling of cement compositions [2–3].

The advantage of structural simulation modeling is the reproduction of explicitly taken into account, using mathematical physics and elasticity theory equations, parameters determined during preliminary structural studies that contribute to a more realistic reflection of the structure of the material and the possibility of obtaining system responses to various external and internal effects. This method allows, first of all, to directly linking the structure and properties of the composite material, which is one of the fundamental tasks of building materials science.

The description of the joint work of phases of heterogeneous properties in the stochastic structure of compositions at different structural levels is possible, as noted, using numerical methods [3]. The most developed and approved numerical method for solving differential equations describing the behavior of continuous media is the finite element method (FEM). Efficient implementation of FEM algorithms for describing the interaction of individual structural elements of cement systems has become due to the powerful development of computer technology.

Objective: to study in detail the issues related to the scientific substantiation of the techniques and methods of optimization, the creation of a computer-aided design system for heavy concrete compositions using numerical modeling.

Materials and methods: as a material for experimental studies was used a composite material used for the manufacture of heavy concrete brands offered in order to develop and improve methods for optimizing the composition of heavy concrete using the finite element method.

In the present paper, the methods of mathematical physics, set theory, computational mathematics, algorithmization, modular and structured programming technologies, as well as computational experiments are applied.

The results of the study.

Development of an algorithm for calculating the composition of concrete. One of the main methods of researching the objects of this work is modeling, in which real objects are replaced by analogues obtained from the original by idealization, abstraction. When modeling the composition of heavy concretes, the priority requirement is the fact that in the proposed model the object should be formed so that it is possible to obtain new information about the original.

To assess the effectiveness of the development of the algorithm for calculating the composition of concrete, we carried out laboratory studies related to obtaining experimental data based on the definition of various types of properties inherent in materials. In these studies, physical and mechanical properties were studied. Laboratory studies were carried out in relation to cement concretes of various compositions. The results obtained served as the basis for creating a source data layout that serves to refine and test the numerical simulation system.

Mechanical methods. The mechanical properties of building materials are characterized, first of all, by compressive strength and modulus of elasticity.

The content of the components of concrete and the preparation of the compositions was carried out manually. Before preparing the samples, the aggregates were washed and dried to constant weight. Fillers only dried. Weighing binder, fillers, additives and fillers were carried out on a scale with an accuracy of up to 0.5 g. Samples were made in metal molds, which were lubricated with technical oil before the mixture was laid. After lying, the samples were hardened under normal conditions for 1 day, and then in a steaming chamber according to the mode of 1.5 + 6.0 + 1.5 h.

Optimization of the composition of concrete is carried out taking into account their application, conditions of construction and operation, the type and purpose of the structural elements: floor slabs and coatings, columns, beams, beams-walls, trusses

and others; external and internal, bearing and protecting walls, panels, and internal partitions.

Depending on the purpose, the structural elements have requirements that determine the properties of deformability and strength, heat – sound insulation and water and vapor impermeability, biostability, frost resistance, etc. Among these properties, the most significant, determining the reliability and durability of concrete, are mechanical properties (strength and deformability). When modifying materials (thermal conductivity, sound permeability, etc.). As a rule, at this stage, the selection of binders, fillers, additives and granular aggregates is carried out. When selecting the composition, based on the physic-technical properties, the basic structure of the modified material is formed on the basis of the corresponding experimental work and the choice of their optimal content. In the future, work is carried out to determine the mechanical parameters of the material and adjust its composition.

The method developed in this paper is intended to predict the mechanical parameters of optimized materials and adjust their composition by adjusting the volume content of the used components of the structure to ensure the required strength and deformability. The technique was developed in relation to the use of the finite element method *(plane stress state*).

When using the technique, one should pay attention to the identity of the nature of the stress-deformable state in the numerical simulation and experimental work carried out to determine the mechanical parameters (strength and deformation modulus, coefficient of lateral expansion of materials under compression). To develop a mathematical description of the process of the development of cracks in concrete, we have created an initial material model.

The analysis and generalization of the existing volume of experimental data presented in the works of researchers in the field of concrete scientists makes it possible to formulate the above model [4–7]. It is important to note that the model is based on a number of simplifying hypotheses and boils down to the following, successively performed operations:

1. considers a solid body in the form of a matrix with inclusions (aggregate grains) of various sizes, with defects of the first (pore) and second (crack) kind at different levels of the material structure;

2. defects of the first kind have a different shape, but the same characteristic size and are considered at the same micro level;

3. defects of the second kind can have various outlines and sizes; they are subject to review at the micro and macro level;

4. the matrix material between defects and inclusions is uniform;

5. the matrix material between defects and inclusions is isotropic;

6. the size of defects and inclusions is small in comparison with the size of the body;

7. deformations are small;

8. the triaxial stress state can be replaced by a biaxial – flat stress state;

9. in case of a short-term action of the load, it is considered possible to neglect the phenomenon of creep and to assume that the material is basically its mass (except for the zone immediately adjacent to cracks) works elastically; at the same time, the effect of possible physical nonlinearity of the material is taken into account;

10. with long-term load action, it is considered acceptable to transfer from solutions of an elastic instantaneous problem by using an operator;

It also takes into account the influence of the physical nonlinearity of the material for both elastic and long-term deformations.

Concrete macrostructure. The structure of concrete, visible to the eye or with a slight increase. In the macrostructure of concrete there are structural elements: coarse aggregate, sand, cement stone, air pores. Sometimes the macrostructure of concrete is conventionally made of two components: coarse aggregate and cement-sand mortar.

The matrix is a component of a two-component system of concrete, representing the mortar part. Physical parameters of the matrix:

– Elastic modulus $E_м$;
– Poisson's ratio $\mu_м$;

Considering the above information, we have developed software algorithms that include the formation of a finite element model (flat stress state). In the course of calculations, it was conditionally determined in the work that the properties of materials can be estimated from the results of testing samples as properties of a continuum. This allowed the use of appropriate theoretical models. The developed ARPEK system is based on the fragmentation of modeling objects, the principles of its formation, and is based on the finite element method. Fragmentation of the object, performed in the finite element method, allowed the modeling to assign individual properties to individual fragments and, thus, realize specific structural elements such as matrices, inclusions (*for example, crushed stone, sand, pore fractions, etc.*). The change in the volumetric content of structural components and the replacement of the input of structural elements made it possible to significantly speed up the process of predicting properties. According to the simulation results, we obtained effective parameters equivalent to those experienced.

It would like to be noted that the model of modeling can be considered as a system of structure-forming objects with its own inherent properties at a given qualitative stage of deformation or destruction. The properties of such an object are determined by its geometric shape, position, and functions that characterize the laws of its deformation or destruction. In the formulation of practical experiments, the principle of describing such an object is defined by us as the principle of encapsulation. The establishment of a function in a numerical simulation was performed using continuum theories. The fragmentation of an object by finite elements was defined as a special kind of medium in which a change in mechanical properties takes place, when moving from one fragment to another. The selected methodological approach allowed the use of the principle of polymorphism in the development of numerical modeling systems.

It should be emphasized that for the practical application of the principle of polymorphism, first of all, we determined the type of the base object (fragment) by selecting the type of the final element and the interpolation function. In turn, using the principle of polymorphism, in the work the basic elements of the first order, having their own functions, are defined. For example, the basic functions of fragments of inclusions, their shells, matrices, pores. On the other hand, the use of the principle of inheritance allowed us to determine the properties of objects of the entire structure.

In the research, special attention is paid to the adjustment of the developed program and making amendments, as well as the corresponding changes. The process of building a finite element model is automated and implemented in the software module APCEM. The user is connected with the software package by launching the program and implementing a sequence of modules from the library of discretization modules that are elementary in the configuration of subregions. The library also includes modules for "stitching" and "separating" subregions, modules for visualizing and minimizing the difference in node numbers in the finite element model. Interactive communication of the user with the software package allows the sampling process to be implemented in accordance with the algorithm for constructing a finite-element partitioning of the source domain with a complex configuration occupied by the object under study. The results of the calculations are recorded on the MD.Further, based on the volume ratio of the fiber and the matrix in the composite material, as well as their mechanical characteristics, effective mechanical parameters are calculated, which together with the data on the finite element model serve as input data for the LIREK software module, where mathematical

modeling of linear deformation of composite materials is performed. Here, the coefficients of the stiffness matrix of finite elements and the vector of external influences are calculated. The process of forming the resolving system of linear algebraic equations taking into account the boundary conditions and its solution is carried out. The obtained solutions of the elastic problem are recorded on the MD and are the initial information for the nonlinear calculation of composite materials, the calculation of which is performed in the NERPEC software module. Nonlinear calculation implements an iterative process for solving an elastoplastic problem based on the theory of small elastoplastic deformations for a transversal homogeneous medium. The obtained values of the nodal displacements are recorded on the MD, and serve as input data for the TASVIR software module, in which the parameters of the stress-strain state are calculated, the finite element model of the object under consideration and the calculation results are visualized.

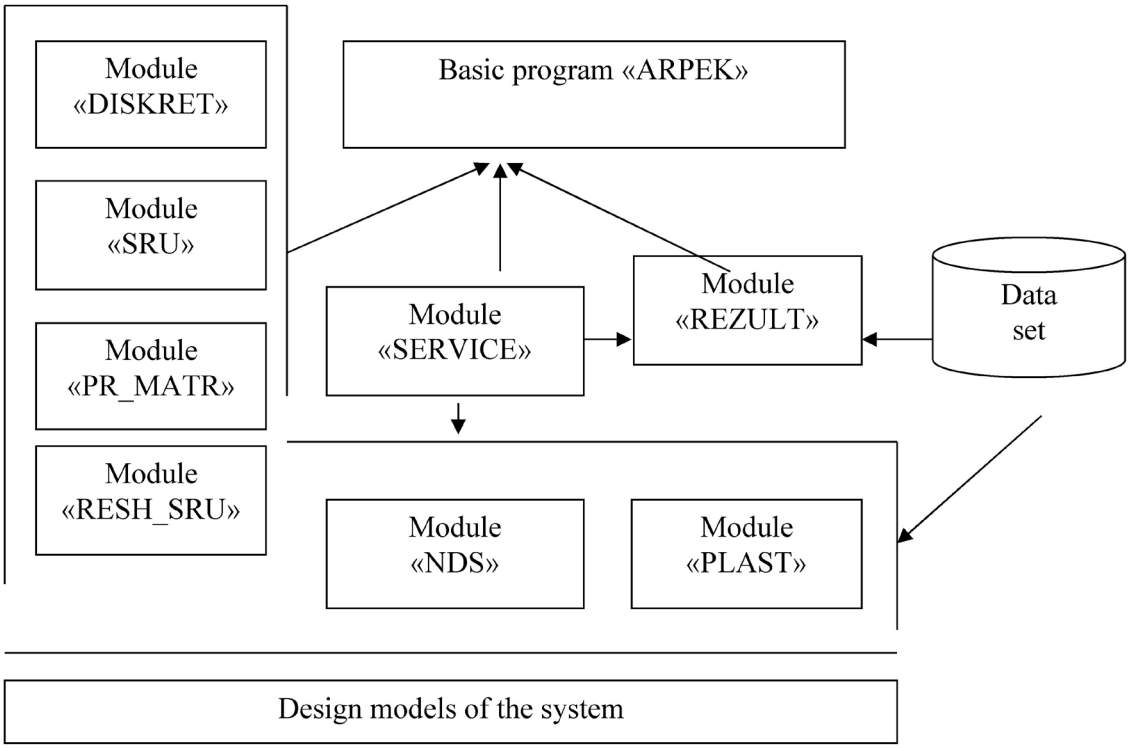

Figure 1. The main modules of the ARPEK system and their interconnection

The developed ARPEK software package is built according to a modular principle, where each module implements a certain stage of calculation. Various service and auxiliary functions are implemented by a separate service module. Some modules are executed as links of a sequential chain of problem solution, others are connected according to the "master-slave" scheme, that is, some modules use other modules. A list of the main modules developed for the implementation of the above algorithm is given in (fig. 1), where the directions of the arrows indicate the logical interdependence of the modules.

The relationship between the modules is carried out through the files that make up the system data set:

1. *.dsk – files for storing intermediate data obtained at the stage of body sampling;
2. *.kmg – files for storing the coefficients of the global system of equations.
3. *.kvn– files to store load vector coefficients.
4. *.kff – files for storing form function coefficients.
5. *.kti – files for storing the coefficients of Gaussian integration points in the local coordinate system.

6. *.kzp – files for storing values of nodal displacements.

7. *.khs – files for storing the values of the stress-strain state.

The operation of the complex is controlled through the "ARPEK" program, which in the form of a menu provides an opportunity to select the main operating modes of the system (Fig. 2).

Giving a description of the modes of operation of the developed system, in particular:

I. Mode "DISCRET". The mode is intended for sampling the specified area. This mode is implemented by the procedures from the DISKRET module, which includes the following submodules:

1. "SEKTOR" – the formation of a discrete model of the surface of the cavity;

2. "NUMER" – the numbering of the nodal points of a discrete model of the body.

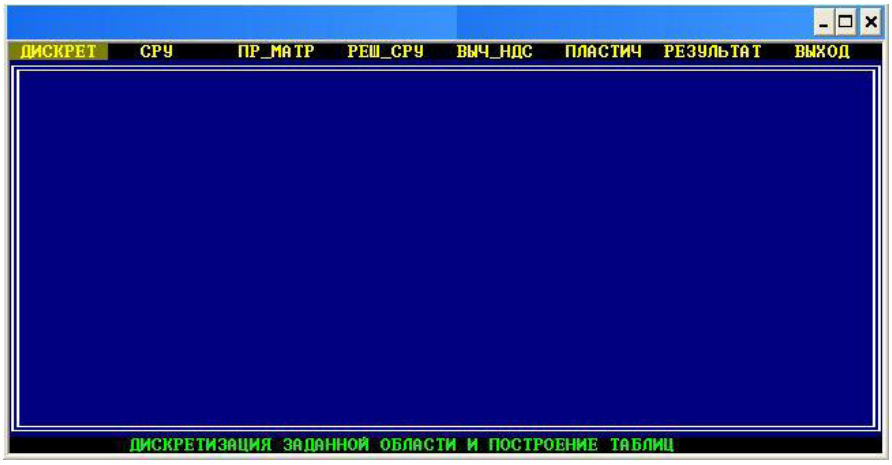

Figure 2. Menu of operating modes of the ARPEK system

II. Mode "CPU". This mode is used to form the coefficients of the system of solving equations of the finite element method, based on a discrete body model. It is implemented by the procedures of the SRU module, which uses the following sets of submodules:

1. "MATR_J" – the formation of the coefficients of the stiffness matrix of the final element and the unit vector of loads;

2. "GRAN_USL" – transformation of the system of equations with regard to specified displacements;

3. "UCHET_PR" – consideration of the directions of specified displacements along the coordinate axes;

4. "YAKOBIAN" – definition of the components of the Jacobi matrix;

5. "DIFEREN" – calculation of derivatives of a function of a form from given displacements;

6. "PODSTAN" – determination of the interpolation polynomial value.

III. Mode "PR_MATR". The algorithm of the modified square root method for solving systems of algebraic equations is implemented (decomposition of the original matrix into the product of two triangular matrices, and the sequential implementation of the direct and reverse moves of this method). At this stage, the coefficients of the matrix of the system of resolving equations are converted to a triangular form.

IV. Mode "RESH_SRU". Performing the reverse of the square root method.

V. Mode "VICH_NDS." The calculation of the stress-strain state.

VI. Mode "PLASTIC". Execution of the iterative process of the method of elastic solutions A. A. Ilyushin. This mode is implemented by the procedures from the "PLAST" module, which includes the following sub-modules:

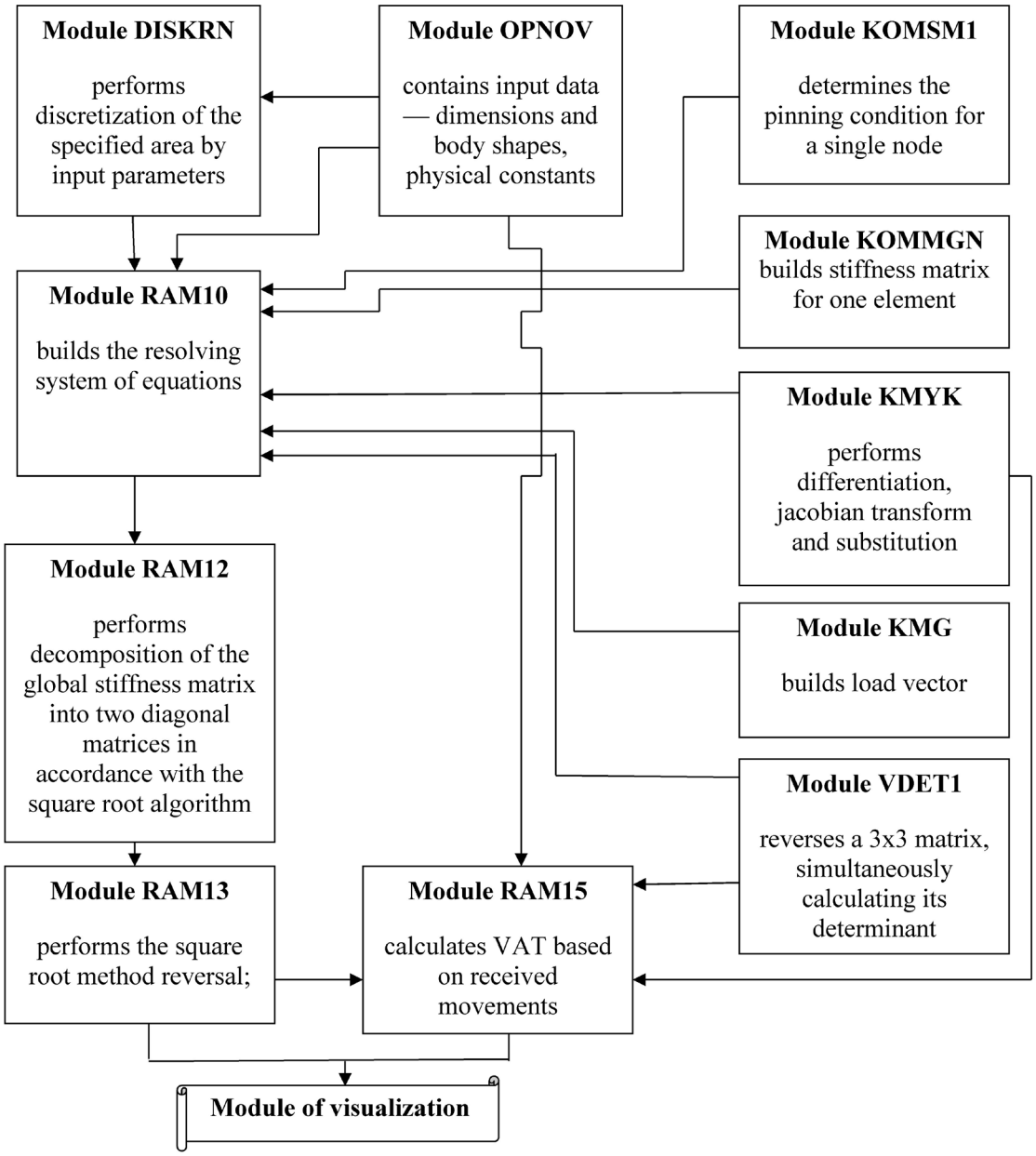

Figure 3. The overall architecture of the complex ARPEK

1. "MATR_P" – the formation of the coefficients of the stiffness matrix of the final element in the zone of plastic deformations;

2. "GRAN_USP" – transformation of the system of equations with regard to specified displacements that are in the zone of plastic deformations;

3. "INTEN_DEF" – calculation of the intensity of deformations;

4. "INTEN_NAPR" – calculation of stress intensity.

VII. Mode "RESULT". Reading information from a data set for the formation of tables, graphs and plots.

VII. Exit mode. The mode of exit from the system.

The results of the solution are recorded in the same output VAT file. As shown in fig. 3, then (optionally) a visualization module for graphical interpretation of calculation results can be launched.

The results in the table are presented in the form of numbers in the exponential format and are in the

output file of the complex. The line numbering in this file is identical to the numbering of nodes in the finite element mesh.

Justifying the trends and prospects for the development of building technologies related to the development of techniques for optimizing the compositions of heavy concrete using finite element methods, it is advisable to draw the following conclusions:

1. An optimization technique has been developed that represents a plan for conducting research on the modification of various types of concrete taking into account all the necessary conditions, such as developing an initial experimental plan, applying computer simulations, analyzing the obtained results and dependencies, establishing the optimal concrete composition.

2. The compressive strength and the modulus of deformation are considered as optimized parameters taken as the basis for the modification of concrete.

3. For the purposes of the optimization methodology, the software package ARPEK was developed. The system of numerical simulation is based on the finite element method. The purpose of the system is to accelerate the work on the optimization method.

4. The main algorithms for the formation of the system are described. They include the formation of a finite element model and its fragmentation, the formation of the material composition of the objects of modeling, the stages of the path of destruction and deformation. The software database of the ARPEK system is considered, which reveals the structure of the system and its individual components (source text, modules).

5. The optimization method is designed to predict the mechanical properties of optimized concrete compositions for various types of building structures, as well as to adjust and control the volume content of the used components of the concrete structure to ensure the required strength and deformability.

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COMPARATIVE ANALYSIS OF POSSIBILITIES OF USING THE VALVE FREQUENCY CONVERTERS FOR SPEED CONTROL OF INDUCTION MOTORS WITH SQUIRREL–CAGE ROTOR

Abstract. The article presents the results of a comparative analysis of the possibilities of using valve frequency converters to control the speed of induction motors with a squirrel-cage rotor.

Keywords: valve frequency converters, induction motor, rotation speed of the electromagnetic field of the stator, frequency control method, autonomous inverter.

As is known [1, 166–167; 2, 62–64], the speed of induction motors is determined by two parameters: the speed of rotation of the electromagnetic field of the stator ω_0 and a slip s, i.e., there are two methods of speed control: control speed of rotation of the electromagnetic field of the stator and the regulation of the constant value ω_0. In turn, the rotation speed of the electromagnetic field of the stator is determined by two parameters: the frequency of the voltage supplied to the stator windings f_1 and the number of pairs of poles of the motor Zp. Thus, two methods of speed control are possible: by changing the frequency of the supply voltage with the help of frequency converters included in the motor stator circuit, and by changing the number of pairs of motor poles.

The method of controlling the speed of the induction motor by changing the number of pairs of poles Zp allows you to get several fixed values of the operating speed. For example, induction motors of 4A-6A series produced two -, three – and four-speed, which are used for crane electric drives. As a rule, smooth speed control for such electric machines is not used, that is, multi-speed induction motors are not used for regulated electric drive systems [3, 99–100].

The frequency control method is based on the conversion of the alternating voltage of the supply network into an alternating voltage with a controlled frequency, voltage and current, which is carried out by frequency converters performed on the basis of power semiconductor switches – thyristors and transistors. It should be noted that this method has its advantages and disadvantages. The main advantages include the possibility of regulation in a wide range due to the smoothness of regulation and high rigidity of mechanical characteristics, as well as energy-saving operation due to the fact that the motor operates with small values of absolute slip. Disadvantages are the complexity and therefore the high cost of frequency converters (especially for drives with high power, as well as difficulties in implementing regenerative braking for most circuits.

The frequency converters according to the type of connection with the mains supply to the semiconductor elements are divided into two broad classes:

– frequency converters with direct connection;
– frequency converters with DC link.

Frequency converters with direct connection

The basis of the power circuit of frequency converters with direct connection is a reversible thyristor converter. The multiphase output of the frequency converter with direct connection is achieved by using multiple reversible converters with single-phase output. In the scheme of the frequency converter with direct connection, the DC link is expressed

implicitly due to the simultaneous combination of two functions in one device – rectification and inversion. Hence, there are the following advantages and disadvantages of frequency converters with direct connection.

Advantages:

– single energy conversion, which determines the high efficiency of the converter;

– the ability to pass reactive power from the network to the load, and back.

Disadvantages:

– complexity of control devices. A large number of thyristors requires a large number of pulse-phase control systems;

– power factor converter substantially below one ($\cos\varphi \approx 0{,}15$);

– significantly distorted form of supply voltage;

– difficulties in obtaining frequencies close to the frequency of the supply network. For a zero circuit, the maximum output voltage frequency is usually limited to f_{1max} = 16 Hz. The transition to the bridge circuit extends the operating range to f_{1max} = 25 Hz. Therefore, induction motor drives with frequency converters with direct connection are used for low-speed without gear electric drives of medium and high power.

Therefore, frequency converters with direct connection are mainly used to power low-speed motors in medium and high power drives that operate in dynamically stressed modes accompanied by frequent reverse, braking with recuperation [4, 8–9].

Frequency converters with DC link, in turn, are divided into:

– autonomous current inverters (ACI);

– autonomous voltage inverter (AVI).

In its structure, autonomous inverters contain a rectifier, a power filter and an inverter that converts a constant voltage (current) into an alternating voltage (current) of a given frequency.

Powerful semiconductor devices, used in power converter devices, operate only in key modes for which there are two steady states:

– open state, the maximum electrical conductivity;

– closed state – minimum electrical conductivity.

When operating in the key mode, the loss of active power $P=UI$ in semiconductor devices is small, since one of the current and voltage output factors (current I or voltage U) has the minimum possible value. This ensures high efficiency of electrical energy converters.

In the process of switching from the closed state of semiconductor devices to the open state and vice versa, the voltage and current vary along the DC load line. Current and voltage output increases significantly. Therefore, it is important that these switches occur in the shortest possible time. This condition has now been realized in two types of semiconductor devices with internal positive feedback, accelerating the switching of semiconductors – IGBT transistors or bipolar transistors with isolated gate and thyristors.

Two-stage converter devices are based on the rectifier of three-phase alternating voltage of the network and an autonomous inverter that converts rectified voltage into three-phase alternating voltage with adjustable frequency and amplitude. Despite the twofold energy conversion and due to this slight decrease, the efficiency of the frequency converters with DC link has received the greatest distribution in the regulated electric drive.

At the transition of the motor, supplied from an autonomous current inverter, to the generator mode, the direction of the counter EMF of the inverter changes, which switches to the mode of operation of the rectifier, which could cause an increase in current in the DC link. However, due to the strong negative feedback on the current, which covers the rectifier, the current in the DC link is maintained at the same level, and the rectifier is transferred to the inverter mode, driven by the network. As a result, energy is recovered into the supply network without changing the direction of current in the DC link.

Thus, in autonomous current inverters, braking modes of the motor with energy recovery into the

network are easily realized, which makes its use in reversible electric drives preferable.

A more perfect scheme of this class is a circuit of an autonomous current inverter with cut-off diodes.

In the scheme of an autonomous current inverter with cut-off diodes, capacitors are separated from the load by diodes, so that capacitors participate in the operation of the inverter only in a relatively short switching time, and the rest of the current does not flow through them. This can significantly reduce the capacitance of the capacitors.

The main advantages of the frequency converter with a stand-alone current inverter:

– possibility of energy recovery in the network;

– the output voltage is close in form to a sine wave;

– failure-free mode of short circuit in the load.

Disadvantages:

– output frequency limit at 100 ÷ 125 Hz;

– switching overvoltage on thyristors, which makes the power circuit more complicated;

– inability to work on the group load;

– substantial weight and dimensions of the induction filter.

The second type of frequency converters with a DC link is based on an autonomous voltage inverter (AVI), the DC link of which contains an LC filter (or only a capacitance C). In the AVI, there is a direct dependence of the voltage in the DC link on the voltage at the load, so it is a source of voltage [5, 40–41]. If the current inverters at each time operates one valve in the anode and cathode groups, the voltage inverters more appropriate simultaneous operation of two valves in one group and one in the other. Due to the presence of capacitance C during operation of the inverter as a voltage source for the active-inductive load (induction motor), the exchange of reactive energy between the motor and the DC link is provided.

The output voltage of the inverter can be regulated in two ways:

– regulation of the input voltage in the DC link for which a controlled rectifier is used, whereas the inverter performing the function of a phase switch forms the required frequency. Such frequency converters called AVI with pulse-amplitude modulation;

– pulse-width voltage regulation in the inverter, which is carried out by the carrier frequency voltage (key switching frequency) signal of the fundamental frequency. Such frequency converters called AVI with pulse-width modulation. In them, the rectifier can be adopted unmanageable.

Given that the first method has such drawbacks as a step form of the output voltage and a low power factor of the converter, the second method is more promising. It should be noted that the pulse-width modulation is possible not only to regulate the average value of the voltage for the period, but also to adjust the form of the output voltage.

Currently, in the regulated electric drives on the system of "induction motors with squirrel-cage rotor – frequency converter based on autonomous inverters" in the power range up to 50 kW, transistor voltage inverters are mainly used, and in the higher power ranges and for all applications with active load braking (centrifuges, test equipment, cranes), the main preference is given to current inverters [6, 64–65; 7, 3–5].

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Section 10. Physics

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THE FORMATION OF DEFECTS IN MIS STRUCTURES BASED ON SILICON WITH MOLYBDENUM IMPURITY

Abstract. By means of methods of capacitance spectroscopy CC-DLTS and is high-frequency capacitance-voltage characteristics processes the formation of defects in the bulk and at the interface Si-SiO_2 of MIS-structures based on silicon with molybdenum impurity are investigated. It is revealed, that presence of electro-neutral molybdenum impurity at structures leads to increase N_{ss}, but appreciable change in distribution N_{ss} on E_g is not observed. It is established, that presence electroactive molybdenum atoms leads to a further increase N_{ss} of structures and occurrence of the peaks connected with levels molybdenum in silicon.

Keywords:

1. Introduction

In connection with the search for semiconductor materials with special properties (increased thermal stability, radiation stability, etc.), recently increased interest in silicon alloyed with refractory elements [1–3]. These specially introduced impurities enter into various interactions with structural defects and different uncontrolled impurities in the process of technological processing, which is accompanied by virtually any route of manufacturing semiconductor devices [4–6]. Among all refractory elements in silicon, molybdenum is the least studied.

In last years, the study of the properties of impurities that create a variety of defective centers in semiconductors has received considerable attention in view of the significant role of refractory impurities in the formation properties of silicon. It is known that the doping of silicon by refractory elements significantly affects the performance of semiconductor devices [7–8], but data about their electrical activity and interaction with other defects and also about influence on characteristics of silicon structures are inconsistent.. The purpose of this work was to study non-equilibrium processes in the bulk and at the interface Si-SiO_2 multilayer structures of the type metal-insulator-semiconductor (MIS) on the basis of silicon, doped with molybdenum.

2. Experimental setup

Below are the results of a complex research CC-DLTS and capacitance-voltage characteristics (C–V characteristics) in MIS-structures with impurity of Mo.

Initial Si it was doped with molybdenum in the process of growing from the melt, and diffusion method. After doping Mo on the Si plates with ori-

entation <100> and a resistivity of 20 Ohm.cm was created by MIS-structures according to the technology described by us earlier [9; 10]. Concentration of possible deep levels (DL) was measured in volume Si by method CC-DLTS on Schottky barriers fabricated on Si after etching of the layer SiO_2.

3. Results and discussion

These measurements showed that the introduction of molybdenum in Si the process of growing from the melt does not form any deep levels in a prohibited area of a silicon substrate. Measuring C–V characteristics of MIS structures based on Si<Mo> (Fig.1, curve 2) showed that they are shifted toward negative displacements in comparison with control samples (Fig.1, curve 1). This suggests that the introduction of molybdenum in Si leads to a change in the generation characteristics of structures: to increase the density of surface states N_{ss} of MIS structures and the formation of positive charge at the interface Si-SiO_2.

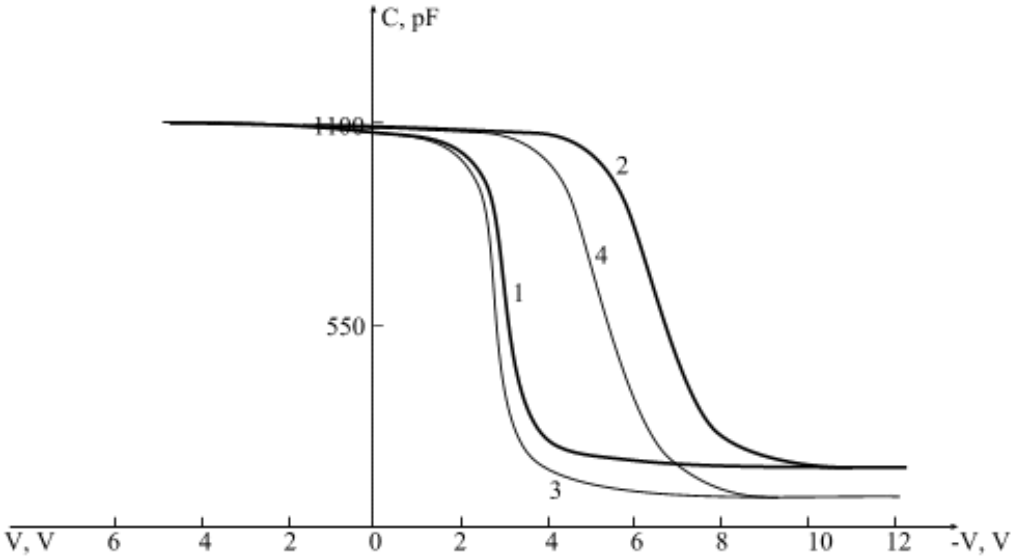

Figure 1. Capacitance-voltage characteristics of a silicon MIS – structures with an impurity of molybdenum: curves 1, 3 – test MIS – structures without an impurity of Mo, curve 2 – MIS – structure based on Si, doped Mo when growing; curve 4 – MIS –structurebased on Si, the diffusion doped Mo

Measurements of the spectra of CC-DLTS in MIS-structures on the basis of Si<Mo> and test MIS-structures (without an impurity of Mo) showed that their spectra practically coincide, any peaks in the visible concentration not founded (Fig. 2, curve 1). Measurements of distribution N_{ss} on width of forbidden zone E_g of the semiconductor of structures with impurity molybdenum have shown that the spectrum of distribution of dependence N_{ss} from E_g has typical U-shaped character.

A different pattern is observed in MIS structures with diffusion introduced molybdenum. Preliminary Si it was doped with Mo by a diffusion method in the range of temperatures 1000–1200 °C within 2 hours from the layer put on surface Si metal molybdenum. Then, on the wafers n-Si<Mo> with resistivity of $\rho = 5 \div 20$ Ohm cm made MIS-structures T [9; 10].

Measuring C–V characteristics of MIS structures with diffusion introduced molybdenum (Fig. 1, curve 4) showed that they are even more shifted towards negative offsets relative to control samples (Fig. 1, curve 3). It is known that the shift of C–V characteristics towards negative voltages indicates an increase in the density of surface states (DSS) structures [11]. This suggests that the presence of the electrical active molybdenum

atoms in the silicon substrate of the investigated structures leads to a further increase of N_{ss} and the formation of positive charge at the interface Si-SiO_2.

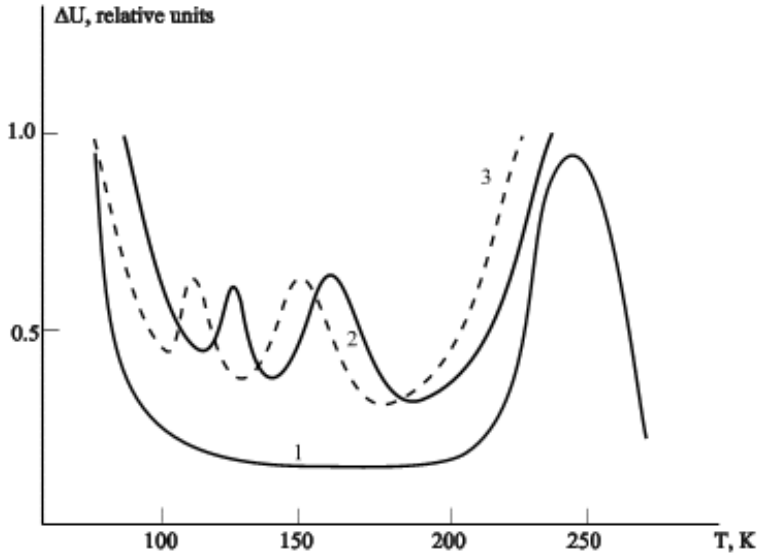

Figure 2. DLTS spectra of the control (curve 1) and doped molybdenum MIS structures (curves 2 and 3)

Measurements of the spectra of CC-DLTS in the doped (Fig.2, curves 2 and 3) and the control (Fig.2, curve 1) MIS structures showed that the spectra of doped samples are observed 2 peaks with maxima at temperatures of T_{max} = 125 K and T_{max} = 160 K, and their amplitude increases with increase in the concentration of electroactive molybdenum. In the control samples, these peaks are not detected. Numerical calculations of the parameters of the defects caused by these peaks showed that the peak with a maximum at T = 125 K corresponds to a level with an ionization energy of E_c – 0.20 eV, and the peak at T = 160 K – level with an ionization energy of E_c – 0.29 eV.

It was also studied the change of distribution of N_{ss} on width of forbidden zone E_g of the semiconductor of MIS structures with impurity of molybdenum and without molybdenum. The spectra of distribution of N_{ss} on width of the forbidden zone U of the semiconductor structures with impurity molybdenum are somewhat complicated nature.

It is shown that on the spectrum of distribution of N_{ss} on width of forbidden zone E_g, in diffusion-doped structures observed three distinct peak in the energy values E_c – 0.20 eV, E_c – 0.29 eV and E_v + 0.36 eV. In the control MIS-structures, this distribution as a typical U-shaped character.

To identify the detected defects with certain impurities in the investigated MIS – structures based on n-Si<Mo> etched oxide and on them barriers Schottky were created.

Measurements of spectra CC-DLTS on the received barriers have shown, that in all samples the recharge of two deep levels in the top half of forbidden zone Si with energies of ionization E_c – 0.20 эВ and the E_c – 0.29 эВ is observed. Scanning of all width of the forbidden zone on the same samples by means of photocapacity was shown, that on spectra of the induced photocapacity the recharge near hν ≈ 0.36 эВ is observed. The analysis of results shows, that parameters of these deep levels do not differ from parameters of the corresponding DL, observed in silicon doped molybdenum.

4. Conclusions

Thus, the presence of electroneutral impurities molybdenum in the silicon substrate of MIS-structures leads to an increase in N_{ss}, but a notice-

able change in the distribution of N_{ss} in E_g is not observed. The presence of the electrical active molybdenum in MIS-structures leads to a further increase of N_{ss} and the emergence of three distinct DLTS peaks associated with the deep levels of molybdenum in silicon.

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Section 11. Philosophy

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SOCIAL RESPONSIBILITY AND ESSENSE

Abstract. in this article, the essence of social responsibility. In order to be effective in implementing the pre-existing programs and projects in the social sector, its subjects need to have a high sense of responsibility. Social responsibility as a category is a distinctive concept that can reflect the principles that are important for the interaction of society and individual in all spheres of life.

Keywords: responsibility, social responsibility, historical approach, methodological approach, Scientific Approach, Responsibility for philosophical – sociological approach, social system, substantive and communicative-sociological approaches.

Sustainability and Development of the Society are mainly based on the social and political activity in all its spheres. The effective functioning of the social system depends on the theory of management and the ability of managing. As we know, strategic management programs are implemented in the theory of management. In the management skill, it is essential that the political expert's experience, his leadership ability, and his own theory of character are important. In order to be effective in implementing the pre-existing programs and projects in the social sector, its subjects need to have a high sense of responsibility. That's why today, in addition to the theory of management and managing skills, it is necessary to pay attention to the social and moral aspects of society's stability. Social responsibility is crucial in solving this problem.

When analyzing the social responsibility phenomenon, it is necessary to identify the content of this concept. The category of responsibility began to be examined in the middle of 19th century. Nevertheless, many philosophical scientists throughout history have had different views on this issue, but we can see that his view as a monotheistic conceptual theme has grown more and more as we have said above. Historically, responsibilities should not be limited to liability, direct responsibility and social responsibility. Various methodological approaches are used in the social sciences about responsibility and social responsibility.

When analyzing the concept of social responsibility, we can see that scientists are divided into the following approaches:

– Historical approach introduced by ancient Greece, ancient Rome and ancient Oriental doctrines;

– methodological approach;

– Scientific Approach: Moral, economic, legal, philosophical concepts.

The category of responsibility is formed by the norms and values of a person's lifestyle, through the individual's historical experience of social interaction and communication. It embodies all aspects of human activities and its transformation.

The concept of responsibility was first introduced in the English and French languages in 1787. Linked

to the beginning "with the functioning of political institutions of the era of the English and French revolutions, it does not disappear from use in the XIX century, when the constitutional form of government receives a much greater distribution among the people of the world and significantly expands its sphere of activity" Still, the concept of responsibility has been consumed in English as an abstract concept a few decades ago.

The idea of prejudice appears in the work of Ieremia Bentam's "Part of the Government" (1776), which discusses the obligation of the manager. It was a work that suits the democratic governance of its time.

G. Jonas explains this by the fact that "responsibility -" is always a function derived from power and knowledge, "and at that time in interrogations about the consequences" one had to rely on the destiny and inviolability of the natural order "[2].

The meaning of the category "responsibility" has been widely used in social philosophical thinking. At present, it is trying to interpret the term from the point of view of activity, philosophical-sociological, substantive and communicative-sociological approaches.

Responsibility for an activity approach focuses on understanding a person's commitment to society or the community. Each event is caused by the behavior of the subject and the feeling of guilt in it. In this sense, S. I. The dictionary, written by Ojegov, describes the responsibility as follows. Responsibility – "The need, the obligation to give someone a report in their actions" [3].

But in the widespread interpretation of the relative responsibility, the following view is given. "… the relation of a person's dependence on something (from another) perceived by him (retrospectively or prospectively) as the determining basis for making decisions and committing actions that directly or indirectly aim at preserving or assisting others" [4].

Substance abuse suggests that more moral and legal responsibility is on the rise. Responsibility for a moral and legal relationship with a person comes from the obligation to fulfill the ethical duty and the legal norms.

From the point of view of liability and punishment, the concept of legal responsibility is used as the type of social responsibility. Legal liability – State-imposed measures are applied to the offender. The purpose of legal responsibility is to strengthen, regulate and protect social relationships.

The category of responsibility embraces the philosophical and sociological problem of the measure of ability and ability of a person to act as the author of his actions and more specific issues, such as a person's ability to intentionally and voluntarily fulfill certain requirements and carry out the tasks facing him; make the right choice; achieve a certain result; as well as related issues, the rightness or guilt of a person, the possibility of approving or condemning his actions, reward or punishment [5].

Responsibility for philosophical – sociological approach "The basic ethical concept, fixing the realm of reality, which is subject to reproduction by the responsible subject" [6]. Under this approach, the responsibility lies in the subjective perception of the objective depending on the circumstances and the need for active movement and selection of methods of action.

Communicative-sociological approach focuses on the responsibility of its own responsibility. Responsibility means to be accountable for their own minds and consciences, to respond to their actions in front of citizens and the future generations.

Social responsibility implies the elimination of social norms as an objective necessity. It reflects the individual's relationship with society, the state, the community, the social groups, and the people around him.

Social responsibility lies in the social nature of human behavior. It is impossible for a person to live separately from society. Farabi, Beruniy and Ibn Sina were one of the Orientalist philosophers.

Social responsibility is one of the most complex categories of subjects such as philosophy, law, ethics,

and psychology. But they will explore various aspects of it. That is why we find ethical, political, legal, social, civil, professional, and other responsibilities. In turn, the above types of responsibility constitute a complete social responsibility.

Social responsibility combines key and quality characteristics of the activity. There is an effective character of social responsibility, and it is the quality of social consciousness, which is a mixture of emotions, emotion, thought, value, and the result of the simultaneous movement of objective conditions and subjective factors.

Social responsibility also has the task of managing people's behavior. At the same time, a person's aspiration must show what he needs to do.

Social responsibility combines personal experiences and the overallity and peculiarities of social life. From this point of view, the experience is a criterion for social responsibility and today serves as a means to respond to community needs.

There are socially responsible forms of social roles in society that are divided into civil, political, industrial, family types.

In the philosophical thinking of the social responsibility problem, however, it is impossible to make scientific (demographic, ecological, energy, etc.) or political-legal analysis. Social responsibility covers all forms of social consciousness. Therefore, it is necessary to develop the philosophical essence of responsibility. In modern philosophy schools, this problem has been achieved in a moral direction. Today, it is global in terms of responsibility for the development of society.

Different disciplines in different subjects connect the concept of responsibility through the integrated approach of social responsibility. Therefore, defining the concept of social responsibility makes it incredible. In designing this category, philosophers, sociologists, lawyers, pedagogues and psychologists need to work together to deeply philosophical and socio-political thinking.

It can be concluded that social responsibility as a category of social philosophy is a distinctive concept that can reflect the principles that are important for the interaction of society and individual in all spheres of life, and can be changed individually or collectively. The view of social responsibility depends on a person's viewpoint and his position in life. This does not raise the issue of sub-orientation. On the contrary, it enables to reveal the multidimensional nature of social responsibility, based on the multidimensional nature of man.

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Section 12. Chemistry

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COPOLYMERIZATION OF ISOHEXYLACRYLATE WITH STYRENE

Abstract. The copolymerization of isohexyl acrylate with styrene in the presence of a radical initiator in an environment of organic solvents has been studied. It has been determined that in all cases the copolymers are enriched in isohexyl acrylate units. The application as a comonomer leads to an increase in the reaction rate and the yield of the copolymer at last.

Keywords: copolymerization, isohexylacrylate, styrene, initiator, comonomer.

Introduction

The synthesis of polyfunctional polymers has attracted many researchers, and this interest is growing steadily. This is due to a wide range of useful properties of these polymers, which have established themselves as promising flocculants, sorbents, carriers of physiologically active agents, separation membranes, etc. [1, P. 188]. Success in this area of high molecular compounds is determined, first of all, by the development of effective methods for the synthesis of polyfunctional polymers based on available raw materials. One of the promising methods for obtaining polymers with a complex of desired properties is radical copolymerization. The study of such reactions is not only of practical value, but also important from a theoretical point of view, because it allows to evaluate the comparative reactive activity of functional monomers and find approaches to clearing the features of radical processes that occur with the participation of various functional groups in the formation of the polymer chain. Most often, vinyl and acrylic monomers containing carbonyl and amino groups in the structure have been used to obtain such polymers [2, P. 140; 3, P. 199].

The results of the initiated radical copolymerization of methyl methacrylate with methacrylic acid in a medium of solvents with different polarity: acetone, toluene and methanol are presented in the work [4, P. 140]. It is shown that the activation energy increases in the presence of acetone and methanol while it decreases in toluene.

However, information on the copolymerization of isohexyl acrylate is not available in the literature. In connection with the above, the search, development

of new approaches and effective methods for the synthesis of new copolymers based on unsaturated ester – isohexyl acrylate with vinyl monomers is an urgent task.

The aim of this work is the synthesis of unsaturated ester based on 2-methyl-1-pentene with acrylic acid and its copolymers with styrene.

Experimental part

Acrylic acid, 2-methyl-1-pentene, DMF, ethyl alcohol were distilled before use, and drying was carried out through standard methods. The initiators – dinitrile azobisisobutyric acid (DAC), benzoyl peroxide (PB) have been recrystallized from a solution in absolute ethanol, dried in a vacuum desiccator to constant weight.

The studies have been carried out through the gravimetric method [4, P. 304]. This method is based on the separation of the polymer from the reaction medium by precipitation of it in solvents that dissolve the monomer and do not dissolve the polymer. The polymer is released as a precipitate, which is washed with a precipitant and then it is dried to constant weight and weighed on an analytical balance. The reaction rate has been determined by the degree of conversion of the monomer to a given point in time,.

The copolymerization has been carried out in glass ground tubes. The required amount of initiator was placed in clean tubes with ground stoppers and the solvent, an ester based on 2-ethyl-1-pentene with acrylic acid, styrene in the required proportions, was poured. The mixture was stirred until the initiator was dissolved, then the tubes were purged with nitrogen for 10 minutes, carefully closed with glass stoppers and placed in a thermostat with a temperature of 60–80 °C. The copolymerization reaction was carried out to small degrees of conversion, which was determined by reaching a syrupy mass. It has been determined that in different ampoules the copolymerization rate is different – the reaction rate increases with increasing ester content in the mixture of comonomers. At the end of the copolymerization, the ampoules were cooled to room temperature and the stoppers were opened, the contents were slowly poured with stirring into a glass with a precipitant (acetone, alcohol). Samples of the copolymers were cool- dehumidified and weighed to constant weight on an analytical balance with an accuracy of ±0.0002. The resulting copolymers are white powdery products that dissolve in benzene, toluene and dimethylformamide.

The IR-spectra of the ester and the synthesized copolymers have been recorded on a SISTEM-200 FT-IR spectrophotometer.

Results and discussions

The method of esterification of acrylic acid with liquid olefins is a convenient method for the synthesis of esters. Synthesis of an ester based on 2-methyl-1-pentene with acrylic acid has been carried out according to the procedure described in [5, P. 260]. The structure of the obtained ether was confirmed by the IR-spectral method (Fig. 1).

In the IR-spectrum of an ester based on 2-methyl-1-pentene with acrylic acid, new absorption bands of stretching vibrations of the C-O-C bond in the region of 1297 cm^{-1} were found, stretching vibrations of the carbonyl group having a double bond in the region of 1704 cm^{-1}, absorption bands of the $-CH_3$, $-CH_2$ groups at 2583–2934 cm^{-1}, and there is no wide spectrum of carboxyl groups in the region of 3600 cm^{-1}. The absorption bands at 1636 cm^{-1} correspond to the –C=C– bond stretching vibrations; the ether band C–C (=O)–O and O–C–C – consisting of two interacting antisymmetric vibrations are observed in the range 1045–1297cm^{-1} (see fig. 1).

The copolymerization of ester of 2-ethyl-1-pentene and acrylic acid (M_1) with styrene (M_2) has been carried out in the low-conversion region at a temperature of 60–80 °C in the presence of a radical initiator of benzoyl peroxide (BP) in an organic solvent. Dimethylformamide was used as a solvent.

To determine the effect of the composition of the initial mixture of monomers on the composition of the resulting copolymers, the reaction has been carried out at various molar ratios of comonomers (Table 1).

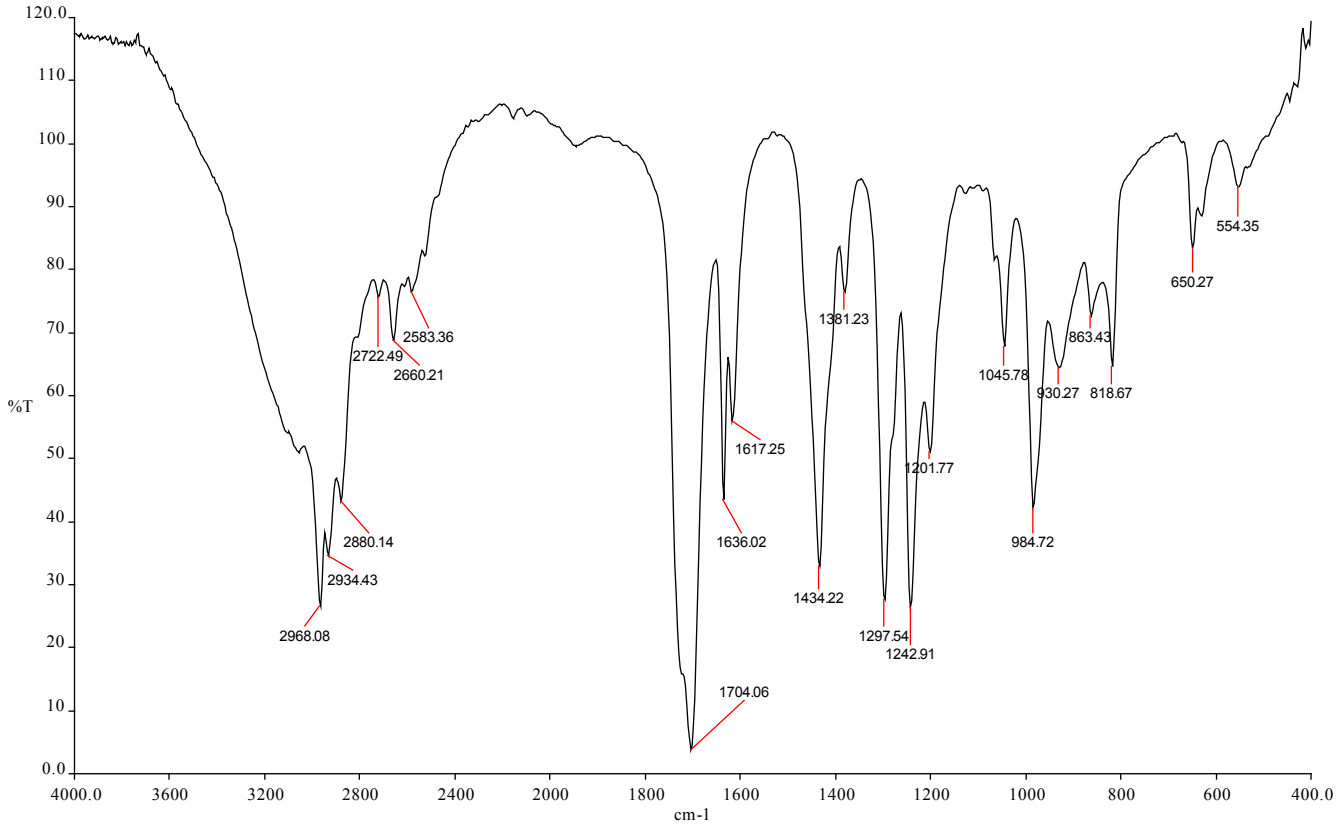

Figure 1. IR-spectrum of an ester based on 2-ethyl-1-pentene with acrylic acid

Table 1.– Copolymerization of M_1 with M_2 in a DMF solution (BP = 5 • 10^{-3} mol/l, 60 °C, 3 hours)

Composition of initial mixture,% mole		Yield,%	Composition of copolymer,% mole	
M_1	M_2		m_1	m_2
10	90	2.5	11.2	88.8
30	70	3.7	33.6	66.4
50	50	5.0	55.6	44.4
70	30	6.1	78.0	22.0
90	10	8.4	97.8	2.2

The results show that the ester M_1 is a more active monomer compared to styrene.

It should be noted that the copolymerization of the ester with styrene is completely inhibited in the presence of hydroquinone and atmospheric oxygen, which confirms the radical nature of the process mechanism.

The structure of the obtained copolymers has been determined by IR-spectroscopy. The IR-spectra of the copolymers have been analyzed and compared with the spectra of the starting monomers and their homopolymers obtained under similar conditions. In the IR-spectra of the copolymers, absorption bands characteristic of the double bond of monomers in the regions of 1636–1640 cm^{-1} are absent, which confirms the course of the reaction along the vinyl groups of the starting monomers. The stretching vibrations of the C – O and C=O groups are in the region of 1155 cm^{-1} and 1681––1716 cm^{-1}.

The solubility and other properties of the copolymers depend both on the ratio of comonomer units in the copolymer chain and on the nature of the second comonomer, styrene. The synthesized copolymers based on M_1 with M_2, at all ratios of monomer units in the macromolecule, well dissolve in dimethylformamide, dimethyl sulfoxide, benzene, toluene.

Thus, an unsaturated ester based on 2-ethyl-1-pentene and acrylic acid has been synthesized and copolymerized with styrene in dimethylformamide in the presence of benzoyl peroxide at a temperature of 60 °C.

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Section 13. Economics

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THE DEVELOPMENT OF INDIVIDUAL INVESTMENT ON RUSSIAN STOCK MARKET

Abstract: This article is dedicated to a development of private investment in Russia. Despite the significant changes undertaken by the government in order to stimulate attraction of individuals to the stock market, systemic barriers continue to restrain investing activity of households. The reasons for persistent ineffectiveness of structure of Russian families' savings are analyzed and possible ways to increase of individual's attraction to investment in securities are suggested in the paper.

Keywords: private investment, individuals, securities, savings, deposits, Russia, stock market

1. Introduction

Since the beginning of the century, the economic community has been discussing the significance of financial markets and their impact on the economy. The statistical studies by Ross Levine, Robert King [1], and the theoretical research by Asli Demirguc-Kunt [2] showed a high level of interrelation between the maturity of the financial sector and the long-term growth of the respective economy. The higher the maturity of the financial market is, the faster the country's economy grows on a long-term horizon. In addition, developed and efficient financial markets are beneficial for the social sphere, leading, among other things, to lower inequality.

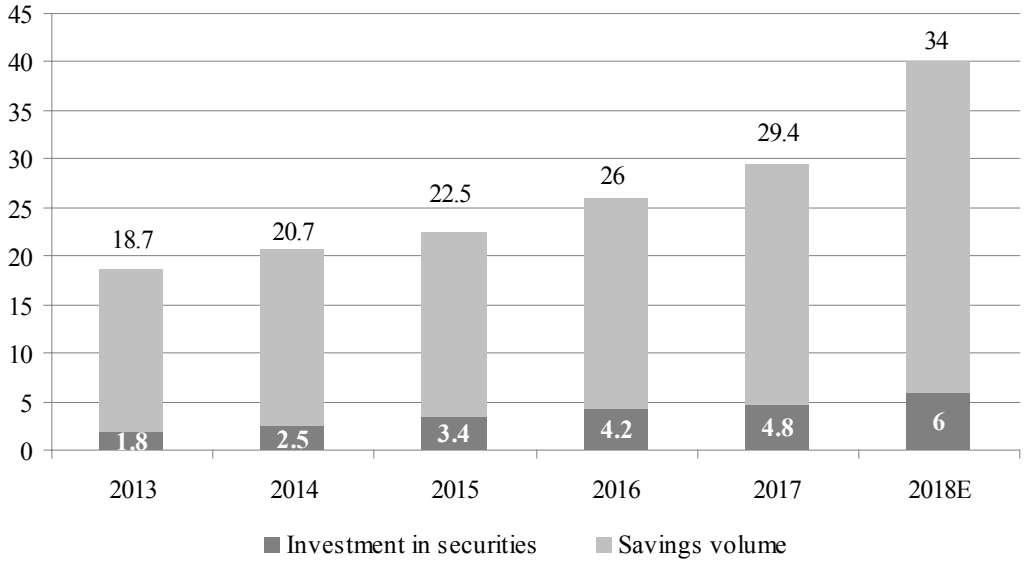

Figure 1. Savings and Investments of Population in the Stock Market, tn

Thus, the financial sector can act as an engine and source of funds for the growth and development of the economy.

The need for long-term funds in Russia is estimated by Russian economists at 20–30% of GDP, or Rb15tn per year [3].

The required amount of money is accumulated by households: their deposits and bank accounts amounted to Rb34tn as of December 2018, and if we add the cash 'under the mattress', the sum rises to at least Rb40tn, or about 50% of a country's GDP. As reported at the national debt market conference (Cbonds-2018), only the reorientation of individuals from traditional deposits to the stock market can enlarge investment resources by at least two times.

The disadvantages of analyzed works either include high levels of abstraction (macroeconomics level) or indulgence into details and resolution of specific problems with subtle connection to the general problem.

2. The purpose of the work

The selected topic, i.e. individual investments, is important for the economy due to the tremendous volume of savings, accumulated by population – instead of being hoarded, this money can be redirected to facilitate economic development. The issue of redirecting household savings to financial markets is acute, especially now.

The distinction of the study is the attempt to look upon the issues not just with the national level, but to compare them with those of the other countries.

3. Research methodology

The information on the Russian Federation government policies of individual investment support was gathered and analyzed to study problems which preclude the development of individual investment in Russia; the structure of Russian households' savings is analyzed in comparison with analogous in income and location savings in other countries; the possible investing process problems are discovered; the ways of investment improvement are suggested.

4. Results and discussion

a. Features of savings behavior in Russian households

Russian households are showing inefficient savings structure. The main reason for the low efficiency is low revenues as such. Since most of the money of the households is spent on current consumption, a very small amount is left for savings. The main motive of savings is the preservation of acquired wealth, the main asset of the family is property, and the traditional way of keeping money is a bank deposit or cash.

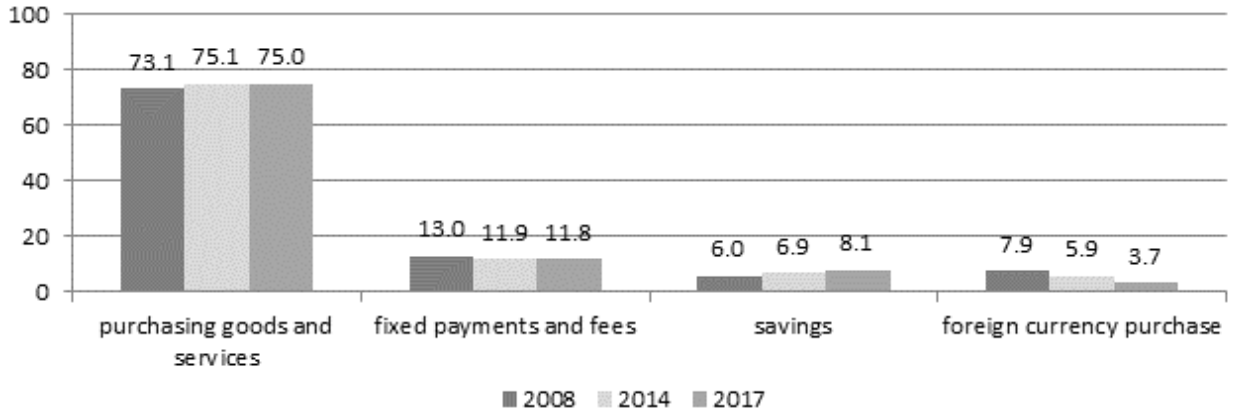

Figure 2. Structure of Money Income of the Population, in% of income

Household welfare determines the set of available investment tools [5]. Families in low-wealth countries, which include Russia with its EUR4,590 of net income per person per year, prefer conservative instruments, i.e. bank deposits. We note that this is in line with the general trend for Eastern European countries, where 55% of savings were deposited in 2017.

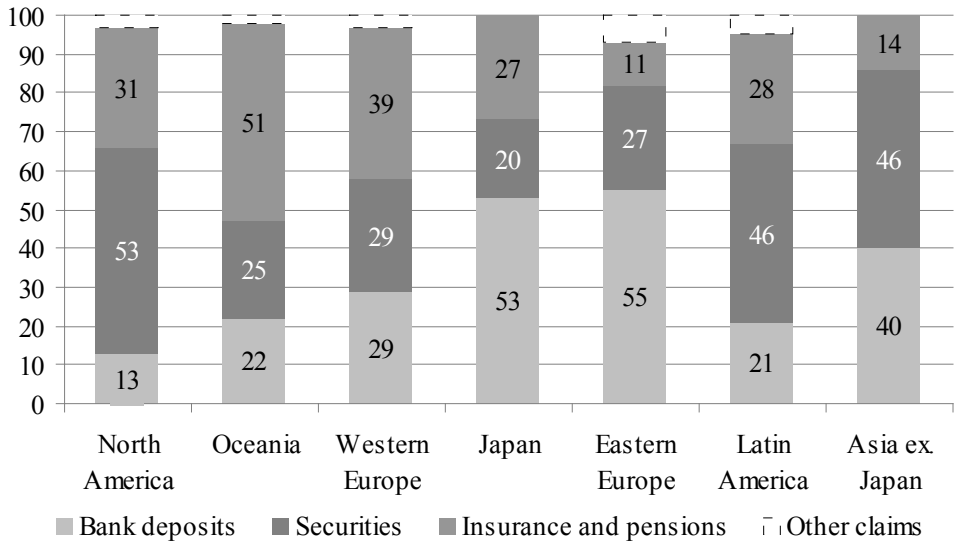

Figure 3. Breakdown of Households' Savings Structure in terms of Asset Types, 2017,%

The common reason for such a conservative savings structure is low income of the families, when most of the money is spent on current consumption, and allocation of significant funds for investment purposes is not possible. Meanwhile, aware of their vulnerable financial condition, households set aside some funds, forming a safety cushion. Since this 'rainy day' money has to be accessed quickly, they are usually either kept on deposits (up to a year) or remain in cash at home and in bank cells. Such savings methods are short-term and provide a much smaller return or none at all in comparison with investments in the stock market. Families in high-wealth countries with incomes of more than EUR42,000 per person multiply their capital much faster by investing in securities, diversifing their investment portfolios with pension programs and various types of life insurance.

b. Systemic Barriers to Private Investment

In 2015–18, the Central Bank of Russia has first identified its priority goals in the field of financial market development, highlighting the following areas (goals are listed in order of importance) [7]:

- increasing the level and quality of life of the population;
- promoting economic growth;
- creating conditions for the functioning of financial markets.

Meanwhile, one of the most significant barriers to participation of people in the investment process in the stock market is the focus of the Central Bank primarily on ensuring the stability of the banking segment and preventing systemic risk, which puts the protection of investors on the backburner. Thus, in the event of national currency devaluation, exporters become the main beneficiaries of the weaker ruble, while country's population will suffer from a decline in purchasing power due to the inflation shock following devaluation. Weaker bargaining power of a small private investor is often used by banking institutions, which put themselves first in line to seek bond repayments, while individuals get no more than 6% on default and restructured bonds.

Another limiting factor for the development of the securities market and non-financial institutions attracting funds from individuals is the existence of a deposit insurance system in Russia (since 2003) and individual entrepreneurs (since 2014). Mikael Bergbrant [4] demonstrated a relation between these factors, using more than hundred countries as an example. And indeed, when a private investor looks into how to increase his funds, the alternative for him would be a risk-free (within the insured amount of Rb1.4mn) investment in bank deposits (registered with the Deposit Insurance Agency).

The state, fully aware of the need to attract private investment to the securities market, in recent years has taken a number of important steps that have increased the appeal of securities for individuals.

c. Flattening tax inequalities between deposits and investments in securities for individuals

The measures for flattening tax inequalities between deposits and bonds – the closest financial instrument to deposits in terms of risk levels – were undertaken.

Hence, In 2017, the monetary authorities provided tax exemptions (personal income taxes for individuals) on corporate bond coupons. During the grace period from 2017 to 2020, coupons on corporate bonds placed after 2017 that do not exceed the key rate by more than 5 ppts are not taxed. Now the personal income tax on coupons is not paid for all types of ruble bonds (municipal and sub-federal, state and corporate), which creates equal tax environment for individuals both when placing their funds on deposits and when investing in bonds.

d. Launching new financial products that can be interesting for individuals

The government aimed to attract individuals' attaraction to investment before 2008-year crisis. (The so-called 'folk IPOs'). For the first time ever, the IPOs of Rosneft, VTB and Sberbank gave Russians an opportunity to take part in the placement of the largest Russian companies, become shareholders and participate in the profits of these companies.

Approximately 10 years later, Ministry of Finance was concerned with the establishing of conservative individuals' instruments. In 2017, the Ministry of Finance launched federal loan bonds for the population (OFZ-n), which is a transitional form from a deposit to securities. OFZ-n can be purchased at the offices of agent banks (Sberbank and VTB), which made them available to people not previously familiar with the securities market. One of the peculiarities of these bonds is that they do not trade on the secondary exchange market. They can only be redeemed after its holder comes to the agent bank. The Ministry of Finance positioned OFZ-n as an awareness project that helps individuals to take the first step towards real investments in the securities market.

Over 18 months since this instrument was launched, it was acquired by 34.5 thousand new investors for a total amount of Rb56bn – 56% were newcomers to the securities market.

In fact, the Ministry of Finance created a new type of instrument, called "folk", designed for general public. Following the Ministry of Finance, 'folk bonds' were also issued by Russian regions and banks.

e. Encourage long-term investment through tax benefits

In 2011, the government introduced a tax return on the income of individuals from long-term holding of stocks or equity units for a period of 5 years, from 2015, the period for the purposes of tax benefits was reduced to 3 years. In 2018, the exchange initiated the reduction of the tenure from 3 to 1 year.

From 2015, individuals have the opportunity to participate in the securities market by opening an Individual Investment Account (IIA). The account holder has the right to receive a personal income tax refund on the invested amount of no more than Rb 400.000 per year for three years or choose profit tax waiver after three years of investment. The former option essentially adds up to 13% to the annual yield of account holders. The first three-year period of use of this form of investment showed a strong interest in the instrument form individuals, although the main disadvantage of IIA as compared to the deposit remains no guarantee of return on investment. Soon this problem could be solved. The draft law on IIA insurance has already passed the first reading in the State Duma. In 2018, the maximum size of IIA was increased to Rb1mn, but tax benefits apply only to Rb 400.000. The possibility of opening several IIA is being discussed.

f. Ways to Boost Attractiveness of Investments

As we have mentioned above, the state is interested in attracting funds from the population in order to

provide the country with long-term resources. This task can be achieved through the following methods:

- Boosting investments from household incomes, which may be possible if tax breaks are introduced or economic growth accelerates or sanctions are lifted;
- Increase in the savings rate of households if they transition to a savings behavior model (leads to lower consumption and long-term economic growth);
- Stimulating more efficient structure of household savings.

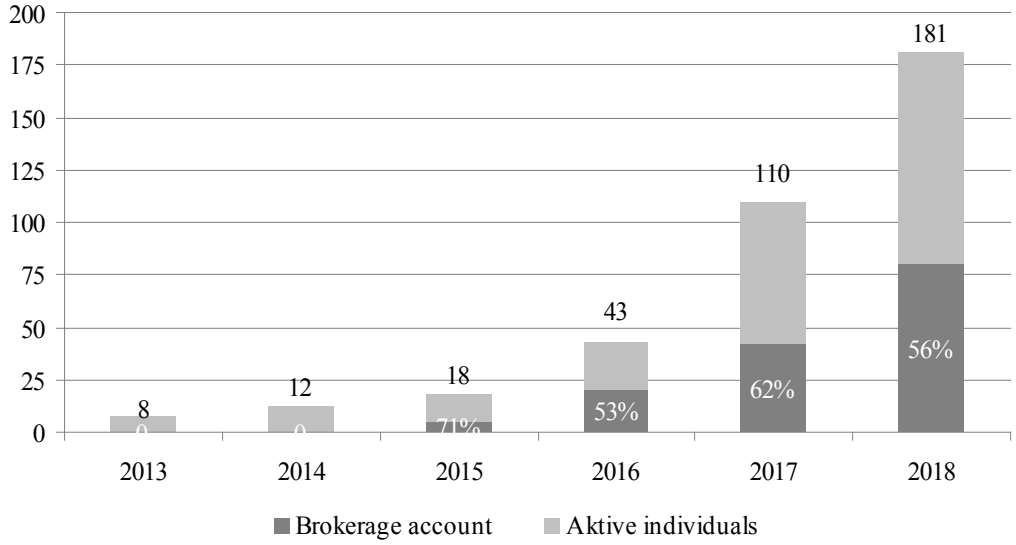

Figure 4. Number of active individuals on the bonds market and number of Individual Investment Accounts (IIA), 000

We note a relatively low level of financial assets held by individuals in relation to GDP (as % of GDP). In this regard, the former method looks theoretically possible in the long term.

The second method is generally feasible, especially in the context of possible new sanctions, as well as higher retirement age. Meanwhile, the slowdown in the economy – the price of this scenario in the long run – is undesirable for the country.

The low level of income, which is the main reason for the small share of savings and ineffective structure of them, is the factor which is unlikely to be improved in medium term.

Thus, most desirable and very much possible option is the latter, i.e. improvement of household savings structure and the shift from traditional real estate and deposits to securities, collective investment, insurance and other more complex financial products.

Ways to Boost Attractiveness of Investments:

- Strengthening trust in banking system and financial institutions, including increasing issuers' transparency and improving the availability and quality of corporate reporting, market information. The sequence of financial crises and the "clearance" of banking system, which included revocations of licenses, do not improve population's confidence. Years are required to regain trust in banks: in this case the removal of "security guarantee" from deposits is unlikely. Meanwhile, even deposited money is more effective than non-performing assets.
- Introducing new financial products that may be interesting for individuals:
  - Given traditional interest of individual Russian investors in deposits, foreign currencies, real estate and gold, new tools can

be introduced with these types of assets (currency bonds, including Eurobonds, local issues traded in two currencies) as underlying, gold bonds with protection capital (structural products based on precious metals), real estate mutual funds;
  - Restrictions for unqualified market participants to buy structured products could be lifted as these instruments are often very convenient;
  - Development of special-type securities ("green bonds", "structural products", folk banking and sub-federal bonds).
- Increasing the availability of market instruments:
  - Projects to create various public and private financial marketplaces should increase the geographical accessibility for regional investors, simplify participation in primary placements for individuals;
  - Launching financial applications and online accounts that would allow individuals to open trust management accounts, buy and sell units, sign brokerage agreements and manage their accounts on their own to eliminate the need for a personal visit to the bank to buy securities, purchase a trading system – a smart phone app would eliminate even the need for a computer. At the end of 2018, four banks had applications for trading securities (VTB, Sberbank, BCS, Tinkoff);
  - Splitting Eurobond lots would lower the barrier to entry when purchasing these tools for unqualified investors. Expanding the list of Eurobonds with small lots in trading systems would allow individuals to access the usually over-the-counter Eurobond market.
- Improving population's financial literacy level and knowledge of financial products and risks. In 2011, the Ministry of Finance together with the World Bank launched the project to improve the financial literacy of Russian citizens. In 2017, the government adopted the National Strategy for Improving Financial Literacy for 2017–23. The population's interest increases due to the launched program and government's policy. Financially literate citizens reasonably deal with their expenditures and savings; however, the results of education are likely to be experienced in the long run. The fact of the government's will to educate the population is particularly valuable because it demonstrates the government's care about the citizens' wellbeing;
- Creation of the Financial Advisors institute in 2018. The institute was created in Russia only in year 2018. Compared with other countries, 8 out of 10 American households use the advice of professional consultants, in the Czech Republic one consultant works with 14 thousand residents, in Hungary – with 11 thousand, in Russia – with 75 thousand. Development of this profession should improve the quality of consultation, as well as increase the reach.

g. Challenges

Growing digitalization, on the one hand, opens up new opportunities, but, on the other, creates new challenges:

- it is necessary to strengthen the security systems for client personal data, their assets and bank assets;
- a massive inflow of unqualified investors can increase market volatility and lead to significant losses for retail investors during a crisis (for example, the crypto currency market in 2017–18);
- new pyramids and high-risk investment products are likely to appear, the potential risk of which is difficult to assess for inexperienced investors.

5. Conclusion

Development of the individual investment market is important for the state seeking to reclaim trillions of hoarded rubles as well as for banks that try to keep the retaining funds on deposits, and for individual investors themselves who are interested in obtaining a higher return on investment amid declining rates of traditional banking deposits.

The authorities make every effort to improve people's education, introduce a culture of investment and facilitate the initial entry into the securities market. Among real steps that boost the attractiveness of investments in the stock market compared to deposits we highlight the launch of the IIA mechanism (individual investment accounts), as well as the exemption of coupon payments on corporate bonds from taxes, which aligns the tax burden on bonds in portfolios of individuals with the deposits. These actions attract the attention of individuals, however, mainly, of those who have previously traded on the securities market.

However, the main restraining factor of individuals' investment growth is their low-income level and ineffective savings structure. The trust towards Russian financial institutions needs to be raised; the population's interests should be taken into account when creating investment instruments; individuals should be worked with in order to increase their knowledge of financial culture.

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INDICATORS OF STRATEGIC PLANNING IN THE BRANCHES OF REAL SECTOR OF ECONOMY OF THE REPUBLIC OF UZBEKISTAN

Abstract. The article discusses the issues of introduction of strategic planning indicators for the branches of the real sector of economy of the Republic of Uzbekistan as targets and guidelines that allow to develop the parameters of decisions to be made, with their reflection in the documents related to development of branches of the real sector of economy.

Keywords: strategic planning, real sector of economy, targets, long-term development strategy, long-term development indicators, sustainable development indicators, economic growth.

Strategic planning in the activities of branches of the real sector of economy will be difficult to implement without setting clear targets and benchmarks, which parameters are indicated in decisions made and documents related to development of a particular sector of the economy. Macroeconomic development with indicators and dynamics should be aimed at developing several options of prospect of a particular industry in the real sector of economy, to act as key indicators of development in general.

For successful implementation of strategic planning by the socio-economic system, the key condition is availability of a standardized set of quantitative and qualitative indicators characterizing the external and internal environment of a particular branch in the real sector (economic situation in the world, country, branches of the real sector of economy, performance indicators of economic entities, production structure, level of technical, technological and innovative development, demographic and environmental situation, the quality of social security of population, etc.).

Analysis of the above indicators will allow to determine the trends based on the current situation and changes, assess the level of results achieved, the effectiveness of positive or negative impact of indicators on the implementation and introduction in practical activity of programs and projects provided for by the general development strategy.

In this regard, a list of indicators is laid down in each long-term prospective development plan, program, development strategy for a particular branch of the real sector of economy. In addition to macroeconomic indicators, strategic planning documents include a large number of more private target indicators characterizing certain aspects of the work of economic management bodies, the dynamics of changes in the socio-economic system of branch.

Unlike medium-term and annual indicative plans, strategic planning should include a minimum set of *predictable indicators* that determine the goals and framework conditions for long term future.

Thus, indicators of long-term development should reflect not only quantitative, but, above all, qualitative changes in the economy, necessary to achieve the targets.

Among the mandatory ones, indicators should be used which allow to have an objective picture of progress in solving the most actual problems and challenges facing the country.

When substantiating targets and indicators of long-term development, it is necessary to proceed

from the main strategic objective – creating modern highly competitive economy resistant to the instability of world development and ensuring all the necessary prerequisites for a full-scale and safe life of the country's population. According to key quality indicators, Uzbekistan should ensure the global average quality of life standards by 2030, and by 2050 enter in the category of advanced developing countries in the world.

It is considered inadvisable to use gross national income per capita (GNI pc) as the main one, moreover as the only target, e.g. setting the task of entering by 2030 in the number of developing countries of the world with income level per capita above average one [1].

The Republic of Uzbekistan was one of the few countries in the world, which GDP growth rate since the 2000's ranged from 5–6% and above. However, the broad masses of population were not able to take advantage of the fruits of this growth. In the past 10 years, the level of labor migration has grown significantly, and efforts are being taken today to achieve progress in diversifying the economy and overcoming its raw-material orientation, as well as in increasing the level of export dynamics.

Currently, all actions are being taken to make the Republic enter by 2030 into the category of highly profitable developing countries of the world [2]. So, the long-term programs and strategies adopted in recent years in Europe, China, Turkey, Saudi Arabia and other countries, focus not on GDP, which is used there as a technical, estimate indicator, but rather on environmental, structural, social and technological indicators, reflecting not the rates, but the quality of economic growth and its inclusiveness.

In the context of globalization, not only the behavior of socio-economic indicators, but also the changing role and place of the country on the world stage is of key importance. Long-term targets along with GDP should be determined by both quantitative and qualitative indicators, showing the level of reduction of inequality in incomes of the population, is ability to access modern medical and educational services, the degree of achievement of ecological balance, the indexes of attractiveness of investment climate, liberalization, global competitiveness and etc.

Sufficiently relevant for Uzbekistan is the problem of reducing the burden on natural capital, and the stability of economic growth in the long term future depends on successful solving of this problem. Assessing the progress in moving in this direction requires the use of an indicator of net adjusted savings and a number of other indicators new to our statistics. The most important factor in the long-term development strategy is formation of the social structure of society.

When forming a set of indicators of qualitative changes in the economy, we should focus primarily on the existing indicators of the quality of state institutions, investment attractiveness, etc. used in international practice.

The most important qualitative characteristics of economic growth are the contribution of efficiency factors to the growth of economic dynamics, indicators of diversification of the economy and export structure, decrease in energy intensity of the economy, growth in labor productivity, growth in the share of population incomes in the structure of GDP, growth in the quality of state institutions, human capital, improvement of the investment climate and business Wednesday.

Thus, for example, Uzbekistan already has a system of quarterly assessment of the level of modernization and diversification of the economy development of the real sector sectors in accordance with the adopted Resolution of the Cabinet of Ministers No. 117 dated 20 April 2012, according to the table [3].

Thus, the indicators of strategic planning in the branches of the real sector of economy should include a *minimum set of predicted indicators*.

Table 1.– Indicators of the level of modernization and diversification of economy development of real sector branches

No.	Description of indicator	Unit	Indicator calculation method	Quality assessment of indicator	Responsible authority
1.	Diversification of industries	%	The ratio of value added of industrial products to the gross output of industrial products	1 – critical level (below 20%) 2 – moderate level (20 to 45%) 3 – mean level (45% to 60%) 4 – high level (above 60%)	State Statistic Committee
2.	Investments in modernization, technical and process retooling of enterprises	%	Growth rate of investments aimed at technical and technological renovation of production, compared to the same period of the previous year	1 – critical level (increase less than 4%) 2 – moderate level (4% to 10%) 3 – mean level (10% to 15%) 4 – high level (above 15%)	State Statistic Committee
3.	Labor productivity in industry	%	Ratio of production in comparable prices to the number of employees of the reporting period, compared to the corresponding period of previous year	1 – low level (average annual growth less than 2%) 2 – moderate level (average annual growth in the range of 2% – 3.5%) 3 – average level (average annual growth in the range of 3.5% – 4.5%) 4 – high level (average annual growth of over 4.5%)	State Statistic Committee
4.	Portion of export in GRP	%	Exported products to GRP ratio	1 – low level (below 15%) 2 – moderate level (15% to 30%) 3 – mean level (30% to 45%) 4 – high level (lower 45%)	State Statistic Committee

Indicators of strategic planning should reflect not only quantitative, but primarily *qualitative changes in the economy* necessary to achieve targets. Among the *mandatory ones,* indicators should be used allowing to have an *objective picture of progress in solving the most urgent problems and challenges facing the country*. When forming a set of indicators of qualitative changes in the economy, one should focus primarily on the *indicators of* performance of state institutions, investment appreciation, etc. *existing and used in international practice*.

In (Table 2) below, subject to these requirements, as a strategic planning, we can draw up a basic set of indicators that can be used for branches of the real sector of economy [4].

Table 2.– Key indicators of development of the branches of real sector of economy

No.	Indicators	Indicator calculation methodology with the unit of measurement in% for reporting periods (actual) and the current year (estimate)
1	*2*	*3*
I. Key indicators characterizing the industrial production growth behavior		
1.	Volume index (VI) of branches of the real sector of economy and GVA by business areas/sectors	Compared to previous year in comparable prices
2.	Growth rates of production of the branches of the real sector of economy	
3.	Growth rates of production of the processing industry	
4.	Growth rates of production consumer goods	
II. Structural changes		
5.	Portion of gross value added (GVA) of industry (business sectors) in GDP	ratio of GVA of industry (business sectors) to GDP
6.	Portion of processing industries in industrial production	ratio of processing industries production volume to production volume of the real sectors of economy
7.	Portion of consumer goods in industrial production	
8.	Portion of high-technology products in production structure	
III. Indicators of products competitiveness in the real sector of economy		
9.	Availability of produced goods in the domestic market	difference of price indices for products of business sectors and product prices for the industry in whole
10.	Portion of export in production volume for the industry and business sectors	ratio of products exportation to production volume of the industry (business sectors)
IV. Effectiveness of technology retooling and modernization of fixed assets, introduction of new technologies		
11.	Growth rates in the basic capital of industry (business sectors)	% to the previous year in comparable prices
12.	Portion of investments in basic capital of industry in the total volume of investments in fixed capital in the Republic	ratio of investments in basic capital of industry to the total volume of investments in fixed assets in the Republic
13.	Portion of investments in the basic capital of business sectors in the total volume investments in the basic capital of industry	ratio of investments in basic capital of foreign economic activity to the total volume of investments in basic capital of industry
14.	Level of wear-and-tear of machinery and equipment	ratio of the amount of depreciation at the end of the year to the initial cost of machinery and equipment

1	*2*	*3*
15.	Level of renovation of machinery and equipment	ratio of the amount of received machinery and equipment for reporting period to the balance of initial cost of machinery and equipment at the end of year
16.	Labor productivity	output per employee in value terms at comparable prices to the previous year
17.	Materials-output ratio of industry (business sectors)	ratio of costs of raw materials to the volume of output
18.	Energy-output ratio of industry (business sectors)	ratio of fuel and electricity costs to the volume of production
V. Introduction of innovation technologies and production of innovative products		
19.	Innovation activity	portion of enterprises implementing innovations in the overall number of enterprises
20.	Investments in technology innovations	expenses for technology innovations million Uzbek Soums

Source: Prepared by the author on the basis of the materials prepared by the Institute of Forecasting and Macroeconomic Research at the Ministry of Economy of the Republic of Uzbekistan

Thus, development of strategic planning indicators should be based on the prerequisites of achieving the established forecast parameters, as well as practical feasibility. Based on this, it is recommended to focus on the following groups of actions:

– actions for leveling the influence of internal restrictions and external risks and threats, which should be directed to alternative development ways and would reduce the influence of constraining factors and use additional reserves;

– actions to achieve the predicted parameters of the factors that determine each predicted indicator, which will allow to fully utilize the activation mechanisms of each group of factors;

– actions to achieve the parameters of industry development programs, localization programs and other programs. These measures should be aimed at ensuring continuous monitoring of implementation of approved programs and timely elimination of barriers that impede their effective implementation;

– additional actions to overcome the fundamental problems of development of the economy and business areas/sectors aimed at overcoming systemic barriers and obstacles that have a negative impact on the economy as a whole. As a rule, these are long-term measures;

– additional actions aimed at solving other current problems.

Determination of the actions for development of business areas/sectors should also be based on such development objectives as:

– acceleration of technological modernization and diversification of the economy, aimed at the rapid development of high-technology processing industries;

– deepening the processing of raw materials;

– expansion of production localization and import substitution, expansion of inter-sectoral cooperation.

References:

1. This is also evidenced by world experience. The example of Venezuela can be taken. With a gross national income per capita of $11.7 thousand in 2016, the country was within the category of highly profitable developing countries of the world (with income above average) with an average evaluation of this indicator in this category of countries at $7.1 thousand. However, the average salary of employees during this period was about $50, and by the beginning of 2019, it had dropped to $20. Similar conclusions can be drawn when analyzing the GNI pc behavior for Cuba, which is also in the number of highly profitable developing countries.
2. In accordance with the data of the World Bank, the GNI pc value for Uzbekistan in 2017 amounted to $2 thousand, while by 2030 the lower limit of the category of developing countries with income level above average will rise to $6–7 thousand per capita, and the growth of this indicator in the next 10–11 years should be in 3 to 3.2 times.
3. The Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 20 April 2012 No. 117 "On approval of the system of quarterly evaluation of indicators of the state of business environment and the level of socio-economic development in the Republic of Karakalpakstan, the regions and the city of Tashkent".
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DESTINATION MARKETING AS A MODERN APROACH TO THE MANAGEMENT OF THE TOURIST REGION

Abstract. A new approach to the management of the tourist region – the marketing of a destination is being considered. The marketing approach assumes that the product that needs to be formed in accordance with the needs and expectations of potential "consumers" – tourists. The destination must be promoted, and its development – managed. The article presents the main objectives of marketing, defining the structure of both a product and a product, which are the stages of strategic marketing planning in the formation and development of a destination.

Keywords: tourism, destination, tourist region, destination marketing.

UNWTO identifies tourist destinations as a central element in the process of forming and delivering tourist products [1]. The main element of the tourist system is the territory that attracts a tourist, where he makes his trip and where he spends a certain time – a tourist destination (according to the UNWTO definition). Tourist destination as a complex phenomenon includes tourist attractions, tourist infrastructure, related services.

One of the results of the active development of tourism in the world is an increasing number of destinations accessible to tourists, with an ever smaller individuality of individual vacation spots, increasing competition between tourist centers. In the face of global competition, when tourist destinations become easily replaceable, destination authorities are included in the real battle for the attention and resources of tourists [1–3]. In the foreign practice of tourism management, it was understood that destinations should be engaged in marketing with the same efforts as enterprises are engaged in marketing their goods and services.

Tourist destinations marketing can be defined as a management process in which destination and business management bodies determine target groups of tourists (current and potential). In addition, they establish communication with them in order to find out and influence their desires, needs, motivation, preferences, and relations that are associated with the adoption of numerous travel decisions; as well as form and adapt the tourist product in accordance with the needs of tourists and to achieve their maximum satisfaction.

The UNWTO data show that in order to attract one foreign tourist, which provides an average of 1.000 euros to the country's economy, governments spend from 3 to 10 euros on non-commercial advertising of the tourist product. In accordance with

this, the average amount of budget funds allocated in European countries for the promotion of a tourist product is 31.7 million euros [4].

A widely spread worldwide marketing approach to destination management has not been adequately reflected in the practice of Georgian tourism. In Georgia, tourism resources are often advertised, rather than creating an integral unique tourist product, target groups are not allocated among potential tourists, destination brands are not formed.

Although the share of Georgia today in world tourism development is minimal, according to UNWTO forecasts, the potential of our country allows, with an appropriate level of marketing activity and tourism infrastructure, to receive up to 12–15 million foreign tourists per year and receive significant foreign exchange earnings [3]. Georgian territories need to learn to create unique popular tourist products, properly allocate their segments of tourists and focus on meeting their needs, create brands as a basis for promoting a destination.

Destination marketing is a particular part of a wider area management concept – territorial marketing. Territorial marketing is marketing in the interests of the territory, its internal subjects, and also external subjects whose territory is interested in the attention and actions of which. It is carried out with the aim of creating, maintaining or changing the opinions, intentions and behavior of residents and non-residents in the person of individuals and companies regarding the given territory [6]. The founder of the territorial marketing concept, Philip Kotler, states that territorial marketing is successful when the main target audiences – residents and business, are satisfied with their region, and when the region meets the expectations and needs of visitors and investors [2]. This is a philosophy of territory management, which contributes to its socio-economic development by meeting the needs of individuals and economic actors in resources for the purpose of living and / or conducting activities in the territory without reference to a specific level of territorial education (region, country, city) [5].

Before the concept of territorial marketing and destination marketing appeared as its part, the "sale" of territories was the dominant form of regional promotion. However, destination marketing is a much more complex activity in contrast to the "sale" of territories, which in general terms represents the use of various types of advertising. Tourist destination marketing is part of the overall concept of territory development and works towards integrated sustainable socio-economic development.

Destination marketing is aimed at achieving a set of goals:

- Strategic analysis of the resources and policies of the territory to determine the potential and role of tourism in shaping the overall sustainable development of the region, including the possible economic impact of tourism, social, environmental, etc;
- Analysis of the tourist resources of the territory, analysis of the state and expectations of the main actors of the destination marketing – government, business, local residents;
- Identification of the most attractive segments of the tourist market for the territory, analysis of their needs, expectations, motivation;
- Development of a comprehensive destination product that meets the expectations of target segments of tourists;
- Creation of new and improvement of existing tourist attractions of the destination;
- Development and implementation of a destination promotion complex;
- Formation and management of the brand and image of the destination;
- Formation and maintenance of a strategic partnership of government, business and local residents for the successful development of a destination;
- Increasing the attractiveness of investments and implementation of investment projects in the field of tourism and hospitality in the destination area.

The basis of a marketing approach to managing a destination is to consider a tourist destination as a product. The territory where the tourist travels and spends a certain time is a key element of the tourist system. The territory, the visit of which is the goal of the tourist is the destination. However, not in itself the territory as a physical place attracts a tourist. Tourists are attracted by what is in this area. Destinations are an integrated, integrated product.

As a product, the destination consists of several key blocks:

- Attractions of the destination – something that directly attracts tourists (natural attractions, cultural, historical, etc.);
- Tourism industry – infrastructure. The traditional view of the destination as an exclusively geographical area (country, city, island) is now superseded by an approach based on consumer perceptions based on the purpose of travel, cultural environment, past experience, etc. For example, London is a tourist destination for German businessmen, Europe – for Chinese tourists who come to plunge into another culture. For some tourists, the destination (as the purpose of travel and destination) may become a specific sanatorium, a hotel complex. On the other hand, there are destinations that are separated by administrative boundaries, but are perceived and consumed by tourists as part of a single product (for example, the Alps). However, in any case, the destination has a specific territorial link, in most cases it coincides with administrative and political boundaries, but this is not necessary;
- A product in tourism is a sensation that a tourist gets through consuming a combination of products and services. For a tourist, a destination is a single set of all components of its products and services, as well as associated expectations and sensations. The tourist perceives the destination holistically. As a complex product, the destination includes [3]:
- Attractions (natural and cultural, natural and artificially created, special events);
- Infrastructure (accommodation, catering, shops and other tourist services);
- Availability – (transport, economic, visa, etc.);
- Events, activities (all activities that a tourist can do during his stay in a destination);
- Ancillary services (banks, telecommunications, health care, law enforcement, etc.);
- Available packages – a decorated package of destination offers, purchased through marketing intermediaries – tour operators, travel agents, airline companies, etc.

Most destinations can be classified as city destinations, beach destinations, alpine destinations, village tourism, exotic destinations, eco-tourism, etc.

It is important to understand that the aggregate of tourist resources is not yet a tourist product of a destination. The product should represent a finished complex, attractive for the target segment of tourists. All elements of the product must comply with the current state of tourist demand. It is fundamentally important that the composition of the main tourist product in its quality and quantity be sufficient to attract tourists.

Destination product consists of 3 levels:

1. The main product is why a tourist visits a destination and what a destination can offer him. At the heart of tourism, as at the heart of any product, is the satisfaction of certain people's needs. For tourism, these are the requirements for relaxation, self-expression, gaining knowledge, stress relief, etc. The destination offers the tourist a number of attractions that can satisfy these needs,

2. Associated product – that which provides consumption of the main product, but has no independent value for the tourist. These elements include the tourist infrastructure: accommodation system, power supply system, transport,

3. An additional product is something that is not created specifically for tourists, but is consumed by them, since for some time they become part of the territory (street lighting, security system, banks, etc.). The tourist perceives the destination as a whole, so even such elements become an integrated part of the product and, with inadequate quality, can destroy even a product with a high-class and attractive main product.

The marketing approach to the destination involves the development of an integrated product of the destination, which will be presented to the tourist as a whole. All elements of a destination product must match. All product levels must match each other and the needs of the target segment. With a multi-segment approach, when the destination has several fundamentally different in their motives, requirements and expectations of tourist segments, it is necessary to develop a product for each of them.

By analogy with goods and services, there are 2 levels in the destination product – the product by design and the product in real performance. The basis of any tourist product is the need to meet a specific need, the so-called intention, that is, its focus on solving a specific need. For a destination, it is not the representation of tourist resources that matters, but the benefits to the tourist. An example of the main product of a destination is the possibility of self-testing and self-realization through extreme sports; recuperation and rest from the city bustle in the beauty of pure nature, etc.

f the concept of a destination product appears as its semantic content side, then its form is determined by the product in real performance – it is a certain set of attractions that allow you to realize the concept, that is, to satisfy a certain tourist need – beaches, ski slopes, museums, architecture, sanatoriums, etc. It is important to take into account that the mountains themselves are not an attraction for skiing enthusiasts, appropriate ski slopes are necessary.

As you can see, the destination is not just a collection of tourist resources. A destination is a product that, for the success of its implementation, should represent a single, interconnected complex that can meet the needs of tourists. The basis of destination marketing is the formation and development of a sought-after competitive product of a destination.

The main mistake in the process of development and promotion of a tourist destination (destination marketing), especially in Georgian practice, is that this process is not systemic, but is a set of unrelated activities implemented by various actors (government, business) in the absence of interaction. In this case, it is as if potential tourists are independently offered to create a single product and destination image based on tourist resources and fragmentary information. Destinations should do what organizations have been doing for many years – strategic marketing planning. Strategic marketing planning involves the development of a route to achieve long-term goals, taking into account the demands of the market and resources of the territory. It is necessary to develop a plan that will link the goals and resources of the destination with the changing capabilities of the surrounding market and social environment. Through strategic marketing planning, it is determined what tourist resources the destination has, what kind of tourist product can and should be developed based on them, who this product is aimed at, how it will be promoted, what resources are needed for this.

It is necessary to distinguish the marketing strategy of the destination (marketing plan) and the overall strategy for the development of tourism in the region. Marketing is only part of a larger tourism development activity, which includes infrastructure development, optimization of legislation, distribution of financial flows, attraction of investments, etc. The marketing strategy determines who are potential tourists, what product and with what characteristics will be most in demand with them, There is a destination for the development of this product, how the product will be promoted.

Destination is one of the most difficult objects for management and marketing, since it is a complex set

of relations between internal participants and foreign markets [8]. The complexity is also associated with the diversity of participants (public sector, various types and directions of business) of creating and selling a tourist product of the territory. The strategic interests of the participants (local residents, government, business) may be fundamentally different. "Consumers" (potential and real tourists) perceive the destination entirely as a single set of resources, products, services, people. Destination marketing strategy should integrate the interests of "consumers" and other participants in the process of producing a destination product – for tourists, for local residents, entrepreneurs, investors, tour operators.

Strategic marketing planning within a range of tasks and constraints.

First, traditional strategic marketing is designed exclusively for corporate planning. He sets himself all the tasks. Destinations – a conglomeration of attractions, enterprises of the tourism industry, local residents, authorities, each of which has its own individual goals. Often these goals do not have to control all aspects.

Secondly, the product of the organization is a combination of various tourist products and services. Tourists, on the other hand, perceive and evaluate goals, often without demarcating individual goods and services. Strategic planning requires putting in order of multidirectional goods and services into a single interconnected complex.

Thirdly, strategic planning must be related to the fact that the organization must fully control its product. In the field of marketing, the main marketers (tourism management authorities) have control over only a part of the product, the remaining parts of the product are owned and operated by a whole set of various organizations and companies.

Strategic marketing for a destination will be successful subject to a number of positions:

1. The presence of an authority responsible for the process of planning and implementing a marketing destination. For the success of the marketing strategy implementation, the role and capabilities of this body in the management of marketing initiatives are crucial. The most common European marketing practice is international or tourist organizations – tourism development tips, tourist offices, etc. [4]. However, in close cooperation and with the support (including financial) local tourist industry. This is a permanent organization. Such a public-private partnership is the most effective destination marketing management model. He has official powers and administrative resources. In Georgia, this model has not yet received distribution.

2. Interconnectedness and consistency. Since marketing is aimed at numerous actors – the government, business, local residents, that is, it is crucial to meet the goals of the overall strategic marketing objectives. Marketing goals can be successful. If each participant implements his own strategy, he will not receive a holistic product, will not form a holistic image and will not express the desire to visit it. Mutual understanding and agreement should be reached at the planning level, therefore, when developing a marketing strategy, it is necessary to involve market participants.

3. The product should be developed strictly from the standpoint of attractiveness for the target segment of tourists. It is necessary to exclude the subjective assessment of the resources of participants in the process of marketing planning. The best option is to base the strategy on the results of marketing research of the tourists themselves.

4. Marketing plan, destination strategy should not be a formal official document. This is in the first stage – a working plan of action. For all interested parties, including local residents.

The intensive development of tourism in the world forces us to pay attention to its possibilities and Georgian territories. Tourism, possessing one of the highest rates of multiplication of income and employment in its own and related areas, is a sector that can become a "point of growth" and a basis for sustainable development of the entire

region. When developing tourism in the territory, it is fundamentally important to understand that the mere availability of tourist resources does not make the territory attractive for tourists. Destinations in their formation and development require a marketing approach. A tourist region (destination) is a specific product that needs to be formed, which needs to look for a target market segment that needs to be transformed to the needs of "consumers", which needs to be positioned and differentiated from competitors, which needs to create an attractive image. The marketing approach is able to ensure the success of a destination even with the initial minimum amount of tourist resources.

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Section 14. Science of law

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PROTECTION OF EXCLUSIVE RIGHTS TO PHARMACEUTICALS: RUSSIAN EXPERIENCE IN INTERNATIONAL CONTEXT

Abstract. The article provides an overview of changes in Russian judicial and legislative approaches along with modification of global tendences in estimating the balance between public and private interest in patent-related issues.

Keywords: exclusive rights, patent, pharmaceuticals, generic, bioequivalence, abuse of patent rights.

Human rights instruments do not exist only for governments, human rights lawyers and UN officials. They are there for anyone who is interested in understanding promoting and protecting the rights of individuals and communities. Human rights instruments are the products of international agreements about how our fundamental rights should be reflected and protected in government legislation, policies and practices [6; 8].

However it is public authorities who stand for the rights of individuals of particular country or nationality in international arena and it's for public authorities to supervise and provide observance by the participants of business practices inside the country of certain international law rules and approaches incorporated in national legislation.

The most acute question arises in connection to the human right to health and the necessity to balance it with private rights to pharmaceuticals as key elements in providing right to health, in particular rights of patent holders in case when the patented object is a pharmaceutical necessary to maintain certain level of health.

The right to health as it is deciphered in the resource manual for NGOs by Judith Asher, should not be seen as a right to be healthy. The state cannot be expected to provide people with protection against every possible cause of ill health or disability such as adverse consequences of genetic diseases, individual susceptibility and the exercise of free will by individuals who voluntarily take unnecessary risks, including the adoption of unhealthy lifestyles. Nor should the right to health be seen as a limitless right to receive medical care for any and every illness or disability that may be contracted. Instead, the right to health should be understood as a right to the enjoyment of a variety of facilities and conditions which the state is responsible for providing as being necessary for the attainment and maintenance of good health [6, 27].

The World Health Organization declares in the preamble to its Constitution: "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition".

It goes even further in finding the deeper reason why maintaining certain standard of health is necessary in a world-wide perspective: "The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest cooperation of individuals and States. The achievement of any State in the promotion and protection of health is of value to all" [2].

As referred to J. Asher, human rights instruments are the products of international agreements about how our fundamental rights should be reflected and protected in government legislation, policies and practices.

As availability of pharmaceuticals remains in great social need, legal regime for protecting the holders of patents for pharmaceuticals' rights should satisfy not only private but public interest as well. And patenting system is not only meant to promote innovations [7, 10] in pharmaceutical industry but also to make this innovations available to the society [8].

The authors of the manual cited above note that maintaining public interest for this purpose is put to practice through the legal institute of limiting the patentholder's exclusive rights. As internantional law examples they refer to the "flexible approaches" provided by TRIPS agreement and Doha declaration which allow the states to take the steps for protecting people's health.

As the official resource of World Health organization states, WTO Members adopted a special Ministerial Declaration at the WTO Ministerial Conference in Doha to clarify ambiguities between the need for governments to apply the principles of public health and the terms of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). In particular, concerns had been growing that patent rules might restrict access to affordable medicines for populations in developing countries in their efforts to control diseases of public health importance, including HIV, tuberculosis and malaria [5].

The authors of the monography on availability of pharmaceuticals from The Institute of Legislation and Comparative Law under the Government of the Russian Federation summarize the "flexible approaches" allowing governments to take steps in order to protect public health. Those are:

1. possibility for the state-members to exclude certain inventions from patentability, elaborating relevant patentability criteria in its internal legislation;

2. prevention within their territory of the commercial exploitation of which is necessary to protect ordre publicor morality;

3. Members may also exclude from patentability:

(a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals;

While article 27 of TRIPS Agreement does merely enumerate the "flexible approaches", articles 30 and 31 provide for the possibility of limitation of the patent rights while article 31 as if foreseeing approaching challenges to the existing patent rights regime states that authorization of use without right holder's permission should be considered on its individual merits [1].

For example, the question obviously demanding the answer for decades now is from which moment and to what kind of preparations the generic pharmaceutical manufacturer is entitled while the patent for the original one remains in force.

International law-making practice obviously takes its roots in the national practices of states-parties to international agreements and organizations. Then national practices in its turn base their legislative and judicial approaches on the rules produced by the international law-makers.

There was an attempt to tackle the said problem in 1984 by the USA Court of Appeals for Federal Circuit remanding the judgement of Eastern District Court.

In the litigation between generic pharmaceutical manufacturer "Bolar" and the producer of the original medicine "Roche" the Federal Circuit Court recognized that generic manufacturing of the generic pharmaceutical by "Bolar" company constituted patent infringement. "It is well-established, in particular,

that the use of a patented invention, without either manufacture or sale, is actionable even though Bolar's intended "experimental" use solely for business reasons and not for amusement, to satisfy idle curiosity, or for strictly philosophical inquiry. //Bolar may intend to perform "experiments," but unlicensed experiments conducted with a view to the adaption of the patented invention to the experimentor's business is a violation of the rights of the patentee to exclude others from using his patented invention. It is obvious here that it is a misnomer to call the intended use de minimis. It is no trifle in its economic effect on the parties even if the quantity used is small. It is no dilettante affair such as Justice Story envisioned. We cannot construe the experimental use rule so broadly as to allow a violation of the patent laws in the guise of "scientific inquiry," when that inquiry has definite, cognizable, and not insubstantial commercial purposes" [8].

In the case cited above the court construes the "use" since it hadn't been directly done by the US Congress and comes to a conclusion that preparatory testing would also constitute the "use" that would infringe exclusive rights of the patent holder.

As noted by Pilicheva A. V., the US Congress amended the Hatch – Waxman Act afterwards by actually abolishing the mentioned judicial act, pointing in section 271 Infringement of a patent art. e) 1) that making, use, offering to selling, or selling within the United States or importing into the United States a patented invention solely for uses reasonably related to the development and submission of information under a Federal law which regulates the manufacture, use, or sale of drugs or veterinary biological products will not constitute patent infringement [7, 271].

In Russia the redline case in this respect was the law-suit of Swiss pharma-company Novartis AG against a Russian company which was preparing for the production of anti-tumoral medicine previously patented in Russia by Novartis.

The Russian judicial approach to the same matter seems more natural rights-oriented.

At the point where the Russian company "Pharm-Synthese" with the patented medicine was submutting its invention having similar formula to medical testing and registration with the relevant social health authority in Russia, Swiss holder of the patent for the pharmaceutical with the same main active substance filed a lawsuit against the Russian patent infringer.

The Russian company claimed that mere production of the medicine containing a patented element does not run contrary any provisions of law as it's objective is charitable and not aimed at obtaining profit. Hence, the Swiss right-holder in this case is trying to take unfair advantage of it's exclusive rights by removing any competition.

Taking into consideration the rule of the Patent law in force at that time which prescribed the necessity of the exclusive right holder consent for the use of products with similar formula the courts of three degrees of jurisdiction recognized that the rights of the patentholder were infringed. Therefore Russian generic pharmaceutical manufacturer was enjoined from any actions aimed at testing and presenting the said pharmaceutical on the market which corresponded to the private rights protection approach and utilitarian approach to the intellectual property rights [12].

However the final review of the case by the Supreme Commercial Court of the Russian Federation showed that preliminary medical testing of the pharmaceutical did not exactly constitute use of the contested patented formula in the sense of article 10 of the Patent law in force at the time. While it was estimated as preparation for use upon expiration of the Swiss company's patent. That is the reason why actions of the Russian of the generic pharmaceuticals manufacturer possesing the same basic properties as the patented one was not recognized as infringement under Russian law in force. The Presidium of the Supreme commercial Court also stressed that all the actions of the proposed infringer mentioned above are aimed at protection of public health and provi-

sion of affordability thereof for the people in need. For this reason the production, testing and filing for registration by the Russian company of the medicine with similar formula was never recognized infringement [9].

The said position runs within the global tendency in the jurisprudence of other countries importing the drugs such as India for example.

Similarly the Bombay High Court, while deciding the motion of Novartis for seeking orders against Meher Pharma to restrain Meher from manufacturing, selling, marketing and exporting Veenat (the generic version of Novartis' anti-cancer drug Glivec), showed concern that if an interim injunction were granted to the plaintiff, the manufacturing network of the defendants would be dismantled and, if eventually the plaintiff failed to make the drug available in the required quantity at reasonable prices in India, it would be disastrous to patients [14].

In 2012 Russian ministry of social health held 14 bids for the supply of the antitumoral pharmaceuticals bearing international unpatented name Imatinib. Seven auctions of 14 were were won by an entity offering for supply the pharmaceuticals produced by Russian company Pharm-synthese, mentioned above.

In four of the auctions proceeds won another Russian entity supplying the pharmaceuticle produced by the argentenian Laboratorio Varifarma bearing different name but possessing the same properties.

In three more auction proceeds a participant offered to supply three different pharmaceuticals with the same properties and curing effect of which only 10% were the product of Swiss Novartis who was until April 1, 2013 the holder of exclusive right for the required formula.

Novartis sued all the participants of the said auctions including "Pharm-Synthese" with whom it has already had a dispute resolved by the Highest judicial instance in 2009.

In December 2012 the Swiss manufacturer abandoned the lawsuits against "Pharm-Synthese" and in April 2013 – against all other respondents. So basically taking into consideration the radical turn in the world practice the claims against all the generic medicines manufacturers were waived [15].

However partial supply under the afore mentioned auctions was performed with original Glivec manufactured by Novartis.

In 2011 while Novartis patent was still in force Glivec was within the three best selling pharmaceuticals and was a leading one within the segment of addicitonal therapeutic remedies. In 2012 the sail of Glivec fell down by 46,6% to 3,3 bln. RUR.

What is important here is to see the difference between generic pharmaceuticals produced in accordance with social health authorities standards which contribute to the realization of the right to health making the medicines affordable to bigger number of consumers due to price reduction, and fake ones. Manufacturing of the latter is under no control of the public or government so there exist a big risk that lack of public obligations and public control will produce a situation in the sphere of public health opposite to the desired one.

The authors of another monography "Russian IP market peculiarities in the context of WTO membership" make an overview of all spheres of intellectual property objects' regulation. As far as pharmaceuticals are concerned they note that while trading in fake pharmaceuticals is a third most profitable business in the world, Russian along with China and India has become the largest fake-pharmaceuticals producer [16, 37].

Thus distribution of pharmaceuticals however finds itself on the edge of civil regulation of exclusive patent rights and administrative regulation of testing and admission of pharmaceuticals for public distribution.

Obviously after the position of the case-law restricting the monopoly of patent holders was elaborated and introduced to Russian case-law and lawmaking practices the Law governing distribution of pharmaceuticals was adopted which includes a ban on the use of the information on pre-clinical testing

of original pharmaceuticals within the period of 6 years [4, 18, 18].

Thus the interests of the right holders for the original pharmaceutical are balanced and protected against undue pretensions from the generic medicines producers. The term of 6 years preserves the right of original medicine manufacturer so that his efforts as new medical formula inventor are remunerated.

The difference between the status of generic and fake pharmaceuticals is defined in Russian legislation by the special status granted to the generics by the said law [4].

At present patent protection in Russia is governed by Russian Civil Code, part 4 [3] and administrative acts issued by the Supreme Courts within the scope of their authority.

Thus Resolution of the Plenum of the Supreme Court of Russian Federation comprises basic features explaining how legal provisions on patent law should be applied by courts [6].

The process of medical testing and certification for distribution in the market is governed by the Federal law on distribution of pharmaceuticals and medical remedies within the Eurasian economic union mentioned above which provides for two procedures for admission of the medicines to the market: standard – for a newly invented pharmaceutical and expedited – for generics.

The expedited testing procedure for the latter is conditioned by the fact that testing authority already has the original formula to which a generic pharmaceutical is compared. After such admission is granted by the social health authority the generics manufacturer can refer to the properties of the copied original which is confirmed by modern case-law.

Still questions of balancing interests of a patentholder for the original pharmaceutical and the manufacturer of a generic one keep arising and have to be balanced by courts.

One of the recent resolutions of the Intellectual property court of Russian Federation resolves the case where the facts are pretty similar to the Novartis – Pharm-Synthese case in 2009.

Two Russia-based entities prepare for circulation of a pharmaceutical with the main active substance previously patented by a global pharmaceutical company Celgene Corporation.

Considering the facts of the case the courts take mostly natural-law and public interest based position desiding that actions taken by the defendant in the case (neither scientific investigations of a patentholder's pharmaceutical containing the element, protected by the plaintiff's patent nor registration of a medical form and ceiling price of a pharmaceutical) do not conctitute patent infringement in accordance with article 1359 of Russian Civil code [17].

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