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ВЕСТНИК

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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources CitationIndex, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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3D NUMERICAL STUDY OF TEMPERATURE PATTERNS IN A FEMALE BREAST WITH TUMOR USING A REALISTIC MULTI-LAYERED MODEL

Abstract. This paper presents a three-dimensional numerical study of temperature patterns in a realistic multi-layered model of a female breast including blood perfusion. The breast surface temperature distributions are computed and analyzed with different tumor positions, sizes and different fat contents in the breast. The results are compared with experimental results for validation of the model. The paper shows that realistic breast model can accurately predict the temperature distributions inside the breast compared with traditional idealized models. The results demonstrate that all of the identifiable tumor occurrences were at the depth from 13 mm to 23 mm while none of the tumors at a depth of 29 mm were found to be detected. In respect to this, it was observed that tumors lied in the gland layer had less impact on the temperature profile of the breast. In addition, it was perceived that because of the natural deformation the breast geometry has an asymmetric surface temperature distribution in regards to symmetric tumor positions. Thus, the conducted parametric study analyzes the tumor location, size, and metabolic heat generation, and compares different temperature patterns subjected to the changes in the fat layer. Additionally, this study uses more realistic breast geometry model compared to previous studies. All this gives greater insight into the detectability of tumors with a variety of physiological conditions based on personalized patients' data and can give useful insight to improve the accuracy of computer-aided diagnosis using similar breast models. This can provide a very useful tool in inverse thermal modelling for the accurate detection of tumors in the breast.

Keywords: breast cancer, multilayer model, numerical study, fat content, COMSOL.

Introduction. Breast cancer is a multifactorial disease, the development of which is associated with changes in the genome of the cell under the influence of external causes and hormones. It is considered to be one of the most common diseases that lead to death among females. Early diagnosis is vital, as the tumor is highly treatable at the earlier stages [1].

There are many techniques for cancer diagnosis and the most common are breast examination and mammography. Thermography is another imaging technique using infrared rays to produce color pictures of the temperature distribution fields. According to Acharya et al. [2], the surface of a breast with cancerous tissues has higher temperature profile compared to the surrounding region and abnormalities can be discovered through thermography. A 0.5 °C difference in temperature profiles between two breasts of a patient is enough to conclude abnormal condition [1]. In Chen et al. [3], cameras with 0.1°C

resolution with 4 second scan time can detect tumor hidden within more than one-third of the depth of the breast. Nowadays, thermography is capable of detecting possible tumor hidden inside more than one-fourth of the depth of a breast.

There have been numerous studies on the numerical analysis of female breasts with tumors. However, the studies used a simple model of the breast, whose geometry was assumed to be a perfect hemisphere which is axisymmetric. Only a small number of the studies considered multi-layered breast models to replicate realistic anatomy of the breast. Moreover, even the multi-layer models were assumed to have constant fat contents, which limits the information that can be gathered.

The main objective of this work is to examine temperature patterns generated by tumors on different locations based on multi-layered breast models with blood perfusion and different physiological conditions to provide insight into the detectability of tumor inside the breast. This study analyzes the tumor location, size, and metabolic heat generation, and compares different temperature patterns subjected to the changes in the fat layer. Additionally, this study uses more realistic breast geometry model compared to previous studies. The findings in this study could provide useful insight to improve the accuracy of computer-aided diagnosis using similar breast models.

1 Methodology of the study

To solve the steady-state thermal conduction problem in a breast, the bioheat equation presented by Pennes [4] was used in the model [5-9]: $k\nabla^2 T - c_b w_b \rho_b (T - T_a) + q_m = 0$, where "$k$" is the thermal conductivity; "c_b" is the heat capacity of blood; "w_b" is the blood perfusion coefficient; "ρ_b" is the density of the blood; "q_m" is the metabolic heat generation; "T" tissue temperature; "T_a" arterial temperature, which is equal to 37 °C, that is the same as the core temperature of the body.

At the boundaries, there are heat convection condition on the surface of the breast and the constant thoracic temperature condition applied at its bottom where it is connected to the thorax: $-k\,\Delta T = h(T - T_{ambient})$ and $T = T_a$, where $h = 13.5\, Wm^{-2\,o}C^{-1}$, which is evaluated for combined effects of convection, radiation and evaporation [10]. Equation (2) is a boundary condition at the skin surface representing heat convection between breast surface and the ambient environment assumed to be air temperature $T_\infty = 22\ ^oC$. Equation (3) is a boundary condition at the surfaces representing body core and it always remains constant $T_a = 37$ °C.

In order to consider a geometrically realistic breast as a 3D-model, the geometry obtained by Mukhmetov et. al. [11,12] was used as a base model (figure 1). The authors used an engineering scanning technique to obtain a 3D surface model of a mannequin chest and converted it into a solid breast model in SolidWorks CAD software. The overall geometry was not changed, but layers of materials were added to simulate real breast tissues. The parameters chosen were: height of the gland layer (figure 2), spherical coordinates (r, θ, φ in figures 3,4), of the center of the tumor inside the breast, and the diameter of the tumor, totaling five independent parameters.

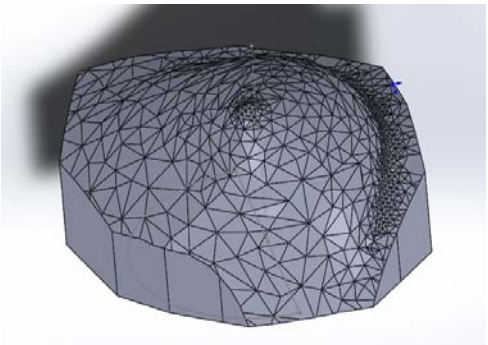


Figure 1 - The breast model developed by Mukhmetov [14]

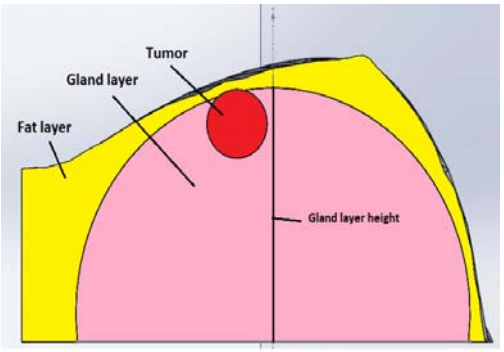


Figure 2 - A cross-section view of the 3D model of the breast in SolidWorks

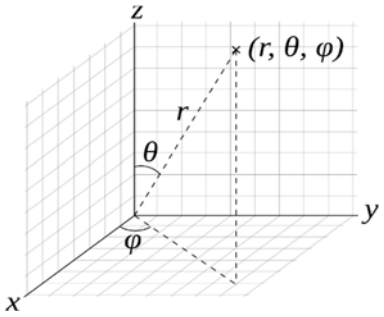


Figure 3 - Spherical coordinate system

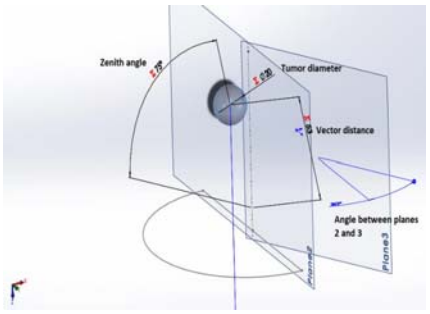


Figure 4 - CAD model in spherical coordinate

COMSOL Multiphysics was chosen as a solver because it includes bioheat transfer module [10], to synchronize 3D model changes between SolidWorks and COMSOL the "LiveLink". The "biological tissue" feature of the COMSOL was used to set the heat generation values for each tissue: fat, gland layer and tumor. The feature has dedicated settings for blood perfusion and metabolic heat generation terms. The domains and contact regions are automatically recognized by the COMSOL via LiveLink feature and can be easily selected for application of materials. The PARDISO was set as a solver with automatic preordering algorithm. Also, the nonlinear Newton method was used with initial damping factor of 0.01 and minimum damping factor of 10^{-6}.

The parameters of thermal properties for all the breast tissues were taken from Ng and Sudharsan [10] and are presented in table 1.

From Bezerra et. al. [6] the metabolic heat generation of the tumor can be derived from the function of Doubling time: $q_m * \tau = C\ (W * day/m^3)$, where *"C"* is a constant C=3.27×10^6 W×day/m^3 and "τ" is the doubling time value. On top of that, the tumor dimeter is a function of doubling time as [7]: $D = 0.01 * \exp(0.002134 * (\tau - 50))$.

Table 1 - Pennes equation parameters [10]

Parameter name	Symbol	Fat	Gland	Tumor
Thermal conductivity (W/mK)	k	0.21	0.42	0.42
Blood perfusion (ml/s/ml)	w	0.0002	0.0006	0.012
Density (kg/m^3)	ρ	920	1050	1060
Specific heat (J/kg K)	c	2770	3770	3800
Arterial temperature (°C)	T	37	37	37
Metabolic heat generation (W/m^3)	q	400	700	29000

From these equations, the heat generation can be estimated for each input diameter of the tumor, such as 10, 15 and 20 mm. The variation of this parameter would give insight into the relationship between detectability of tumor for various body fat values which normally vary with ages of patients. This parameter was varied as H_{gland} = 74, 64 and 54 mm which resulted in 36.7%, 49.4%, and 60.3% of fat content in the 3D breast model respectively.

These parameters were uploaded to COMSOL Multiphysics via option in "Parametric sweep" study. In order to have reference temperatures for comparison, several simulations were conducted for H_{gland} = 74, 64 and 54 mm (fat content of {36.7%, 49.4%, and 60.3%}) for the breast without a tumor.

3 Results and discussion

To ensure accurate and reliable result, a mesh convergence study was conducted and for this purpose tetrahedral mesh was adopted. Mesh convergence study was varied, ranging from 5,193 elements to 178,517 elements and the probe was placed at the center of the tumor that corresponds to the maximum temperature in the breast. Based on figure 5, it was decided to use 37,231 tetrahedral mesh elements due to the convergence of the results within the change of 0.002 °C, which is a much smaller value than the resolution of thermal cameras needed to identify tumor [1]. The difference in the number of elements is associated with the complexity of the realistic model.

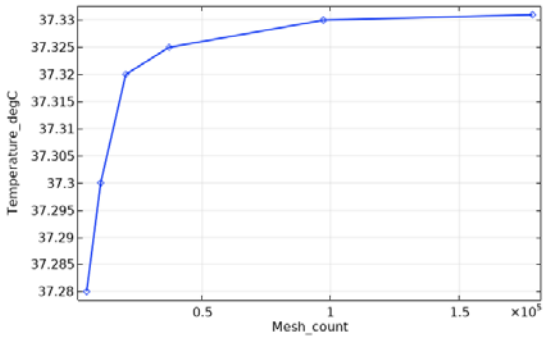


Figure 5 - Results of mesh verification study for a tumor of radius 20 mm, zenith angle of 90 mm, tumor distance of 54 mm, and a gland height of 74 mm

Based on the forward simulation of the heat conductivity in the breast without tumour for the values of gland layer height = {74, 64, 54} mm, the respective values of average surface temperatures are {304.084, 303.428, 303.175} K. The average temperature data indicates that the surface temperature is cooler with decreasing height of gland layer or increasing fat content. This trend is due to the change of material properties near the surface area, namely the increase of fat layer, which has lower metabolic heat generation rate as well as lower blood perfusion rate. Furthermore, surface temperature difference distributions between healthy (no tumor) breast and breast with tumor become less significant with decreasing vector distance (figure 6).

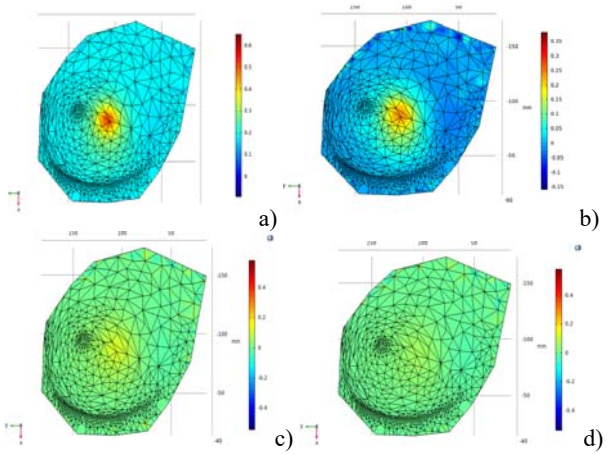


Figure 6 - The temperature difference distributions between diseased and healthy breasts for gland layer of 74mm, a tumor of 20mm, zenith angle of 90º, vector distance of: a) 54 mm; b) 49 mm; c) 44 mm; d) 39 mm and reference data of the same gland layer

Since the vectors distance is the distance from the center of spherical coordinates to the tumor center, decreasing vector distance means increasing tumor depth from the skin surface. Based on Figure 9*d*, the identification of tumor at depth of 29 mm is unlikely due to the fact that the maximum observed temperature difference was 0.058 ºC while according to the literature it should be at least 0.5 ºC [1]. Furthermore, changing the zenith angle to 60º results in the same pattern of tumor recognition features that fade away with deepening tumor location (figure 7) and gives a visual cue on the change of tumor position due to zenith angle.

Figure 8 represents a deviation of the surface temperature of the breast with a tumor from a reference breast. The threshold average surface temperature on the skin surface was calculated to be {0.0189 ºC}, which corresponds to the maximum surface temperature difference of 0.5 ºC between tumorous and reference breast model that was concluded as enough to identify a breast with a tumor [1]. This threshold was used to identify the detectable tumors from the parameter sweep data.

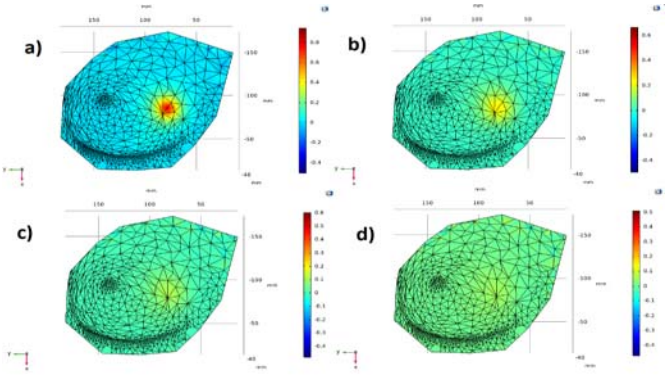


Figure 7 –
The temperature difference distributions between diseased and healthy breast for gland layer of 74 mm, a tumor of 15 mm, zenith angle of 60º, vector distances of a) 54 mm, b) 49 mm, c) 44 mm, d) 39 mm and reference data of the same gland layer

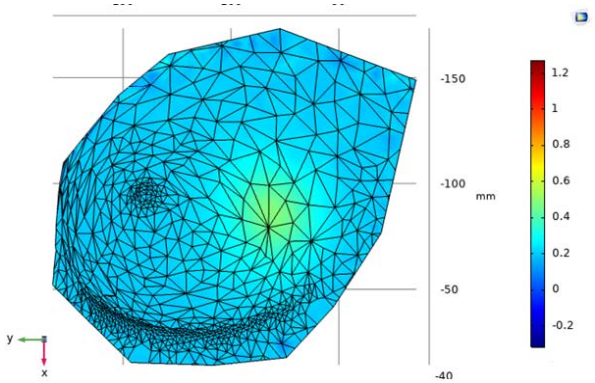


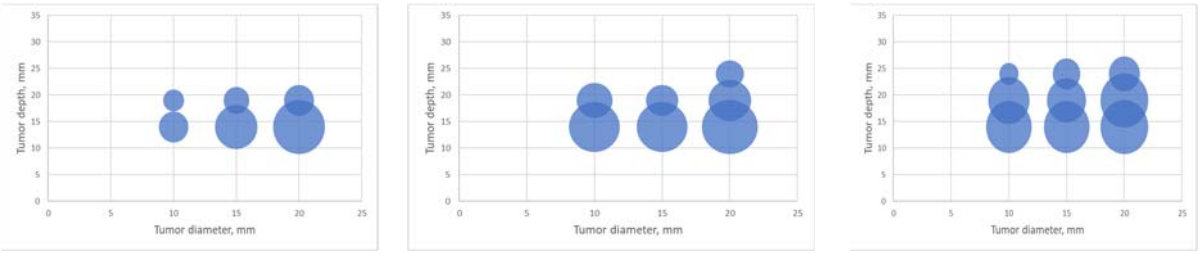
Figure 8 –
The surface temperature difference distribution between cancerous and healthy breasts for gland layer of 74 mm, a tumor of 20 mm, zenith angle of 60º, vector distance of 49 mm and reference data of the same gland layer

Table 2 reveals a summary of the data obtained for analysis. The total number of simulations for each gland height case was 144: a combination of tumor diameters of {20, 15, 10} mm, zenith angle of {60º, 80º, 100º, 120º}, the angle between planes of {0º, 90º, 45º}, tumor depth of {14, 19, 24, 29} mm derived from vector distances of {54, 49, 44, 39} mm respectively. The table shows the number of simulations that surpassed the threshold of being detectable. The obvious trend is that the instances increase with decreasing gland height or increasing the fat content. This is due to lower metabolic heat generation, lower heat capacity, and lower blood diffusion coefficient of fat tissue that cannot contain the heat generated by the tumor and conducts it through generating a more distinct pattern compared to a thinner layer. Although this property of tumor detectability may indicate that people with more fat content can detect tumor easier, it should be taken with caution. The fact is that additional fat increases breast size and breasts with the same gland size but different fat content will have different overall size. If the tumor grows on the same place on the glandular tissue the tumor will be deeper from the surface for the breast with more fat content compared to another breast.

Table 2 - Number of instances categorized as detectable out of 12 for different gland layer height and fat content

Tumor depth, mm	Gland layer 74 mm; Fat content 36.7%			Gland layer 64 mm; Fat content 49.4%			Gland layer 54 mm; Fat content 60.3%		
	Tumor diameter, mm			Tumor diameter, mm			Tumor diameter, mm		
	20	15	10	20	15	10	20	15	10
14	12	8	4	12	10	10	12	11	11
19	4	3	2	7	4	5	12	8	9
24	0	0	0	3	0	0	5	4	2
29	0	0	0	0	0	0	0	0	0
Total			33			51			74

Figure 9 shows novel bubble charts of tumor detectability, which is found to increase with the tumor diameter. In addition, it should be noted that the data showed no occurrences of detectable tumor that had a depth of 29 mm, among all simulations. This depth puts the tumor inside the glandular tissue even at the highest fat content of 60.3%. The high heat capacity and high blood perfusion of the gland contained prevents identifiable hot spots on the surface of the breast model.



a) b) c)

Figure 9 - Scatter bubble chart for fat content of:
a) 36.7%; b) 49.4%; c) 60.3% where the size represents a number of detected instances

Moreover, at a gland height of 64 mm, the number of instances with 10 mm diameter tumor being detected is higher than the number of detected tumors with a 15 mm diameter. This was the result of sufficiently high heat generation rate of the 10 mm tumor as well as being fully located in the fat layer due to its smaller size that resulted in greater detectability of the tumor.

An interesting trend was observed when comparing data of zenith angles 60º and 120º of different plane angles. The pattern was that there was a difference between average temperatures of heat patterns produced by tumors at upper and lower regions on the breast with respect to the x-axis. The upper region is tumor locations with parameters: a zenith angle 60º and a plane angle of 90º, whereas lower region has a zenith angle of 120º and a plane angle of 90º. The average temperatures were compared and the upper region generated 20.785% more heat on average. This asymmetry could be explained by the fact that the realistic geometry of the breast that was used in this study is asymmetric due to natural deformation of the breast under the effect of gravity and lower part of the breast has accumulated tissue which creates asymmetry in final surface temperatures. This effect was impossible to observe in previous studies that assumed the breast to be perfectly semispherical and thus axisymmetric. Further examination was done on the comparison between the left and rights regions. The right tumor locations could be described by the parameters: a zenith angle 60º and a plane angle of 0º, whereas the left region has a zenith angle of 120º and a plane angle of 0º. A similar comparison was performed and the difference in the surface temperatures was 7.157% on average. This suggests that the tumors that are located in the lower regions are harder to identify compared to upper regions and that left and right temperature profiles vary less than the top and bottom temperature profiles.

Conclusion. A sophisticated 3D numerical heat transfer model for the breast was developed and validated. Selected breasts were simulated by the model with various sized tumors and corresponding metabolic heat generation rates, different locations of the tumor and gland heights that corresponded to fat content. The predicted temperature agreed well with experimental results from the studies of Gautherie. The surface temperature was observed to be lower with increasing fat content, which could be estimated based on the thermogram using reverse thermal modeling. The parametric analysis of different tumor locations indicated that the variation of the surface temperature patterns due to tumor positions in the fat or gland layer significantly differed. As the diameter of a tumor increased its detectability increased correspondingly. The tumors that were fully emerged in the gland layer due to very thin fat layer had a significantly lower surface impact and sometimes did not give enough thermal signature in the breast surface to make it identifiable. All of the identifiable tumor occurrences were at the depth from 13 mm to 23 mm while none of the tumors at a depth of 29 mm were found to be detected. Moreover, it was observed that a naturally deformed breast geometry results in asymmetric surface temperature distribution with respect to symmetric tumor positions. This behavior did not take place in the previous studies with axisymmetric breast models.

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ҮШӨЛШЕМДІ НАҚТЫ КӨПҚАБАТТЫ МОДЕЛЬДІ ҚОЛДАНУ АРҚЫЛЫ ІСІГІ БАР ӘЙЕЛ ОМЫРАУЫ БЕТІНДЕГІ ТЕМПЕРАТУРАНЫҢ ТАРАЛУЫН ЗЕРТТЕУ

Аннотация. Мақалада қан перфузиясын қоса алғандағы әйел омырауының реалистік көпқабатты моделінің нақты беткі қабатында температураның таралуы мен жылу өткізгіштігінің үшөлшемді математикалық зерттеулері көрсетілген. Сүт безі бетіндегі жылу өткізгіштік пен температураның таралуы әйел омырауындағы түрлі ісік позициясы, мөлшері және түрлі тығыздықпен (май мөлшері) есептеледі және талданады. Әйел омырауына арналған аталған модель дәстүрлі идеализацияланған модельдермен салыстырғанда омырау ішінде температураның таралуын дәл болжай алатындығы жұмыста көрсетілді. Есептеу нәтижелері барлық анықталған ісіктер 13 мм-ден 23 мм-ге дейінгі тереңдікте болатынын көрсетті. 29 мм және одан да арықарайғы тереңдіктегі ісіктер анықталмады. Сондықтан сүт безінің қабатында жатқан ісіктер сүт бездері бетінің жылу өткізгіштігіне және температурасының таралуына аз әсер ететіні атап өтілді. Сонымен қатар, зерттеулер, табиғи деформацияға байланысты әйел омырауының геометриясы, ісіктің симметриялы позицияларына қатысты беткі температураның асимметриялық таралатынын көрсетеді. Сөйтіп, өткізілген параметрлік және математикалық зерттеулер ісіктің шоғырлануын, мөлшерін және метаболикалық жылу бөлінісін талдайды. Сонымен қатар, айтылған зертеулер май қабатындағы өзгерістерге ұшырайтын түрлі температуралық заңдылықтарды салыстырады. Мұның бәрі пациенттердің жеке деректері негізінде түрлі физиологиялық жағдайдағы ісіктерді анықтау туралы кеңірек түсінік береді және сүт бездерінің ұқсас модельдерін қолдану негізінде компьютер-лік диагностика дәлдігін жақсартуға пайдалы ақпарат ұсынады.

Түйін сөздер: сүт безінің қатерлі ісігі, көпқабатты модель, сандық зерттеу, май мөлшері, COMSOL.

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ЧИСЛЕННОЕ ИЗУЧЕНИЕ РАСПРЕДЕЛЕНИЯ ТЕМПЕРАТУРЫ НА ПОВЕРХНОСТИ ЖЕНСКОЙ ГРУДИ ПРИ НАЛИЧИИ ОПУХОЛИ С ИСПОЛЬЗОВАНИЕМ ТРЕХМЕРНОЙ РЕАЛИСТИЧЕСКОЙ МНОГОСЛОЙНОЙ МОДЕЛИ

Аннотация. В данной работе представлено трехмерное численное исследование температурных паттернов в реалистичной многослойной модели женской молочной железы, включая перфузию крови. Распределение температуры поверхности молочной железы вычисляется и анализируется при различных положениях опухоли, размерах и различном содержании жира в молочной железе. Полученные результаты сравниваются с экспериментальными результатами для валидации модели. В статье показано, что реалистичная модель груди может точно предсказать распределение температуры внутри груди по сравнению с традиционными идеализированными моделями. Результаты показывают, что все идентифицируемые опухолевые образования находились на глубине от 13 до 23 мм, в то время как ни одна из опухолей на глубине 29 мм не была обнаружена. В связи с этим было замечено, что опухоли, лежащие в слое железы, оказывали меньшее влияние на температурный профиль молочной железы. Кроме того, было замечено, что из-за естественной деформации геометрия груди имеет асимметричное распределение температуры поверхности относительно симметричных положений опухоли. Таким образом, проведенное параметрическое исследование анализирует локализацию опухоли, ее размеры и метаболическое тепловыделение, а также сравнивает различные температурные паттерны, подверженные изменениям жирового слоя. Кроме того, в этом исследовании используется более реалистичная геометрическая модель груди по сравнению с предыдущими исследованиями. Все это дает более глубокое понимание выявляемости опухолей с различными физиологическими состояниями на основе персонализированных данных пациентов и может дать полезную информацию для повышения точности компьютерной диагностики с использованием аналогичных моделей молочной железы. Это может стать очень полезным инструментом в обратном тепловом моделировании для точного обнаружения опухолей в молочной железе.

Ключевые слова: рак молочной железы, многослойная модель, численное исследование, содержание жира, COMSOL.

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OPTIMIZATION OF MANAGEMENT OF URBAN LIGHTS WITH THE USE OF NEURAL NETWORKS

Abstract. One of the most pressing problems of large cities is the problem of traffic management of vehicles. The reason for this problem is an imperfect way to manage traffic flows. Traffic light regulation is of particular importance in traffic management. Most modern traffic light control systems operate at set time intervals and are not able to cope with the constantly changing situation on the road. A promising direction for solving this problem is to optimize the system using artificial neural networks. The advantage of neural networks is self-learning, which allows the system to adapt to the changing situation on the road.

Despite numerous attempts, it has not yet been possible to obtain a high-quality mathematical model of urban traffic management. This model should determine the functional dependence of transport flow parameters on control parameters. Nowadays, traffic flows are regulated everywhere by means of traffic lights. If we can get a fairly accurate mathematical model of traffic flows, we can determine the optimal duration of the traffic signal phases to achieve the maximum capacity of the road network node.

A fairly accurate mathematical model of traffic management that works in predictive mode will display an estimate of the optimal control parameters, as well as make correct decisions in emergency situations.

Well-known mathematical models of road traffic take into account only the average values of traffic flows, and not the exact number of cars on each road section at a particular time.

Key words: traffic management, artificial neural networks, self-learning, mathematical model, traffic flows.

The mathematical model of road traffic is based on the theory of controlled networks. This model takes into account the network and road structure, its changes according to traffic signals, and allows you to calculate the state of traffic flows at each time. The main difficulty is to determine the exact values of quantitative parameters of flow distribution. Overview of the use of neural networks for optimizing traffic management.

Artificial neural networks are widely used in traffic management in the road network. Let's look at some of the latest work in this area.

Cellular neural networks for the task of controlling traffic lights at individual intersections, i.e. without taking into account the mutual influence of traffic light modes on neighboring sections of the network. In this work, the total delay of vehicles at the intersection is minimized. For modeling purposes, the flow delay determined by the traffic light phase is considered as a quadratic function of the duration of the green light in this phase. Both linear and nonlinear equality-type constraints are applied to the duration of the green light.

A comparison of classical Ann and fuzzy controllers as the control systems for traffic lights. The authors of this article suggest using a neural network with a single hidden layer, the input of which is fed a vector with the number of idle cars in front of each traffic light, and the output is the duration of each phase. ANN is trained using a genetic algorithm. Application of "biology-inspired" neural networks (BiNN) for intersection management. In such methods, the emphasis is on the study of dynamics in contrast to the classical ANN, which mainly consider training procedures. BiNN is studied on a complex intersection model. The structure of BiNN is as follows: input neurons describe a queue of vehicles in each lane. Output neurons correspond to the phases on the bands. All output neurons are associated with inhibitory neurons that suppress the activity of other output neurons. The duration of the phases is limited by an equation describing the concept of "immanent plasticity" of the neuron.

Using a deep, ultra-precise artificial neural network for adaptive traffic management. For ANN training, reinforcement training is used. In the terminology of the reinforcement learning paradigm, an ANN is called an agent. The input signal in the ANN is formed from the state space proposed by the authors – discrete traffic state encoding (DTSE). The following neural network architecture is proposed. Two neural networks are used with an identical structure, but with a different set of input signals.

The first input is a binary vector describing the presence or absence of a car on a road section, and the second is a vector of real numbers describing the speed of cars on road sections. The outputs of neural networks deployed in the vector are glued together with each other and with the current state of the phases and fed to the input of a fully connected ANN. The output from the ANN is an indicator vector that shows the action that the agent should perform, namely, it contains the number of the phase that should be enabled.

In conclusion, we would like to note that in domestic practice, advanced knowledge and experience in the field of traffic light regulation are poorly used. This leads to a loss of time at traffic light intersections, reduced road safety, increased fuel consumption, and more intense environmental pollution from exhaust gases.

Currently, there are no mandatory rules governing the construction of a traffic light control cycle in our country. There are recommendations and tutorials that are not required for use and are not used. To fully understand the impact of regulation at intersections, regular data collection on road accidents is required, including location, time, conditions, age of participants, consequences of accidents, and other parameters. At a minimum, this will allow you to identify intersections with the most intense occurrence of accidents, as a maximum, to assess the conditions that provoke risky behavior of road users and avoid them in the future. Optimizing traffic light control using neural networks is a relatively cheap way to increase traffic safety at intersections. It is necessary to pay close attention to this method, since the effect may correspond to expensive measures.

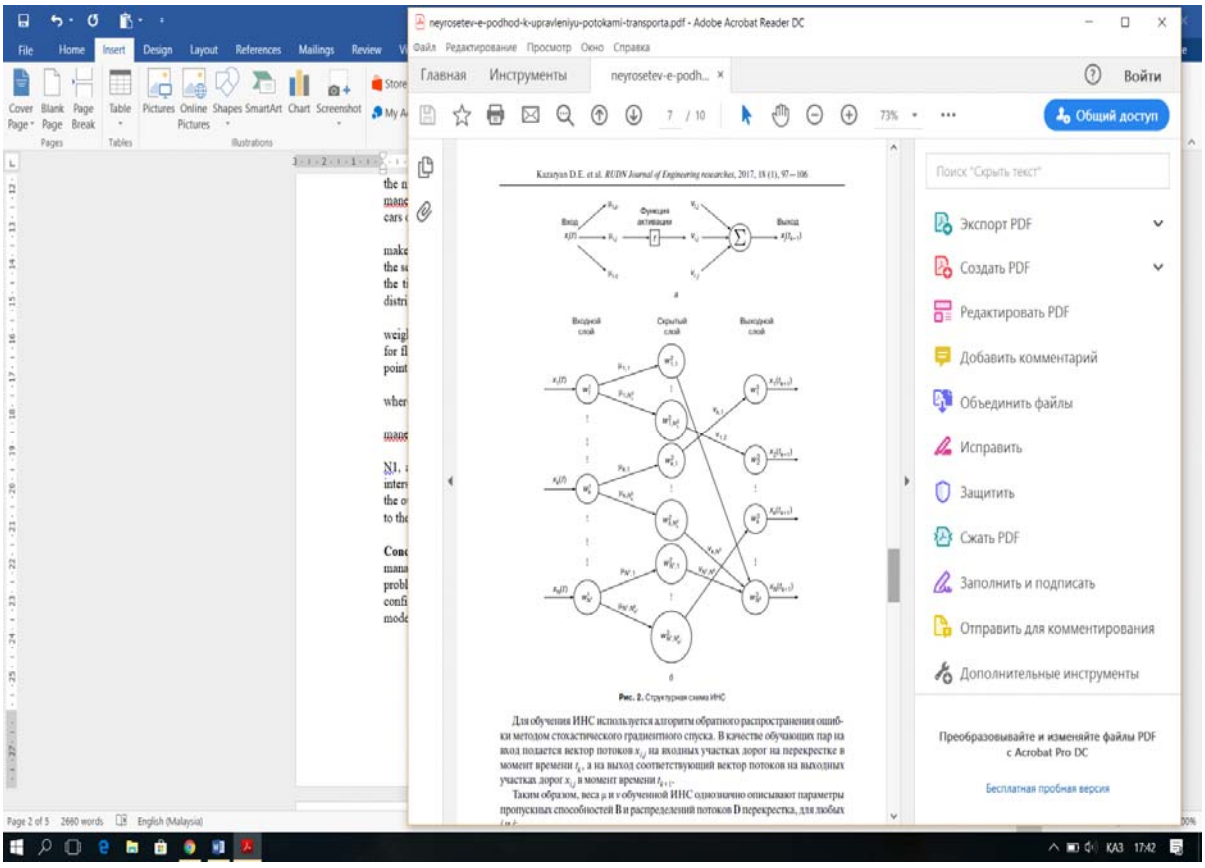

Figure 1 - Structural scheme of the Ann

The mathematical model of a traffic management system contains parameters that must be obtained experimentally for each intersection. These parameters include elements of the throughput matrix B and the distribution matrix D. The capacity of the maneuver bi, j from road section i to road section j determines the number of vehicles that can perform this maneuver in a single time interval. The capacity of the bi,j maneuver depends on the spatial characteristics of the intersection, the speed of the car, and the number of cars on sections i and j.

The elements di, j of the distribution matrix D determine the proportions of the flow of cars that make a maneuver from road section i to road section j. the Sum of these fractions is equal to the flow on the section i.the values of the parameters di,j depend on the routes of all cars and can change depending on the time of day, day of the week, and season. To determine the parameters of the throughput B and distributions D of the model, we use a two-layer incompletely connected ANN.

The architecture of the Ann chosen accordingly to the relationship of the roads at intersections, the weight values of the Ann coincide with the parameters of the capacity and distribution flows. Input values for flows on road sections at some point in time, and output values for flows on road sections at the next point in time.

The ANN structure is determined by the intersection structure: the input layer consists of N0 inputs, where N0 = n, n is the number of input road sections at the intersection.

Each input is associated with the mi of neurons in the hidden layer, where mi is the number of maneuvers that can be performed from the I section.

Each neuron of the hidden layer is associated with only one element of the output layer, with $N2 \geq N1$, and each neuron of the output layer defines the output section of the road that departs from the intersection. Several neurons of the hidden layer can be connected to one neuron in the output layer. Since the output layer defines the output road sections, the link to the hidden layer is defined from road section i to the output road section j.

Conclusion. The article describes a neural network approach for solving the problem of traffic flow management in the urban road network. Traffic flows are managed as a result of solving the optimal control problem using a mathematical model based on the theory of managed networks. The ANN provides configuration of model parameters when there is a discrepancy between the output data obtained on the model and the output data on a real object or road network section.

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НЕЙРОНДЫҚ ЖЕЛІЛЕРДІ ҚОЛДАНУ НЕГІЗІНДЕ ҚАЛАЛЫҚ БАҒДАРШАМДАРДЫ БАСҚАРУДЫ ОҢТАЙЛАНДЫРУ

Аннотация. Ірі қалалардағы өзекті мәселенің бірі – көлік құралдарының жол қозғалысын ұйымдастыру. Аталған мәселенің пайда болу себебі – көлік ағынын басқарудың жетілмеген тәсілі. Көлік ағынын басқаруда бағдаршамды реттеудің ерекше маңызы бар. Бағдаршамды басқарудың қазіргі заманғы жүйелерінің көпшілігі берілген уақыт аралығы бойынша жұмыс істейді және жолдағы үздіксіз өзгермелі жағдайды жеңе алмайды. Бұл мәселені шешудің перспективалық бағыты – жасанды нейрондық желілер арқылы жүйені оңтайландыру. Нейрондық желілердің артықшылығы – өзін-өзі оқыту мүмкіндігінің аталған жүйеге жолдағы өзгермелі жағдайға бейімделуге мүмкіндік береді. Көптеген талпыныстар жасалса да, қалалық қозғалысты басқарудың жоғары сапалы математикалық моделі негізделмеді. Мұндай модель көлік ағыны параметрлерінің басқару параметрлеріне функционалдық тәуелділігін анықтауы тиіс. Қазіргі уақытта көлік ағыны барлық жерде бағдаршамдар арқылы реттеледі.

Егер көлік ағынының нақты математикалық моделін жасасақ, жол желісі торабының барынша өткізу қабілетіне қол жеткізу үшін бағдаршам сигналдары фазаларының оңтайлы ұзақ уақытын анықтай аламыз.

Болжау режимінде жұмыс істейтін жол қозғалысын басқарудың нақты математикалық моделі басқарудың оңтайлы параметрлерін бағалауды білдіреді, сондай-ақ төтенше жағдайларда дұрыс шешім қабылдайды. Жол қозғалысының белгілі математикалық модельдері нақты сәтте жолдың әрбір учаскесіндегі машиналардың нақты санын емес, ағынның орташа мәнін ғана ескереді.

Түйін сөздер: трафикті басқару, жасанды нейрон желілері, өзін-өзі оқыту, математикалық модель, көлік ағыны.

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ОПТИМИЗАЦИЯ УПРАВЛЕНИЯ ГОРОДСКИМИ СВЕТОФОРАМИ С ПРИМЕНЕНИЕМ НЕЙРОННЫХ СЕТЕЙ

Аннотация. Одной из наиболее актуальных проблем крупных городов является проблема организации дорожного движения транспортных средств. Причина возникновения данной проблемы – несовершенный способ управления транспортными потоками. В управлении транспортными потоками особое значение имеет светофорное регулирование. Большинство современных систем управления светофорами работает по заданным интервалам времени и не способно справиться с непрерывно меняющейся ситуацией на дороге. Перспективным направлением для решения этой задачи является оптимизация системы с помощью искусственных нейронных сетей. Преимущество нейронных сетей заключается в возможности самообучения, что позволяет системе подстраиваться под изменяющуюся ситуацию на дороге.

Несмотря на многочисленные попытки, до сих пор не удалось получить качественную математическую модель управления городским движением. Такая модель должна определять функциональную зависимость параметров транспортных пото-ков от параметров управления. В наши дни транспортные потоки повсеместно регулируются посредством светофоров.

Если удастся получить достаточно точную математическую модель потоков транспорта, мы сможем определять оптимальную длительность фаз сигналов светофоров для достижения максимальной пропускной способности узла дорожной сети.

Достаточно точная математическая модель управления дорожным движением, работающая в режиме предсказания, будет отображать оценку оптимальных параметров управления, а также принимать корректные решения в экстренных ситуациях. Известные математические модели дорожного движения учитывают только средние значения потоков, а не точное количество машин на каждом участке дорог в конкретный момент.

Ключевые слова: управление трафиком, искусственные нейронные сети, самообучение, математическая модель, транспортные потоки.

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KAZAKHSTAN ZEOLITES AS A PERSPECTIVE MATERIAL IN THE WATER TREATMENT OF THE DAIRY INDUSTRY

Abstract. In the modern world, there are practically no sources of clean water suitable for human consumption. As a result, at any enterprise in the food industry a number of sequential operations are carried out related to the purification of water necessary for the production of products. In all processes of processing dairy raw materials, water supply to enterprises is carried out from a public water supply network and / or from an artesian well. The article discusses the feasibility of using natural zeolites to ensure water safety. Research data of Kazakhstan zeolites of various deposits and their application in practice were studied.. As shown by the results of experimental studies, zeolites of the Taizhuzgen deposit significantly improve water quality. As a result of activation, the sorption ability of zeolite rises to 85-90%. Production tests of zeolites indicate the significant potential of this mineral raw material. Natural zeolites are cheap, resistant to mechanical wear and can be reused after regeneration. Studies have shown that Taizuzgen zeolite is a good sorption material and can be recommended in further studies with the aim of developing filters for water purification used in water treatment processes in the dairy industry.

Key words: safety, water, zeolites, sorption ability, zeolite benefits, modification.

Introduction. In the modern world, there are practically no sources of clean water suitable for human consumption. That is why at any enterprise in the food industry a number of sequential operations are carried out related to the purification of water necessary for the production of products.

For the production of dairy products of a wide range, they are increasingly resorting to the use of dry canned milk. An integral part of the production process is the restoration of these products with drinking water. There are many operations to purify water, but having received purified drinking water and directing it to restore dry canned food, we will no longer receive dairy products that are as full in their properties and benefits as they were before drying. There will be no longer that original natural structure that exists in fresh milk [1].

Today, research is being conducted on many biological objects, the study of their energy and structural properties, including water, as well as its effect on other biological fluids.

Special water treatment methods imply the purposeful imparting of certain properties to water. For example, milk powder in such water can dissolve better, acquire better organoleptic and physicochemical properties, and the system itself – a solution obtained by reconstituting dry components – can acquire a certain structure similar to that of natural dairy products [2].

The aim of the study is to ensure water quality using zeolites in dairy production technology.

Research results and discussion. Food industry enterprises mainly use water from the drinking water supply system in food production [3]. The water used in the production of milk and dairy products must comply with the requirements of the Technical regulation of the Custom Union's TR 033/2013 'On the Safety of Milk and Dairy Products" [4]. Water used in the process of the manufacturing of food products and in direct contact with food raw materials and packaging materials must meet the requirements for drinking water established by legislation of the Member States of the Customs Union TR

CU 021/2011 "On Food Safety" and the Technical Regulation of the Republic of Kazakhstan "Requirements for the Safety of Drinking Water for the Population" (table 1) [5].

Table 1 – Basic requirements for water quality in the production of reconstituted dairy products

Indicators	Standards (maximum permissible concentrations), no more	Hazard indicator <1>	Hazard Class
Hydrogen indicator, pH	Within 6-9	-	-
Total mineralization (dry residue), mg/l	1000(1500)<2>	-	-
Total hardness, mEq/L	7,0(10)<2>	-	-
Permanganate oxidation, mg/l	5,0	-	-
Petroleum products, total, mg/l	0,1	-	-
Surfactants (anionic surfactants) anionic, mg/l	0,5	-	-
Phenolic Index, mg/l	0,25	-	-
Aluminum (Al^{3+}), mg/l	0,5	S.-t.	2
Barium (Ba^{2+}), mg/l	0,1	S.-t.	2
Beryllium (Be^{2+}), mg/l	0,0002	S.-t.	1
Boron (B, total), mg/l	0,5	S.-t.	2
Iron (Fe, total), mg/l	0,3 (1,0)<2>	Org.	3
Cadmium (Cd, total), mg/l	0,001	S.-t.	2
Manganese (Mn, total), mg/l	0,1 (0,5)<2>	Org.	3
Copper (Cu, total), mg/l	1,0	Org.	3
Molybdenum (Mo, total), mg/l	0,25	S.-t.	2
Arsenic (As, total), mg/l	0,05	S.-t.	2
Nickel (Ni, total), mg/l	0,1	S.-t.	3
Nitrates (NO^{3-}), mg/l	45	S.-t.	3
Hydrargyrum (Hg, total), mg/l	0,0005	S.-t.	1
Lead (Pb, total), mg/l	0,03	S.-t.	2
Selenium (Se, total), mg/l	0,01	S.-t.	2
Sulphates (SO_4^{2-}), mg/l	500	Org.	4
I and II, mg/l	1,5	S.-t.	2
III, mg/l	1,2		2
Chlorides (Cl^-), mg/l	350	Org.	4
Chromium (Cr^{6+}), mg/l	0,05	S.-t.	3
Cyanides, mg/l	0,035	S.-t.	2
Zinc (Zn^{2+}), mg/l	5,0	Org.	3
γ-HCH (lindane), mg/l	0,002 <3>	S.-t.	1
DDT (sum of isomers), mg/l	0,002 <3>	S.-t.	2
2,4-D, mg/l	0,03 <3>	S.-t.	2

Notes: <1> - The limiting sign of the harmfulness of the substance for which the standard is established: S.-т. - sanitary toxicological, org. - organoleptic. <2> - The value indicated in brackets can be established by decision of the chief state sanitary doctor in the appropriate territory for a particular water supply system based on an assessment of the sanitary and epidemiological situation in the village and the water treatment technology used. <3> - Standards adopted in accordance with WHO recommendations.

Water from the drinking water supply system is characterized by a rather high content of impurities (table 2) [6]. It can be confirmed by the current provisions of the Technical Regulation of the Customs Union «On the Safety of Milk and Dairy Products», as well as the Technical Regulation of the Republic of Kazakhstan «Requirements for the Safety of Drinking Water for the Population» dated May 13, 2008, used by various enterprises producing dairy products.

Table 2 – The content of heavy metals in natural waters of Zhambyl and Almaty regions

Indicator of quality	Normative value (maximum permissible concentration) no more	Water intake (samples)			
		sample №1 (Issyk city, Almaty region)	sample №2 (Karasai district, Almaty region)	sample №3 (Auezov district, Almaty)	sample №4 (village Merke, Zhambyl region)
Hydrogen indicator, pH	Within 6-9	8,14	7,91	7,92	6,64
Total hardness, mEq//l	7,0(10)<2>	2	2,9	4,4	3
Chlorides (Cl^-)	350	7	7,5	20,5	14,5
Iron (Fe, total), mg/l	0,3 (1,0)<2>	3,1969	0,096	0,091	17,16
Lead (Pb, total), mg/l	0,03	not detected	0,04079	not detected	not detected
Cadmium (Cd, total), mg/l	0,001	0,00091	0,0039	0,00018	not detected
Arsenic (As, total), mg/l	0,05	0,00882	0,02716	0,05936	not detected
Zinc (Zn^{2+}), mg/l	5,0	0,00295	0,00382	not detected	not detected
Copper (Cu, total), mg/l	1.0	not detected	0,4892	not detected	not detected
Chromium (Cr^{6+}), mg/l	0,05	not detected	not detected	not detected	not detected
γ-HCH (lindane), mg/l - $\alpha - HCH$ - $\beta - HCH$ - γ- HCH	0,002 <3>	 not detected not detected not detected	 not detected not detected not detected	 not detected not detected not detected	 not detected ***0,000013*** 0,00002
Heptachlor	0,002 <3>	0,04873	not detected	not detected	0,000007
DDT (sum of isomers), mg/l	0,002 <3>	not detected	not detected	not detected	not detected

The dairy industry consumes significant amounts of water for technological needs, which must meet all the usual requirements for drinking water, and also have a higher degree of bacteriological purity, low stiffness and lack of iron, which even in minimal amounts can cause undesirable odor changes and taste of finished products [7].

Zeolite filters can become a solution to the problem of removing iron and other elements from water. Natural zeolites are widespread and cheap mineral raw materials, have a unique range of physicochemical, adsorption and ion-exchange properties, due to which they are widely used in wastewater treatment and drinking water treatment technologies [8].

The use of zeolites for processing raw materials and finished food products is interesting from the point of view of regulating the mineral composition of the product, as well as improving its hygienic, physico-chemical characteristics. This is primarily due to the unique combination of properties of natural zeolites. Due to its crystal-chemical structure, zeolites are biologically active and acid resistant. They have a prolonged adsorption, ion exchange, catalytic and detoxification ability. However, this raw material is not sufficiently used in the food industry, although it has been well studied from the biomedical, hygienic sides [9].

Currently, in the field of water treatment and water purification, natural materials (quartz sand, shungite, expanded clay, granite sand, burned rocks, zeolites, etc.) remain the main ones due to their better knowledge, accessibility, and relatively low cost [10]. Their reserves in Kazakhstan are significant: a large deposit of natural zeolites Taizhuzgen (Tarbagatai district of East Kazakhstan region, approved reserves - 7 million tons, forecasted - 215 million tons) and Shankanai (Kerbulak district, Almaty region, approved reserves – 5,5 million tons, forecasted-120 million tons), which are prepared for industrial development [11]. In Southern Kazakhstan, Altyn-Emel (41 million tons), Karzhantau and Daubabin zeolite deposits were pre-evaluated [12].

It is known that zeolites are characterized by favorable technological parameters for creating filtration materials on their basis. They do not swell in water, can be easily machined with subsequent fractionation, possess molecular sieve, absorption (ion exchange) and other useful properties, while being environmentally safe. Technical conditions have been developed and a sanitary-hygienic conclusion has been obtained on the zeolite of the Honguruu deposit as a filtering and sorbing material for the treatment of natural and waste water [13]. Countries with experience in using natural zeolites are Bulgaria, Hungary, USA, Turkey, Czech Republic, Japan, etc. [14].

The main indicators of the zeolites of Kazakhstan deposits are identical to the known deposits of Ukraine (Sokrinitskoe), Georgia (Tedzamskoe) and Russia (Kholinskoye, Kulikovskoye, Vanginskoye) [15]. Of the studied tuffs, Choline zeolite in any form is more effective in terms of the extraction of heavy metals, which, apparently, can be explained by the more rigid crystalline structure of the mineral and its chemical composition (table 3) [16].

Table 3 - Sorption of heavy metal ions from model solutions by zeolites

Cations	The volume of filtrate before the breakthrough of the cation, in column volumes				DEC, mmol/g Zeolite			
	Sakhaptin		Choline zeolite		Sakhaptin		Choline zeolite	
	natural	H^+- form	natural	H^+- form	natural	H^+- form	natural	H^+- form
Pb^{2+}	1230	1353	1556	1690	0.98	1.10	1.15	1.32
Ni^{2+}	280	340	420	480	0.81	0.90	0.94	1.04
Cu^{2+}	215	310	380	420	0.35	0.40	0.43	0.52
Zn^{2+}	156	200	205	293	0.27	0.31	0.36	0.40

Zeolites belong to the group of framework aluminosilicates, the infinite aluminosilicate framework of which is formed when articulating through common vertices of the $[AlO_4]^{5-}$ and $[SiO_4]^{4-}$ tetrahedra [17]. The frames have a regular system of cavities, interconnected by channels, in which there are metal cations and water molecules that are able to freely be removed and absorbed by the structure, due to which ion exchange occurs. The structural formula of zeolite can be represented as follows: $M_{m/n}[(AlO_2)_x(SiO_2)_y]\cdot zH_2O$ where x+y- is the sum of tetrahedra in the unit cell, m- is the number of cations M (potassium, sodium, calcium, magnesium) , n-is the valence of the cation [18].

Of the more than 40 mineral species and varieties of zeolites known in nature, only a few satisfy the requirements for practical use, namely: they form large almost monomineral concentrations and at the same time have the corresponding consumer properties (adsorption, ion exchange, acid and heat resistance, etc.) [17].

Zeolites of the Taizhuzgen deposit belong to clinoptilolite aluminosilicates with a content of clinoptilolite of 55-60%, mainly sodium and potassium type [19]. Table 4 presents the average chemical composition of zeolites in Kazakhstan deposits [20,21,22,29].

It was established that these zeolites comply with the RSS-99 standards for the content of toxic elements and radionuclides. The mineral composition of zeolites is represented by clinoptilolite, montmorillonite, quartz, feldspar and rock fragments [23].

For use in water purification processes, significant advantages of zeolites from East Kazakhstan deposits were revealed: high sorption properties; availability (deposits are located near consumers); low cost (in comparison with other technological reagents); resistance to temperatures and climatic conditions during transportation, storage and exploitation. The indicated advantages make it possible to successfully use natural zeolites for treating groundwater in the region, which are characterized by high hardness and a high content of heavy non-ferrous metal ions. As the results of the study showed, the zeolites of the Taizhuzgen deposit improve water quality by 30-50%, however, as a result of activation, the sorption ability of the zeolite rises to 85-90% [24].

Table 4 – The averaged chemical composition of zeolite tuffs of Kazakhstani deposits

Components	Deposits, average content of components. %	
	Taizhuzgen	Shankanai
SiO_2	65,5	59,86
TiO_2	0,20	0,46
Al_2O_3	14,27	14,39
Fe_2O_3	0,87	5,21
FeO	0,53	-
MnO_2	0,04	-
MgO	0,8	1,71
CaO	3,2	4,93
Na_2O	2,04	1,07
K_2O	2,83	1,56
SO_2	0,07	-
H_2O	10,0	3,61
P_2O_5	-	0.09
MnO	-	0.09
Fe	-	3,85
Sr	-	0,31
l.o.i.	-	3,38

Note: l.o.i.- loss on ignition

Plotnikov Ye.V. et al. [25, 26] studied the sorption and surface characteristics of filtering materials based on natural modified minerals. The obtained results confirm the possibility of using modified zeolites as a load for cleaning water from bacteria only when the size of the sorbent fraction is less than 0.1 mm (table 5). In general, zeolites have shown great efficiency in the removal of microbiological contaminants. The most promising is the use of a mixture of various fractions to obtain acceptable levels of water purification and hydrodynamic resistance (table 6).

Table 5 – Surface characteristics of modified mineral sorbents

Material	Fraction, mm	Specific surface, m^2/g	Specific pore volume, cm^3/g	The average pore size, nm
Zeolite	<0,1	25,351	0,011	1,715
Zeolite	0,1-0,5	24,158	0,010	1,715
Zeolite	0,5-1,0	21,241	0,009	1,716
Glauconite	<0,1	44,74	0,013	1,714
Glauconite	0,1-0,5	39,69	0,019	1,717
Glauconite	0,5-1,0	30,715	0,017	1,715

Table 6 - Assessment of the degree of extraction of microbiological contaminants from aqueous media with modified sorbents

Parameter	Fraction (<0,1 mm)		Fraction (0,1-0,5 mm)		Fraction (0,5-1,0 mm)	
	Zeolite	Glauconite	Zeolite	Glauconite	Zeolite	Glauconite
The number of bacteria after filtration (CFU/ml)	0	0	$1,7 \cdot 10^5$	$7 \cdot 10^6$	$1,0 \cdot 10^7$	$1,0 \cdot 10^7$

The mineralogical composition and thermal stability of the natural zeolite of the Taizhuzgen deposit are studied. The main component of the zeolite-containing rock is clinoptilolite. The possibility of using this zeolite to purify water from iron under dynamic conditions is shown. At the initial concentration of Fe_{total} 1,5 mg/l, the removal efficiency was 100% after passing 300 ... 500 ml of water through the filter. The ion-exchange properties of zeolite by Fe^{2+} ions were studied: the total ion-exchange capacity of Fe^{2+} is 18,2 g-equiv / m^3 [27]. Studies have shown that Taizhuzgen zeolite is a good sorption material and can be recommended in further studies with the aim of developing filters for water purification used in water treatment processes of the dairy industry.

Thus, the use of zeolites for the preparation of water in the dairy industry:

- does not require high maintenance costs and reagents;
- makes it possible to additionally extract toxic substances in contrast to the reagent method;

- characterized by simplicity and accessibility in operation, in contrast to the electrodialysis method;
- does not require thorough water purification from mechanical impurities, the use of reagents to prevent precipitation;
- does not require maintaining a relatively high speed of mechanical cleaning;
- low cost of the installation of purification, unlike the reverse osmosis method [16].

Methods that prevent or exclude the ingress of harmful compounds into food products are quite limited, time-consuming and expensive, cumbersome, require frequent regeneration of plants and materials. Their use is effective at high productivity and high initial hardness of water. The cost of materials, for example, ion-exchange resins, is incommensurably higher than that for natural materials, for example, natural zeolites. However, their capabilities are much wider. Natural zeolites can soften water, release it from metal ions, organic impurities, colloids, and trap microorganisms. The use of zeolites of various modifications will make it possible to obtain water of the desired composition, microbiologically pure [28].

Conclusion. The chemical composition of zeolite tuffs of Kazakhstan deposits is identical to the chemical content of the known zeolite deposits of Ukraine, Georgia and Russia. Studies of drinking water from various regions of the country, conducted by the authors of the present paper, led to the conclusion about the presence of iron and cadmium in drinking water in quantities exceeding the allowable regulatory limits. As shown by the results of experimental studies, zeolites of the Taizhuzgen deposit significantly improve water quality. Thus, the studies performed have shown that the use of zeolites for preparing water in the dairy industry will make it possible to obtain dairy products with higher hygiene safety indicators.

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ҚАЗАҚСТАНДЫҚ ЦЕОЛИТТЕР – СҮТ САЛАСЫНДАҒЫ СУ ӨҢДЕУ ҮДЕРІСІНДЕ ПЕРСПЕКТИВАЛЫҚ МАТЕРИАЛ РЕТІНДЕ

Аннотация. Қазіргі уақытта тағамға қолдануға жарамды таза су көзі кездеспейді. Соның салдарынан тағам саласының кез келген кәсіпорнында өнім өндіру үшін қажетті суды тазартуға байланысты бірқатар жүйелі амалдар жүзеге асырылады. Сүт шикізатын өңдеу үдерістерінде кәсіпорындарды сумен жабдықтау қоғамдық су құбыры желісінен және/немесе артезиан ұңғымасынан жүзеге асырылады. Мақалада су қауіпсіздігін қамтамасыз ету үшін табиғи цеолиттерді қолданудың пайдалылығы қарастырылған. Түрлі кен орындарындағы қазақстандық цеолиттерге қатысты зерттеу материалдары мен оны тәжірибеде қолдану жолдары зерттелді. Тәжірибелік зерттеу нәтижелері көрсеткендей, Тайжөзген кен орнының цеолиттері су сапасын едәуір жақсартады. Белсендіру нәтижесінде цеолиттің сорбциялық қабілеті 85-90%-ға дейін артады. Цеолиттердің өндірістік сынақтары аталған минералды шикізаттың ерекше мүмкіндіктерін көрсетеді. Табиғи цеолиттер арзан, механикалық тозуға төзімді және регенерациядан кейін бірнеше рет пайдаланылуы мүмкін. Зерттеулер көрсеткендей, Тайжөзген цеолиті жақсы сорбциялық материал болып саналады және сүт саласының су дайындау үдерісінде қолданылатын суды тазарту үшін сүзгілерді әзірлеу мақсатында кейінгі зерттеулерде ұсынылуы мүмкін.

Түйін сөздер: қауіпсіздік, су, цеолиттер, сорбциялық қабілет, цеолиттер артықшылығы, модификация

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КАЗАХСТАНСКИЕ ЦЕОЛИТЫ КАК ПЕРСПЕКТИВНЫЙ МАТЕРИАЛ В ПРОЦЕССАХ ВОДОПОДГОТОВКИ МОЛОЧНОЙ ОТРАСЛИ

Аннотация. В современном мире практически нет источников чистой воды, пригодной для потребления человеком. В результате на любом предприятии пищевой промышленности осуществляется ряд последовательных операций, связанных с очисткой воды, необходимой для производства продукции. Во всех

процессах переработки молочного сырья водоснабжение предприятий осуществляется из водопроводной сети общего пользования и / или из артезианской скважины. В статье рассматривается целесообразность использования природных цеолитов для обеспечения безопасности воды. Изучены данные исследований казахстанских цеолитов различных месторождений и их применение на практике. Как показали результаты экспериментальных исследований, цеолиты месторождения Тайжузген значительно улучшают качество воды. В результате активации сорбционная способность цеолита повышается до 85-90%. Производственные испытания цеолитов свидетельствуют о значительном потенциале этого минерального сырья. Природные цеолиты дешевы, устойчивы к механическому износу и могут быть повторно использованы после регенерации. Исследования показали, что цеолит Таизузгена является хорошим сорбционным материалом и может быть рекомендован в дальнейших исследованиях с целью разработки фильтров для очистки воды, используемых в процессах водоподготовки в молочной промышленности.

Ключевые слова: безопасность, вода, цеолиты, сорбционная способность, преимущества цеолитов, модификация.

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POPULATIONS OF THE MAJOR CARRIER *RHOMBOMYS OPIMUS*, VECTORS OF *XENOPSYLLA* FLEAS AND THE CAUSATIVE AGENT OF *YERSINIA PESTIS* IN THE CENTRAL ASIAN DESERT NATURAL FOCUS OF PLAGUE

Abstract. In the Central Asia desert natural focus of plague, the major carrier of the *Yersinia pestis* agent is the great gerbil *Rhombomys opimus*, and its vectors include fleas of the *Xenopsylla* genus. Phenotypical and genotypical properties of the *R. opimus* populations, *Xenopsylla* fleas and *Yersinia pestis* strains have been studied in the Central Asia desert natural focus of plague. Phenotypic distinctions and population discreteness have been identified in *R. opimus* on the *cytochrome b* gene of the mitochondrial genome from three autonomous plague foci: Pre-Balkhash, Betpakdala and Pre-Ustyurt. Phenotypic distinctions have been found in *Xenopsylla* fleas in the Central Asia desert natural focus of plague, and the genotype of *X. gerbilli minax* fleas on the Cox2 gene of the mitochondrial DNA; these had been captured in the Betpakdala autonomous focus. The repertoire diversity in phenotypical properties of *Y. pestis* strains from different natural foci of plague has been demonstrated, and population discreteness of *Y. pestis* strains has been determined using the next-generation sequencing method for single nucleotide polymorphism genes. Results of the study suggest that geographical and environmental isolation and natural selection have led to heterogeneity in the three populations of the great gerbil, vector fleas and *Y. pestis*.

Keywords: plague, natural focus, *Yersinia Pestis*, carrier, *Rhombomys Opimus*, vector, *Xenopsylla*.

1. Introduction

Plague is a zoonotic natural focus based infectious disease. Its causative agent, *Yersinia pestis*, belongs to the *Enterobacteriaceae* family. *Y. pestis* explicably exists in the nature in deserts, steppes and mountain landscapes, within the carrier-vector-agent system. In natural foci, *Y. pestis* carriers include various species of rodents. The role of vectors is played by the rodents' fleas. Stability and sizes of natural foci, which normally correspond to the area of species of the major carrier rodent, demonstrate specificity of the *Y. pestis* ecological niche, the level of systemic interaction between the agent and its natural carriers, and the impact of the selection and selective mechanisms which ensure a dynamic equilibrium between the carrier populations and *Y. pestis* within the focus. In Kazakhstan, natural plague foci cover an area of more than 39% of the total country's area, or approximately 1.1 million square kilometers (figure 1).

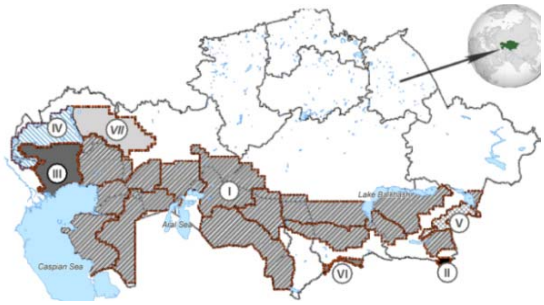


Figure 1 - Natural plague foci in Kazakhstan:
I – Central Asian desert natural focus; II – Tien Shan natural focus; III – Volga-Ural sand natural focus; IV – Volga-Ural steppe natural focus; V – Dzungarian mountain natural focus; VI – Talas natural focus; VII – Ural-Oiyl steppe natural focus

In the Central Asia desert natural focus of plague, the major carrier of the *Yersinia pestis* agent is the great gerbil *Rhombomys opimus* Lichtenstein, 1823 (Fig. 2, A) [1, 2]. The roles of secondary and accidental carriers are played by other species of gerbils. There are a total of 14 autonomous foci in Kazakhstan, differing in the landscape diversity, spatial and biocenotic structure [3]. *R. opimus* is also common in desert areas of the Northern Hemisphere [4] (Figure 2, B), including countries with expansive natural plague foci.

A B

Figure 2 - Natural habitat of *R. opimus* in Kazakhstan and worldwide

In individual parts of the natural focus, *R. opimus* populations differ in their phenotypical properties, including the scaffold and dimensions of the skull [5]. Apparently, geographical isolation and different landscapes have determined heterogeneity of the three great gerbil populations in question [6]. To the best of our knowledge, the genome of plague carrier rodents in Central Asian plague foci has not yet been properly investigated while genomes of *R. opimus*, inhabiting areas in Iran and northern China, have been sequenced [7, 8. 9].

Major vectors of plague in the desert focus of Central Asia are *R. opimus* fleas of the *Xenopsylla* genus [3, 10, 11, 12]. A few species of *Xenopsylla* fleas prevail in autonomous foci of the Central Asian natural focus: in Pre-Balkhash - *X. hirtipes*; in Betpakdala - *X. gerbilli minax*, and in Pre-Ustyurt - *X. skrjabini* (figure 3).

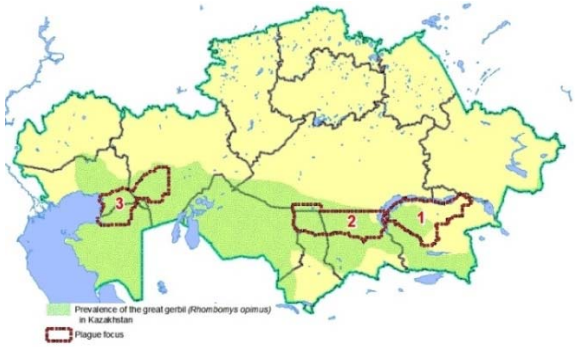


Figure 3 - Habitats of *Xenopsylla* fleas in autonomous foci of the Central Asian natural desert plague focus:
1 - *X. hirtipes* (Pre-Balkhash autonomous focus); 2 - *X. gerbilli minax* (Betpakdala autonomous focus);
3 - *X. skrjabini* (Pre-Ustyurt autonomous focus)

In Kazakhstan, anti-plague stations (NSCEDI branches), located within natural foci, carry out continuous epizootological monitoring of enzootic areas. Only isolated sporadic cases have been recorded in Kazakhstan over the last years, with no epidemic outspread. The last four plague cases were recorded in 2003.

The study of *Y. pestis* strains from some other natural foci of Asia and Europe suggests phenotypical and genotypical diversity of ecological variants of *Y. pestis*. [13, 14]. Different limited areas of the Central Asian natural focus show a steady long-standing circulation of *Y. pestis* strains atypical in the need in amino acids as growth factors [15]. An analysis of *Y. pestis* strains from the Central Asian desert and the Tien Shan mountain natural plague foci with various environmental conditions shows that the *Y. pestis* strains in question belong to three biovars: Antiqua, Mediaevalis and Orientalis [14]. The *Y. pestis* genome has been sequenced, and strains from numerous plague foci have been genotyped [16].

2. Materials and methods

Study materials included: 1) samples of mitochondrial RNA isolated from the liver of *R. opimus;* 2) samples of mitochondrial RNA of *Xenopsylla* fleas; 3) DNA of *Y. pestis* strains from the NSCEDI collection isolated in the Central Asian plague focus and other foci.

All manipulations with *R. Opimus* organs, fleas and *Y. pestis* strains followed appropriate biosafety standards and pathogen handling techniques [17].

Isolation of the *R. opimus* mitochondrial RNA. A total of 88 great gerbil samples had been captured from three independent population groups. Extraction of mitochondrial RNA from the liver of *R. opimus* utilized the QIAamp DNA Mini Kit (Qiagen, USA) [18]. A fragment of *cytB* with the length of 578 bps (without primers) was amplified using UNFOR403 and UNREV1025 primers [19].

The nucleic acid sequence of the D-loop of *R. opimus* DNA was amplified using Thr-L15926 and DL-H16340 primers [20]. PCR product purification involved the enzyme-based method using Exonuclease I (Fermentas) and alkaline phosphatase (Shrimp Alkaline Phosphatase, Fermentas) [21]. Sequencing assay utilized BigDye® Terminator v3.1 Cycle Sequencing Kit (Applied Biosystems). The phylogenetic analysis used MEGA 7.0 software, Tamura 3-parameter model, discrete gamma distribution, and Bootstrap 1000 [22].

Phenetic studies of fleas. The material included 681 *Xenopsylla* fleas from autonomous foci and from the collection of the NSCEDI zoological and parasitological museum. Data were processed in free statistical environment R version 4.0.0, with RStudio graphic environment [23]. Head and head bristle measuring was based on pictures of fleas using ImageJ software [24]. The analysis used meristic features [10].

Isolation of mitochondrial DNA and genotyping of *Xenopsylla* fleas. 22 *Xenopsylla* flea samples were selected for the assay. DNA isolation used the established protocol [25]. The *CoxII* nucleic acid sequence fragment was amplified using Insect-A-LEU and Insect-B-T primers [26]. PCR product purification involved used of exonuclease I (Thermo Scientific) and alkaline phosphatase (Thermo Scientific) [21]. Sequencing utilized cycle sequencing kit BigDye® Terminator v3.1 (Applide Biosystems) and primers, for PCR amplification. The phylogenetic analysis used MEGA 7.0 software, with the maximum likelihood method, Tamura 3-parameter model, discrete gamma distribution, and Bootstrap 1000 [22].

***Y. pestis* DNA genotyping. *Y. pestis* DNA genotyping method.**

Isolation of *Y. pestis* strain DNA utilized QIAamp DNA Mini Kit (Qiagen, USA) [25]. Genotyping of 31 *Y. pests* strains was based on the whole-genome sequencing method. Assessment of preliminary sequencing data used FastQC v0.11.7 and Multiqc v1.8 software. The phylogenetic tree derivation used BioNumerics v8.0 software (Applied Maths, Belgium).

3. Results

The epizootic status of plague in the Central Asian natural focus

Over the last decade (2010-2019) of monitoring in the Central Asian desert focus, active plague epizootics have been registered; 1024 *Y. pestis* strains have been isolated and studied. During the study of *R. opimus* and *Xenopsylla* fleas in three autonomous foci, the following numbers have been isolated: in Pre-Balkhash - 264; in Betpakdala – 60, and in Pre-Ustyurt - 20 *Y. pestis* strains.

***R. opimus* and *Xenopsylla* flea populations in the Central Asian natural plague focus.** All three regions in study are in the northern desert area, where special impact on vegetation is made by trends in changing precipitation amounts and frequencies. An analysis of climatic and geographical features has found synchronization degrees of the air temperature and precipitation trends [6]. Intensive growth of the yearly average temperature has been noted in the surface air since the mid-1970s. Therefore, irregularities of climatic, geographical and geobotanical conditions in the three autonomous foci in question have resulted in genetically isolated *R. opimus* population.

A morphometric study was carried out for 681 samples of *Xenopsylla* fleas (*X. hirtipes, X. skrjabini* and *X. g. minax*), captured in the Pre-Balkhash, Betpakdala and Pre-Ustyurt autonomous foci. A number of significant distinctions have been found in *Xenopsylla* fleas regarding their morphometric parameters: position of parietal bristle and the back edge bristle. *X. hirtipes* fleas from the Pre-Balkhash and Betpakdala foci show statistically significant difference from fleas from other foci, regarding the distance between the ocular and parietal bristle (p = 0,00126 и 0,00025, respectively), as well as the distance between the parietal and angular bristle (p = 0,00138 and 0,00402, respectively). This may suggest formation of an independent population of *X. hirtipes* fleas in the Pre-Balkhash and Betpakdala plague foci.

Sequencing of mitochondrial RNA of *R. opimus*. Genotyping of *R. opimus* from the Pre-Balkhash, Betpakdala and Pre-Ustyurt foci has been carried out. Based on a review of publications [7, 9], a conclusion has been made that genotyping on the *CytB* gene sequence should be performed to study population differences in great gerbils.

A total of 19 unique haplotypes have been identified on the fragment of nucleic acid sequence of *CytB* gene. Out of 578 analyzed bases, the share of transitions was 37, and transversions - four. Eight of the polymorphisms analyzed result in amino acid replacement. 88 samples clustered into seven haplogroups. 25 haplotypes were established using *D-loop* nucleic acid sequence. 63 of 468 bases were variable. Of them, 59 were transitions, and three – transversions; also, adenine insertion was found in three samples from I-B15, I-B16, I-B17 samples captured in southern Pre-Balkhash.

The phylogenetic analysis with nucleic acid sequences of 19 haplotypes, established in *R. opimus* from fovi in Kazakhstan, and sequences of *CytB* gene of *R. opimus* captured in Iran and China [7, 8], formed three major clusters (figure 4).

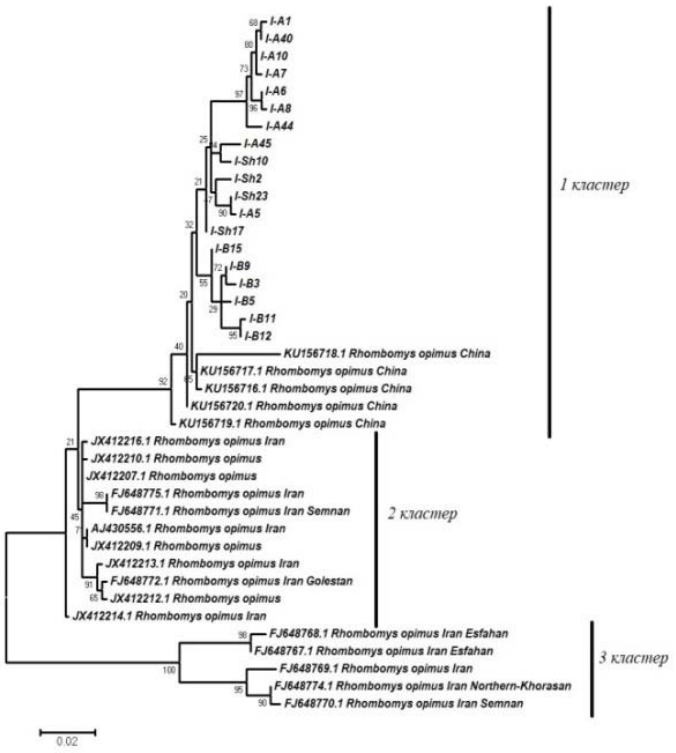
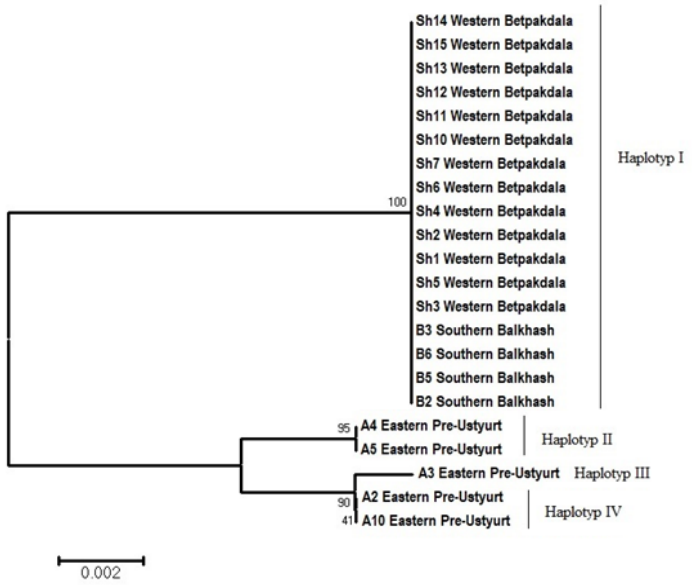


Figure 4 –
The phylogenetic tree based on the analysis of nucleic acid sequence of *CytB* gene of *R. opimus*, captured in Kazakhstan, Iran and China:
B - samples collected in southern Pre-Balkhash;
Sh - samples collected in western Betpakdala;
A - samples collected in eastern Pre-Ustyurt

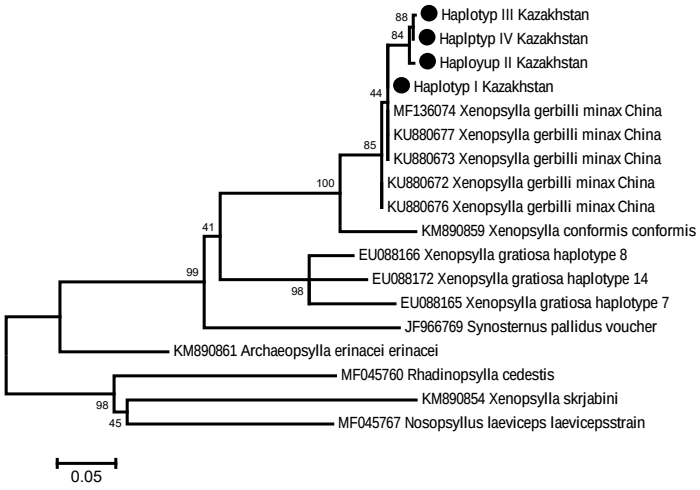
The first cluster includes sequences of *R. opimus* captured in Kazakhstan and China; concurrently, the great gerbil captured in Kazakhstan is a separate clade. The second and third cluster includes sequences of the great gerbil captured in Iran.

Genotyping, looking for population diversity and genomic features of the *Xenopsylla* genus from the Central Asian desert natural plague focus

A total of 743 bps in 22 *Xenopsylla* samples have been sequenced. The resulting sequences include the whole protein coding sequence *COII* (cytochrome oxidase subunit II) and a fragment of sequence tRNA-Lys. A total of 4 haplotypes have been found in 22 *Xenopsylla* samples. The largest genotype includes 17 sequences from fleas from the southern Pre-Balkhash and western Betpakdala. Flea samples from the eastern Pre-Ustyurt represent a separate clade, are more genetically diverse, and include 3 haplotypes (figure 5, A). An analysis including sequences of the *Xenopsylla* genus allowed to cluster haplotype I with sequences *X. gerbilli minax* collected in China's Xinjiang Uyghur Autonomous Region (figure 5, B). Haplotypes II-IV are unique for Kazakhstan and represent a separate clade.



A



B

Figure 5 - The phylogenetic tree based on nucleic acid sequence of *COII* and fragment tRNA-Lys

Genotyping of *Y. pestis* strain DNA.

Whole-genome data of 31 штамма *Y. pestis* strains have been received. The strains form four phylogenetic branches: 0.PE4, 1.ORI3, 2.MED0 и 2.MED1 (figure 6).

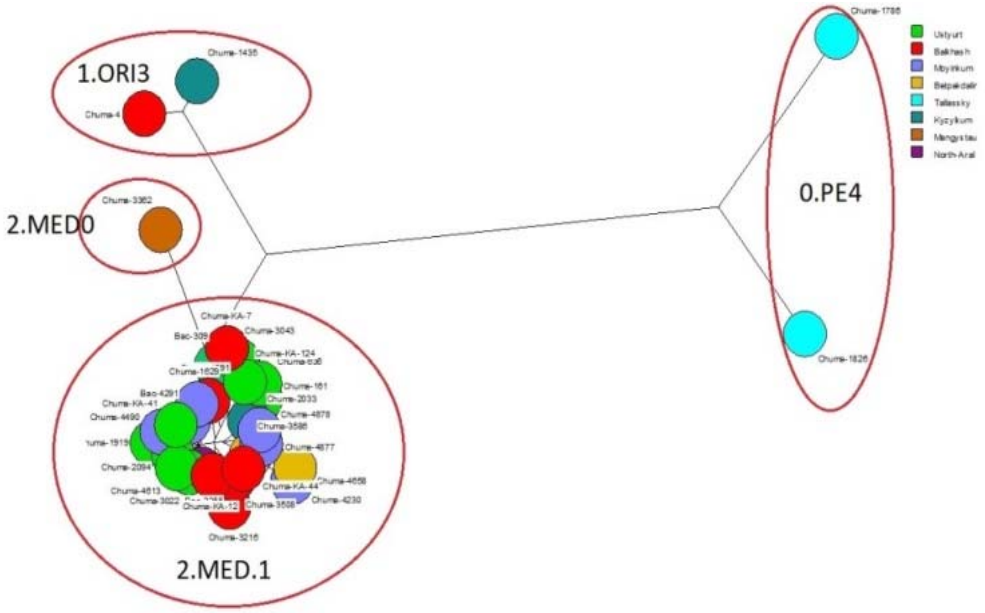


Figure 6 - Clusterization of 31 *Y. pestis* strains

The remaining 26 strains clustered into medieval biovar of the phylogenetic branch 2.MED1. Two strains, Chuma-1435 and Chuma-4, went to the phylogenetic branch 1.ORI3; the strains were isolated from the great gerbil from the Kyzylkum plague focus and from a person infected with plague in the Pre-Balkhash autonomous focus, respectively. Strain Chuma-3362 was phylogenetically identified as 2.MED0; it was isolated from a sick camel in the Mangistau autonomous focus.

4. Conclusions

The results of the studies are as follows: a) Identification of the genetic structure of mitochondrial DNA of *R. opimus* captured in different geographically remote areas in the Central Asian desert natural focus; b) Finding of genetic differences in *Xenopsylla g. minax* fleas regarding the nucleic acid sequence *Cox2* of the mitochondrial DNA gene; c) The studied populations of *Y. pestis* strains are genetically diverse and belong to four phylogenetic branches: 0.PE4, 1.ORI3, 2.MED0 and 2.MED1.

Geographic isolation, different climatic conditions and landscapes, and natural selection determined heterogeneity of three populations of the great gerbil, *Xenopsylla* fleas and *Y. pestis* strains in autonomous foci of the Central Asian desert natural plague focus.

The statistically significant differences of phenotypical features in the great gerbil R. opimus and some species of Xenopsylla fleas suggest formation of distinct populations of rodent carriers and flea vectors in natural plague foci. The studies that have been carried out exemplify comprehensive research of genomic variability regarding co-members of the plague enzootic triade (carrier-vector-agent), and an attempt to find co-evolution of biological species of the plague biocenosis participants, with environmental isolation.

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Ethics statement. The studies were carried out with permission from the local ethics committee, National Scientific Center for Especially Dangerous Infections under the Ministry of Health of the Republic of Kazakhstan: Протокол # 1, Заседание # 2 от 18.09.2017.

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ОРТАЛЫҚ АЗИЯ ШӨЛДІ ТАБИҒИ ОБА ОШАҒЫНДА ТАРАЛҒАН *YERSINIA PESTIS* ҚОЗДЫРҒЫШЫН ТАСЫМАЛДАУШЫ *XENOPSYLLA* ТУЫСЫНА ЖАТАТЫН БҮРГЕЛЕР МЕН *RHOMBOMYS OPIMUS* ПОПУЛЯЦИЯЛАРЫ

Аннотация. Ортаазиялық шөлді табиғи оба ошағында Yersinia pestis қоздырғышының негізгі тасымалдаушысы-үлкен rhombomys opimus гербилі, ал оның тасымалдаушылары-Xenopsylla тұқымдас бүргелер. Орталық Азия шөлдеріндегі обаның табиғи ошағында R. opimus популяциясының, Xenopsylla және Yersinia pestis бүрге штаммдарының фенотиптік және генотиптік қасиеттері зерттелді. R.opimus-тегі фенотиптік айырмашылықтар мен популяциялық дискреттілік обаның үш автономды ошақтарынан: Балхаш, Бетпақдала және Прустюртскийден митохондриялық геномға цитохромды генмен анықталды. Фенотиптік айырмашылықтар xenopsylla бүргелерінде Орталық Азия шөліндегі обаның табиғи ошағында және митохондриялық ДНҚ-ның Cox2 генінен X. gerbilli minax бүргесінің генотипінде табылды; олар Бетпақдала автономды ошағында ұсталды. Обаның әртүрлі табиғи ошақтарынан алынған Y. pestis штаммдарының фенотиптік қасиеттерінің репертуарының әртүрлілігі көрсетілген және Y. pestis штаммдарының популяциялық дискреттілігі бір нуклеотидті полиморфизм гендерінің келесі ұрпағын жүйелеу арқылы анықталған. Зерттеу нәтижелері географиялық және экологиялық оқшаулау және табиғи сұрыптау үлкен гербилдің, векторлық бүргелердің және Y. pestis-тің үш популяциясында гетерогенділікке әкелгенін көрсетеді.

Түйін сөздер: оба, табиғи ошағы, Оба қоздырғышы, тасымалдаушы, Үлкен құмтышқан, тасымалдаушы, Ксенопсилла.

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ПОПУЛЯЦИИ ОСНОВНОГО НОСИТЕЛЯ *RHOMBOMYS OPIMUS*, ПЕРЕНОСЧИКОВ БЛОХ РОДА *XENOPSYLLA* И ВОЗБУДИТЕЛЯ *YERSINIA PESTIS* В ЦЕНТРАЛЬНО-АЗИАТСКОМ ПУСТЫННОМ ПРИРОДНОМ ОЧАГЕ ЧУМЫ

Аннотация. В Среднеазиатском пустынном природном очаге чумы основным переносчиком возбудителя Yersinia pestis является большая песчанка Rhombomys opimus, а ее переносчиками являются блохи рода Xenopsylla. Изучены фенотипические и генотипические свойства популяций R. opimus, штаммов блох Xenopsylla и Yersinia pestis в природном очаге чумы в пустынях Центральной Азии. Выявлены фенотипические различия и популяционная дискретность у R. opimus по гену цитохрома в митохондриального генома из трех автономных очагов чумы: Предбалхашского, Бетпакдальского и Предустюртского. Фенотипические различия были обнаружены у блох Xenopsylla в природном очаге чумы в пустыне Центральной Азии и генотипа блох X. gerbilli minax по гену Cox2 митохондриальной ДНК; они были захвачены в автономном очаге Betpakdala. Показано разнообразие репертуара фенотипических свойств штаммов Y. pestis из различных природных очагов чумы и определена популяционная дискретность

штаммов Y. pestis методом секвенирования следующего поколения генов однонуклеотидного полиморфизма. Результаты исследования свидетельствуют о том, что географическая и экологическая изоляция и естественный отбор привели к гетерогенности в трех популяциях большой песчанки, векторных блох и Y. pestis.

Ключевые слова: чума, природный очаг, *Возбудитель чумы*, носитель, *Большая песчанка*, переносчик, *Ксенопсилла*.

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STUDY OF THE INFLUENCE OF BIOREGULATORS ON THE PRODUCTIVITY AND DEVELOPMENT OF PLANTS GROWN BY HYDROPONICS

Abstract. In many regions of the Republic of Kazakhstan, the environmental situation is deteriorating. The total area of the territory of the Republic of Kazakhstan according to the land balance as of November 1, 2013 is 272.5 million hectares. In recent years, under the influence of natural and anthropogenic factors, the volume of pastures has increased per unit area, soil fertility has decreased, irrigation and rainwater nutrients have decreased, salinization and irrigation areas have decreased, crop yields have decreased, and water and soil pollution are increasing, and certain species of flora and fauna are at risk of extinction. Most of the Republic's territory is located in desert zones (60% of the territory). In agriculture, industry and everyday life, the role of hydroponics is increasing. One of the reasons for this is a reduction in the financial costs of tillage, protection from weeds and pests when using the hydroponics method, as well as an increase in a large number of plants on a limited landing site. Water and mineral fertilizers are spent more efficiently due to their repeated use. Growing plants using hydroponics is very profitable, since in a short period of time you can get a crop using year-round and small areas. Here, an important role is played not only by macro-and know the concentration of trace elements. As a result, plants do not realize their potential, and therefore do not always give a high-quality product. The use of hydroponics also reduces the financial costs of soil cultivation, protection from weeds and pests, and will increase the number of plants on the landing site with a limited volume.

Keywords: hydroponics, soil erosion, plants, nutrient medium, chemical elements, drainage, wick, air pump, agricultural products, irrigation.

Introduction. The role of hydroponics in agriculture, industry and everyday life is increasing. A special place in the structure of vegetable growing is occupied by growing vegetables and herbs using hydroponics. Green vegetables are valuable depending on the high need for vitamins, mineral salts, and other nutrients. Growing plants using hydroponics is very profitable, since in a short period of time you can get a crop using year-round and small areas. Here, an important role is played not only by macro-and know the concentration of trace elements. Since all plants need trace elements to create enzyme systems-biocatalysts, including iron, manganese, zinc, chalk, molybdenum, cobalt, etc. Scientists call them "elements of life", in the absence of these elements, the life of plants and animals is impossible. Lack of trace elements does not lead to the destruction of plants, but causes a decrease in the speed and sequence of processes responsible for the development of the body. As a result, plants do not realize their potential, and therefore do not always give a high-quality product. The use of hydroponics also reduces the financial costs of soil cultivation, protection from weeds and pests, and will increase the number of plants on the landing site with a limited volume. Water and mineral fertilizers are spent more efficiently due to their repeated use. You can control the growth of plants by changing the content of the nutrient solution, the concentration of oxygen in the solution, which increases productivity. Innovations of the traditional method acquired in the process of cultivating crops in agriculture, reduction of factors affecting the pollution of land and water resources, as well as the effectiveness of applying the method of hydroponics

in the country to the economy were demonstrated. Many hydroponics systems have been studied and found to have a positive effect on the process of cultivating crops cultivated in agriculture. In comparison with traditional methods of plant cultivation, hydroponics has a number of advantages. The plant receives the entire supply of nutrients in the required amount. This contributes to its rapid growth and healthy development. Fruit trees give a good harvest, and ornamental plants are characterized by abundant and long-lasting flowering. When growing plants without supervision, you can forget about such problems as drainage and overwork of the soil. Due to monitoring of water consumption, the amount of irrigation will be reduced. You can forget about daily irrigation by choosing a growing system. Depending on the amount of hydroponic capacity, watering is reduced twice a week to once a month. The plant absorbs the actual amount of fertilizers formed during watering. Having drawn up an irrigation scheme and calculated the required amount of fertilizers, you don't have to worry about it all the time. The use of a pesticide is not required. Plants grown in hydroponics are not afraid of soil pests, root rot and fungal diseases. The process of changing the place, containers of plants does not require extra effort and is easy to occur. The roots are not injured when transplanted, they do not need to be freed from the Ground. Just add the solution to the plant and put it in another bowl. Hydroponics is an economical way to grow plants, especially houseplants [1-3].

Before building a hydroponic system, it is important to first consider the type of plants that need to be grown in the system, as well as the space required for growing them. Then we need to make sure that you have designed the system in such a way as to meet the needs of the plants (number of plants, number of roots, oxygen for vessels, water consumption, etc.) Even after they have grown to their full size. Because one type of hydroponic system may be good for growing some types of plants, but it may not be the best choice for growing other crops [4-7]. However, the introduction of other types of hydroponic systems shows that the growth process is easy, small and inexpensive. In addition, when growing many types of plants, it is usually better to grow in different systems for certain crops, without trying to grow them in a large system [8-9].

Depending on the type or location of the hydroponic system and plant growth trends, the type of lighting is selected. By the time of the year, it is possible to use natural sunlight or artificial lighting for growing crops. If possible, use natural sunlight, which does not require the simplest, unnecessary consumption and additional equipment. However, if natural sunlight is not sufficient, the required light source is provided with artificial plant lighting [10-12] (table 1).

Table 1-Systems of hydroponics methods

Type of system	Substrate	Part	Recycling
Wick system	Yes	Compressor (optional)	No
Deep water culture	No	Compressor	No
Periodic flooding	Yes / No	Watermark + timer	Yes
Drip irrigation system	Yes	Compressor+water request	Yes
Nutritional benefits	Yes / No	Compressor+water request	Yes
Aeroponics (air culture)	No	Part of water	Yes

The substrate is one of the components of the hydroponics method. Some of its species are used not only for hydroponic cultivation, but also for conventional geo-political plant cultivation. Modern hydroponic systems have come a long way from using river gravel and sand in the very first systems. An ideal environment may include approximately the same concentration of water and air. The plant needs both oxygen and nutrition. The ability of the substrate to support water / air is determined by the space between the grains or fibers of the substrate. List of fertilizer sources for the nutrient solution. De studied the influence of the mineral composition of the nutrient solution of Rizhk and Sshrevens and substrate humidity on the mineral composition of hydroponic tomato fruits, "design and analysis of impurity systems", an expanded simplex grid with a common centering of the nutrient solution in the space of the cationic factor (K+, Ca2+ and Mg2+) [13]. Two substrate moisture contents (40 and 80% by volume) were studied for each nutrient composition (table 2).

Table 2 - List of the most commonly used fertilizers and acids in hydroponics
(as well as some characteristics of interest for use in plant nutrition)

Fertilizers	Formula	Percentage of nutrients	Solubility, g L^{-1} at 20 °C
Calcium nitrate	$Ca(NO_3)_2$ $5H_2O$	N:15,5; Ca:19	1290
Potassium nitrate	KNO_3	N:13;K:38	316
Magnesium nitrate	$Mg(NO_3)_2$ $6H_2O$	N:11; Mg:9	760
Ammonium nitrate	NH_4NO_3	N:35	1920
The monokaliy	KH_2PO_4	P:23; K:28	226
Monoammonium phosphate	$NH_4H_2PO_4$	N:12; P:60	365
Potassium sulphate	K_2SO_4	K:45; S:18	111
Magnesium sulphate	$MgSO_4$ $7H_2O$	Mg:10; S:13	335
Ammonium sulphate	$(NH_4)_2SO_4$	N:21; S:24	754
Potassium chloride	KCl	K:60; Cl:48	330

Methods of research. To get a good product, as indicated above, you must choose a normal, well-lit place. In the hydroponic method, strawberries need a temperature range of 57° F to 70° F (13.8° C to 21.1° C). If the amount of natural light is less or does not meet the deadlines, you must install lights with artificial lighting. Depending on the type of strawberry crop cultivated, special nutritional solutions for strawberries are produced and selected to ensure the ratio of specific nutrients.

The next step is selecting the tank. A large tub or bucket can be selected to work in the tank. It should be deep enough to hold a lot of nutrient solution. Also, strong and growing strawberry seedlings should be installed in containers in the upper part of the tank. The tank is filled with water and nutrient solution. Mixing nutrients with water should be performed in accordance with the instructions of the wick system of the hydroponic method. Special attention should be paid to the use of the necessary amount of water. Because too much or too little water directly depends on the correct maturation and fruit culture (figure1).

Although there are several ways to grow plants with hydroponics, using a wick system is the easiest way and requires fewer materials. It is also the most suitable and good system for growing small plants such as strawberries.

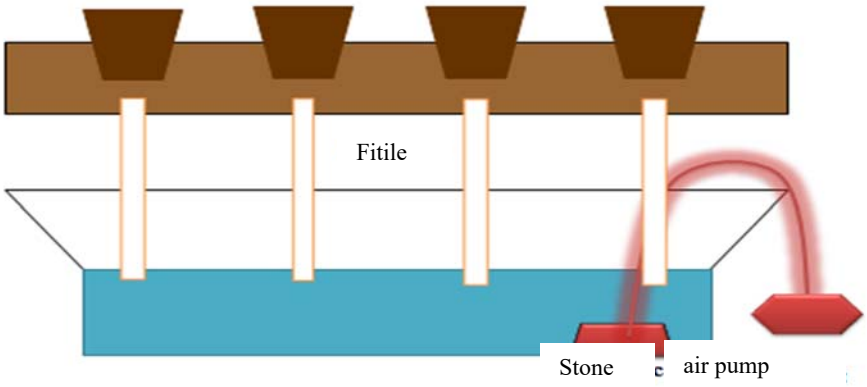


Figure 1- Diagram of a wick system

Results and discussion. As the plant grows, it grows through the substrate and the lattice basket supporting the roots, and continues to grow in the nutrient solution, providing a balanced set of plant nutrients and oxygen for maximum root development and green mass. To grow plants in multiple containers, it is necessary to develop a recycling system. Since checking each isolated system in this system can be caused by the strong labor and effort required to replenish the pH, nutrient levels, and stocks of "beer" plants. Recycling water in a circle helps not only to increase the volume of the solution, but also to maintain the concentration of nutrients, saturation of the water with pH and oxygen. Stable water circulation prevents any high concentration of mineral salts or increased concentration of acids in all amounts of solution in many small tanks.

Advantages of deep water culture:

1. Plant roots have a high effect on oxygen, which contributes to vascular development and overall plant growth.

2. Good aeration greatly increases water absorption, nutrient absorption, and cell growth.

3. It also prevents water stagnation, which can lead to vessel health, such as rot and Pythium.

The device of the deep-water culture system of the hydroponic method consists of the following parts. The system of deep-water culture consists of tanks, latticed thieves or glasses (depending on the intensity and volume of growth of the selected culture), an air infusion pump, and an air line.

Currently, pipelines presented on the construction market are made of the following polymers: polyethylene, polypropylene, polyvinyl chloride, polyvinyl chloride. The most popular material for modern sewer systems is PVC pipes. These pipes are resistant to all aggressive substances found in the surrounding soil, industrial and domestic wastewater. In the course of research, it was very convenient to use PVC pipes as buoyancy, able to fix the glasses with the plant and freely walk in the water exchange. We also increased the advantages of using this type of pipeline, since part of the root system must be located directly in a place where there is no source of sun.

Plastic cups were removed as a plant placement chamber, and holes for mounting are made from the PVC pipe specially made above. To supply water to the lower side of the glasses, holes are made before installation, as shown in the figure. After our glasses are ready, we prepare the pump. The operation of the pump is very important. The pump does not need to pulsate by saturating the water with air. If the compressors and recirculating pumps are switched off, there is a risk of a significant decrease in oxygen at one time.

The next step is to prepare the substrate. As a substrate, expanded clay granules are ideal in a deep water culture system. Expanded clay granules have a wide range of sizes and provide good aeration of neutral pH and root. Also, marble stone was chosen as the second substrate as a comparative one. Currently, due to obtaining the status of the Turkestan region, mass construction is underway. As a result many remnants of marble stones are removed.

After selecting the Substrate, we grind it in an amount of 3-5 mm, acceptable for strengthening vegetation. Crushed clay and marble stone are placed on the bottom of the glasses. In the next stage, we prepare a tank that will house the water / air heater. As a reservoir, a plastic container with a capacity of 20-25 liters, a standard trapezoid was purchased. After all the items needed for the deep-water culture system are prepared, we produce the selected plant seeds. In our practical work, cucumbers – representatives of vegetable culture-were selected for the study.

Leave the cucumber seeds for 5-10 minutes with water from the pipe. We remove pop-UPS on the surface and place them on cotton disks to be convenient for their production. The average length of the seed is 0.5-0.8 cm. Leave for 2-3 days at room temperature, which will not get directly into the sun. Seeds of grown cucumbers are transferred to a pre-prepared growing chamber.

Before placing the growing chamber in the tank to fix the plants, add a water system. In the tank for placing water, pour water with a volume of 15-20 liters, add a pump to supply water to the tank for attaching plants. After the system, as shown in the above diagram, is ready, we have a growing chamber.

The first two days we examine the vegetation through water from the pipeline. And when the length of the cucumber undergrowth is 2.5-3.5 cm, we prepare a pot in the tank where the water is located. A positive solution is to use organic substances rich in micro-and macro-elements listed in the table below. Therefore, the method of hydroponics provided for the use of eggshells in the system of deep-sea culture.

The value of eggshells as fertilizers depends on the high cost of calcium and other micro-and macronutrients needed for garden crops for healthy development and good fruit production. You can feed potatoes, bell peppers, eggplant, cauliflower. But the most popular fertilizer is obtained as a means of increasing the productivity of cucumbers and tomatoes.

It also participates in the following processes:

The saturation of urine with calcium. The shell includes a large concentration of this element and most importantly-in a form that is easily digested by plants.

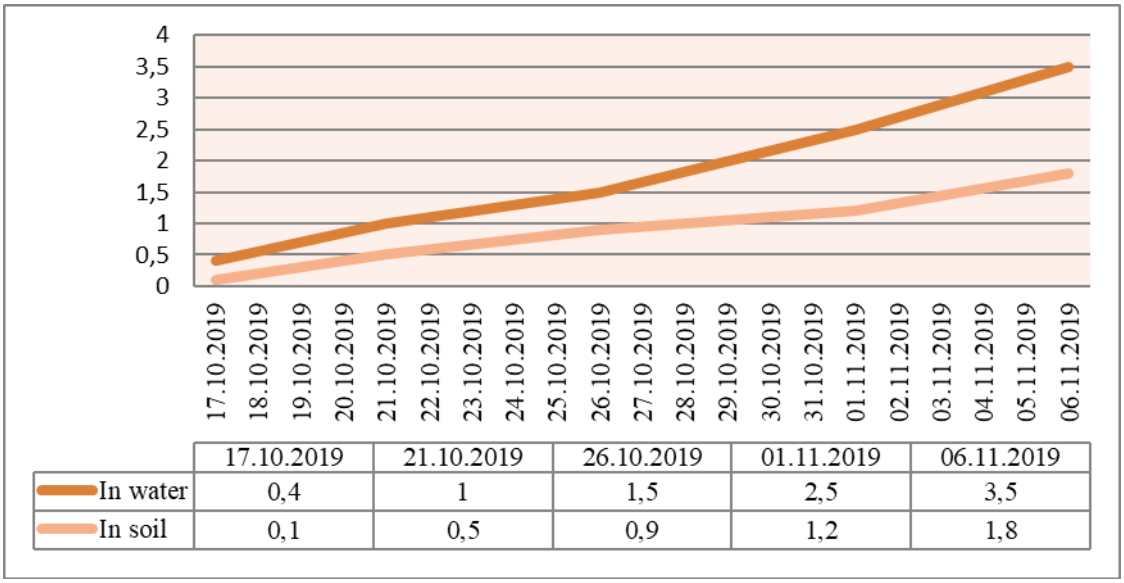
Reduced caloric intake. Cucumbers and tomatoes require growth in a neutral or slightly acidic environment. The advantage of bark over means for limestone, such as chalk or lime, is that it is "accepted" faster.

Improving the structure. In the process of development of the germinating vascular system, it is necessary to ensure evenly developing and territorial needs.

For fertilizer, you must keep in mind that you can use not only the shell of a chicken egg, but also "products" from any poultry. Quail eggs are considered the most useful, since their shell contains the largest amount of trace elements.

At the same time, due to the high temperature when cooking eggs, there is a danger of losing some of the useful substances, raw shells are considered very valuable and are used for growing more than 90% of plant seedlings. However, it is recommended to heat the raw materials in the oven-in this case, the amount of losses is compensated by active calcium release. When preparing raw materials, it should be focused on the amount of planting material. The positive effect of drying or heating in the oven, this process prevents the spread of bacteria and fungi that can start rotten processes, or is based on complete elimination (table 3).

Table 3 - diagram of growth rates of undergrowth in the ground and water environment



	17.10.2019	21.10.2019	26.10.2019	01.11.2019	06.11.2019
In water	0,4	1	1,5	2,5	3,5
In soil	0,1	0,5	0,9	1,2	1,8

It is known that it is very difficult to get a quality product without timely application of fertilizers and good care for the grown plants. We also considered alternative options, rejecting known chemical additives in order to preserve the quality of the grown products and not cause harm to health. It provides for the use of substances rich in trace elements, organic substances, as well as recognized as residues. And as an alternative fertilizer, we used banana peel, which is suitable for this characteristic. This is an effective tool that, when used correctly, increases the product by 40-50%.

Conclusion. In recent years, under the influence of natural and anthropogenic factors, the volume of pastures has increased per unit area, soil fertility has decreased, irrigation and rainwater nutrients have decreased, salinization and irrigation areas have decreased, crop yields have decreased, and water and soil pollution are increasing, and certain species of flora and fauna are at risk of extinction. Most of the Republic's territory is located in desert and desert zones (60% of the territory). They wear out at different levels and are subject to desertification, only $ 30 million. about 3 million hectares of land are inhabited by France sand, and saline land-34 million ha. more. During cultivation, it is dissolved with firm attention and checked for acidity. the normal pH level is 5.5-6.5, but may vary in individual cultures. If the acidity is disturbed, the vegetation may be disrupted or die by the growth process, which cannot fully absorb elements from the water. An important role is played at the temperature of the working solution. The temperature should be within +18...+24 °C. Each plant species has a minimum, optimal, and maximum temperature for growth, which requires the introduction of heating or cooling systems to balance the temperature of the nutrient solution. When the temperature rises, the oxygen level in the water decreases

and plants consume a lot of fertilizers. If the temperature drops, the oxygen will be more and the plants need small elements.

At present, 17 elements are necessary for many plants: carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, copper, zinc, manganese, molybdenum, chalk, chlorine and Nickel. The main elements, with the exception of carbon (C) and oxygen (O) coming from the atmosphere, are taken from the nutrient medium. Other elements, such as Sodium, silicon, vanadium, selenium, cobalt, aluminum, and iodine, are considered useful because some of them can stimulate growth or compensate for the toxic effects of other elements, or replace essential nutrients in a lesser special role. The main nutrient solutions are nitrogen, phosphorus, potassium, calcium, magnesium and sulfur, which are supplemented with trace elements.

The value of eggshells as fertilizers depends on the high cost of calcium and other micro-and macronutrients needed for garden crops for healthy development and good fruit production. In the study, the growth rate was increased by 2 days after the introduction of crushed eggshells into adolescents. And so the basis of the undergrowth is delayed. When fertilizing an eggshell, it is better to use it for feeding the root. Because the egg shell not only nourishes plant growth, but also has a good effect on their quality. Banana shell is an absolutely natural product, which in its composition is no less than many complex mineral additives intended for feeding. Banana shell is a natural product that is not less than numerous complex mineral additives intended for feeding. Because it contains potassium salt, magnesium compounds, phosphorus and other organic nutrients, it is involved in many growing processes. For example: it helps to grow the potash-root system, correctly "allocates" nutrients and water, which contributes to the overall strengthening of the culture, participates in phosphorus-photosynthetic processes, increases the percentage of germination and ensures the formation of full-fledged seeds. At the same time, the introduction of the hydroponics method in agriculture is not only ecological, but also cost-effective. For example, using small funds (1000-1500 tenge) from 0.28 square meters to 10-12, which allows you to get 100-120 net products. The possibility of using agricultural and household waste as secondary fertilizers, and the departure from the method of hydroponics can be used as a fertilizer in the reclamation of soil horizons, since the departure from the method of hydroponics is only a liquid.

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ГИДРОПОНИКА ӘДІСІМЕН ӨСІРІЛГЕН ӨСІМДІКТЕРДІҢ ДАМУЫ МЕН ӨНІМДІЛІГІНЕ БИОРЕТТЕГІШТЕР ӘСЕРІ

Аннотация. Қазақстан Республикасының көптеген өңірлерінде экологиялық ахуал нашарлауда. Қазақстан Республикасы аумағының жалпы алаңы 2013 жылғы 1 қарашадағы жер балансының деректері бойынша 272,5 млн га құрайды, соңғы жылдары табиғи және антропогендік факторлардың әсерінен жайылым көлемі алаң бірлігіне артты, топырақ құнарлылығы төмендеді, суару және жаңбыр суы үшін қоректік заттар азайды, тұздану және суару алаңдары азайды, ауыл шаруашылығы дақылдарының шығымдылығы төмендеді, су мен топырақтың ластануы өсті, ал флора мен фаунаның кейбір түрлері жойылып кету қаупі төніп тұр. Республика аумағының басым бөлігі шөлді аймақтарда (аумақтың 60%) орналасқан. Ауыл шаруашылығында, өнеркәсіпте және күнделікті өмірде гидропониканың рөлі артып келеді. Мұның себептерінің бірі-гидропоника әдісін қолдану кезінде топырақты өңдеуге, арамшөптер мен зиянкестерден қорғауға қаржылық шығындардың төмендеуі, сондай-ақ шектеулі отырғызу алаңында көптеген Өсімдіктердің көбеюі. Су мен минералды тыңайтқыштар оларды қайта пайдалану арқылы тиімді жұмсалады. Гидропоника көмегімен өсімдіктерді өсіру өте тиімді, өйткені қысқа уақыт ішінде сіз жыл бойы және шағын аудандарды пайдаланып егін жинай аласыз. Мұнда макро ғана маңызды рөл атқармайды, бірақ микроэлементтердің концентрациясын білу керек. Нәтижесінде өсімдіктер өз әлеуетін іске асырмайды, сондықтан әрқашан сапалы өнім бермейді. Гидропониканы қолдану сонымен қатар топырақты өңдеуге, арамшөптер мен зиянкестерден қорғауға кететін қаржылық шығындарды азайтады, сонымен қатар шектеулі көлемдегі отырғызу алаңындағы өсімдіктер санын көбейтеді.

Түйін сөздер: гидропоника, топырақ эрозиясы, өсімдіктер, қоректік орта, химиялық элементтер, дренаж, фитиль, ауа сорғысы, ауылшаруашылық өнімдері, суару.

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ИЗУЧЕНИЕ ВЛИЯНИЯ БИОРЕГУЛЯТОРОВ НА ПРОДУКТИВНОСТЬ И РАЗВИТИЕ РАСТЕНИЙ, ВЫРАЩИВАЕМЫХ МЕТОДОМ ГИДРОПОНИКИ

Аннотация. Во многих регионах Республики Казахстан ухудшается экологическая ситуация. Общая площадь территории Республики Казахстан по данным земельного баланса на 1 ноября 2013 года составляет 272,5 млн га. В последние годы под влиянием природных и антропогенных факторов увеличился объем пастбищ на единицу площади, снизилось плодородие почв, снизились питательные вещества для орошения и дождевой воды, уменьшились площади засоления и орошения, снизились урожаи сельскохозяйственных культур, возросло загрязнение воды и почвы, а некоторые виды флоры и фауны находятся под угрозой исчезновения. Большая часть территории Республики расположена в пустынных зонах (60% территории). В сельском хозяйстве, промышленности и повседневной жизни возрастает роль гидропоники. Одной из причин этого является снижение финансовых затрат на обработку почвы, защиту от сорняков и вредителей при использовании метода гидропоники, а также увеличение большого количества растений на ограниченном посадочном участке. Вода и минеральные удобрения расходуются более эффективно за счет их многократного использования. Выращивать растения с помощью гидропоники очень выгодно, так как за короткий промежуток времени можно получить урожай, используя круглогодичные и небольшие площади. Здесь важную роль играет не только макро-, но надо знать и концентрацию микроэлементов. В результате растения не реализуют свой потенциал, а потому не всегда дают качественный продукт. Использование гидропоники также снизит финансовые затраты на обработку почвы, защиту от сорняков и вредителей, а также увеличит количество растений на посадочной площадке с ограниченным объемом.

Ключевые слова: гидропоника, эрозия почв, растения, питательная среда, химические элементы, дренаж, фитиль, воздушный насос, агропродукты, орошение.

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BIOLOGICAL FEATURES OF SPECIES OF PHYTOPATHOLOGICAL FUNGI AFFECTING TOMATOES (LYCOPERSICON ESCULENTUM MILL.) IN THE SOUTHERN REGION OF KAZAKHSTAN

Abstract. The article considers studies designed to justify the types of pathogens of tomatoes that occur during vegetation and storage, and measures to combat them. The work was carried out in 2019 on a land plot near the rural districts of Babaykorgan, Zhuynek, and Issa of the Turkestan region. As it became known, the growth period of vegetable seedlings depends on the temperature of the soil. In our experience, the seed material was planted in the open ground in early April. The soil was very hot and moist. Depending on the culture and varietal characteristics, the sprouts appeared on 6-15 days after sowing. The results of phytopathological control showed that various varieties of all types of tomatoes were affected by phytopathogenic microorganisms. During the growing season, the most dangerous disease in tomato fruit was apical rot of the fruit, which led to a significant decrease in the yield. The leaves are widely developed early blight and verticillus. Late blight at the end of the growing season was observed in full on both leaves and fruits (developed during fruit storage). When growing tomato crops at two sites was dominated by late blight, early blight, verticillus, viral diseases and apical rot. Based on the results of phytopathological control, it can be concluded that the number of fungal diseases prevailed in plot 1, which is associated with frequent irrigation on this site, its shading and a large number of fruits on plants. Viral diseases prevailed in plot 2, which is explained by weeds clogging the plot.

Key words: phytopathology, fungi, tomatoes, pathogens, vegetation, microorganisms, morphology, microscopy, mycelium, lesions.

Introduction. Tomatoes are one of the main vegetable crops in Kazakhstan. It is successfully grown in Africa and America, Canada and Japan, in Central Asia and Northern Europe**.**

This is due to the high environmental efficiency and productivity of the crop, good taste properties of the fruit. Tomato is one of the main sources of raw materials for industrial drying of the country. Tomato belongs to the genus Lycopersicum Tourn of the Solanaceae family. The main representative is the common tomato Lycopersicum esculentum Mill., which occupies an important place in the genus.

During the growing season, the plant is in direct connection with the environment. Its growth and development necessarily depends on the temperature, humidity, chemical composition of the soil and other various factors.

If the state of the environment meets the necessary requirements of the plant, then morphological and functional changes are not observed. In any change in the stable state of the environment, other extraneous organisms can affect the plant, disrupt the metabolism and physiological features, change the anatomical structure and appearance of the plant, which can lead to its disease.

Plant disease is a very complex pathological process. The main place among pathogens of diseases in plants is occupied by phytopathogenic fungi. Currently, many studies are being conducted in different regions that characterize the bioecological features of the species composition of imperfect fungi [1]. The yield of tomatoes has also significantly decreased due to various diseases.

Main part. The city of Turkestan, with a total area of 9.4 thousand square kilometers, is located in the center of the Turkestan region. In the East it borders with the historical Otrar, in the North with the city of Kentau and the Suzak district, in the West with the Zhanakorgan district of the Kyzylorda region.

The Turkestan region includes diversified agriculture. In General, the district has 156,000 hectares, including 47780 hectares of irrigated land, and 280000 hectares of land are reserved. Currently, 43700 ha of land is used.

In the district, along with crops, currently, thanks to financial support from the state (subsidies), most of the population is focused on vegetable growing (table1).

Table 1 - Information about the acreage of Turkestan district for 2019, ha

№	rural county	Areas of irrigated land	Area of crops	Vegetables
1	Babaykurgan	2421	2100	90
2	Juynek	4260	3950	300
3	Yassy	2435	2200	140
4	Karashik	4267	3950	450
5	Sauran	1841	1150	110
6	New Ikan	4534	4100	210
7	Old Ikan	10452	10050	500
8	Orangay	2217	2100	420
9	Shaga	5016	4800	340
10	Shornak	4653	4150	250
11	Ushkayik	3594	3050	150
12	Zhibekzholy	2090	1400	100
13	Turkestan city		700	350
	Total:	47780	43700	3410

Objects and methods of research. The research work is intended to substantiate the types of pathogens of tomatoes that occur during vegetation and storage, and measures to combat them.

The work was carried out in 2019 on a land plot near the rural districts of Babaykorgan, Zhuynek, and Issa of the Turkestan region.

The determination of plant pathogens was based on the determinants of these groups of phytopathogens [2-8].

The material collected in the field for the determination of microorganisms was studied in the laboratory. Studies that cannot be performed in the field (determination of microbial species, analysis with determinants, analysis of morphological features, etc.) were performed in the laboratory. A herbarium made of damaged plants, preserved and freshly damaged material was used. When getting acquainted with plant pathogens, microscopic analysis is required. To make a microscopic preparation, you must have the following materials and tools: a surgical knife (scalpel), two-pair needles, a pipette, a razor (or a safety razor blade), a pipette with water, alcohol candles, cover and slide glasses.

Microscopic preparation is done in various ways, depending on the material under study. Using a magnifying glass, the infected plant or part of it is examined, the presence of spores is determined and in what form they are [9-12].

If the spores of the pathogen are on the plant surface in the form of mold or powder, then pull out a surgical knife or a pair of needles and transfer to a drop of water on a slide. In the water on the slide, the pest seeds are easily spread out and then the cover glass is carefully applied so that there are no air bubbles left. In this form, this drug is examined under a microscope. Preparation of the drug in this way is used only if the pest spores are on the surface of the affected organ.

If harmful spores are inside the plant tissue or are absent, then it is necessary to determine the disease of the plant, for example, if the plant tissue begins to rot, then you need to consider the affected plant tissue under a microscope. In this case, two methods of preparation of the drug are used. According to the first method, part of the affected tissue is cut out and placed in a drop of water on a slide , then the tissue is divided into parts with a surgical scalpel or needles, after which the top is covered with a cover glass [13-15].

From such a preparation, pycnids will be visible under the microscope, in which spores and fruit bodies are located, which are released from the tissues or seed body of colorless or colored filamentous

fungi in the form of a mass of small turbid particles. When studying the sexual spores of lower fungi, such as oospores (perenospores), located deep in plant tissue, for the preparation of the drug, you should not use water, but lactic acid, since it discolors the tissue. These drugs are heated to get rid of air bubbles. The second method of preparation of the drug is cutting tissue with a razor. The technique of preparing a piece is varied and depends on the material being studied. Cutting out a leaf or other soft part of the plant is carried out as follows.

Sometimes, when studying fungal diseases, it is necessary to paint over the affected tissue. Here, the method of using the color of a living object and color during pre-fixation is applied. The N.A.Naumov method is used for staining live fungi (mycelium, conidiophores, spores). To do this, without pre-treatment of the affected part of the leaf, use a cotton-gauze swab soaked in 1% solution of water or lactic acid aniline blue. The staining time is from a few seconds to 1-3 minutes. During the staining process, the spores, conidia, and mycelium in the affected tissue turn blue, and the healthy tissue remains unpainted [16-17].

The colored affected part of the leaf can be viewed with a microscope at a small magnification.

A cotton-gauze blue swab (soaked in 1% water or lactic acid solution) can be used to color the selected object. The easiest way to select (cut) an object is to heat it in a drop of water or lactic acid on a slide. Then 1-2 drops of paint are dropped on the cut. Usually the cut-off point is well painted in 5-10 seconds. Spores and mycelium are stained more intensely than plant tissue.

This method of coloring is used when fungi of the genus perenospore are affected: in particular, to determine the pathogens of the keel disease (the material is covered on a slide).

Cultivation of microscopic fungi, depending on the method and purpose of the study, includes the following levels:

- Production of these types of natural substrates (affected organs and seeds of plants, etc.), planned for planting in elective (selected) and simple (Chapek agars) nutrient media that provide special development of one species or genus, group of species; determination of the presence of fungi.

- Receiving and allocation of pure culture of fungi in agar nutrient media.

Methods of pure culture. Take a pure culture of mushrooms and conduct in vitro observations. The color of a pure culture will provide an opportunity to determine the nature of their growth and sporulation in fungi, especially morphogenesis, to determine the types of fruiting bodies, and spores formed, to determine the relation of fungi to environmental factors (temperature, humidity, lighting engineering, acidity), to radiation, to the composition of the cover (substrate) to determine the biosynthetic activity of metabolic products of fungi (enzymes, growth regulators, vitamins), to determine the relationship of fungi to fungicides to drugs., to make the comparative characteristics of the isolates of fungi, conduct population studies, determine the relationship of fungi with each other, characterize the degree of parasitism, describe the relationship between fungi, etc.

Results of experimental researches. Germination - an indicator that characterizes the quality of the seed material. As it became known, the growth period of vegetable seedlings depends on the temperature of the soil. In our experience, the seed material was planted in the open ground in early April. The soil was very hot and moist. Depending on the culture and varietal characteristics, the sprouts appeared on 6-15 days after sowing (table 2-3).

Table 2 - Biometric indicators of tomatoes in the growing season (Rural district Juynec)

Growing	breed	Stem length, cm.	The number of shoots, PCs.	Number of leaves		Assimilation surface, cm^2	
				1 sprout, pieces	plant, pieces	1 leaf	plant
Growth period – growth of vegetative mass							
tomato	Gloria	17,1±1,8	1	5,3	5,3	9,3	49,3
	Table tomato	8,5±1,8	1	4,7	4,7	9,9	46,5
The periods of budding and flowering							
tomato	Gloria	33,5±8,5	2,2	9,0	19,8	14,7	291,1
	Table tomato	27,3±7,7	2,7	7,6	20,6	15,8	325,5

Table 3 - Biometric indicators of tomatoes in the growing season (Babaykurgan field plot)

Growing	breed	Stem length, cm.	The number of shoots, PCs.	Number of leaves		Assimilation surface, cm^2	
				1 sprout, pieces	plant, pieces		
Growth period – growth of vegetative mass							
tomato	Novichok	17,1±1,8	1	5,3	5,3	9,3	49,3
	Rio-grande	8,5±1,8	1	4,7	4,7	9,9	46,5
The periods of budding and flowering							
tomato	Novichok	33,5±8,5	2,2	9,0	19,8	14,7	291,1
	Rio-grande	27,3±7,7	2,7	7,6	20,6	15,8	325,5

As can be seen from Table-3, biometric analysis was performed for plant growth indicators and indicators that characterize plant growth. According to the table at the beginning of the growing season the indicators of the Novichok variety were high.

During the period of active growth of the vegetative mass, during the period of seedlings, every 3-4 days, the soil was loosened. The emergence of plant diseases was observed on leaves and sprouts. Since the tomato crop was planted in the open ground, yellowing and color change of the lower leaves was observed. There was also constant monitoring of the appearance of diseases and the formation of tomato fruits, and chemical treatment was not carried out. Thus, according to the methods described above, observations were made in all regions. According to the purpose of our study, the main and constant attention was paid to determining the resistance of tomatoes to diseases (figure1).

Figure 1- Bacterial disease of apical rot of the Novichok breed

Table 4 - Defeat of tomato breeds by types of diseases (Babaykurgan field plot)

Growing	Breed	Spread of diseases/development, %				
		Viral disease	late blight	Alternaria blight	verticillium	Apical rot
25 July 2019						
tomato	Novichok	13,3/2,7	13,3/2,7	26,7/5,3	6,7/1,3	-
	Rio-grande	20,0/4,0	6,7/1,3	33,3/6,7	6,7/1,3	-
7 August 2019						
Tomato	Novichok	20,0/4,0	-	33,3/9,3	26,7/6,7	46,7/13,3
	Rio-grande	20,0/5,3	-	33,3/10,7	13,3/2,7	100/53,3
27 September 2019						
tomato	Novichok	46,7/17,3	60,0/16,0	46,7/17,3	66,7/25,3	-
	Rio-grande	53,3/20,0	53,3/13,3	53,3/20,0	33,3/17,3	-

Resistance of vegetable crops to diseases is one of the most important characteristics of the variety. The quality of vegetable products depends on this. Phytopathological analysis of vegetable plants revealed viral, bacterial and fungal diseases. As can be seen from table 7, the varieties of vegetable crops studied affect both viral and fungal diseases. During the growing season until the second half of August, hot and dry weather prevailed, so in early August there was a high degree table-4 defeat of tomato varieties by types of diseases.

On July 25, 2019, diseases of tomato microorganisms were detected at the Babaykurgan field plot: late blight, alternariosis and verticilliosis (table 5). The highest degree of infection with viral diseases, alternariosis was the Rio Grande variety (the ratio of prevalence for viral diseases – 20.0/4.0%, alternariosis-33.3/2.7), and late blight - the Novichok variety (13.3/2.7%). Both varieties are equally damaged by verticillosis (6.7/1.3%). On August 7, 2019, tomatoes were affected by viral diseases, alternariosis, verticillosis and apical rot (figure 2-3).

Figure 2 - Type of disease Alternariosis and conidia Alternaria alternate

Viral diseases (20/5, 3%), alternariosis (33.3/10.7%) and high rottenness (100/53,3) – the Rio Grande variety was the most exposed, as well as equal prevalence of viral diseases and alternariosis (20 and 33.3%, respectively). Verticillatum (26,7/6,7%) severely damaged the grade Novichok (26,7/6.7 percent). On September 27, 2018, tomato plants were subjected to viral diseases, late blight, alternariosis and verticilliosis. Viral diseases (53.3/20.0%) and alternariasis (53.3/20%) prevailed in Rio Grande tomatoes, while late blight (60.0/16.0) and verticillosis (66.7/25.3%) prevailed in Novichok breeds.

Table 5 - Defeat viral diseases varieties of tomatoes (village Karachik)

Growing	Breed	Spread of diseases/development, %				
		Lamination	Wrinkled mosaic	Striped mosaic	Leaf roll	The twisting of the leaves
21 July 2019						
tomato	Junior	6,7/1,3	13,3/2,7	-	6,7/1,3	6,7/1,3
	Avrora	13,3/2,7	20,0/5,3	-	6,7/2,7	-
1 August 2019						
tomato	Junior	20,0/4,0	13,3/2,7	13,3/2,7	13,3/2,7	13,3/2,7
	Avrora	20,0/6,7	20,0/6,7	-	20,0/5,3	13,3/2,7
29 September 2019						
Томат	Junior	33,3/13,3	20,0/4,0	20,0/5,3	26,7/6,7	20,0/4,0
	Avrora	40,0/17,3	33,3/9,3	6,7/1,3	26,7/8,0	26,7/8,0

As can be seen from table 8, on July 21, 2019, it was found that the leaves of tomatoes are twisted, which means they are susceptible to viral diseases. Leaf twisting was mainly observed in the Aurora variety (26.7 / 8.0%), and leaf twisting virus (20.0/8.0%) was observed in tomatoes of the Junior variety.

Figure 3 - Type of disease Alternariosis and conidia Alternaria alternate

As can be seen from table 8, on July 21, 2019, it was found that the leaves of tomatoes are twisted, which means they are susceptible to viral diseases. Leaf twisting was mainly observed in the Aurora variety (26.7 / 8.0%), and leaf twisting virus (20.0/8.0%) was observed in tomatoes of the Junior variety.

The results of phytopathological control showed that various varieties of all types of tomatoes were affected by phytopathogenic microorganisms. During the growing season, the most dangerous disease in tomato fruit was apical rot of the fruit, which led to a significant decrease in the yield. The leaves are widely developed early blight and verticillus. Late blight at the end of the growing season was observed in full on both leaves and fruits (developed during fruit storage). When growing tomato crops at two sites was dominated by late blight, early blight, verticillus, viral diseases and apical rot. On the No. 1 site was dominated by late blight (the disease on 29 September 2019-16.0% by grade Beginner and 13.3% grade Junior), Alternaria (17.3% of the class Beginner and 20.0% of the variety Rio Grande) and verticillus. In section 2, viral diseases of tomatoes prevailed (an increase in the incidence on September 29, 2010-25.3% of the Novichok variety) and high rottenness (17.3% in the Rio Grande variety and 60.0% in the Novichok variety).

The use of new technologies, fertilizers, biologics, plant varieties, and other agromeric measures to increase crop yields and the quality of the resulting products in many ways requires additional labor costs, the use of material and monetary resources, a large number of technological means of mass production or their replacement with new ones, improving the professional staff of specialists, performers, and so on. This necessitates an economic assessment of the measures and their organizational justification [18].

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ҚАЗАҚСТАННЫҢ ОҢТҮСТІК АЙМАҒЫНДА ҚЫЗАНАҚҚА ЗИЯН КЕЛТІРЕТІН ФИТОПАТОЛОГИЯЛЫҚ САҢЫРАУҚҰЛАҚ ТҮРЛЕРІНІҢ БИОЛОГИЯЛЫҚ ЕРЕКШЕЛІКТЕРІ

Аннотация. Мақала вегетация және сақтау барысында пайда болатын қызанақ ауруын қоздырғыштардың биоэкологиялық ерекшеліктерін зерттеуге және оған қарсы күресу шараларын қарастырады. Жұмыс 2019 жылы Түркістан ауданының Бабайқорған, Жүйнек, Иассы ауылдық округтері маңындағы жер учаскесінде жүргізілді. Белгілі болғандай, көкөніс дақылда-рының өсу кезеңі топырақ температурасына байланысты. Біздің тәжірибеміз бойынша тұқымдық материал сәуір айының басында ашық топырақта отырғызылды. Топырақ өте қызған және ылғалданған жағдайда жүргізілді. Дақылға және сорттық ерекшеліктеріне байланысты өскін егуден кейін 6-15 тәулікте пайда болды. Фитопатологиялық бақылау нәтижелері қызанақ түрлерінің түрлі сорттары фитопатогенді микроорганизмдермен зақымданғанын көрсетті. Қауіпті ауру қызанақ жемістерін де шіритіп, өнімді айтарлықтай азайтты. Жапырақтарда альтернариоз және вертициллез кең дамыды. Фитопатологиялық бақылау нәтижелері бойынша №1 учаскеде

саңырауқұлақ ауруының басым екендігі туралы қорытынды жасауға болады, бұл аталған учаскеде жиі суару, оның көлеңкеленуі және өсімдіктердегі жеміс мөлшерінің көптігіне байланысты. №2 учаскеде вирус ауруы басым болды, бұл учаскенің арамшөптермен ластану жағдайы арқылы түсіндіріледі.

Түйін сөздер: фитопатология, саңырауқұлақ, қызанақ, ауру қоздырғышы, вегетация, микроорганизм, морфология, микроскопия, жіпшумақ, зақымдану.

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БИОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ВИДОВ ФИТОПАТОЛОГИЧЕСКИХ ГРИБОВ, ПОРАЖАЮЩИХ ТОМАТЫ (*LYCOPERSICON ESCULENTUM* MILL.) В ЮЖНОМ РЕГИОНЕ КАЗАХСТАНА

Аннотация. В статье рассматриваются исследования, направленные на обоснование видов возбудителей болезней томатов, возникающих в период вегетации и хранения, и мероприятий по борьбе с ними. Работы проводились в 2019 году на земельном участке вблизи сельских округов Бабайкорган, Жуйнек и Исса Туркестанской области. Как стало известно, период роста овощной рассады зависит от температуры почвы. По нашему опыту, семенной материал высаживали в открытый грунт в начале апреля. Почва была очень горячей и влажной. В зависимости от культуры и сортовых особенностей всходы появлялись на 6-15 день после посева. Результаты фитопатологического контроля показали, что различные сорта всех видов томатов были поражены фитопатогенными микроорганизмами. В течение вегетационного периода наиболее опасным заболеванием плодов томата была апикальная гниль плодов, которая приводила к значительному снижению урожая. Листья широко развиты ранним фитофторозом и вертициллой. Фитофтороз в конце вегетации наблюдался в полном объеме как на листьях, так и на плодах (развивался при хранении плодов). При выращивании томатных культур на двух участках преобладали фитофтороз, ранний фитофтороз, вертициллез, вирусные заболевания и апикальная гниль. На основании результатов фитопатологического контроля можно сделать вывод, что количество грибковых заболеваний преобладало на участке 1, что связано с частым поливом на этом участке, его затенением и большим количеством плодов на растениях. На участке 2 преобладали вирусные заболевания, что объясняется засорением участка сорняками.

Ключевые слова: фитопатология, грибы, томаты, возбудители болезней, вегетация, микроорганизмы, морфология, микроскопия, мицелии, поражения**.**

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SEARCHING FOR RESISTANCE SOURCES TO WHEAT COMMON BUNT (Tilletia caries (DC.)

Abstract. Common bunt (Tilletia caries (DC.) the disease occurs in areas where autumn wheat is grown. In our country, most of the zoned wheat varieties are infected with this disease. Therefore, foreign germoplasm should look for sources of strength. In our research in the field of artificial epizootic environment, the Hungarian 21 varieties of soft wheat Tilletia caries (DC.) of the pathogen was made the phytopathological and genetic-selection analysis. The study revealed that 15 wheat varieties are resistant to diseases, of which 8 wheat varieties were highly resistant to diseases (IT-0). They are; Ati, Békés, Berény, Csillag, Futár, Pilis, Szala and Rege. We say 7 varieties that are resistant to common bunt (IT-1), they are Kalász, Mentor, Göncöl, Fény, Garaboly, Szemes and Vitorlás. The indicator of the biomass index (NDVI) was determined at the stages of vegetative development of plants in ears, flowering phase and milky stage. The average value of the biomass index is higher than 0.70, with a high score of 9 varieties that have Ati, Mentor, Hajnal, Göncöl, Tisza, Csillag, Futár, Garaboly and Szala. As a result of the analysis of structural characteristics, the varieties Körös, Mentor, Tisza, Szala, Szemes and Rege showed a high index for all characteristics. As a result, disease-resistant and high-performance varieties can be presented as common bunt resistant specimens in immune selection.

Keywords: wheat, pathogen, infection, samples, inoculation, common bunt, resistant.

Introduction. The main criterion for the food security of the state is the creation of highly productive and resistant wheat varieties. Annually cereals are sown about 15.5 million hectares in the Republic of Kazakhstan and about 17-18 million tons of grain are produced, of which about 8 million tons are exported to Europe, the Middle East and Arab countries. To ensure food security, it is necessary to increase genetic resistance to pests and diseases, as well as adaptation to climate change combined with improved agronomic practices [1, 2].

The use of genetically resistant cultivars is considered to be the most effective, economic and environmentally safe method for disease control. The region of Central Asia is one of the world's most important producers of wheat, encompassing a production are of more than 15 million ha [3-5]. The problem of ensuring crop stability is of particular importance for Kazakhstan, most of the grain-sowing regions of which are located in areas with insufficient moisture, high temperatures, excessive salinization and intense phytosanitary conditions [6-8]. Developing high yielding and leaf rust, stripe rust and stem rust resistant cultivars is an important objective of winter and spring wheat (*Triticum aestivum* L.) improvement programs in Central and West Asia [9-13]. Production of wheat in Kazakhstan is being constrained also by leaf spotting diseases, including tan spot, caused by *Pyrenophora tritici-repentis* [14-17] and common bunt, caused by *Tiletia caries* [18].

One of the most devastating diseases of wheat in the world is common bunt. The causative agents of the disease are the fungi Tilletia caries and T. Laevis [19, 20]. In Europe, the yield loss due to the common bunt was more than 50%, in some years this disease led to a complete loss of harvest [19, 21]. However, in

the first half of the 20th century, the common bunt caused more yield losses and quality, than all other wheat diseases in the United States of America [19]. The most important source of infection is contaminated seeds. Infection of wheat occurs during germination, this is promoted by cool and humid conditions. Affected ears of light weight, do not droop, have a greyish-violet hue, emit a herring smell [20]. Koyshybaev M.K. (2002) reported that when seed is sown with untreated seeds, wheat is affected by the bunt up to 10% or more, which leads not only to direct losses, but to a marked decrease in grain quality, and to the toxic properties of bile spores containing alkaloid trimethylamine, which adversely affects human health and agricultural animals. Strongly spore-contaminated seeds cannot be used for cooking food and animal feed [20, 22, 23]. Many Kazakhstan wheat varieties, which have a stable yield, high quality of grain and ecological plasticity, are greatly affected by the diseases on the infectious background. This can lead to large losses in the agrarian sector in the case of the emergence of epiphytotics [2].

In traditional agriculture, a common bunt is often exclusively controlled by chemical seed treatment. In modern conditions, when Kazakhstan began the process of entering the WTO, the export of wheat to the European Union must meet the requirements of organic farming. Considering that these chemical methods of treatment with seed disinfectants are prohibited in the EU and in accordance with organic certification standards, there is the need to use alternative methods of controlling a common bunt in organic conditions. However, since synthetic chemicals are banned in organic farming, the common bunt is a serious threat to the production of organic wheat and for seed production [24]. The Commission Regulation (EC) No 1452/2003 states that starting from 2004 all plant material used for organic farming should be produced without chemical treatments. Thanks to this decree, it now becomes extremely important that the seed and planting material are free of pathogens and of excellent quality [25].

In order to maintain high yield and excellent quality of seeds, organic producers must rely on disease-resistant wheat varieties [24]. The most effective method of combating the bunt is the genetic protection of plants, which is achieved by introducing new resistant to common bunt lines into production. Thus, instead of using chemical seed treatments, organic means are needed to combat plant diseases. Wheat varieties carrying resistance genes are used as an alternative method of fighting instead of chemical fungicides against common disease.

Materials and methods. The research work was carried out in the laboratory of genetics and selection of the Institute of plant biology and biotechnology and in the experimental field of the Kazakh research Institute of agriculture and crop production. The research study material consisted of from Hungary 21 varieties of soft wheat and common bunt Tilletia caries pathogen spores of crop in Almaty region acreage were used. In the study, Bogarnaya 56 was selected as a standard resistant to common bunt. In the inoculation of wheat with the pathogen A.I. Borggard-Anpilogova's method (1961) was used [26]. Samples Tilletia caries (D.C.) the V. I. Krivchenko scale (1974) was used to assess infection with the pathogen [27]. The V. I. Krivchenko scale (1974) samples Tilletia caries (D.C.) was used to assess infection with the pathogen [27]. According to this method: 0 - highly resistant varieties or entries, affection up to 1%; 1 - practically resistant, infestation of ears not more than 5%; 2 - moderately susceptible, no more than 10-25% of ears are affected; 3 - susceptible - 26-50% of ears; - highly susceptible - up to 51-100%. The method of determining the index of plant biomass (NDVI – Normalized Difference Vegetation Index) [28]. This method is used to calculate the indicators of the biomass index (NDVI) at the vegetative stages of wheat development. Methods for determining the productivity of wheat varieties. When the wheat was ripe, it was harvested and structural analysis was carried out. Statistical data processing was calculated in Excel [29].

Results. Previously, we studied samples of Bulgaria, SIMMYT, Bt-isogenic lines, and Romanian wheat on the common bunt disease [30-33]. PCR analysis revealed the sources of *Bt-9* and *Bt-10* endurance from the Romanian samples 02429GP-1, F08245G1, F08034G1 and F07270G2 identified. Of the isogenic lines, *Bt-0, Bt-1, Bt-2, Bt-3, Bt-4, Bt-5, Bt-6, Bt-7, Bt-9, Bt-10, Bt-11, Bt-14, Bt-15* and *Bt-8,9,10* are identified. From Bulgarian wheat varieties samples Karina, Enola, Iveta, Korona, Slaveya, Yunak, KM 135, Geya, Tsarevo and Boryana tilletia caries (D.C.) pathogenin highly resistant (IT-0), revealed that. Of the SIMMYT wheat samples, 10 wheat samples were found to be resistant to common bunt. 21 soft wheat from Hungary has been tested for disease resistance as part of an artificial epidemic. The study found common bunt of the samples (Tilletia caries (D.C.) Tul. & C. Tul) data were obtained on the persistence of field crops. In the period from the waxing period to the ripening period of wheat, the

incidence was estimated 3 times. Depending on the type of infection, models can be classified into 5 groups: highly resistant, persistent, weakly resistant, and moderately resistant (table 1, figure1).

Table 1- Disease resistance of common bunt of grain samples, Almaty region, 2019

Cultivar	Origin	Total No, of plants	Infection spikes, pcs				Infected plants, %	Disease reaction
			I-Infection	II-Infection	III-Infection	The total number of infected spikes		
Ati	HUN	105	0	0	0	0	0	R
Bekes	HUN	64	0	0	0	0	0	R
Bereny	HUN	88	0	0	0	0	0	R
Kalasz	HUN	78	5	1	0	6	7,7	MS
Koros	HUN	69	21	1	0	22	31,9	S
Mentor	HUN	91	0	5	2	7	7,7	MS
Hajnal	HUN	148	15	0	0	15	10,1	MS
Goncol	HUN	80	6	1	0	7	8,8	MS
Tisza	HUN	89	18	0	0	18	20,2	MS
Csillag	HUN	137	0	0	0	0	0	R
Futar	HUN	125	0	0	0	0	0	R
Feny	HUN	128	0	0	6	6	4,7	MR
Pilis	HUN	120	0	0	0	0	0	R
Petur	HUN	78	30	24	0	54	69,2	HS
Garaboly	HUN	85	0	3	0	3	3,5	MR
Szala	HUN	105	0	0	0	0	0	R
Szemes	HUN	148	0	2	0	2	1,4	MR
Vitorlas	HUN	102	4	4	0	8	7,8	MS
Rege	HUN	147	0	0	0	0	0	R
Raba	HUN	122	20	5	0	25	20,5	MS
Rozi	HUN	108	23	0	0	23	21,3	MS
Bogarnaya 56	KAZ	120	10	30	30	70	58,3	HS

Phytopathological assessment of resistance to common bunt was performed. The study of resistance to on an infectious background showed that 8 varieties are characterized by common bunt resistance to Tilletia caries with a incidence of 0%. These varieties include Ati, Vekes, Vegepu, Csillag, Futár, Pilis, Szala, Rege. Of the 21 samples studied, 3 are weakly susceptible (Fény, Szemes, Garaboly), and the affected ears do not exceed 1-5%. The group of weakly susceptible varieties with 6-25% included 8 varieties (Kalash, Mentor, Hajnal, Göncöl, Tisza, Vitorlas, Rose, Rose). The körös variety was shown to be susceptible (26-50% incidence). Varieties Petur and Bogarnaya 56 showed highly susceptible (51-100% incidence).

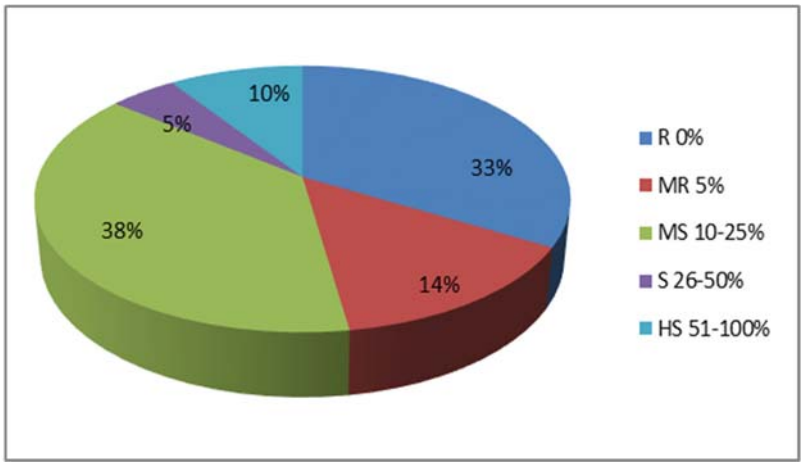

Figure 1 – Infection with the disease of common bunt of wheat varieties in the field of artificial infection, Almaty region, Almalybak 2019

According to the results of phytopathological screening, the studied 21 varieties of wheat are ranked according to the V. I. Krivchenko scale (1974) according to the degree of resistance to disease into groups: Resistant (33%), practically resistant (14%), moderately susceptible (38%), Susceptible (5%), Highly Susceptible (10%) (figure 1).

The biomass index (NDVI) was calculated during the vegetative development of wheat samples at the stages of colorfulness, flowering and molestation. During the ear period, the biomass index (NDVI) was recognized as the highest indicator, distinguished by 8 varieties, they are: Bekes, Hajnal, Goncol, Tisza, Csillag, Futar, Garaboly and Szala. The NDVI of these varieties was higher than 0.75. During the flowering period of wheat development, the highest index index was observed (figure 2), during this period, the biomass index was in the range of 0.70-0.80. It was found that the biomass index above 0.80 is 11 varieties, including Ati, Bekes, Bereny, Mentor, Hajnal, Goncol, Tisza, Csillag, Petur, Garaboly and Rozi (table 2).

Table 2- Wheat samples biomass index (NDVI), Almaty region, 2019

Cultivar	Plant Biomass Index (NDVI)			Average values
	Heading period	Flowering period	Period of milk ripeness	
Ati	0,72	0,81	0,59	0,71
Bekes	0,76	0,80	0,46	0,67
Bereny	0,69	0,77	0,52	0,66
Kalasz	0,73	0,72	0,56	0,67
Koros	0,68	0,74	0,56	0,66
Mentor	0,71	0,81	0,63	0,72
Hajnal	0,77	0,78	0,66	0,74
Goncol	0,79	0,77	0,65	0,74
Tisza	0,75	0,78	0,66	0,73
Csillag	0,76	0,78	0,66	0,73
Futar	0,77	0,73	0,64	0,71
Feny	0,71	0,74	0,63	0,69
Pilis	0,68	0,73	0,56	0,66
Petur	0,68	0,80	0,58	0,69
Garaboly	0,76	0,80	0,56	0,71
Szala	0,79	0,73	0,72	0,75
Szemes	0,72	0,73	0,57	0,67
Vitorlas	0,72	0,74	0,59	0,68
Rege	0,69	0,73	0,59	0,67
Raba	0,71	0,73	0,54	0,66
Rozi	0,73	0,79	0,54	0,69
Bogarnaya 56	0,71	0,73	0,54	0,66

During the period of wheat ripening, the biomass index above 0.65 was recognized as a high indicator of 8 varieties that have Mentor, Hajnal, Goncol, Tisza, Csillag, Futar, Feny and Szala.

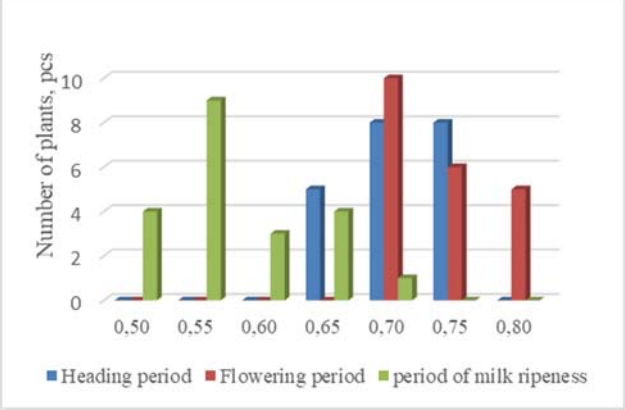

Figure 2 – Biomass index dynamic (NDVI)

Thus, the biomass index (NDVI) of the histology, flowering, and molestation stages of plants had a high index of 9 varieties, with an average index value (NDVI) higher than 0.70, as shown by Ati, Mentor, Hajnal, Goncol, Tisza, Csillag, Futar, Garaboly, and Szala. In our next study, we analyzed the structural features of mature wheat samples. We can see that the germination period of wheat varieties lasted from May 22 to June 2. The earliest ears: Ati, Bekes, Bereny, Koros, Hajnal, Tisza, Csillag, Futar, Feny, Pilis, Garaboly and Vitorlas. The flowering period of these varieties is from May 22 to May 25. The height of all wheat varieties in plant height is 85-108 cm. 6 varieties of wheat with an Ear length of more than 10 cm were distinguished by a high indicator, they; Bekes, Mentor, Tisza, Garaboly, Szemes, and Rege (table 3).

Table 3 - Structural analysis of cultivars wheat, Almaty region, 2019

Cultivar	Days to heading	Plan height (cm)	Spike length (cm)	Kernels/ spike	Grain weight/spike, pcs	Grain weight/spike (g)	Thousand kernel weight (g)
Ati	24.05.2019	85	7,50±0,22	19,0±2,00	46,2±6,21	1,60±0,46	35,55
Bekes	25.05.2019	94	10,85±1,96	20,6±1,20	50,5±5,55	2,40±0,28	46,74
Bereny	25.05.2019	84	9,32±0,39	22,5±1,36	62,9±9,80	1,80±0,50	30,75
Kalasz	26.05.2019	89	9,11±0,37	20,9±1,14	35,6±4,89	1,70±0,27	53,26
Koros	24.05.2019	87	8,96±0,38	21,6±1,28	59,3±6,84	2,50±0,26	43,8
Mentor	27.05.2019	94	12,32±0,33	20,9±0,83	69,2±6,83	2,85±0,39	41,05
Hajnal	25.05.2019	88	9,14±0,66	20,9±1,81	38,1±9,32	1,58±0,48	40,51
Goncol	26.05.2019	86	8,31±0,89	20,4±1,50	43,3±5,52	1,85±0,26	42,37
Tisza	23.05.2019	84	11,08±0,80	21,9±1,22	55,0±6,73	2,23±0,35	40,82
Csillag	24.05.2019	88	7,32±0,75	18,4±0,92	40,8±5,07	1,32±0,13	34,51
Futar	22.05.2019	85	9,61±0,85	19,6±1,43	31,2±14,86	1,27±0,15	50,93
Feny	25.05.2019	100	9,23±0,56	21,5±1,28	48,4±6,64	1,82±0,31	37,93
Pilis	24.05.2019	93	8,25±0,35	18,8±0,98	52,2±8,59	2,16±0,26	42,8
Petur	30.05.2019	87	8,44±0,72	21,6±0,92	53,2±7,26	1,62±0,37	35,48
Garaboly	23.05.2019	73	10,45±1,10	21,4±2,33	56,2±9,19	1,57±0,40	32,13
Szala	02.06.2019	98	8,56±0,63	21,7±1,49	59,2±4,59	2,34±0,32	43,84
Szemes	28.05.2019	105	10,36±0,49	24,6±3,29	74,1±10,62	2,19±0,36	29,57
Vitorlas	23.05.2019	81	8,78±1,14	18,9±1,30	36,1±7,39	1,43±0,27	41,3
Rege	26.05.2019	108	11,27±1,11	24,7±4,29	69,0±16,97	2,64±0,72	38,41
Raba	28.05.2019	99	9,26±1,11	19,9±1,97	48,3±3,10	1,58±0,35	33,74
Rozi	27.05.2019	92	7,48±0,51	20,9±1,45	46,6±9,13	1,42±0,41	33,21
Bogarnaya 56	25.05.2019	110	9,7±21	20,12±1,33	40,3±32	1,60±36	44,65

The number of ears of more than 21 samples showed high indicators of 9 varieties: Bereny, Koros, Tisza, Feny, Petur, Garaboly, Szala, Szemes and Rege. The amount of grain in the main ear was more than 55 pieces; varieties Bereny, Koros, Mentor, Tisza, Garaboly, Szala, Szemes and Rege were found to be high. Bekes, Koros, Mentor, Tisza, Pilis, Szala, Szemes and Rege varieties with a grain weight of more than 2 grams in the main ear showed high indicators. Bekes, Kalasz, Koros, Mentor, Hajnal, Goncol, Tisza, Futar, Pilis, Szala and Vitorlas showed the highest indicators for the weight of 1000 seeds.the weight of 1000 seeds of these varieties exceeded 40 grams.

Discussion. T. caries fungal pathogens are the major actors for common bunt disease. This disease is very dangerous seed borne disease for wheat and causes heavy losses in yield quality and quantity [34]. Since 2018, we have been searching for reliable sources of resistance to smut of wheat among collection samples of domestic and foreign selection from around the world during artificial infection, studying their

biological characteristics and economically valuable traits [30, 31, 32, 35]. As part of an artificial epidemic, the Hungarian 21 wheat cultivar has been tested Tilletia caries (D.C.) Tul. & C. Tul resistance to the pathogen. The study distinguished 8 wheat varieties that are highly resistant to the common bunt, they are Ati, Békés, Berény, Csillag, Futár, Pilis, Szala and Rege. 7 varieties were found to be stable, which are, Kalász, Mentor, Göncöl, Fény, Garaboly, Szemes and Vitorlás. The biomass index (NDVI) was calculated at the vegetative stages of wheat development. The biomass index of Bekes, Hajnal, Goncol, Tisza, Csillag, Futar, Garaboly and Szala varieties was high. during the flowering period, the indices of ATI, Bekes, Bereny, Mentor, Hajnal, Goncol, Tisza, Csillag, Petur, Garaboly and Rozi samples were recognized as high. During the milking period of wheat, the highest indicators of the index's biomass are: Mentor, Hajnal, Goncol, Tisza, Csillag, Futar, Feny, and Szala. As a result of the analysis of structural features of economically valuable wheat varieties Koros, Mentor, Tisza, Szala, Szemes and Rege showed high indicators for all features. With the early Ear, 12 varieties of wheat were distinguished, such as Ati, Bekes, Bereny, Koros, Hajnal, Tisza, Csillag, Futar, Feny, Pilis, Garaboly, and Vitorlas. These varieties can be submitted to the breeding program as a model that is resistant to diseases of the common bunt. Recently held studies aimed at assessing sustainability germplasm of wheat to smut [18]. Screening of large pools of genotypes comprising commercial and historical varieties, breedding lines, and old local accessions revealed very low levels of resistance [21]. The search for new sources of resistance would enhance the genetic diversity available for breeding purposes.

Conclusion. Thus, our research data allowed us to expand the range of sources and donors of wheat resistance to smut. To increase the efficiency and effectiveness of breeding programs designed to increase the resistance of breeding material and, in the future, varieties, the released sources were comprehensively evaluated for economic utility. Given the presence and absence of important agronomically valuable traits among the selected sources, the selection of parental pairs for hybridization should be carried out.

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БИДАЙДЫҢ ҚАТТЫ ҚАРАКҮЙЕГЕ (TILLETIA CARIES (DC.) ТӨЗІМДІЛІГІНЕ СКРИНИНГ

Аннотация. Қатты қоқыс (Tilletia caries (DC.) күздік бидай өсірілетін жерлерде кездеседі. Елімізде аудандастырлған бидай сорттарының басым бөлігі аталған аурумен залалданған. Сондықтан шетелдік гермоплазмалардан төзімділік көзін іздеу керек.

Зерттеулерімізде танапты жасанды індеттік ортада венгриялық 21 жұмсақ бидай сортының *Tilletia caries* (DC.) патогеніне фитпатологиялық және генетика-селекциялық талдау жүргізілді. Зерттеу нәтижесінде 15 бидай сорты ауруға төзімді деп анықталды, соның ішінде 8 бидай сорты ауруға жоғары төзімді (IT – 0) деп ерекшеленді. Олар мыналар: Ati, Bekes, Bereny, Csillag, Futár, Pilis, Szala, Rege. Қатты қаракүйеге төзімді (IT – 1) деп 3 сортты айтамыз, олар: Fény, Szemes, Garaboly. Әлсіз төзімсіз тобына 6-25% есепке алыну бойынша 8 сорт (Kalász, Mentor, Hajnal, Göncöl, Tisza, Vitorlás, Rába, Rozi) анықталды. Төзімсіз сорт ретінде Körös (ауру 26-50%) сорты байқалды. *Tilletia caries* (D.C.) патогенімен 69%-бен залалданған Petur сорты жоғары деңгейде төзімсіздік танытты.

Индекс биомасса көрсеткішінің орташа мәні 0,70-тен жоғары болған 9 сорт жоғары көрсеткішке ие деп ерекшеленді, олар: Ati, Mentor, Hajnal, Göncöl, Tisza, Csillag, Futár, Garaboly және Szala.

Құрылымдық белгілеріне талдау нәтижесінде Körös, Mentor, Tisza, Szala, Szemes және Rege сорттары барлық белгілері бойынша жоғары көрсеткіш көрсетті. Нәтижесінде ауруға төзімді және өнімділігі жоғары сорттарды иммунитет селекциясында қатты қаракүйеге төзімді үлгілер ретінде ұсынуға болады.

Түйін сөздер: бидай, патоген, инокуляция, қатты қаракүйе, төзімді.

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СКРИНИНГ НА УСТОЙЧИВОСТЬ К ТВЕРДОЙ ГОЛОВНЕ (TILLETIA CARIES (DC.) ПШЕНИЦЫ

Аннотация. Твердая головня (Tilletia caries (DC.) встречается в районах, где выращивается озимая пшеница. В нашей стране большинство районированных сортов пшеницы заражены этим заболеванием. Поэтому источники устойчивости следует искать в зарубежных гермоплазмах. В наших исследованиях в области искусственной эпизоотической среды на венгерском 21 сорте мягкой пшеницы Tilletia caries (DC.) возбудителя был проведен фитопатологический и генетико-селекционный анализ. В результате исследования было выявлено, что 15 сортов пшеницы устойчивы к болезням, из которых 8 сортов пшеницы были высокоустойчивы к болезням (ИТ-0). Это: Ати, Бекес, Берени, Чиллаг, Футар, Пилис, Сала и Риге. Слабовосприимчивыми оказались 8 сортов, поражаемость составила 6-25% (Kalász, Mentor, Hajnal, Göncöl, Tisza, Vitorlás, Rába, Rozi). Восприимчивым оказался сорт Körös (поражаемость 26-50%). Патогеном Tilletia caries (D.C.) на 69% заразился сорт Petur и проявил высокую восприимчивость. Среднее значение показателя индекса биомассы выше 0,70 показали 9 сортов пшеницы Ati, Mentor, Hajnal, Göncöl, Tisza, Csillag, Futár, Garaboly и Szala. В результате анализа структурных характеристик сорта Кереш, Ментор, Тиса, Шала, Шемес и Реге показали высокий индекс по всем признакам. В результате устойчивые к болезням и высокоэффективные сорта могут быть представлены в программу селекции в качестве модели, устойчивой к твердой головне пшеницы.

Ключевые слова: пшеница, патоген, инокуляция, твердая головня, устойчивость.

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MORPHOLOGICAL AND GENOTYPIC FEATURES OF THE POPULATIONS OF FLEAS OF THE GENUS *XENOPSYLLA* GLINKIEWICZ, 1907 (SIPHONAPTERA, PULICIDAE) FROM THE AUTONOMOUS FOCI OF THE CENTRAL ASIAN NATURAL DESERT PLAGUE FOCUS

Abstract. The paper presents the results of the study of some morphological and genotypic features of fleas of the *genus Xenopsylla: X. gerbilli minax, X. skrjabini, X. hirtipes* - the main vectors in the Central Asian natural desert plague focus. In order to identify population characteristics, for the first time we attempted both morphological analysis using the ImageJ computer program and subsequent data processing in a free statistical environment R version 4.0.0 with R Studio graphic shell, as well as genetic analysis of a fragment of a nucleotide sequence of the *COII* gene of fleas sampled in Pre-Ustyurt, Betpakdala and Pre-Pre-Balkhash autonomous plague foci. As a result of the study of morphometric indices of the main plague vectors in Kazakhstan, independent populations of three species of fleas of the genus *Xenopsylla* have been identified: the Betpakdala and Pre-Pre-Balkhash populations of *X. gerbilli minax* and *X. hirtipes*, as well as the Pre-Pre-Balkhash, Betpakdala and Pre-Usturt populations of *X. skrjabini* fleas.

Keywords: fleas, *Xenopsylla,* plague, morphometry, DNA, genotyping, populations.

Introduction. Over the past 20 years, despite the absence of outbreaks, plague prevention in Kazakhstan is one of the important and priority tasks. Plague foci on the territory of the Republic remain active to this day, occupying about 40% of the territory and stretching from the north-western to south-eastern borders. A special position is occupied by the Central Asian natural desert plague focus, which is located in the desert zone, stretching from the eastern coast of the Caspian Sea to the south-east to the foothills of the Tien Shan [1]. The main host of plague in the Central Asian desert hearth is the great gerbil *Rhombomys opimus*, and its main vectors are fleas of the genus *Xenopsylla* [1, 2, 3]. The number and distribution of fleas depend on many different factors: natural and climatic, hydrological regime and soil structure, species, physiological state and gender-age characteristics of the host-feeder [4-7].

Fleas of the genus *Xenopsylla*, widely distributed in many countries of the world, are the most numerous, frequently occurring and play an important role in the circulation of zoonotic agents in natural foci [8, 9]. Fleas of *Xenopsylla* can feed on many species of animals, including synanthropic animals, and may participate in the circulation of zoonotic pathogens in domestic animals and humans [10].

Fleas of *Xenopsylla* belong to a family with a relatively wide range, typical for fauna of tropical and subtropical belts [8, 9]. They are found in Kazakhstan, Turkmenistan, Uzbekistan, as well as in the deserts of northern Mongolia, northwest China, eastern Iran, northern Afghanistan and Pakistan. *Xenopsylla*

gerbilli minax living in China are genotyped [11], while typing of the genome of fleas of the genus *Xenopsylla* in the Central Asian desert plague focus in Kazakhstan has not been previously conducted.

All of the above together served the purpose of our research - to study the genetic and phenotypic diversity of ecological populations of the plague pathogen transmission fleas from autonomous foci of the Central Asian natural desert plague focus.

Material and research methods. Studies in the foci were conducted in accordance with the Sanitary Regulations "Sanitary and epidemiological requirements for the organization and conduction of sanitary and epidemiological (preventive) measures to prevent infectious diseases (plague, cholera)," approved by the Government of the Republic of Kazakhstan on January 12, 2012 № 32 and the Resolution of the Chief State Sanitary Inspector of the Republic of Kazakhstan from 27. 11. 2015 № 20 "About the sanitary-epidemiological and prophylactic measures in the territory enzootic by plague of the Republic of Kazakhstan for 2016-2020.

The material for work served as fleas of genus *Xenopsylla* caught by employees of anti-plague stations in three autonomous foci of the Central Asian natural desert plague focus (Pre-Pre-Balkhash, Betpakdala and Pre-Ustyurt) at carrying out of annual planned epizootological inspection of territories of natural foci of Kazakhstan on plague according to Sanitary rules. Fleas from the collection of the zoo-parasitological museum of the Masgut Aikimbaev's National Scientific Center from the Pre-Pre-Balkhash, Pre-Ustyurt, Betpakdala and Tienshan plague foci were also studied.

For morphometric studies 681 specimens of fleas of three species of the genus *Xenopsylla* (*X. hirtipes, X. skrjabini, X. gerbilli minax*) were selected and studied from territorially isolated from each other in the Pre-Balkhash, Betpakdala, Pre-Ustyurt and Tienshan autonomous foci.

For species identification and morphological analysis preparations from fleas were done using standard methods [12]. Head and bristles of the head were measured using photos of flea preparations using the ImageJ program [13]. For correct interpretation of the results of the analysis, we used signs whose variability does not depend on body size [14-16]. In the preliminary stage meristic features that have a discrete variability were selected, and vary within certain limits, and represent one of the characteristic features of the external appearance of insects, allow to analyze the variability, do not undergo changes during the life of an imago: head length, distance between the eye and parietal bristles and distance between parietal and angular bristles.

Multiple linear regression was used to evaluate the impact on the listed phenotypic features of the trapping site (region) and sex of insects. Data processing was performed in a free statistical environment R version 4.0.0 with a graphical shell R Studio [17].

For genetic analysis, 22 specimens identified as *X. gerbilli minax* were selected from three isolated plague foci (table 1).

Table 1 - Flea samples taken for genetic analysis

Code	Coordinates	Autonomous focus
II-B1	10 П-1, ББ-225. Muyunkum N44°30'305″ E77°25'802″	Pre-Pre-Balkhash
II-B2	10 П-1, ББ-225. Muyunkum N44°30'305″ E77°25'802″	Pre-Pre-Balkhash
II-B3	11 П-4, ББ-226. Muyunkum N44°31'140″ E77°26'368″	Pre-Pre-Balkhash
II-B4	11 П-4, ББ-227, Muyunkum N44° 31' 328″ E77°25'928″	Pre-Pre-Balkhash
II-B5	13С-ББ-220, Malaisary N44° 31'328″ E77°25'928″	Pre-Pre-Balkhash
II-B6	13С-ББ-220, Malaisary N44° 31'328″ E77°25'928″	Pre-Pre-Balkhash
II-B7	13С-2, ББ-222, Malaisary N44°18'249″ E77°08'137″	Pre-Pre-Balkhash
II-Sh1 - II-Sh15	N 45°12', E 67°25'; N 45°38', E 69°21'	Betpakdala

DNA was isolated from separate specimens using Qiamp DNA minikit for tissue protocol (Qiagen, Hilden, Germany). The samples were previously homogenized by shaking with a glass and steel ball and TissueLyser using the protocol.

Composition of the reaction mixture: Insect-A-tLEU and Insect-B-Tlys primers with 20 pmols each in the reaction; 75 mMTris-HCl (pH 8.8 at 25°C), 20 mM (NH4)2SO4, 0.01% (volume/volume) Twin 20; DNTF in concentration of 200 nM each; 2 units of Taq DNA polymerase; magnesium ions 2.5 mM; *R. opimus* DNA - 3 ng. PCR amplification program: prolonged denaturation 95ºC - 3 minutes; 35 cycles 95ºC - 20 seconds, 59° - 30 seconds, 72ºC - 1 minute; final elongation 7 minutes at 72ºC.

Purification of PCR products was carried out by enzymatic method using Exonuclease I (Ferments) and alkaline phosphatase (Shrimp Alkaline Phosphatase, Ferments) (Werle et al. 1994). Sequencing was performed by using the BigDye® Terminator v3.1 Cycle Sequencing Kit (Applide Biosystems) and the primers used for PCR amplification, according to the manufacturer's instructions. Fragment separation was carried out on a 3730xl DNA Analyzer (Applide Biosystems) automated genetic analyzer. Quality assessment and assembly in contigs was performed by using SeqScape 2.6.0 (Applied Biosystems).

Phylogenetic analysis was performed using MEGA 7.0 software. Using the maximum likelihood method, the Tamura 3-parameter model, discrete Gamma distribution, and Bootstrap 1000. Due to shorter gene fragments of other species of fleas from the NCBI database 651 b.p were used for phylogenetic analysis.

Results. For morphometric studies, 681 specimens of fleas of *Xenopsylla* genus were divided by species, each species was divided into groups at the place of sampling. Each species was considered separately.

X. gerbilli minax in the plague foci of Kazakhstan is distributed from the middle current of the Syr-Darya river to the east through the Betpakdala desert, Kyzylkum and Moyynkum sands, reaches the Karatal river, then interrupts and the most eastern part of the range lies between Alakol lake and the eastern border with the People's Republic of China (figure 1).

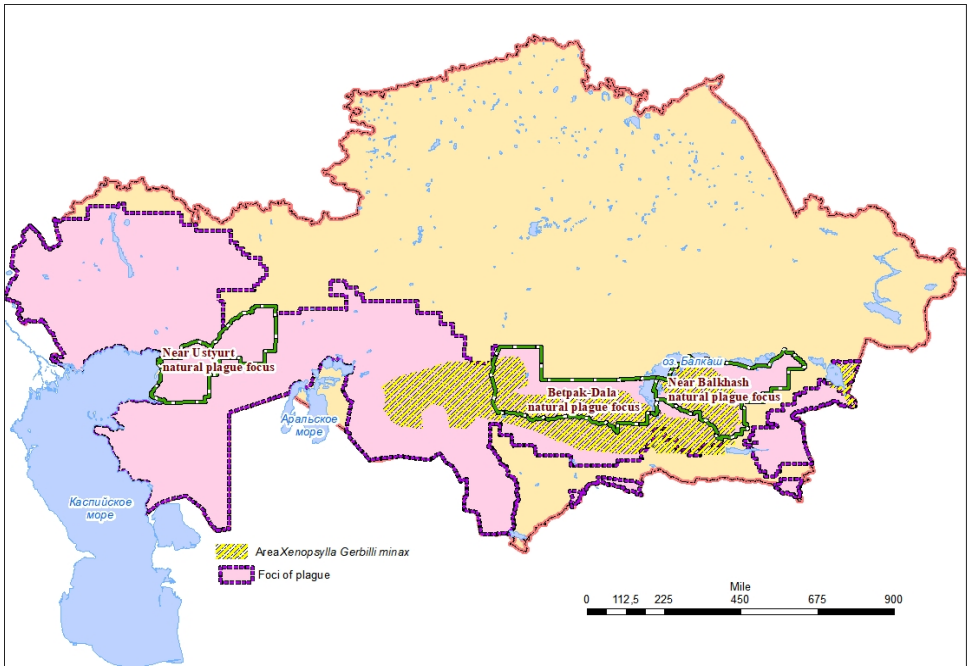

Figure 1 - Distribution of *X. gerbilli minax* in Kazakhstan

368 specimen fleas of this species were divided into 3 groups in their habitat - 147 specimen fleas collected from the Pre-Balkhash autonomous plague focus, 71 specimens - from the Betpakdala autonomous plague focus, 150 specimens - from the Tianshan autonomous plague focus, located on the territory of the People's Republic of China, kept in the zoo-parasitological museum of the Masgut Aikimbayev National Scientific Center of Especially Dangerous Infections.

X. gerbilli fleas sampled in Dzungarian autonomous plague focus, statistically significantly differed from the fleas of the same species from other foci by the distance between parietal and angular bristles ($p = 0.00149$), including after stratification by sex ($p = 0.00007$).

The area of *X. hirtipes* in plague foci of Kazakhstan occupies much smaller territory in comparison with *X. gerbilli minax* and is mainly connected with sandy areas (figure 2).

137 specimens of fleas of this species were divided into 3 groups in their habitat - 105 specimens of fleas collected from the Pre-Balkhash autonomous plague focus, 27 specimens - from the Betpakdala autonomous plague focus. For comparative assessment, we also studied 5 specimens of fleas from the

Tienshan plague focus located in the territory of the People's Republic of China, stored in the zoo-parasitological museum of the Masgut Aikimbayev National Scientific Center of Especially Dangerous Infections.

X. hirtipes fleas sampled in the Pre-Balkhash and Betpakdala foci statistically significantly differed from the fleas other foci by the distance between the ocular and parietal bristles (p = 0,00126 and 0,00025 respectively), as well as by the distance between the parietal and angular bristles (p = 0.00138 and 0.00402 respectively), including after stratification by sex (p = 0.0525 and p = 0.02127).

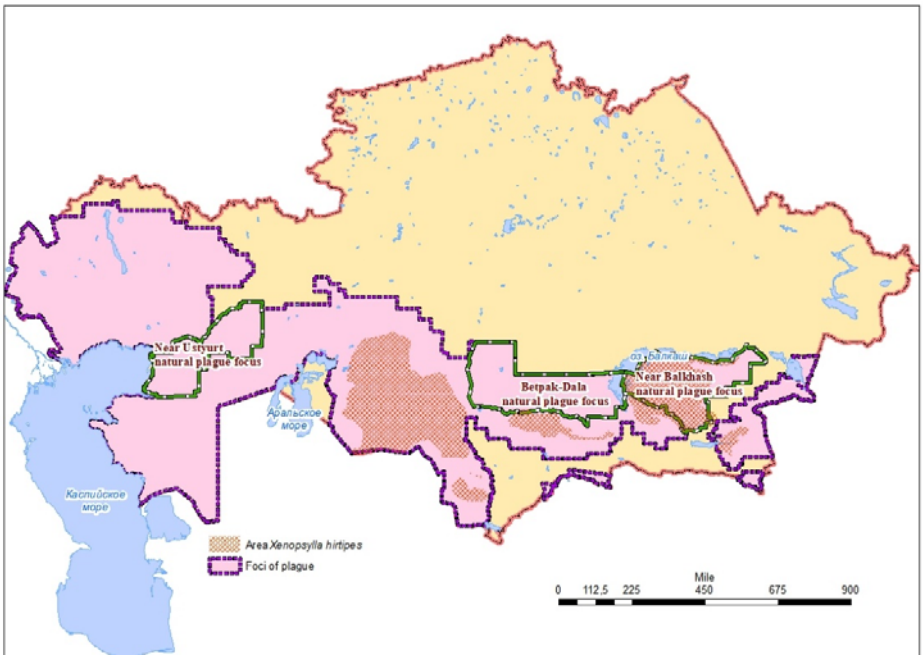

Figure 2 - Distribution of *X. hirtipes* in Kazakhstan

The area of *X. skrjabini* occupies a significant part of the plague foci of Kazakhstan and stretches from the north-western coast of the Caspian Sea to the east to the southeast border with China on the eastern border with the People's Republic of China (figure 3).

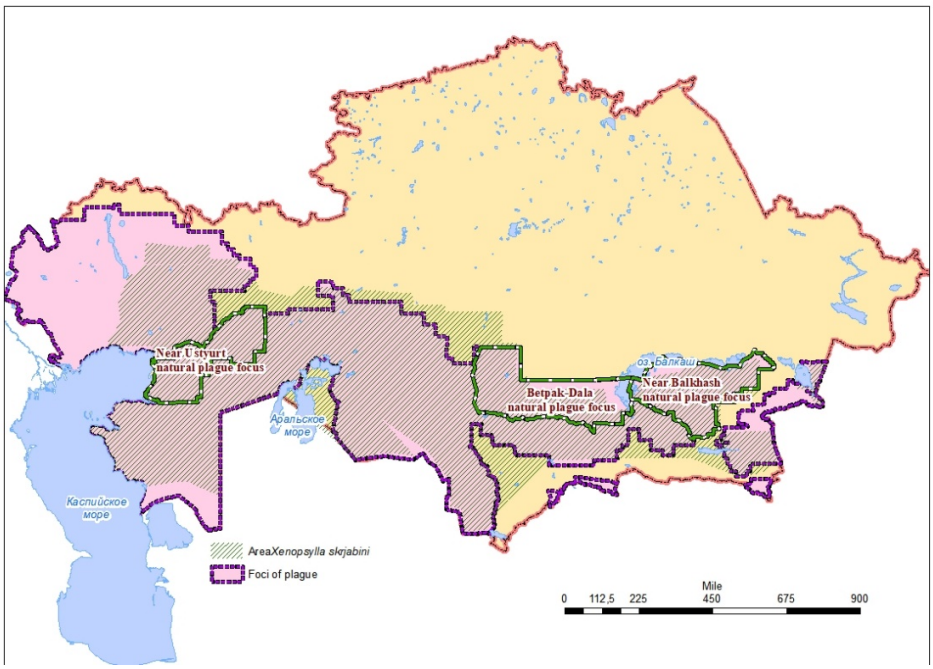

Figure 3 - Distribution of *X. skrjabini* in Kazakhstan

176 specimens of fleas of this species were divided into 4 groups in their habitat - 72 specimens of fleas collected from the Pre-Balkhash autonomous plague focus, 56 specimens - from Betpakdala and 13 specimens from the Pre-Ustyurt plague focus. For comparative assessment, we also studied 35 specimens of fleas from the Tienshan plague focus, located in the territory of the People's Republic of China, stored in the zoo-parasitological museum of the Masgut Aikimbayev National Scientific Center of Especially Dangerous Infections.

X. skrjabini fleas from Betpakdala, Pre-Balkhash and Pre-Ustyurt foci of Kazakhstan do not statistically significantly differ by the distance between the ocular and parietal bristles. Fleas caught in Betpakdala focus statistically significantly differ from other fleas in terms of head length (p=0, 0355) and distance between parietal and angular bristles (p=0,0181).

Genotyping and search for population diversity and genome features of the genus *Xenopsylla* were performed by analyzing a fragment of the *COII* gene nucleotide sequence. Phylogenetic analysis clustered 22 samples from Kazakhstan into one treasure with *X. gerbilli minax* samples. Samples with code A4, A5, A2, A3 and A10 are located in the same branch. The remaining 17 sequences are completely identical to the samples from China.

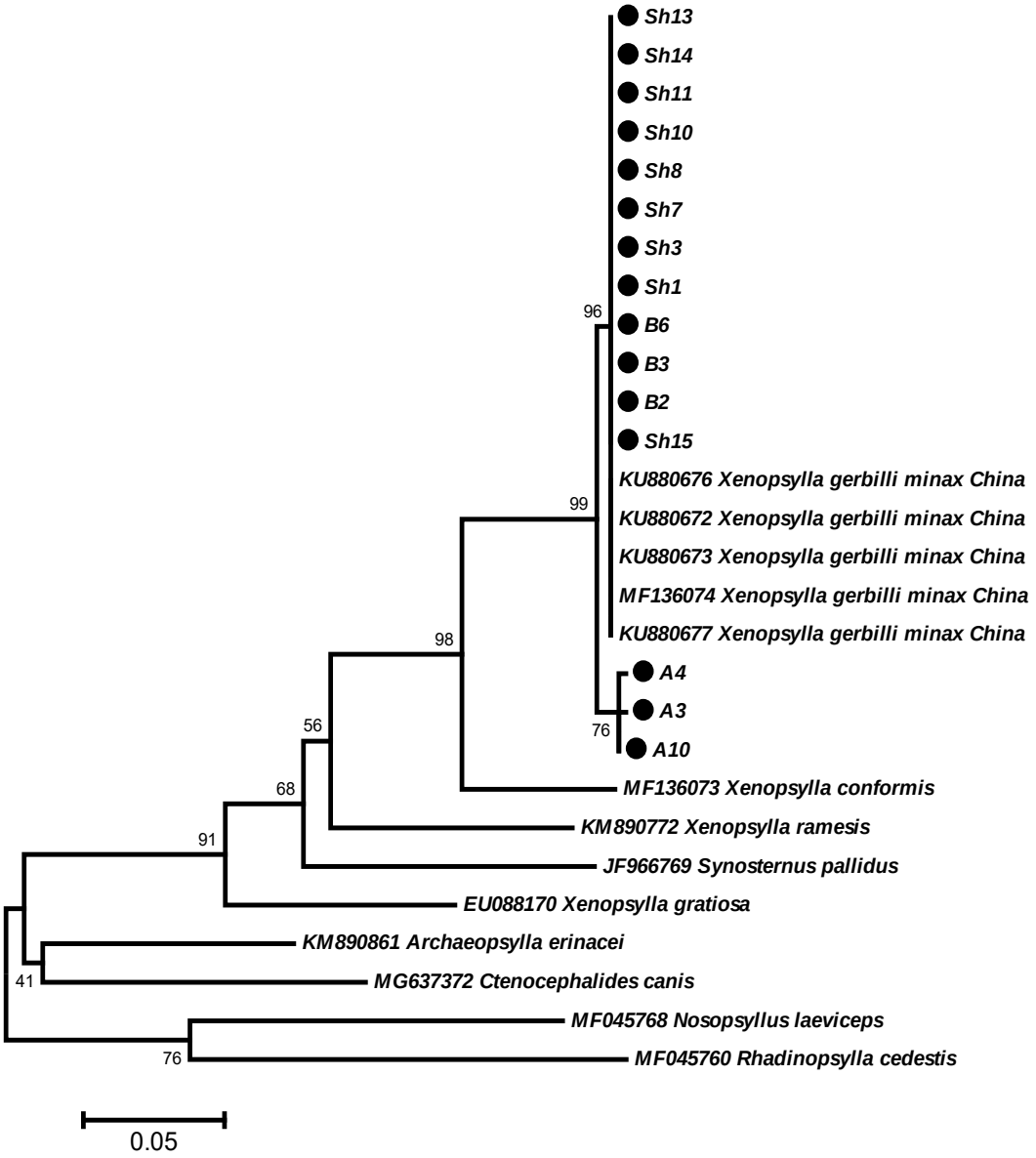

Figure 4 - Phylogenetic tree based on the analysis of the COXII nucleotide sequence of the genus *Xenopsylla*

Discussion. There is an opinion that *X. skrjabini, X. gerbilli minax* and *X. hirtipes* branched off in the second half of the Pleistocene from *X. gerbilli gerbilli*, which penetrated the territory of Kyzylkum with great gerbils from the Western Asia. With the penetration of great gerbils to the north distribution of fleas to new territories took a place and currently species of *Xenopsylla* genus within their ranges are unevenly distributed, which is probably due to the environmental, natural and climatic factors [18].

The study of morphological features of flea species sampled at geographically remote sites has revealed a number of significant differences in size of the head and distance between the parietal and ocular bristles, as well as between the parietal and angular bristles.

Based on the conducted studies, we can assume that studied flea species belong to different regional complexes – Pre-Balkhash, Pre-Ustyurt, Betpakdala and Tienshan foci.

Genotyping has shown that fleas *Xenopsylla gerbilli minax* from China, Western Betpakdala and Southern Pre-Balkhash are a separate autonomous group of populations.

Conclusions.

- *X. skrjabini* fleas caught in different autonomous foci do not statistically differ from each other in phenotypic features and probably belong to the same population group.
- *X. gerbilli minax* fleas caught in the Dzungarian autonomous focus are statistically significantly different from the fleas of their species from other foci by the distance between the parietal and angular bristles, which may indicate the formation of an independent population of *X. gerbilli* fleas in the Dzungarian autonomous plague focus.
- *X. hirtipes* fleas caught in the Pre-Balkhash and Betpakdala foci, statistically significantly different from the fleas of the same species from other foci on the basis of the distance between the eye and parietal bristles, as well as the distance between the parietal and angular bristles, which may indicate the formation of an independent population of fleas of the *X. hirtipes* in the Pre-Balkhash and Betpakdala plague foci.

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ОРТАЛЫҚ АЗИЯ ТАБИҒИ ШӨЛДІ ОБА ОШАҒЫ АВТОНОМДЫ ОШАҚТАРЫНЫҢ XENOPSYLLA GLINKIEWICZ, 1907 (SIPHONAPTERA, PULICIDAE) ТҰҚЫМДАС БҮРГЕ ПОПУЛЯЦИЯСЫНЫҢ МОРФОЛОГИЯЛЫҚ ЖӘНЕ ФЕНОТИПТІК ЕРЕКШЕЛІКТЕРІ

Аннотация. Жұмыста *Xenopsylla* тұқымдас бүргенің кейбір морфологиялық белгілері мен генотиптік ерекшеліктерін зерттеу нәтижелері келесідей келтірілген: *X. gerbilli minax, X. skrjabini, X. Hirtipes* – обаның Орталық Азия табиғи шөлді ошағындағы негізгі тасымалдаушысы болып саналады. Популяциялық ерекшеліктерді анықтау үшін алғаш рет ImageJ компьютерлік бағдарламасы арқылы морфологиялық талдау және RStudio графикалық ортасымен R 4.0.0 нұсқасының еркін статистикалық ортасында деректерді өңдеу және Үстірталды, Бетпақдала және Балқаш маңы автономды ошақтарында ұсталған бүрге гені *COII* генінің нуклеотидтер тізбегінің фрагментіне генетикалық талдау жасадық. Қазақстанда обаның негізгі тасымалдау-

шысының морфометриялық көрсеткіштерін зерттеу нәтижесінде *Xenopsylla* тұқымдас бүргенің үш түрінің келесідей жеке популяциялары анықталды: Бетпақдала және Балқаш маңы популяциялары − *X. gerbilli minax* және *X. hirtipes*, сондай-ақ Балқаш маңы, Бетпақдала және Үстірталды популяциялары − *X. skrjabini.*

Түйін сөздер: бүрге, *Xenopsylla,* оба, морфометрия, ДНҚ, генотиптеу, популяция.

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МОРФОЛОГИЧЕСКИЕ И ГЕНОТИПИЧЕСКИЕ ОСОБЕННОСТИ ПОПУЛЯЦИЙ БЛОХ РОДА *XENOPSYLLA* GLINKIEWICZ, 1907 (SIPHONAPTERA, PULICIDAE) ИЗ АВТОНОМНЫХ ОЧАГОВ ЦЕНТРАЛЬНО-АЗИАТСКОГО ПРИРОДНОГО ПУСТЫННОГО ОЧАГА ЧУМЫ

Аннотация. В статье приведены результаты изучения некоторых морфологических признаков и генотипических особенностей блох рода *Xenopsylla*: *X. gerbilli minax, X. skrjabini, X. hirtipes* - основных переносчиков в Центрально-Азиатском природном пустынном очаге чумы. С целью выявления популяционных особенностей впервые нами были предприняты попытки морфологического анализа с помощью компьютерной программы ImageJ и обработки данных в свободной статистической среде R версии 4.0.0 с графической средой RStudio и генетического анализа фрагмента нуклеотидной последовательности *COII*гена блох, отловленных в Предустюртском, Бетпакдалинском и Прибалхашском автономных очагах чумы. В результате исследования морфометрических показателей основных переносчиков чумы в Казахстане были выделены самостоятельные популяции трех видов блох рода *Xenopsylla:* Бетпакдалинские и Прибалхашские популяции *X. gerbilli minax* и *X. hirtipes*, а также Прибалхашская, Бетпакдалинская и Предустюртская популяции блох *X. skrjabini.*

Ключевые слова: блохи, *Xenopsylla,*чума, морфометрия, ДНК, генотипирование, популяция.

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RESEARCH OF GROWTH, DEVELOPMENT AND PRODUCTIVE PROCESSES OF PLANTS GROWN IN BIOCONTAINERS

Abstract. In the article, biocontainers consist of an optimal amount of organic, environmentally friendly substances necessary for the growth of plants, without chemical additives. Their composition is mainly biohumus, in terms of dry matter is about 95%, treated with biohumus agricultural waste and cattle manure with the help of California red worms. When planting seedlings, biocontainers were created conditions that positively affect their output. Their seeds and seedlings have well stored energy from the process of point feeding and quickly formed a strong root system. The use of biocontainers with a real volume of components leads to economic efficiency in saving fertilizers, does not threaten the cleanliness of the environment and products. In addition to environmental impacts, soil pollution is associated with high economic losses associated with reduced crop yield and quality. Prevention of soil pollution should prevail throughout the world. Most pollutants are the result of human activity. Ecological and agrotechnical justifications for the creation of biocontainers of optimal composition of various sizes have been developed and the possibility of growing agricultural plants in the field has been proved. Biocontainers also contribute to the rapid growth of vegetables and increase productivity. When using biocontainers in the field of agriculture, the need to feed plants with additional mineral and organic fertilizers is reduced by about three times. It is proved that the technology of creating biocontainers of optimal composition for planting highly productive plants with high biological potential has acquired practical value. The use of biocontainers with a real volume of components leads to the economic efficiency of saving fertilizers.

Keywords: biocontainer, soil, fertilizer, erosion, biohumus, mineral, pollution, degradation, productivity, plants.

Introduction. The agro-industrial complex (AIC) is one of the most important factors affecting the environment. The impact of the agro-industrial complex on the environment consists in the intensification of agricultural production, in particular, the mechanization of many processes, pumping and chemicalization of the territory, and water reclamation. Taking into account the state of waste generation in agro – industrial production, it should be noted that the main part of waste falls on the animal and water industry - 56%, crop production - 35.6%, poultry - 3.7%, manufacturing-4.7%.

The main areas of negative impact of agro-industrial enterprises:

- formation of previously formed physical organs and substances;
- the appearance of industrial noise;
- pollution of the atmosphere and lithosphere by various industrial emissions and wastes;
- pollution of the hydrosphere by industrial wastewater, as well as depletion of fresh water;
- consumption of non-renewable natural resources;
- withdrawal of land resources for objects;
- creation of a certain adverse environment at production facilities that is harmful to human health and dangerous to his life [1-5].

Currently, 95 million hectares of land are characterized by a low level of humus, subject to wind and water erosion-70%, surface and watered soils-20%, salty soils-8%, highly toxic soils-44% (figure1).

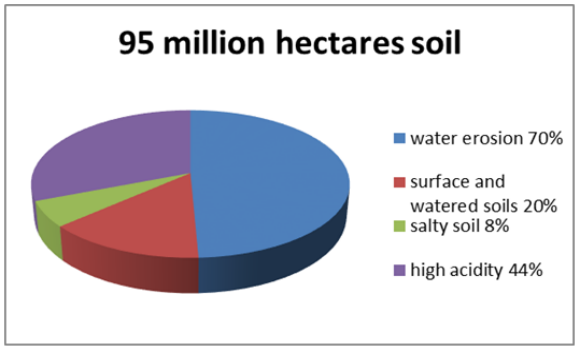

Figure 1-the level of humus that is located on the surface of the Earth

In addition to environmental impacts, soil pollution is associated with high economic losses associated with reduced crop yield and quality. Prevention of soil pollution should prevail throughout the world. The vast majority of pollutants are the result of human activity, so we are directly responsible for changing the situation, reducing pollution and ensuring a safe future for our environment.

Soil contamination may be the result of inappropriate agricultural practices. Improper farming practices reduce soil organic matter reserves and damage their ability to reduce organic pollutants. This increases the risk of pollutants entering the environment. In many countries, intensive crop production reduces soil that threatens future production opportunities in these areas. Therefore, the stability of agricultural production has become a prerequisite for restoring the anti-wear process and ensuring global food security for present and future generations [6-8].

Reclamation consists of two main stages: agrotechnical planning, formation of slopes, removal and use of fertile soil cover, installation of hydraulic and reclamation installations, elimination of toxic pollution and creation of necessary conditions for further economic use of reclaimed land [9-12]. The biological period includes a complex of agromeliorative and phytoreactivation measures aimed at improving the agrophysical, agrochemical, biochemical and other properties of soils. This is the main stage of land reclamation, since the soil must create the same conditions for the favorable development of plants and ensuring the life of microorganisms. Organic and mineral fertilizers should be used in the soil, and greenish-dung fields should be used to create a favorable environment for the development of soil microflora (figure 2).

The object of research relates to the field of agriculture, in particular, to the branch of crop production and can be used in technologies for planting and growing plants using biocontainers, when sowing seeds of agricultural crops, garden, medicinal or ornamental plants, planting roots, tubers, bulbs or tubers, when planting in the soil reduced green or silage cuttings of various crops and when planting seedlings of plants grown in greenhouses [13].

It is known that a biocontainer for planting seeds or plants, the material of which has a pressed shell of biologically absorbable substances. In the shell of the biocontainer (for example, a spherical shape), a blind cavity is made to accommodate the fruits of plants. The biocontainer also contains a compacting element of forming biologically absorbing substances, part of which contains mineral elements, biologically active substances [14].

Norm-forming biologically absorbed substance, as a rule, is crushed to a powdery type with a particle size of no more than 2.5×3 mm and dried to a rash in proportions that ensure the best squeezability and normal safety when assembling and transporting biocomposers, peat or their compounds. The biocontainer used for pressing the biocontainer taking into account possible natural impurities, biocompos, peat or a mixture of them, is at least 97% of the weight (in terms of dry matter) of the forming biologically absorbed substance. The biocontainer material does not contain additional binders, as they impair the growth of seeds and slow down the further development of plants. The required strength and transport of the biocontainer is provided by selecting the sealing mode of its shell. Pressing is performed on a rotating rotary press with an average capacity of 100 kg/cm^2. In this case, the humidity of the compressed mixture should be within 25-30%. Depending on the humidity and dispersion of the pressed material, its volume is reduced by 2-4 times during pressing.

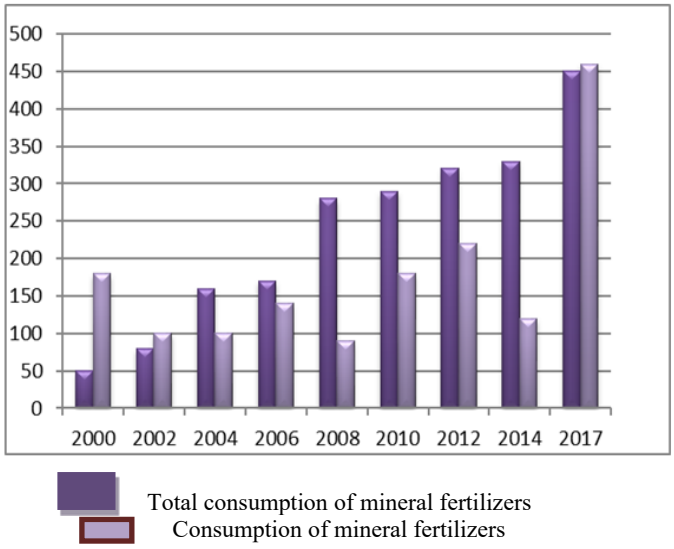

Figure 2 - Indicators of mineral and organic fertilizers application (1000T))

When a biocontainer is introduced by seed or plant germination into a soil with low humidity (often occurs during a spring drought), the shell of the biocontainer is mechanically destroyed due to its high density (i.e., it breaks up into separate fragments) too slowly. Additional watering also does not solve problems, since the moisture evaporates partially, and the material of the biocontainer shell, without having time to absorb, is partially removed to the deep layers. This leads to the fact that when planting fast-growing and fast-growing crops (for example, legumes), the growth of plant roots is faster than the process of fragmentation and complete destruction of the biocontainer shell. This prevents the rapid growth of plants. In addition, some of the intensively growing roots of the plant may come out of the zone where the fragments of the biocontainer are located, which are not yet completely disintegrated. As a result, there is a loss of the possibility of obtaining plants at the early stages of development of biologically absorbed substances embedded in the material of the biocontainer shell [15].

In this case, the volume of the cavity divided by the planting material in the biocontainer always selects a large volume that in this cavity exactly leads to the planting material (or its root system, if root vegetation is planted). This ensures better conditions for breathing of the planting material, and reduces the possibility of damage to the planting material when the volume of the cavity changes with fluctuations in temperature and / or humidity in the storage.

Methods of research. General requirements for methods for determining soil pollutants are regulated by SST 17.4.3.03-85. Sampling, transportation and storage of samples for analysis in accordance with SST 17.4.3.01-83. Sampling is carried out to control soil contamination and assess the quality of natural and disturbed soil connections. Indicators to be monitored are selected from those specified in SST 17.4.2.01-81 and SST 17.4.2.02-83. Sampling for chemical, bacteriological and helminthological analyses is carried out at least once a year. Sampling for the control of heavy metal contamination is carried out at least once every 3 years.

Salts, mineral fertilizers. In unorganized nitrates are determined by the method of Ag, VA, P, N-Dumas. For the determination of nitrogen in pure sodium nitrate and sodium nitrate, the titrimetric method is used after dissolving the sample and passing it through a cationic column.

Results and discussion. Biocontainers consist of highly active biological components, such as humus, peat, and various soil impurities obtained from the soil where plants grow that act as natural fertilizers. After these components and special binding organic compounds have the same properties as clay, which is convenient for plastic processing, cylindrical or spherical shapes are formed.In some cases, mineral fertilizers, such as phosphate, potassium, and others, are mixed into biocontainers intended for use in non-fertile soils of very poor content.

In our work, biocontainers consist of an optimal amount of organic, environmentally friendly substances necessary for the growth of plants, without chemical additives. Their composition contains mainly biohumus, in terms of dry matter is about 95%, which we obtained biohumus by the method

mentioned in the previous section, that is, agricultural waste and cattle manure treated with California red worms (figure 3).

The content of nutrients in biocontainers is as follows: nitrogen (N) at least-0.7%; phosphorus (P) - at least -0.6%; potassium (K) at least - 0.9%; pH-7.0. by microelement composition: Zn, Gu, Mn, Mo, B, Fe, Se. the Biocontainer has a shell of one or more impurities from several compacted biological substances available for planting plant material. The shell material contains absorbent granules that absorb water in the soil. Creates optimal conditions for growing seed seeds in the initial, critical period. Provides optimal, favorable conditions for seed growth and further development. The "Biohumus" granule (biocontainer) consists of an optimal amount of organic, environmentally friendly substances, without the addition of chemical impurities necessary for plants, which is based on" biohumus " from cattle manure (cattle), enriched with a very useful microflora, enzymes and vitamins from the strings of earthworms.

Figure 3-Optimal composition of biocontainers

According to the developed technology biocontainers have the following properties:

- ensures the reproduction and production of highly productive plants on fertile soils;
- protects against adverse factors of the external climatic environment, including frosts and droughts;
- saving the amount of fertilizers in terms of economic efficiency and funds for their purchase, since the seeds or seedlings of plants consume nutrients in the biocontainer;
- reduces the number of weeds that cause the greatest harm in the field of agriculture, reduces the number of diseases and pests, respectively, reduces the cost of fighting them;
- additionally reduce the number of thin sprouts and seedlings.

The use of biocontainers with a real volume of components leads to economic efficiency in saving fertilizers, does not threaten the cleanliness of the environment and products**.**

Granules of dried biologically decomposed absorbent (i.e. before they enter the wet environment) in the soil have a solid consistency and do not reduce its strength after pressing when adding the biocontainer material to 2.5-3%. At the same time, for the shell material of the biocontainer, the granules of such an absorber are not a passive filler. On the contrary, they actively interact with the other components of the biocontainer shell material, in particular with the biocompost and peat. For example, the latter contain significant microfibre. This microclimate due to its capillary structure, in the initial stage of absorption of moisture from the soil biocontainer actively applies moisture directly to the granules of biodegradable absorbent, swelling in the soil in deep layers of the shell from the outer surface of the shell of the biocontainer. Since the rate of edema of this absorbent exceeds the rate of edema of the biocontainer shell material with the participation of soil moisture (water and/or water solutions of mineral and organic substances), the biocontainer grains that swell in the soil increase their volume faster compared to the biocomposer and peat particles. This is provided by acute mechanical destruction of the biocontainer shell and rapid contact of the fruit, tubers, bulbs, etc. (or the root of the plant) with soil moisture and soil nutrients. When the biocontainer shell is destroyed, the granules of a biodegradable absorbent that is oozed in the soil can reach soil moisture (i.e., in water and aqueous solutions of mineral and organic substances) and become active in their volume, leaving it on the deep layers of the soil or uselessly giving off evaporation.

At the beginning of the field season, biocontainers are planted with plant seeds (or other planting materials) on moist soil. In case of insufficient humidity of the initial soil, additional irrigation works are carried out. When providing water for 60-80% after placing moisture in the soil, the biocontainer increases by at least 1.5-2.5 times. Due to the lack of adhesives or other binders in the biocontainer material, it quickly absorbs the substance under the action of elastic forces for several hours (with excess soil moisture) or up to several hours (with a lack of soil moisture), increasing the volume and gradually begins to decay. As a result, a favorable microclimate is created around plant seeds or seedlings, and the seeds are provided with full primary nutrition. In addition, the biocontainer prevents the reproduction of weeds and protects plants from diseases, cold, bumps and infections in the early stages of development.

Since the Biocontainer is a complex dimensional structure, eventually, after complete mechanical decomposition of the outer shell in the soil, due to the spread of biohumus and bentonite in the soil homogeneous, it leads to a good development of plant nutrients and moisture-saving root systems.

The bottom of the biocontainer is covered with soil, so it is covered with plant seeds, the top is covered with additional soil, which is left to the surface by two or three millimeters. The biocontainers are planted at a depth of 5-7 cm for large seeds (corn, cucumber, pumpkin, etc.) and 4 cm for small seeds (tomatoes, peppers, onions, etc.). Then the pit with the biocontainer fills 200-300 ml of water, wait for one to three minutes and is covered with soil. For growing seedlings, biocontainers can be placed in boxes or in bundles. In this case, no additional soil is used. Biocontainers are filled with water, after a while they are swollen and get the entire volume. After watering in wet soil, the biomolecular bonds of the biocontainer are destroyed and disintegrated. An extensive environment for breathable, nutritious substances is formed around the seeds, which forms a cell about twice the original size.

From the above examples, it is established that the results obtained from the use of biocontainers in accordance with the presented technology are not ordinary research work in comparison with the product grown in ordinary soil. On the contrary, the result obtained significantly exceeds the sum of the above results, which is explained by the presence of a synergistic effect associated with the complex interaction of the plant with the components of the biocontainer.

When seeds are shown on biocontainers, conditions are created that promote their output. Their seeds store energy well from the point feeding process and quickly form a strong root system. Due to the fact that the soil around the vegetation is not fertile, the growth of weeds slows down sharply. Biocontainers also contribute to the rapid growth of vegetables and increase productivity. When using biocontainers in the field of agriculture, the need to feed plants with additional mineral and organic fertilizers is reduced by about three times. For example, to get a large crop in a fertile soil, carrots are enough to place biocontainers with seeds on the edges and cover with soil. At the initial stage of vegetative propagation of seeds, Biocontainerde nutrients and in the process of all production etilgendiginen profitability of 1.5-2 times, which will ensure (figure 4).

Figure 4-Technology of growing plants in Biocontainers

The biocontainer after a complete mechanical destruction of the soil nutrient particles biocompost, peat and pellets, feed moisture biodegradable substances in excess of the soil are distributed spatially evenly in the soil and are directly in the vicinity of the root system of the developing plants. Thus, around the plant at the initial stage of its development, a local zone is created, saturated with moisture and nutrients, and it does not need to spend its limited energy resources (at the juvenile stage of development) and nutrient reserves for long-term nutrition and searching for sources of moisture. The shell material contains seeds or biocontainers for planting plants containing a shell of several formative biologically absorbing substances or pressing material, the rate of edema in the soil exceeds the rate of edema and the absorption capacity of the biocontainer shell material, respectively, the rate of edema exceeds the rate of edema and the absorption capacity of the biocontainer shell material, respectively.

A biocontainer is a ball of compressed fertilizer components and trace elements with a diameter of two centimeters. It includes all the things necessary for a powerful start of the plant and its further development. After watering, the biocontainer's molecular bonds are broken in the wet soil and begin to decay, creating an air-nutrient biomass that exceeds 2-2. 5 times the original volume of the container around the fruit placed in the biocontainer. The plant will receive a powerful boost for healthy development. At the same time, the nutrient shell protects the vegetation from infection in the early stages of development.

Conclusion. When planting seedlings of the bio containers are created conditions favourable for their departure. Their seeds and seedlings store energy well from the point feeding process and quickly form a strong root system. Ecological and agrotechnical justifications for the creation of biocontainers of optimal composition of various sizes have been developed and the possibility of growing agricultural plants in the field has been proved. In General, the production of plants when planted in biocontainers allows you to get a 100% good yield. These biocontainers are in great demand, since it is possible to plant plants of different sizes in the right time. In addition, it will be easy to control the nutrition regime of plants in containers, choosing the optimal substrates and fertilizers. Since the Biocontainer is a complex dimensional structure, eventually, after complete mechanical decomposition of the outer shell in the soil, due to the spread of biohumus in a homogeneous soil, it leads to a good development of nutrients and moisture-saving root systems. In addition, these biocontainers can be used in a quadrilateral, round shape, in different sizes, and for different purposes. It decays to a few weeks, months, or one year, depending on the force used in the continuous production process.

It is proved that the technology of creating biocontainers of optimal composition for planting highly productive plants with high biological potential has acquired practical value. The use of biocontainers with a real volume of components leads to economic efficiency in saving fertilizers, does not threaten the cleanliness of the environment and products. In addition to environmental impacts, soil pollution is associated with high economic losses associated with reduced crop yield and quality. Prevention of soil pollution should prevail throughout the world. The vast majority of pollutants are the result of human activity, so we are directly responsible for changing the situation, reducing pollution and ensuring a safe future for our environment.

According to the developed technology biocontainers have the following properties:

provides overgrowth of plants and high yield in fertile soils, protects against adverse factors of the external climatic environment, including frosts and droughts, saves on economic efficiency the amount of fertilizers and funds for their purchase, as seeds or seedlings of plants consume the nutrients contained in the biocontainer, reduce the number of weeds that cause the greatest harm in the field of agriculture, reduce the number of diseases and pests, respectively,, additionally reduce the number of thin sprouts and seedlings.

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БИОКОНТЕЙНЕРДЕ ӨСІРІЛГЕН ӨСІМДІКТЕРДІҢ ӨСУ, ДАМУ ЖӘНЕ ӨНІМДІЛІК ҮДЕРІСТЕРІН АЙҚЫНДАУ

Аннотация. Мақалада биоконтейнерлер химиялық қоспаларсыз өсімдіктердің өсуіне қажетті органикалық, экологиялық таза заттардың оңтайлы мөлшерінен тұрады. Олар негізінен биохумустан тұрады, құрғақ заттарға қарағанда, Калифорниядағы қызыл құрттардың көмегімен биохумуспен өңделген ауылшаруашылық қалдықтары мен малдың көңінің шамамен 95% құрайды. Биоконтейнерлердің көшеттерін отырғызу кезінде олардың шығуына оң әсер ететін жағдайлар жасалды. Олардың тұқымдары мен көшеттері нүктелі тамақтандыру процесінде энергияны жақсы сақтайды және тез тамыр жүйесін қалыптастырады. Компоненттердің нақты көлемі бар биоконтейнерлерді қолдану тыңайтқыштарды үнемдеуде экономикалық тиімділікке әкеледі, қоршаған орта мен өнімнің тазалығына қауіп төндірмейді. Қоршаған ортаға әсер етуден басқа, топырақтың ластануы дақылдардың өнімділігі мен сапасының төмендеуіне байланысты жоғары экономикалық шығындармен байланысты. Топырақтың ластануын болдырмау бүкіл әлемде басым болуы керек. Ластаушы заттардың көпшілігі адам қызметінің нәтижесі болып табылады. Әр түрлі мөлшердегі оңтайлы құрамдағы биоконтейнерлерді құрудың экологиялық-агротехникалық негіздемелері әзірленді және далалық жағдайда ауыл шаруашылығы өсімдіктерін өсіру мүмкіндігі дәлелденді. Биоконтейнерлер сонымен қатар көкөністердің тез өсуіне және өнімділіктің жоғарылауына ықпал етеді. Ауыл шаруашылығы саласында биоконтейнерлерді пайдаланған кезде өсімдіктерді қосымша минералды және органикалық тыңайтқыштармен қоректендіру қажеттілігі шамамен үш есе азаяды. Биологиялық әлеуеті жоғары жоғары өнімді өсімдіктерді отырғызу үшін оңтайлы құрамдағы биоконтейнерлерді құру технологиясының практикалық маңызы бар екендігі дәлелденді. Компоненттердің нақты көлемі бар биоконтейнерлерді пайдалану тыңайтқыштарды үнемдеудің экономикалық тиімділігіне әкеледі.

Түйін сөздер: биоконтейнер, топырақ, тыңайтқыш, эрозия, биогумус, минерал, ластану, деградация, өнімділік, өсімдіктер.

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ИЗУЧЕНИЕ РОСТА, РАЗВИТИЯ И ПРОДУКТИВНЫХ ПРОЦЕССОВ РАСТЕНИЙ, ВЫРАЩЕННЫХ В БИОКОНТЕЙНЕРАХ

Аннотация. В статье сообщается, что биоконтейнеры состоят из оптимального количества органических, экологически чистых веществ, необходимых для роста растений, без химических добавок. Они в основном состоят из биогумуса, в пересчете на сухое вещество составляет около 95% обработанного биогумусом сельскохозяйственных отходов и навоза крупного рогатого скота с помощью калифорнийских красных червей. При посадке рассады биоконтейнерами были созданы условия, положительно влияющие на их выход. Их семена и саженцы хорошо накапливают энергию от процесса точечной подкормки и быстро формируют сильную корневую систему. Применение биоконтейнеров с реальным объемом компонентов приводит к экономической эффективности в экономии удобрений, не угрожает чистоте окружающей среды и продукции. Помимо воздействия на окружающую среду, загрязнение почвы связано с высокими экономическими потерями, связанными со снижением урожайности и качества сельскохозяйственных культур. Предотвращение загрязнения почв должно превалировать во всем мире. Большинство загрязняющих веществ являются результатом деятельности человека. Разработаны эколого-агротехнические обоснования создания биоконтейнеров оптимального состава различных размеров и доказана возможность выращивания сельскохозяйственных растений в полевых условиях. Биоконтейнеры также способствуют быстрому росту овощей и повышению урожайности. При использовании биоконтейнеров в области сельского хозяйства потребность в подкормке растений дополнительными минеральными и органическими удобрениями снижается примерно в три раза. Доказано, что технология создания биоконтейнеров оптимального состава для посадки высокопродуктивных растений с высоким биологическим потенциалом приобрела практическое значение. Использование биоконтейнеров с реальным объемом компонентов приводит к экономической эффективности экономии удобрений.

Ключевые слова: биоконтейнер, почва, удобрение, эрозия, биогумус, минерал, загрязнение, деградация, продуктивность, растения.

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PLANT GROWTH AND BIOLOGICAL PRODUCTIVITY AFTER PROCESSING WITH MICROELEMENTS

Abstract. In laboratory conditions, the effect of sodium selenite and a mixture of sodium selenite and zeolite on the growth and biological productivity of peas was investigated. The soil was examined after harvesting. It was shown that the addition of both sodium selenite and the mixture of sodium selenite with zeolite to the soil with irrigation affects the development of the root system - the length of the main root in the first case increased by 16.5%, the height of the stems 30 days after planting was 29% more in comparison with the control variant, and in the second case, the length of the main root increased by 18.5%, the height of the length of the stems increased by 24% than that of the control. Processing of peas with microelements also caused a stimulation of the reproduction system: an increase in the number of inflorescences by 3 times and the number of beans in 3.4 times compared with the control. A 160-fold decrease in the selenium content and the introduction of zeolite did not cause a large difference in the obtained results (except for the number of beans - with the addition of zeolite, the number of beans increased by 8%). Biochemical indicators of pea biomass showed an increase in dry matter, in sugar content by 28.8%, but a decrease in crude protein by 17.7%, a decrease in carotene by 17.5%, nitrogen by 18% (when irrigated with sodium selenite). When treated pea with sodium selenite and zeolite, the sugar content increased by 85.5%, but it was observed a decrease in crude protein by 9.5%, in crude fat - by 16.5%, a decrease in carotene by 31.2%, a decrease in nitrogen by 9.4%. Analysis of the soil after harvesting showed in the option with the addition of sodium selenite a decrease in the amount of humus by 6.5%, mobile potassium by 18.5%, but an increase in mobile phosphorus by 6.6%, mobile calcium by 2.7%. In the option with the introduction of the mixture of sodium selenite and zeolite, no decrease in humus was observed, the content of mobile potassium decreased by 10.8%, the content of mobile phosphorus increased by 9.8%, mobile calcium by 3.5%. The acidity of the soil has not changed.

Keywords: peas, watering, sodium selenite, zeolite, development, productivity, biochemical parameters, soil.

Introduction. The issue of studying the influence of microelements on plants has always been relevant for plant physiology. Of great interest is the role of microelement of selenium in plants. This is caused by the current environmental problem - a deficiency of selenium in animal feed and human food, which causes many serious diseases [1-3].

There is little data on the effect of selenium compounds on plant growth and development and they are contradictory. Selenium in low concentrations is essential for plants. However, the need for it is determined by the species and varietal characteristics of plants, since in some cases even low concentrations of selenium do not have a positive effect on the growth, development, and productivity of some crops [4,5].

For example, the use of presowing treatment of spring wheat seeds with selenium contributed to an increase in grain yield. A significant effect of seed treatment with selenium on photosynthetic indicators and the nature of donor-acceptor relations of plants under different conditions of water supply was noted [6,7]. Under the action of selenium (2.5 mg/kg of soil), seed germination and grain yield increased. Signs of toxicosis occurred at doses greater than 8 mg/kg.

An increase in the resistance of plants to stress factors under the selenium action is confirmed by experiments on treating eastern galega with sodium selenate of different concentrations against heat and salt stresses, as well as by determining the resistance of nodule bacteria to prolonged hypothermia when selenium is introduced into the soil [8 -11].

The study of new starting material is always relevant in view of the fact that the quality of the starting material always determines the effectiveness of selection [12].

The lack of selenium in plants is compensated by fertilizers in the form of selenites and selenates introduced into the soil. It has been shown that sodium selenite was the most active form of fertilizer. In cereals and fodder crops, selenium is converted primarily to selenomethionine. It is incorporated into proteins instead of methionine [13].

Some scientific experiments have resulted that the use of sodium selenite promotes an increase in not only nitrogen, but also potassium in barley plants and their accumulation in grain [14 - 16]. It was found that selenium enhances the synthesis of free amino acids in cereals, which confirms the physiological significance of this element for plants.

Currently, to increase productivity, along with selenium, the zeolites are used both as an independent fertilizer and as the mixture with mineral fertilizers. Zeolites as active natural sorbents absorb, retain for a long time and gradually release absorbed nutrient ions into the environment. Part of the nitrogen in the soil is fixed by zeolite grains and is kept from leaching. The nitrogen bonded with zeolite is used by plants gradually, throughout the growing season. Also, natural zeolites absorb elements poisonous to plants from the soil, such as mercury, lead, cobalt, etc. and improve the ion-exchange and adsorption properties of soils. [17-21].

The aim of this work is to show in laboratory conditions the effect of sodium selenite and the mixture of sodium selenite and zeolite on the morphogenesis and biochemical parameters of peas and soil conditions after harvesting.

To achieve the aim, the following objectives were set:

1. to show the impact of sodium selenite and the mixture of sodium selenite and zeolite on the development of pea shoots;
2. to determine the biochemical parameters of the green mass of peas;
3. to investigate the composition of the soil after harvesting peas.

Materials and methods of the research. To set up the experiments, there were used pea of the Triumph variety; 30 peas were placed in wooden containers with 8 kg of universal soil (GOST R 53381-2009). Sodium selenite (TS 6-09-17-209-88) was added to the soil in the form of 800 ml of an aqueous solution with a concentration of 0.056%, with which plantings were watered 5 times throughout the season at intervals of 15 days (experiment 1). In experiment 2, watering was carried out with an aqueous solution (480) ml of sodium selenite and zeolite (TS 2163-077-05766575-99) with 0.025% concentration. The experiments were carried out at a temperature of 20-25 °C in four series, threefold repetition. The height of pea shoots was measured 30 days after planting, the number of inflorescences was determined 60 days after planting, the number of beans and the length of the main root was determined after 76 days, the content of biochemical substances was defined in slices of greenery and fruits 76 days after planting. The results of the experiments are summarized in tables 1,2,3, figures 1,2,3. To obtain agrochemical parameters, the methods described in [22] were used.

Carotene was determined with the photometric method by extraction with petroleum naphtha and photometry of colored solutions [22].

Nitrogen and crude protein were determined by mineralizing the sample with boiling sulfuric acid in the presence of a catalyst to form ammonium sulfate, adding excess sodium hydroxide to the cooled mineralizate to disengage ammonia, distilling and titrating the disengaged ammonia, calculating the mass fraction of nitrogen in the test sample and recalculating the mass fraction of crude protein.

Crude fat was determined by continuous extraction with sulphuric ether (according to Soxhlet).

Sugar was defined by the photometric method, based on the interaction of carbonyl groups of sugars in alkaline medium with potassium ferricyanide and measuring the optical density of the resulting solution with a photoelectric colorimeter.

Humus in the soil was specified by oxidation of organic matter with a solution of potassium bichromate in sulfuric acid and the subsequent determination of trivalent chromium, equivalent to the content of organic matter, on a photoelectric colorimeter.

Exchange calcium was determined by the chelatometry by titration with Trilon B at pH of 12.5–13.0 using acid dark blue as an indicator of chromium.

Mobile phosphorus and potassium were determined by extracting phosphorus and potassium from a sample weight with hydrochloric acid of 0.2 mol/dm^3 concentration and then determining the mobile compounds of phosphorus using photoelectric colorimeter and potassium - using a flame photometer.

Total nitrogen was determined by the photometric method by mineralization of the sample by heating with concentrated sulfuric acid in the presence of hydrogen peroxide, followed by measuring the optical density of the colored indophenol compound formed in the alkaline medium during the interaction of ammonia with hypochlorite and sodium salicylate.

Humic acids were specified by treatment of the sample with an alkaline solution of sodium pyrophosphate, subsequent extraction of the sample with a sodium hydroxide solution, precipitation of humic acids with an excess of mineral acid, and determination of the mass of the obtained precipitate.

Research results. The analysis of the obtained data (table 1, figure 1) indicates that the addition of both sodium selenite and the mixture of sodium selenite with zeolite to the soil with irrigation affected the development of the root system, which, having a higher absorption capacity, probably contributed to more intensive consumption of nitrogen and this could have a positive effect on the formation of pea productivity. So watering with sodium selenite (ex. 1) caused an increase in the length of the main root by 16.5%, and watering with the mixture of selenite and zeolite (ex. 2) - by 18.5%. Besides, stimulation of the growth and development of pea was observed in comparison with the control: the length of the stems (ex.1) 30 days after planting was 29%, and in ex. 2 – 24% higher than that of the control. Apparently, this can be explained by the intensity of photosynthesis and a strong increase in the overall biological activity of the soil.

Control Experiment 1 Experiment 2

Figure 1 - The height of the pea stems after planting after 30 days

Table 1 - Average phytotesting data for various concentrations of mineral additives

No of ex.	Watering	Added to 1 kg of soil per season, mg		Germination after 15 days, %	Height of the shoots after 30 days, cm	Number of inflorescences after 60 days, pcs.	Number of beans after 76 days, pcs.	Length of the main root after 76 days, cm
		Sodium Selenite	Zeolite					
Control	Water	-	-	89.2	26.05	13.3	10.3	9.14
1	Sodium selenite + water	7.5	-	80.8	33.65	39.75	33.75	10.65
2	Sodium selenite + zeolite + water	0.047	4.653	91.7	32.2	39.5	36.5	10.83

The treatment of pea with sodium selenite and the mixture of selenite and zeolite also stimulated the reproduction system: an increase in the number of inflorescences by 3 times and the number of beans by 3.4 times compared to the control (figure 2). It should be noted that a 160-fold decrease in the selenium

content in experiment 2 compared to experiment 1 and the introduction of zeolite did not cause a big difference in the experimental results (except for the number of beans increased by 8% compared to experiment 1).

The biochemical indicators of pea biomass are given in table 2 and figures 3, 4. The results showed a gain in dry matter in experiments 1 and 2 compared with the control (figure 3), an increase in sugar content: in ex.1 by 28.75%, in ex.2 by 85.54% (figure 4) - apparently, this is connected with the activation of photosynthesis or increased sugar transport under the action of selenite and zeolite, but a decrease in crude protein was noted: in experiment 1 - by 17.7%, in experiment 2 - by 9.5%. It was noted in the work [15] that selenium can stimulate or inhibit protein biosynthesis in a plant depending on conditions, a form of the compound, and its concentration. Evidently, in our conditions, protein synthesis was inhibited. There was also a decrease in crude fat - by 16.5% in ex.2, a decrease in carotene in ex.1 by 17.5% and in ex.2 - by 31.2% compared with the control. The nitrogen content declined in ex. 1 by 18%, in ex. 2 - by 9.4%. This is possibly due to the influence of selenium and zeolite on the development of the root system, which, having a greater absorption capacity, consumed nitrogen more intensively, and used it more efficiently.

Figure 2 - Inflorescences and beans of Triumph pea cultivar (Experiment 2).

Table 2 - Biochemical indicators of pea

No.	Crude protein,%	Crude fat,%	Nitrogen,%	Carotene, mg/kg
Control	26.70	4.11	4.27	77.11
Experiment 1	21.88	4.16	3.50	63.65
Experiment 2	24.17	3.43	3.87	53.04

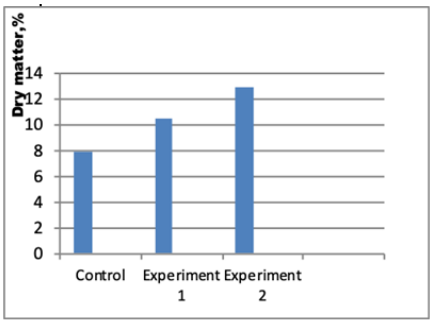

Figure 3 - Dry matter content in peas

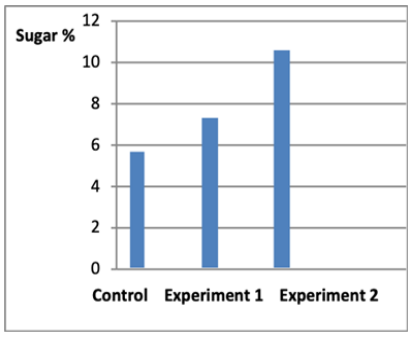

Figure 4 - Sugar content in peas.

After harvesting, the soil was analyzed. The data in table 3 indicate that the content of humus in the soil decreased by 6.5% after the application of selenite (ex. 1) and did not change after the introduction of

selenite with zeolite (ex. 2). Options for laboratory experiments with the introduction of sodium selenite and the mixture of zeolite and sodium selenite are characterized by the enhanced content of mobile phosphorus by 6.6% (ex. 1), by 9.8% (ex. 2), mobile calcium by 2.7% (ex. 1), by 3.5% (ex. 2) compared to the option without additives. Apparently, selenium and zeolite introduced into the soil affect the mobility of chemical elements, increasing or decreasing their level, availability for plants. It should be noted that the level of mobile potassium decreased by 18.5% in experiment 1 and by 10.8% in experiment 2 compared with the control. The soil acidity after the introduction of additives has not changed. The positive impact of selenite and zeolite on soil properties is also expressed in the increased content of total nitrogen by 7.4% (ex.1), by 31% in ex.2, the humic acids by 12.6% (ex.1), by 7 % in ex. 2 compared with the control.

Table 3 - Physico-chemical parameters of the soil after harvesting

No.	Humus,%	Mobile phosphorus, mg/kg of soil	Mobile potassium, mg/kg of soil	Total nitrogen, mg/kg	Humic acids, mg/kg	Exchange calcium, mmol/kg	pH
Control	16.93	266.8	135.5	6.8	218.3	222.5	6.68
Experiment 1	15.83	284.5	110.5	7.3	245.8	228.5	6.53
Experiment 2	17.1	292.8	120.8	8.9	223.5	230.5	6.50

Conclusion. In such a way, it was found that 5-fold watering of pea seedlings during the season under laboratory conditions with aqueous solutions of sodium selenite and the mixture of zeolite and selenite stimulates the growth and development of the plant, stimulates the pea reproduction system, increasing the number of inflorescences by 3 times and the number of beans in 3,4 times compared with the control. The introduction of microelements sodium selenite and zeolite ambiguously affects the biochemistry of pea: the sugar content sharply increases, but crude protein, crude fat, and carotene decrease compared to the control. Analysis of the soil after harvesting showed an increase in mobile elements - phosphorus and calcium, an increase in the content of total nitrogen, humic acids, but a decrease in the level of mobile potassium compared with the control experiment.

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МИКРОЭЛЕМЕНТТІ ҚОСПАЛАРМЕН ӨҢДЕУДЕН КЕЙІНГІ ӨСІМДІКТЕРДІҢ ӨСУІ МЕН БИОЛОГИЯЛЫҚ ӨНІМДІЛІГІ

Аннотация. Зертханалық жағдайда натрий селенитінің және натрий селениті мен цеолит қоспасының бұршақтың өсуіне және биологиялық өнімділігіне әсері зерттелді. Егін жиналғаннан кейін топырақ тексерілді. Суару кезінде натрий селенитінің де, натрий селенитінің де цеолит қоспасының топыраққа қосылуы тамыр жүйесінің дамуына әсер ететіні көрсетілген - бірінші жағдайда негізгі тамырдың ұзындығы 16,5%-ға өсті, отырғызудан 30 күн өткен соң сабақтарының биіктігі бақылау нұсқасымен салыстырғанда 29%-ға көп болды, ал екінші жағдайда негізгі тамырдың ұзындығы 18,5%-ға өсті, сабақтың ұзындығы бақылаумен салыстырғанда 24%-ға өсті. Бұршақты микроэлементтермен емдеу репродуктивті жүйені ынталандырды: бақылаумен салыстырғанда соцветия санының 3 есе және бұршақ санының 3,4 есе артуы. Селен мөлшерінің 160 есе төмендеуі және цеолитті енгізу нәтижелерде үлкен айырмашылықты тудырмады (бұршақ санын қоспағанда - цеолит қосылған кезде бұршақ саны 8%-ға өсті). Бұршақ биомассасының биохимиялық көрсеткіштері құрғақ заттың, қант құрамының 28,8%-ға артуын ғана емес, шикі протеиннің 17,7% - ға төмендеуін, каротиннің 17,5%-ға, азоттың 18%-ға төмендеуін (натрий селенитімен суару кезінде) көрсетті. Бұршақты натрий селенитімен және цеолитпен өңдеу кезінде қант мөлшері 85,5%-ға ұлғайды, бірақ шикі ақуыздың 9,5% - ға, шикі майдың 16,5%-ға төмендеуі, каротиннің 31,2%-ға төмендеуі, азоттың 9,4% - ға төмендеуі байқалды. Жинаудан кейінгі топырақ талдауы натрий селениті қосылған нұсқада қарашірік мөлшерінің 6.5%-ға, жылжымалы калийдің 18,5%-ға төмендегенін, сондай-ақ жылжымалы фосфордың

6,6%-ға, жылжымалы кальцийдің 2,7%-ға өскенін көрсетті. Натрий селениті мен цеолит қоспасы енгізілген нұсқада қарашіріктің төмендеуі байқалмады, жылжымалы калий 10,8%-ға төмендеді, жылжымалы фосфор 9,8%-ға, жылжымалы кальций 3,5%-ға өсті. Топырақтың қышқылдығы өзгерген жоқ.

Түйін сөздер: бұршақ, суару, натрий селениті, цеолит, даму, өнімділік, биохимиялық көрсеткіштер, топырақ.

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РОСТ И БИОЛОГИЧЕСКАЯ ПРДУКТИВНОСТЬ РАСТЕНИЙ ПОСЛЕ ОБРАБОТКИ МИКРОЭЛЕМЕНТНЫМ СОСТАВОМ

Аннотация. В лабораторных условиях исследовано влияние селенита натрия и смеси селенита натрия и цеолита на рост и биологическую продуктивность гороха. Почву осматривали после уборки урожая. Показано, что добавление как селенита натрия, так и смеси селенита натрия с цеолитом в почву при орошении влияет на развитие корневой системы - длина основного корня в первом случае увеличилась на 16,5%, высота стеблей через 30 дней после посадки была на 29% больше по сравнению с контрольным вариантом, а во втором случае длина основного корня увеличилась на 18,5%, высота длины стеблей увеличилась на 24% по сравнению с контролем. Обработка гороха микроэлементами также вызывала стимуляцию репродуктивной системы: увеличение количества соцветий в 3 раза и количества бобов в 3,4 раза по сравнению с контролем. 160-кратное снижение содержания селена и введение цеолита не вызвало большой разницы в полученных результатах (за исключением количества бобов - при добавлении цеолита количество бобов увеличилось на 8%). Биохимические показатели биомассы гороха показали увеличение не только сухого вещества, содержания сахара на 28,8%, но и снижение сырого протеина на 17,7%, снижение каротина на 17,5%, азота на 18% (при орошении селенитом натрия). При обработке гороха селенитом натрия и цеолитом содержание сахара увеличивалось на 85,5%, но наблюдалось снижение сырого белка на 9,5%, сырого жира - на 16,5%, снижение каротина на 31,2%, снижение азота на 9,4%. Анализ почвы после уборки показал в варианте с добавлением селенита натрия снижение количества гумуса на 6.5%, подвижного калия на 18,5%, а также увеличение подвижного фосфора на 6,6%, подвижного кальция на 2,7%. В варианте с внесением смеси селенита натрия и цеолита снижения гумуса не наблюдалось, содержание подвижного калия снизилось на 10,8%, содержание подвижного фосфора увеличилось на 9,8%, подвижного кальция-на 3,5%. Кислотность почвы не изменилась.

Ключевые слова: горох, полив, селенит натрия, цеолит, развитие, продуктивность, биохимические показатели, почва.

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FACTORS OF NONSPECIFIC RESISTANCE OF CALVES IN DAIRY CATTLE BREEDING

Abstract. Under the influence of the biostimulant, an increase in the morphological and biochemical data of blood in calves grown both on private plots and on small and medium farms, which at the end of the observation period exceeded the control values: the number of red blood cells - by 0.98; 0.81 and 0.79x10^{12}/l, hemoglobin - by 9.8; 7.0 and 6.2 g/l, albumins - by 2.2; 2.8 and 3.5 g/l, γ-globulins - by 5.5; 3.7 and 5.6 g/l (P <0.05-0.001), respectively. The data on the leukocyte phagocytic activity, plasma lysozyme activity, serum bactericidal activity, and immunoglobulins were higher than in the control: when rearing calves in private subsidiary plots - by 5.6%, 4.8%, 5.5% and 4.7 mg/ml, on a small farm - by 5.2; 4.2; 7.8 % and 3.6 mg/ml and on a medium farm - by 5.8%, 3.6%, 4.4% and 4.3 mg/ml, respectively (P<0.05-0.01).

A rising in the technological stress on the calf's organism was revealed depending on the increase in the enterprise capacity, which is confirmed by the bioamine blood spectrum.

Keywords: private subsidiary plots, small and medium-sized farms, calves, polystim, growth and development, hematological and biochemical profiles, meat quality.

Introduction. A survey of private plots, small and medium-sized farms showed that according to many parameters, they do not meet the veterinary-sanitary and zoohygienic requirements. In livestock enterprises as an artificially created ecological system, technological solutions are provided that do not meet the biological requirements of animals. Therefore, in the process of their exploitation, animals are forced to constantly adapt to the changing living conditions, technical and engineering elements of production. As a result, the unresolved problems of the microclimate optimization and many other factors in animals cause stress reactions that reduce natural resistance, productivity and can be the reason of morbidity and withdrawal, especially of young stock. In newborn calves, the most common diseases are of the gastrointestinal tract and respiratory system. Their incidence reaches up to 80%, and the withdrawal - up to 20% [1, 2, 3, 4, 5, 6].

One of the ways to activate the protective and adaptive functions of the calf body to the conditions of keeping on private subsidiary plots, on small and medium-sized farms in winter, reducing stress on the body and more fully realizing the biological potential of resistance and productivity in young stock is the use of biological stimulants with a wide range of positive effects on the body. The use of appropriate preparations during the critical immunological periods of calves allows for a long time to maintain the constancy of the internal environment of the body under the conditions of engineering, technological, zootechnical, veterinary, zoohygienic and environmental stress factors [7, 8, 9, 10, 11, 12, 13, 14].

The aim of this work is to study the biological characteristics of the nonspecific resistance of the calf organism raised in private subsidiary plots, on small and medium farms using a biostimulator polystim (PS-1).

Materials and methods. The experimental part of the research work was carried out on the OOO Koltsovka Agrofirm dairy farm (medium farm for 200 cows), training and production farm (small farm for 50 cows) VGO Vurnarsky agricultural technical high school and in private farms of Vurnarsky district of the Chuvash Republic. The processing of materials was carried out in the State Institution "Chuvash Republican Veterinary Laboratory" of the State Veterinary Service of the Chuvash Republic and in the Vurnarsky District Veterinary Laboratory of the State Institution "Vurnarskaya District station to fight animal diseases", as well as in laboratories of the Chuvash State Agricultural Academy.

Three series of scientific and economic experiments were carried out in the conditions of private subsidiary plots, small and medium farms using black-and-white calves. In all series of experiments, two groups of newborn calves were selected according to the principle of pair-analogs (control and experimental), taking into account the physiological state and live weight of 10 animals in each group.

In the first series of the experiments, the newborn calves were raised in a cowshed with a cow-mother in the isolated section, in the second sergers - firstly, in dispensary individually for up to 30 days, then in sections in a group way (starting from 3-5 to 8-10 animals), and in the third series of the experiments - in the beginning individually in a shift-section dispensary for up to 21 days, then - in a group way in calf pen sections (8-10 animals each).

To activate the protective and adaptive functions of the calf body under the keeping conditions in private subsidiary plots, on small and medium farms in winter, to reduce the stress load on the body and to more fully realize the biological potential of the resistance and productivity of young animals, we used a polystim biostimulator developed by scientists from the Chuvash State Agricultural Academy.

When setting up the experiments, the control group of calves was not injected by a biostimulator, and the experimental group was intramuscularly injected with polystim at a dose of 3 ml at 1-2- and 5-6-days old age.

The research of the clinical and physiological state, morphological and biochemical values of blood, as well as factors of nonspecific resistance and bioamine blood spectrum of calves were studied on the 1st, 15th, 30th, 60th, 90th, 120th, 150th and 180th days of life according to modern common methods in veterinary medicine.

Research results. It was found that in calves raised in the private subsidiary plot using polystim, the data of hematological parameters were higher than in the control: the number of red blood cells - by 0.28-0.98x10^{12}/l, the hemoglobin concentration - by 5.8-13.2 g/l, on a small farm - by 0.27-0.81x10^{12}/l and 2.2-10.0 g/l and on a medium farm - by 0.34-0.79x1012/l and 4.2-9.6 g/l, respectively ($P<0.05$-0.01). At the same time, polystim did not have a significant effect on the production of leukocytes.

An increase in the concentration of hemoglobin and the number of red blood cells in the blood of experimental calves indicates an improvement in their hematopoiesis under the influence of the biological stimulator.

The level of total protein and albumins in the blood serum of calves of the experimental group during the observation period was significantly higher than in the control: with the keeping technology in private plots - by 0.6-4.8 and 1.2-4.5 g/l, on a small farm - by 0.6-4.6 and 0.3-3.8 g/l and with the keeping technology on a medium farm - by 2.2-4.8 and 1.8-3.5 g/l ($P<0.05$-0.01), respectively.

That is, the used preparation activated the albumin synthesis as the main source of plastic material.

The concentration of α- and β-globulin protein fractions in the blood serum of animals of the compared groups varied throughout the observation period, and the difference between the obtained data was unreliable.

In animals of the experimental group, raised in the conditions of private subsidiary plots, the concentration of the γ-globulin protein fraction in the blood serum exceeded the control data by 2.2-5.9 g/l, with the keeping technology on a small farm - by 1.5-3, 8 g/l, and in medium farm conditions - by 1.0-5.6 g/l ($P<0.05$-0.001).

A build-up in the concentration of the γ-globulin protein fraction in the blood serum of animals of the experimental groups in the early period of postnatal ontogenesis indicates the activation of the humoral arm of the nonspecific resistance of the calf's organism under the influence of polystim with small farming conditions.

The dynamics of the main indicators of nonspecific resistance of the calf body are presented in table 1.

Table 1 - Factors of nonspecific resistance in calves

Group of animals	Age, days	Phagocytic activity, %	Phagocytic index	Lysozyme activity, %	Bactericidal activity, %
in private subsidiary plots					
Control	1	25.8±1.1	3.6±0.40	6.1±0.37	31.6±1.32
	15	35.2±1.53	4.0±0.45	9.8±0.57	33.6±1.02
	30	46.0±1.14	5.6±0.24	14.1±0.49	40.6±1.19
	60	44.2±1.24	6.2±0.37	16.2±0.82	46.1±0.86
	90	51.6±1.08	6.6±0.24	17.4±0.62	53.2±1.12
	120	52.8±1.36	6.8±0.49	19.8±0.57	58.2±1.48
	150	52.0±1.48	7.4±0.68	20.0±0.65	57.6±1.37
	180	54.8±1.59	8.2±0.58	20.3±0.59	58.9±1.37
Experimental	1	26.2±1.59	3.6±0.24	6.3±0.47	31.4±1.56
	15	39.2±1.50	5.4±0.60	12.2±0.50*	38.2±1.40*
	30	50.2±1.36*	6.4±0.60	16.9±0.57**	48.1±1.40**
	60	52.6±1.63**	7.2±0.58	19.8±0.64**	53.9±1.39**
	90	56.2±1.36*	7.4±0.24	20.9±0.54**	60.7±1.70**
	120	57.0±1.34	7.8±0.37	22.9±0.74*	63.7±1.36*
	150	57.8±1.59*	8.2±0.37	23.2±0.62**	62.4±1.43*
	180	60.4±1.69*	8.8±0.58	25.1±0.77**	64.0±1.50*
on small-sized farms					
Control	1	25.4±1.21	3.4±0.51	5.8±0.64	30.1±1.09
	15	32.2±1.56	4.2±0.58	9.3±0.71	32.7±1.10
	30	44.0±1.52	5.2±0.49	13.0±0.81	39.7±1.05
	60	43.6±1.33	5.8±0.58	15.4±0.83	43.8±1.15
	90	49.6±1.03	6.2±0.66	16.3±0.75	50.9±1.28
	120	51.2±1.46	6.6±0.51	18.6±1.06	54.0±1.03
	150	51.8±1.91	7.0±0.32	18.9±1.03	53.2±1.18
	180	53.4±1.50	7.6±0.51	19.4±0.80	55.3±1.45
Experimental	1	25.6±1.03	3.6±0.40	5.9±0.45	31.4±1.31
	15	36.6±1.21	5.0±0.55	11.9±0.67*	37.1±0.95*
	30	49.2±1.62*	6.0±0.71	15.9±0.69*	45.7±1.55*
	60	51.2±2.08*	6.8±0.58	19.2±0.70**	52.6±1.74**
	90	54.4±1.25*	7.2±0.37	20.1±0.99*	57.7±1.45**
	120	56.2±1.53*	7.4±0.40	21.6±0.76	61.1±1.39**
	150	58.0±1.87*	7.8±0.37	22.2±0.66*	60.2±1.34**
	180	58.6±1.57*	8.4±0.60	23.6±0.76**	63.0±1.51**
on medium-sized farms					
Control	1	22.0±1.70	3.4±0.24	5.4±0.61	27.5±1.46
	15	29.8±1.46	4.0±0.32	8.0±0.75	29.0±1.40
	30	41.8±1.36	4.8±0.58	11.7±0.72	36.4±1.12
	60	41.4±1.21	6.0±0.32	13.7±0.75	41.6±1.13
	90	47.8±1.56	5.8±0.58	15.1±0.89	48.3±1.36
	120	49.6±1.33	6.2±0.80	16.7±0.77	51.9±1.15
	150	50.2±1.85	6.6±0.51	16.6±1.01	50.2±1.14
	180	51.6±1.40	7.8±0.73	18.1±0.69	54.8±1.29
Experimental	1	22.4±1.72	3.4±0.51	5.2±0.33	26.7±1.21
	15	33.8±1.07	4.6±0.24	10.7±0.77*	33.9±1.33*
	30	46.4±1.25*	5.4±0.51	14.5±0.61*	42.1±1.66*
	60	48.6±1.89*	6.6±0.68	17.6±1.10*	48.4±1.12**
	90	52.6±1.36*	6.8±0.49	18.2±0.75*	53.8±1.27*
	120	54.4±1.21*	7.6±0.51	19.5±0.70*	58.1±1.09**
	150	56.8±1.11*	7.2±0.66	20.2±0.90*	55.5±1.28*
	180	57.4±1.75*	8.0±0.32	21.7±1.01*	59.2±1.28*

* P<0.05, ** P<0.01.

It was found that the cellular factors of nonspecific resistance in calves on the first day after birth did not differ significantly. In the subsequent periods of the studies, it was established that in animals raised in the conditions of private subsidiary plots using polystim, they turned out to be significantly higher than in the control: leukocyte phagocytic activity by 4.0-8.4%, the phagocytic index by 0.8 -1.4 units (P<0.05-0.01). When keeping animals in the dispensary and calf pens on a small farm, the data of the same indicators were higher by 4.4-7.6% and 0.8-1.0 units. (P<0.05), and in medium farm conditions - by 4.0-7.2% and 0.2-1.4 units (P<0.05), respectively. The results of these investigations indicate that polystim activated cell factors of nonspecific resistance of calves in small management forms.

The state of the humoral arm of the organism's resistance most fully reflects the lysozyme activity of plasma and the bactericidal activity of blood serum. It was found that in calves of the experimental group raised in the conditions of private subsidiary plots using polystim, the indicated humoral arms of the immune system were higher than in the control by 2.4–4.8 and 4.6–7.8% (P<0.05-0.01), on a small farm - by 2.6-4.2 and 4.4-8.8% (P<0.05-0.01) and on a medium farm - by 2.7- 3.9 and 4.4-6.8% (P<0.05-0.01), respectively.

The level of immunoglobulins in the blood serum of experimental calves was also significantly higher than in the control group, starting from the age of 15 days until the end of the observation period: with the technology of keeping in private plots - by 1.3-5.2 mg/l, in conditions of the small farm - by 1.9-4.8 mg/l and on the medium farm - by 2.2-4.3 mg/l (P<0.05-0.01).

These changes indicate that the use of polystim stimulated the humoral arms of the nonspecific resistance of the organism in conditions of small forms of management. Moreover, the immunogenic effect of the polystim application was more pronounced in the conditions of private subsidiary plots.

One of the significant problems in keeping calves is that the rapid transformation of the technological environment does not correspond to changes in the main specific forms and rhythms of behavior, therefore animals are encouraged to adapt. We have identified a build-up in technological stress on the calf's body, depending on the increase in the capacity of enterprises, which is confirmed by the bioamine blood spectrum.

The concentration of catecholamines in the blood components (in platelets, neutrophils, lymphocytes, and plasma) of calves of the control and experimental groups in conditions of small forms of management is presented in table 2.

The dynamics of catecholamines in the studied blood components of the control and experimental calves show that animals were stressed under growing technology on medium farms, as evidenced by an increase in the number of bioamines in the above-mentioned blood components, which could be a protective reaction to the stress factor. This reaction was most actively manifested 30 and 60 days after the experiments, which was a consequence of the stress reaction in the anxiety stage, which, starting from the age of 90 days, gradually decreased until the end of the observation period and ended with the resistance stage.

Intramuscular administration of biostimulant to calves caused an increase in metabolic processes and additional energy production by the body under the influence of a stress factor. So, in animals of the experimental group, the concentration of these bioamines in the blood was significantly higher at the age of 30 days by 5.5-9.9 conventional units, 60 days - 5.9-7.1, 90 days - 2.8- 6.6 and 120 days - by 2.3-4.8 conventional units (P<0.05-0.001) than in the control.

A similar pattern was noted in the concentration of serotonin in platelets, neutrophils, lymphocytes, and plasma. So, in the young animals of the experimental group, the content of serotonin in the blood components was significantly higher than in the control group after the administration of polystim: after 30 days - by 7.9-14.3%, after 60 days - by 9.1-13.3% and after 90 days - by 7.2-13.1% (P<0.05-0.01). The dynamics of histamine in the blood components were similar to the nature of changes in the level of catecholamines. Moreover, the histamine level in the blood components of the experimental calves was authentically higher than the control data at the age of 30 days - by 6.8-10.6%, in the 60-day-olds - 8.3-14.4%, in the 90-day-olds - 9.6-12.9%, in the 120-day-olds - 13.5-15.9% and in the 150-day-olds - by 12.4-15.8% (P<0.05-0.001), respectively.

Table 2 - The dynamics of catecholamines, conventional units

Group of animals	Age, in days	Catecholamines in the blood components			
		platelets	neutrophils	lymphocytes	plasma
in private subsidiary plots					
Control	1	26.0±1.14	23.2±0.97	24.9±1.21	20.6±1.03
	30	29.6±1.03	35.0±0.89	38.4±1.08	28.2±0.80
	60	43.2±0.86	51.6±0.81	55.4±1.36	48.0±1.18
	90	67.4±1.21	71.8±1.16	74.6±1.44	62.2±1.32
	120	77.6±1.29	73.6±1.21	81.8±1.32	70.2±1.32
	150	68.4±1.25	74.0±1.05	78.2±1.16	66.4±1.17
	180	63.0±1.14	62.2±1.16	67.6±1.17	54.8±1.16
Experimental	1	25.2±1.02	24.0±1.10	24.6±1.12	24.8±0.86*
	30	35.2±0.92**	41.6±1.03**	46.2±1.24**	32.6±0.98**
	60	50.8±1.16***	58.8±1.16***	61.6±1.03**	57.6±1.21***
	90	70.0±1.10	75.4±0.93*	79.0±1.14*	69.6±1.60**
	120	77.4±1.03	77.2±0.92*	85.8±1.02*	69.6±1.21
	150	72.0±1.58	75.8±1.16	80.4±1.17	70.2±1.02*
	180	66.8±1.07*	64.4±1.44	69.4±0.93	57.4±1.12
on small-sized farms					
Control	1	31.5±1.01	27.0±0.56	29.1±0.87	24.8±0.53
	30	53.8±1.12	55.6±1.06	54.6±0.84	54.2±1.02
	60	44.0±1.33	49.6±0.79	46.1±1.17	38.2±1.30
	90	34.9±1.12	32.5±0.94	31.3±1.16	26.8±1.23
	120	23.9±0.87	24.7±1.09	23.5±1.32	23.2±1.46
	150	21.7±0.76	24.0±0.90	21.4±0.97	24.3±1.22
	180	22.9±0.80	23.9±0.98	24.4±1.36	24.1±1.10
Experimental	1	32.1±0.68	28.5±0.94	27.6±0.65	26.5±0.98
	30	62.7±1.33***	60.2±1.03*	60.3±0.99**	58.5±0.75**
	60	52.7±1.35**	59.8±1.28***	52.9±0.73**	45.9±0.90**
	90	39.9±0.77**	38.5±0.81**	33.4±1.08	28.4±1.02
	120	23.6±0.65	26.1±1.19	26.6±1.10	25.3±1.42
	150	24.2±0.86	25.8±0.94	23.8±1.01	24.9±0.86
	180	25.0±0.76	25.0±1.39	26.9±1.15	25.1±0.92
on medium-sized farms					
Control	1	33.5±1.14	29.6±1.11	31.1±1.32	27.3±1.27
	30	56.0±1.21	57.4±1.81	29.2±1.30	55.6±1.30
	60	62.4±1.32	66.0±1.52	63.5±1.50	61.4±1.48
	90	53.5±1.48	47.3±1.59	43.7±1.64	45.2±1.56
	120	41.2±1.37	31.7±1.40	35.0±1.14	33.2±1.46
	150	32.3±1.43	33.5±1.71	29.9±1.13	29.6±1.25
	180	32.1±1.44	28.3±1.01	24.4±1.36	26.8±1.04
Experimental	1	35.7±1.11	31.5±1.25	29.2±1.17	26.3±1.13
	30	65.9±1.49***	66.2±1.65**	64.7±1.24*	61.1±1.40*
	60	68.8±1.49*	72.9±1.30**	70.6±1.34**	67.3±1.26*
	90	58.6±1.42*	54.0±1.37*	46.5±1.24	51.0±1.38*
	120	43.4±1.45	35.3±1.35	38.0±1.30	38.0±1.46*
	150	33.1±1.23	35.3±1.45	33.6±1.14	31.1±1.12
	180	31.4±1.41	29.1±1.06	26.9±1.15	25.1±1.21

* P<0.05, ** P<0.01, *** P<0.001.

Thus, the dynamics of catecholamines, serotonin, and histamine in the listed blood components of calves indicate that intramuscular injection of polystim to these animals in the conditions of small forms of management activated the sympathoadrenal, serotonin and histaminergic systems, increasing the adaptogenesis and natural resistance of calves to the conditions of keeping in private subsidiary plots, on small and medium farms.

Conclusion. The analysis of the results of research on the biostimulator polystim application to activate the protective and adaptive functions of the calf's body to the conditions of private plots, small and medium farms in winter, reduce the stress load on the body and more fully realize the biological potential of young animals resistance and productivity indicates that not only hematopoiesis, cellular and humoral factors of nonspecific resistance in experimental animals, but also to promote the growth and development of calves at a relatively low cost of feed per 1 kg of gain, reduces the incidence of the respiratory and gastrointestinal tract. The most pronounced stimulating effect was exerted by polystim when raising calves in private subsidiary plots, rather than on small and medium farms.

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СҮТТІ СИЫР ШАРУАШЫЛЫҒЫНДАҒЫ СПЕЦИФИКАЛЫҚ ЕМЕС РЕЗИСТЕНЦИЯЛЫҚ ФАКТОРЛАР

Аннотация. Жұмыстың мақсаты – биостимулятор полистимін (*ПС-1*) қолдану арқылы жеке шаруа қожалықтарында, шағын және орта фермаларда өсірілген бұзау организмінің спецификалық емес тұрақтылығының биологиялық сипаттамаларын зерттеу.

Биостимуляторды бұзаудың көктамырына енгізу метаболизм үдерістерінің жоғарылауына және стресс факторының әсерінен организмнің қосымша энергия өндіруіне септеседі. Сонымен, эксперименттік топтағы жануарларда осы биоаминдердің қан құрамындағы компоненттерінің концентрациясы бақылауға қарағанда 30 тәулікте – 5,5-9,9 шартты бірлікке, 60 күнде – 5,9-7,1, 90 күнде – 2,8-ге едәуір жоғары болды. 6,6 және 120 күн – 2,3-4,8 (P <0.05-0.001).

Лейкоциттердің фагоцитарлық белсенділігі, плазманың лизоцимдік белсенділігі, қан сарысуының бактерицидтік белсенділігі және иммуноглобулиндер бойынша деректер бақылауға қарағанда жоғары болды: жеке қосалқы шаруашылықтарда бұзауларды өсіру кезінде - тиісінше 5,6%, 4,8%, 5,5% және 4,7 мг/мл, ұсақ шаруашылықта - 5,2; 4,2; 7,8% және 3,6 мг/мл және орта шаруашылықта - 5,8%, 3,6%, 4,4% және 4,3 мг/мл (p<0,05-0,01).

Кәсіпорын қуатының артуына байланысты бұзау денесіне технологиялық жүктеменің жоғарылауы анықталды, бұл қан биоаминдерінің спектрімен расталады.

Түйін сөздер: жеке шаруа қожалықтары, шағын және орта фермалар, бұзаулар, полистим, өсу мен даму, гематологиялық және биохимиялық профиль, ет сапасы.

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ФАКТОРЫ НЕСПЕЦИФИЧЕСКОЙ РЕЗИСТЕНТНОСТИ ТЕЛЯТ В МОЛОЧНОМ СКОТОВОДСТВЕ

Аннотация. Цель настоящей работы – изучить биологические особенности неспецифической резистентности организма телят, выращиваемых в личных подсобных хозяйствах, на малых и средних фермах с применением биостимулятора полистим (ПС-1).

Под влиянием биостимулятора произошло увеличение морфологических и биохимических данных крови у телят, выращенных как на приусадебных участках, так и в малых и средних хозяйствах, которые к концу периода наблюдения превышали контрольные значения: количество эритроцитов - на 0,98; 0,81 и 0,79 х1012/л, гемоглобина - на 9,8; 7,0 и 6,2 г/л, альбуминов - на 2,2; 2,8 и 3,5 г/л, γ-глобулинов - на 5,5; 3,7 и 5,6 г/л (P <0,05-0,001) соответственно.

Данные по фагоцитарной активности лейкоцитов, лизоцимной активности плазмы, бактерицидной активности сыворотки крови и иммуноглобулинам были выше, чем в контроле: при выращивании телят в личных подсобных хозяйствах - на 5,6%, 4,8%, 5,5% и 4,7 мг/мл, в мелком хозяйстве - на 5,2; 4,2; 7,8 % и 3,6 мг/мл и в среднем хозяйстве - на 5,8%, 3,6%, 4,4% и 4,3 мг/мл соответственно (P<0,05-0,01).

Выявлено повышение технологической нагрузки на организм теленка в зависимости от увеличения мощности предприятия, что подтверждается спектром биоаминов крови.

Ключевые слова: личные подсобные хозяйства, малые и средние фермы, телята, полистим, рост и развитие, гематологический и биохимический профили, качество мяса.

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ASSESSMENT OF MAIZE GRAIN QUALITY BY DNA MARKERS

Abstract. Research goal. To evaluate maize lines on the basis of the high content of lysine and tryptophan and waxiness using SSR markers.

Methods. Laboratory, statistical.

Results. The article presents the results of maize lines examination using SSR markers carried out in order to select genotypes with a high content of lysine and tryptophan and waxiness. For the selection of lines based on the high content of lysine and tryptophan, a complex of two specific SSR markers was used, namely a dominant phi1212 marker and a codominant phi057 one. With the aid of these markers, three alleles of 141, 153, 165 bp and 141, 150, 160 bp were detected at the polymorphism information content (PIC) values of 0.51 and 0.61, respectively. The homozygous state of the recessive allele *o2* associated with a high content of lysine and tryptophan in grain was detected in 2 out of 77 maize genotypes under examination. The W4 microsatellite marker was used to detect genotypes for the trait of waxiness, i.e. those having zero mutation of the *wx* gene. Resulted from PCR of 77 maize lines, 5 alleles of 176 to 200 bp were detected at the PIC value of 0.73. Amplicons of size 194 and 200 bp were detected in 24 examined maize lines that allegedly contain a zero mutation of the *wx* gene in a recessive homozygous state. Among the promising genotypes with double recessive homozygote for the alleles *o2* and *wx*, two genotypes which are homozygous by *opaque-2- waxy* genes have been selected to be used in further breeding work aimed at improving protein quality of maize grain.

Keywords: SSR markers, lysine, tryptophan, waxiness, *wx* gene.

Introduction. At present, breeding of grain crop is aimed not only at high yield but also at improved biochemical characteristics of the grain. In particular, maize grain contains 8 to 10% protein and a small amount of amino acids. The maize seed protein contains 1.5 to 2% lysine, which is less than a half the human nutrition requirement [1, 2]. In addition, typical maize contains leucine-isoleucine-rich protein which has low biological value.

There are favourable mutations of maize that lead to an improved quality of grain protein. Such mutations are found in genes *opaque2 (o2), opaque6 (o6), opaque7 (o7), opaque11 (o11), floury2 (fl2), floury3 (fl3), Mucronate (Mc) and Defective endosperm (Dc-b30).* They provide for significantly higher concentrations of lysine and tryptophan in maize grain and to a decrease in the accumulation of zein as compared with conventional maize varieties [3, 4].

In particular, the recessive mutation *opaque-2 (o2)* induces a specific decrease in the accumulation of 22-kDa α-zein. It was found that *O2* encodes the main transcriptional regulatory protein bZIP that is specifically expressed in the endosperm and directly or indirectly regulates a number of genes associated with protein accumulation and the level of lysine-ketoglutarate reductase and aspartate kinase. This allows assuming that *O2* plays an important role in the development of grain as a gene expression coordinator which controls protein accumulation, metabolism of nitrogen and carbon [5-9].

Among the well-known starch-modifying maize mutations, mutation *wx* (bearing zero mutation of the *wx* gene, which is a trait of waxiness) deserves special attention. It causes a significant decrease in the activity of the granular-bound starch synthase, suppresses the synthesis of amylose and causes the formation of starch that almost completely consists of amylopectin. Amylopectin is better digested with amylase compared with amylose; therefore, it is more technological feedstock for the industry. The results

of the latest research on plant genome allow effective selection of genotypes and creation of new high-productive genotypes with improved grain quality [10, 11]. Sinkangam et al. (2011) documented the effective combination of traits of high lysine and tryptophan content and waxiness for an individual genotype [10].

For the examination of such maize lines and hybrids, it is necessary to exploit DNA markers, because as a result of the selection for improved quality characteristics, such lines and hybrids (i.e. with increased content of lysine and tryptophan or waxiness) may be inferior to other genotypes in terms of valuable economic and agronomic properties. To evaluate the polymorphism of maize lines in terms of lysine and tryptophan content and waxiness we used of a set of three SSR markers *phi057, phi112* and *W4* [12, 13]. Thus, **the purpose of the work** was to evaluate maize lines on the basis of the high content of lysine and tryptophan and waxiness using SSR markers.

Methods and materials. In the research, 77 maize lines of the Research Institute of Agrarian Business (Dnipro, Ukraine) were used. The work was carried out at the Ukrainian Institute for Plant Variety Examination (Kyiv, Ukraine) during the 2017−2018 period.

Isolation of DNA and PCR. DNA was isolated from 5-day maize seedlings using CTAB (1%) as a lysing buffer. Purification from proteins and polysaccharides was carried out using chloroform; DNA sedimentation was carried out under isopropyl alcohol. The extracted DNA was washed with 95% ethanol solution and dissolved in TE buffer (1mM EDTA pH 8.0, 10 mM Tris-HCl pH 8.0). In the experiment, three SSR markers related to the trait of high lysine and tryptophan content and the trait of waxy seed were used [14, 15] (table 1).

Table 1 - Characteristics of SSR markers

Gene	Marker	Position (bp)	The nucleotide sequence of primers 5'…3'	Hybridization temperature (°C)	Expected size of amplicones (bp)
O2	Phi112	1218-1368	F* - gccctgcaggttcacattgagt	57.0	150
			R** - aggagtacgcttggatgctcttc		
	Phi057	3616-3769	F - ctcatcagtgccgtcgtccat	57.0	165
			R - cagtcgcaagaaaccgttgcc		
Wx	W4	4597-4791	F - aataatccctgctgttcggt	60.0	194
			R - cagcttttggtggccaga		

Note: *Forward primer; **Reverse primer

10 μl of reaction mixture contained: 1 × DreamTaqTMGreen buffer, 0.75 u DreamTaqTM polymerase (ThermoScientific, USA), 100 μM of each dNTP, 25 ng of DNA sample, 0.1 μM of each primer according to the marker. Polymerase chain reaction (PCR) was performed on the TC-Y CreaCon (USA) amplifier. For each primer, the following parameters of PCR were set: step 1 − initial denaturation: (94°C) 5 min; step 2 − development of specific reaction products: denaturation: (94°C) 1 min, hybridization of primers (57-60°C) 1 min, elongation (72°C) 1 min, number of cycles 30; step 3 − final elongation: (72°C) 5 min.

The amplicons were visualized by electrophoresis in a 2% agarose gel in 0.5 × TBE (Tris-borate buffer solution) with bromine ethidium [16]. DNA electrophoresis was performed for 1.5 h. at an electric field intensity of 5 V/cm.

Statistical data analysis. Size of identified alleles was determined using TotalLab TL120 (Trial version) software. In order to evaluate the characteristic of the discriminatory force of the locus not only in terms of the number of detected alleles but also relative frequencies of their encounter, polymorphism information content (PIC) was calculated according to the formula: $PIC = 1 - \sum_i p_{li}^2$, where p_{li} is the frequency of the *i* allele of *l* locus [17].

Results and discussion. To identify maize genotypes based on the trait of high lysine and tryptophan content, a set of two specific SSR markers was used: dominant marker phi1212 that identifies the *O2* allele in the homozygous and heterozygous state [13] and codominant marker phi057 that identifies and isolates three forms of *o2o2, o2O2* and *O2O2*. The results of the electrophoretic separation of the obtained DNA amplicons of maize lines with primers to the markers phi057 and phi112 are shown in figure 1 and 2, respectively.

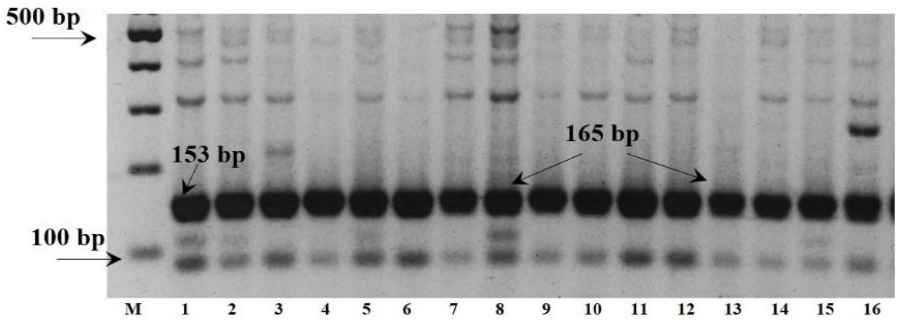

Figure 1 - Electrophoresis of amplicons by the phi057 marker: 1−12 correspond to maize lines RAM 1-RAM 12; 13−16 to RAM 14−RAM 17; M − molecular weight marker Thermo Scientific O'RangeRuler 100 bp DNA Ladder.

As it can be seen from Fig. 1, RAM 1, RAM 2, RAM 3, RAM 4, RAM 5, RAM 6 and RAM 7 lines on tracks 1−7 contain a 153 bp allele. Maize lines RAM 11, RAM 12, RAM 14, RAM 15 and RAM 16 on tracks 11, 12, 14−16 by the marker phi057 also have an allele of 153 bp. Therefore, the indicated lines, in the case of detection of alleles of any size by marker phi112, may have genotype *O2O2*. Amplicons of 165 bp were found in lines RAM 8, RAM 9 and RAM 14 that are shown on tracks 8−10 and 13. This means that in the absence of any amplicon by the phi112 marker, these lines may be homozygous for the recessive allele *o2* and, accordingly, be promising in terms of lysine and tryptophan synthesis.

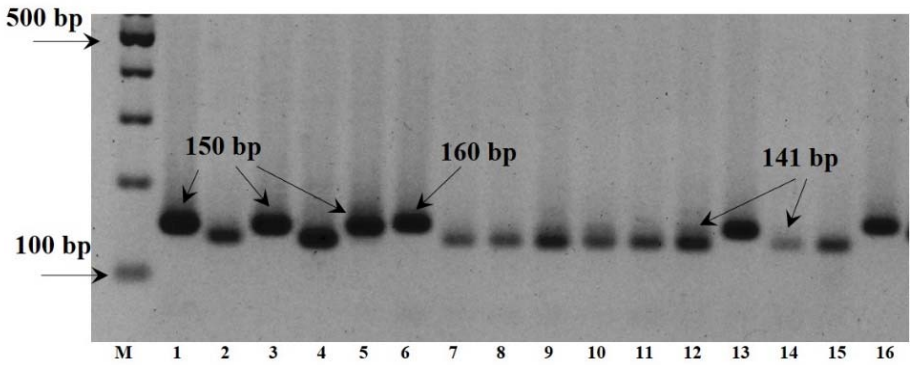

Figure 2 - Electrophoresis of amplicons by the phi112 marker: 1−12 correspond to maize lines RAM 1-RAM 12; 13−16 to RAM 14−RAM 17; M − molecular weight marker Thermo Scientific O'RangeRuler 100 bp DNA Ladder

Figure 2 shows the electrophoresis of DNA amplicons of maize lines by the phi1212 marker. According to the obtained data, alleles of 150 bp were detected in lines RAM 1, RAM 3 and RAM 5 corresponding to tracks 1, 3 and 5, respectively. On tracks 2, 4, 7−12 and 14−15 that represent lines RAM 2, RAM 4, RAM 7, RAM 8, RAM 9, RAM 10, RAM 11, RAM 12, RAM 15 and RAM 16, 141 bp alleles were detected. Presented on tracks 6, 13 and 16 are 160 bp alleles that are characteristic for RAM 6, RAM 14 and RAM 17 lines. The lines described above, in which the allele size detected by the marker phi057 was 153 and 165 bp, may have two genotypes at the heterozygous or homozygous state of the *O2* allele: *O2O2 or O2o2*. However, given the identified alleles by the phi112marker, maize line shown in the figure cannot be homozygous for the allele *o2* that is connected to the increased synthesis of lysine and tryptophan.

According to the obtained data, the size and frequency of the alleles by the markers under study and PIC valued were determined. The markers phi057 and phi112, which identify genotypes with a high content of lysine and tryptophan, detected three alleles: 141, 153, 165 bp and 141, 150, 160 bp, respectively (table 2).

The frequency of the alleles detected by the phi057marker ranged from 0.03 to 0.58 and by the phi112 marker from 0.05 to 0.47. According to the obtained data, the frequency of the 141 bp allele detected by the phi057 marker was 0.03 and the frequency of the 160 bp allele detected by the phi112 marker was 0.05. The frequency of favourable 153 bp allele by the phi057 marker was 0.39. The estimated PIC values for each marker (0.51 and 0.61), indicate a sufficient degree of identified variability among the genotypes under examination. The obtained amplicons allow determining the allelic state of maize lines (table 3).

Table 2 - Alleles, detected in maize lines by markers of high lysine and tryptophan content

SSR marker	The number of alleles	Allele size (bp)	Allele frequency	PIC
phi057	3	141	0.03	0.51
		153	0.39	
		165	0.58	
phi112	3	141	0.47	0.61
		150	0.40	
		160	0.05	

Table 3 - Maize genotypes identified by markers of high lysine and tryptophan content

Genotype	Alleles by the phi057 marker (bp)	Alleles by the phi112 marker (bp)	The share of genotype (%)
O2O2	153	141 or 150 or 160	35
o2O2	165		23
o2o2	165	–	3

Given that phi057 is a codominant marker, the genotypes in which an allele of 153 bp or any of the expected alleles was detected by dominant phi112 marker may be homozygous for the dominant *O2* allele. Of all maize lines under examination, 27 may have *O2O2* genotype. Accordingly, these lines can be considered not promising in terms of lysine and tryptophan content. The largest number of genotypes, according to a combination of dominant and codominant markers, may have a heterozygote for the investigated allele. It was found that 18 genotypes may contain heterozygote *O2o2*. As a result of the amplification of their DNA with the corresponding primers, the presence of 165 bp alleles by the phi057 marker and amplicons of 141, 150 and 160 bp by the phi112 marker was proved. To determine the homozygous state by the recessive allele *o2*, the absence of any amplicons by the phi112 gene marker and the presence of alleles of about 165 bp by the phi057 marker is important. Only two lines (3% of the total number of studied maize genotypes) which conform to the described above conditions were selected.

Volkova et al. (2015) carried out studies of populations of lines GK26 and Mo17 using DNA markers nc030, phi061, phi064, phi083, phi031, phi044, phi057, phi084, phi080 and phi112, which demonstrated clear amplification products for the determination of polymorphism in eight chromosomes. The authors found a link between the phi112 and phi057 marker loci with quantitative trait loci (QTL). The analysed 58 maize lines and detected four alleles for marker locus phi 057 and five for phi112 at PIC values of 0.60 and 0.57, respectively. The obtained results are suggested to be used for the individual genotype forecasting in terms of development of certain agronomic traits, which allows to significantly accelerate the selection of the necessary material within a year, starting from F2, and to model the selection of genotypes with a high level of the trait manifestation in subpopulations by marker alleles, which allows to improve basic maize populations and use them as a source material for heterozygous breeding [18].

Singh et al. (2018) studied the genetic diversity of maize lines and hybrids. The authors analyzed 30 maize genotypes by 23 markers, including the phi112 marker. In the studied genotypes, four alleles in the range from 140 to 165 bp were detected. In our research, this marker also detected the alleles of the specified range with the corresponding frequency [19].

Similar studies were carried out by Smith et al. (1997). The authors evaluated maize lines using RFLP and SSR markers to determine genetic distances between genotypes. The phi057 marker identified four alleles, followed by the phi112 marker with five alleles. The PIC values were 0.60 and 0.57, respectively [20].

The employment of the phi057 and phi112 markers to evaluate maize genotypes with a high content of lysine and tryptophan is documented by Magulama and Sales (2009) and Yang et al. (2008). The authors prove the use of the codominant marker phi057 for the selection of maize lines with a homozygous state of alleles *o2o2* [12, 21]. Danson et al. (2006) recommend using the phi112 marker in marker-associated breeding. The authors studied parent lines of maize by the markers umc1066, umc1216, phi057 and phi112. According to the results of their research, it was found that the presence of zero allele by the phi112 markers is related to the state of a mutant allele of the gene *opaque-2 (o2)* [22].

Consequently, the studies carried out by other authors were aimed at the use of SSR markers not only for the evaluation of genetic diversity but also for the selection of maize genotypes with a high content of lysine and tryptophan in grain. In our studies, the markers phi057 and phi112 were also used to select

promising genotypes with a high content of lysine and tryptophan. However, the obtained data require further investigation to confirm the effectiveness of the approach of using DNA markers.

Since the nutritional value of grain depends not only on the protein content but also on the type of starch, we studied a trait of waxiness by the *wx* gene. Microsatellite W4 marker was used to detect the maize genotypes containing a zero mutation of the *wx* gene (a trait of waxiness). As a result of the amplification of the lines under study, the fragments promising for the presence of a zero mutation (homozygous recessive state of *wx*) were obtained (figure 3).

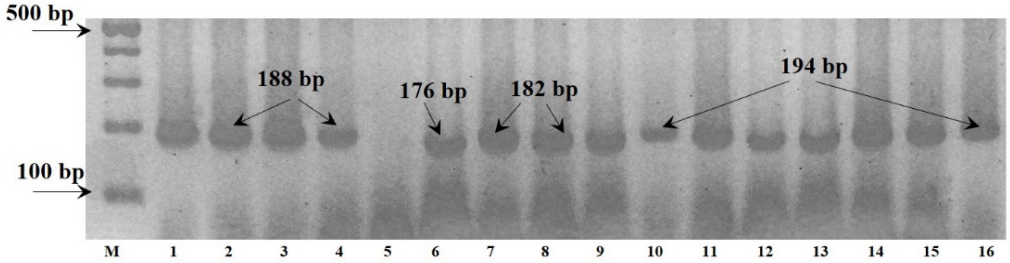

Figure 3 - Electrophoresis of amplicons by the W4 marker: 1−4 correspond to RAM 87−RAM 90; 5 to RAM 94; 6−14 to RAM 99 − RAM 107; 15 to RAM 109; 16 to RAM 111;
M – molecular weight marker Thermo Scientific O'RangeRuler 100 bp DNA Ladder

Shown in figure 3 are the results of the electrophoretic separation of amplicons by the marker of waxiness. The alleles of 188 bp were detected in lines RAM 88, RAM 89, RAM 90, RAM 104, RAM 105 and RAM 109, alleles of 182 bp in lines RAM 100, RAM 101, RAM 102, RAM 106 and RAM 107 and alleles of 176 bp in RAM 99. Given that the presence of alleles of the specified size is not related to zero mutation of the *wx* gene, the lines are not considered promising for further breeding work in terms of the trait of waxiness. Favourable alleles of 194 bp were detected on tracks 1, 10 and 16 in RAM 87, RAM 103, RAM 111 lines, respectively.

According to the PCR results of 77 maize lines, five alleles with a size range between 176 and 200 bp were obtained by the W4 marker (table 4).

Table 3 - Maize genotypes identified by a marker of waxiness

SSR marker	The number of alleles	Allele size (bp)	Allele frequency	PIC
W4	5	176	0.14	0.73
		182	0.12	
		188	0.42	
		194*	0.23	
		200*	0.09	

Note: *favourable alleles on the basis of waxiness.

For the detected alleles, their frequencies were calculated; their values ranged from 0.09 to 0.42. The PIC value was 0.73. According to the obtained data, amplicons of 194 and 200 bp were detected in 24 maize lines. This suggests that these genotypes may contain a zero mutation of the *wx* gene in a recessive homozygous state.

Dang (2010) describes the use of four markers for assessing Chinese maize lines on the basis of waxiness. For this purpose, the author used four pairs of primers W1, W2, W3 and W4. According to the genetic sequences of the various alleles associated with the waxiness, the pair of primers W1, W2 and W3 should amplify fragments 202, 555 and 364 bp, respectively, in the genotypes that are not related to zero mutation of the *wx* gene. Since in practice, similar fragments were observed in both waxy and conventional genotypes, these three pairs of primers did not allow selecting waxy genotypes [13]. Therefore, only one W4 primer was effective, and therefore we used it in our research too.

Sinkangam et al. (2011) investigated the transfer of *opaque-2* genes from inbred maize lines with high-quality protein to elite waxy inbred lines by crossing and selecting homozygous recessive lines using MAS methods as well as their biochemical parameters. The researchers found that lines that have the *opaque-2-waxy* genotype have a high content of sugar and amylopectin. As a result of crosses and selections, the authors obtained six lines homozygous for *opaque-2-waxy* genes [10].

In our study, among the promising genotypes with the trait of waxiness and high content of lysine and tryptophan, i.e. with double recessive homozygote for the alleles *o2* and *wx*, two genotypes can be selected according to the detected by the phi057 marker alleles and with no amplicons by the phi112 marker, as well as by the presence of favourable alleles by the W4 marker.

Considering the fact that the traits of high lysine and tryptophan content and waxiness allow obtaining high-quality processed grain products, there is a need to continue the works on the evaluation of protein composition and the type of starch in promising maize lines selected by SSR markers [10]. The maize lines we selected will be used in further breeding work aimed at improving the quality of protein of maize grain.

Conclusions. Using a combination of two SSR markers phi057 and phi112 we evaluated 77 maize lines on the basis of the high content of lysine and tryptophan in grain. According to the obtained data, two of the studied lines were selected. They were identified as possible genotypes with a homozygous recessive mutation *o2*.

In order to select waxy-seeded breeding materials, an estimation of the genotypes by the W4 marker was carried out. According to the presence of two alleles of 194 and 200 bp, 24 maize lines were found promising. Two promising genotypes have been identified by double recessive homozygote for the alleles *o2* and *wx*. They will be used in further breeding work.

The proposed set of SSR marker is useful for identifying both double and single recessive homozygotes for valuable economic and agronomica traits. As these two traits can be clearly detected only at the later stages of plant development, specific molecular markers for *wx* and *o2* genes may be appropriate to facilitate the early selection of specific genotypes in the respective breeding programs.

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ДНҚ-МАРКЕРЛЕРІН ҚОЛДАНУ АРҚЫЛЫ ЖҮГЕРІ ДӘНІНІҢ САПАСЫН БАҒАЛАУ

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ОЦЕНКА КАЧЕСТВА ЗЕРНА КУКУРУЗЫ С ПОМОЩЬЮ ДНК-МАРКЕРОВ

Аннотация. Цель исследования – ценить линии кукурузы по признакам повышенного содержания лизина и триптофана, а также восковидности с помощью SSR-маркеров**.**

Методы. Лабораторные, статистические.

Результаты. В статье представлены результаты исследований линий кукурузы с помощью SSR-маркеров с целью отбора генотипов с повышенным содержанием лизина и триптофана в зерне, а также восковидным типом зерна. Для отбора линий по признаку повышенного содержания лизина и триптофана применяли комплекс из двух специфических SSR-маркеров: доминантный маркер phi112 и кодоминантных phi057. Определено, что по маркерам phi057 и phi112 получено по три аллели с размерами 141, 153 и 165 пн и 141, 150 и 160 пн соответственно, значение PIC составили 0,51 и 0,61. Гомозиготное состояние по рецессивной аллели *o2*, которая связана с повышенным содержанием лизина и триптофана в зерне была обнаружена в двух из 77 исследуемых генотипов кукурузы.

Для выявления генотипов по признаку восковидности, содержащих ноль-мутацию гена *wx*, применяли микросателлитный маркер W4. По результатам ПЦР анализа 77 линий кукурузы получено пять аллелей размером от 176 до 200 пн, значение PIC составило 0,73. Ампликоны размером 194 и 200 пн были идентифицированы в 24 исследуемых линиях кукурузы, которые могут содержать ноль-мутацию гена *wx* в рецессивной гомозиготной форме.

Среди перспективных генотипов с двойной рецессивной гомозиготой по аллелям *o2* и *wx* отобрано 2 генотипа (гомозиготные по *opaque-2-waxy* генами), которые будут использованы в дальнейшей работе в селекционных программах на улучшение качества зерна кукурузы.

Ключевые слова: SSR маркеры, лизин, триптофан, восковидность, ген w*x.*

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IMPORTANCE OF THE SILK ROAD AND THE SILK ROAD ECONOMIC BELT PROJECT

Abstract. The interaction of different political, economic, historical and cultural dynamics of societies play an important role in the emergence of civilizations. The interaction of these dynamics with each other was realized by means of transportation due to reasons such as trade, migration, war, diplomacy. Transportation routes have been the most important element that provides the relationship of space between people and societies through the means that have developed in the historical process. The factor that makes the transportation route valuable and lasting depends on its geopolitical and geostrategic position, on ensuring that the societies carry out their social and economic relations safely. In this context, the oldest and most valuable transportation route in human history is the Silk Road, which covers a large geography from Europe to Asia to Asia to Africa, where many ancient civilizations were born.

Along with the increase in the importance of energy resources in recent years, the importance of the Silk Road has increased as a result of the growing role of the countries concentrated in the region along the Silk Road in the world economy. On September 7, 2013, Chinese President XI Jinping delivered an important speech at Nazarbayev University in Astana, calling on China and Central Asia to join the creation of a new "silk road Economic belt". According to some researchers, this project covers the European economic zone from China and the Eurasia and Asia-Pacific economy corridor. China's project to revive the Silk Road has emerged as a result of China's economic and political-based regional and global expectations and concerns, rather than being a utopian initiative.

In this study, new projects in the revitalization of the Silk Road were evaluated and the Silk Road Economic Belt project was studied. The environmental threats posed to the region by the world's largest transport project, which is being implemented with the participation of 65 countries, were discussed.

Keywords: Silk Road, Silk Road Economic Belt, trade, environmental threats.

Introduction. The Silk Road, the longest road in the ancient world, for thousands of years brought different cultural elements to each other and allowed distant geographical regions to interact with each other. The Silk Road has become an important tool for strategic and commercial, political, cultural, religious and technological interaction. Due to such large-scale features, the Silk Road had a vital impact on the states at certain times in history.

The Silk Road, which stretches for more than 7,000 km through Asia, Europe and Africa, has been a catalyst for development for centuries, providing an exchange of goods, cultures, arts, history and religion between China and the West. This caravan trade route was the longest in the pre-capitalist era [1]. On September 7, 2013, Chinese President Xi Jinping delivered an important speech at Nazarbayev University in Astana, calling on China and Central Asia to join the creation of a new "Silk Road Economic Belt." The proposal is aimed at promoting the rapid economic development of Eurasian countries, especially Central Asian countries, achieving rapid development in China [2].

It has become an important network of relations that brings trade countries closer, provides product diversity and allows for efficient use of resources. Foreign trade is still used as a policy tool for countries, especially before the end of World War II, many countries viewed foreign trade negatively. In the 1980s, thanks to the positive atmosphere created by globalization, countries conducted research and agreements to remove barriers to trade. In particular, there is the importance of infrastructure investments for the development of trade, which will reduce transport costs. From this point of view, transport networks, which are trying to attract the dominant countries in world trade, are important.

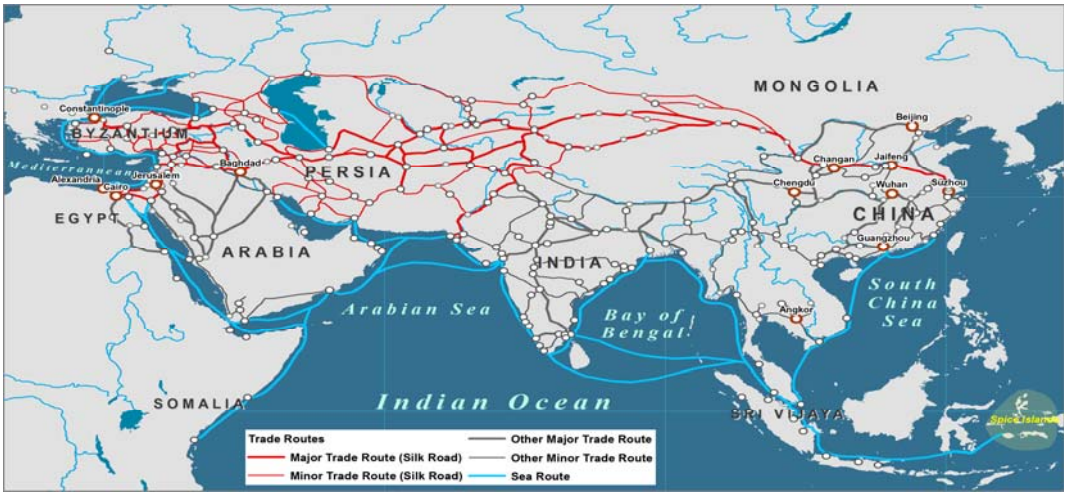
The Silk Road, which has a great significance in history and strives to become the ruler of civilizations, has lost its significance with geographical discoveries. From the Middle Ages, the transportation of commercial goods by sea was important for European countries. In the context of development such as war, economic crisis and globalization, Asian countries have become more competitive in the international arena and have achieved higher growth rates than Western countries. The search for new markets continues, especially for Asian economies, which have achieved economic growth through a breakthrough due to cheap labor, so efforts are being made to reduce transport costs. Therefore, it is important to develop new transportation opportunities, conclude agreements with neighboring countries, invest in infrastructure. Especially with the breakthrough of China, efforts are being made to revitalize the Silk Road as never before in order to trade quickly and cheaply in distant lands. This is evidenced by the modern Silk Road project, which was actually launched under the leadership of China - the "Silk Road Economic Belt". This study assesses the short history of the Silk Road, its economic significance and new projects to revitalize the Silk Road, and discusses the environmental risks of the new Silk Road project.

Name, brief history and directions of the Silk Road.

The Silk Road was established 2,100 years ago during the Han Dynasty (206 BC - 24 BC) to promote trade between China and Europe [3].

It is known that the ancient trade route of Asia, which is of great historical significance, was called the Great Silk Road due to the fact that the silk produced in China was transported to the West by this route. The term Silk Road was not used in Asia, especially in China, and the term was used only by Europeans. Baron von Richtofen was the first to use the name of the Silk Road, and in an article on China he referred to the Silk Road and the Silk Road map of the Macedonian silk merchant Marinus [4]. From the first centuries of history, the Silk Road has been a means of commercial, military, cultural, religious and political relations between East and West for thousands of years. According to some sources, silk, carpets, handkerchiefs, tea, and other important Asian commodities were exported to Iran, Byzantium, and many other European countries by more than a hundred caravans. On the other hand, in the West, many of the cultural dynamics (religions, civilizations, and beliefs) that come through merchants and missionaries have shifted to the East.

The main route of the Silk Road was from China, through Iran to Mesopotamia and to the Mediterranean ports of Antioch and Sur. However, over time, this path changed due to the current political and economic situation and became an international trade network. The Silk Road is divided into two sections: the North Road and the South Road. The northern route ran from the Caucasus to the Black Sea, from there to coastal points such as Azov and Crimea, and then from southern Russia, the Urals, southern Siberia, and the Altai steppes to China. The Southern Silk Road stretched from the Chinese capital to the Eastern Mediterranean, through the plateaus of Central Asia and Iran, and then by ships to the interior of Europe [5]. Below is a **Map 1** of the Silk Road:



Source: https://transportgeography.org/wp-content/uploads/Map_Silkroad.pdf
Date of access: 12.03.2020

Although it was not possible to know the exact direction of the Silk Road, an attempt was made to establish a definite route based on archeological finds and historical data. Until recently, it was believed that there was only one way between East and West. However, today we can talk about a road network with three routes. These are the Northern Silk Road, the Southern Silk Road and the interconnected land and sea routes.

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The information provided so far shows that the Silk Road has a very complex system and a very wide geography. For this reason, its importance can be better understood when considering the direct and indirect economic, social, political, military, religious and artistic effects of the geographical area in which it is located.

The importance of the Silk Road in reducing transport costs in trade.

Due to its geographical and physical properties, countries cannot produce any products. Countries that can produce according to their geographical and human structure have the opportunity to use goods that they cannot produce through foreign trade. Especially in the context of globalization, countries have the opportunity to trade more. Thus, countries have the opportunity to import not only goods that they can not produce, but also goods produced at their own production costs. If countries import goods at cost of production, they can use their resources more efficiently by diverting their resources to other high-profit areas. In this case, as a country's foreign trade policy, it is important to conclude trade promotion agreements, developing the capabilities of foreign markets that bring producers closer to more buyers. Countries that remove restrictions and bans on foreign trade aim to increase trade by reducing transport costs between countries, with a focus on infrastructure investment.

When it comes to developed countries until the 80s, the first countries to appear were America, Japan and Europe. However, Asian countries joined the ranks of developed countries in the 80s. The growth of production in Asian countries entering the international market has led to an increase in foreign trade and greater energy demand. Work to reduce transport costs, low-cost transportation of energy resources between countries will reduce the cost of goods, which will allow to better meet the needs of consumers. In particular, along with the rapid development of the economy, China's energy needs are growing rapidly. China is forced to import half of its oil consumption, or 10 million barrels per day. 60% of oil imports come from the Middle East [6, p.28]. China is concerned about the US presence in the Middle East and its control over oil and natural gas resources and their transportation routes. To reduce its growing energy and dependence on the Middle East, China seeks to diversify its resource-rich countries and enters into agreements with various countries in Central Asia, Africa and Latin America. China's investment in energy is growing both domestically and abroad. By connecting oil pipelines with Central Asia, it seeks to minimize the accuracy of maritime transport routes to these networks, including Iran, crossing the Straits of Omuz and Malacca [7].

Reducing transport costs and creating the shortest and safest trade routes as cost-reducing factors are important for maintaining countries' international competitiveness. In other words, countries that can produce cheap goods due to human and technological development are looking for ways to transport these goods to foreign markets at the lowest prices. In this regard, Kazakhstan and other Turkic republics are in geopolitical importance.

Projects aimed at improving the Silk Road

Although it lost its significance at the end of the XVII century, the historical Silk Road is now trying to renew it with its various forms. In this context, economic and political cooperation is carried out through a number of international and so-called "Silk Road Economic Belts" initiatives. The most important of these are oil and gas pipeline projects, the Europe-Caucasus-Asia Transport Corridor (TRACECA), the International Transport Corridor Europe-Caucasus-Asia (TRACECA), the Northern Distribution Network, the Korean-Siberian Railway and the Persian Gulf-Asia model. actually takes place in a significant part of them.

TRACECA program: It was put on the agenda of the Brussels Conference on May 7, 1993. The conference was attended by the Ministers of Trade and Transport of Azerbaijan, Georgia, Armenia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, as well as representatives of Russia, Romania, Bulgaria, Turkey, Iran, China, Pakistan and the European Union.

The main objectives of the conference:

• Encourage cooperation between participating countries in the development of trade in the region;
• identify problems and shortcomings in the region's trade and transport systems,
• Determining the terms and conditions of the EU-funded technical assistance program;
• Creation and development of the Central Asia-Caucasus-Europe transport corridor.

At the end of the conference, the Brussels Declaration was signed. Thus, the European Union has adopted a funded technical support program for the development of a transport corridor from Central Europe to Central Asia via the Black Sea, the Caucasus and the Caspian Sea. The conference identified problems and shortcomings in the region's trade and transport systems, identified projects to address them, and immediately provided a € 15 million loan from the European Union to operate these projects. These projects were aimed at opening traditional trade routes to the west of Moscow [8].

In addition, 4 sectoral working groups have been established at the Conference since 1993. These are working groups; It was decided to facilitate trade, road transport, rail transport and sea transport. In these working groups, the costs of the sea, the airline and the existing highways passing through Russia were calculated comparatively by determining the route through Central Asia. The most discussed issue at the conference was the simplification of border crossings.

Map 2: TRACECA network

Today, the TRACECA route transportation system includes 13 member countries. These countries; Azerbaijan, Armenia, Bulgaria, Kazakhstan, Kyrgyzstan, Moldova, Romania, Tajikistan, Turkey, Ukraine, Uzbekistan, and Georgia (http://www.traceca-org.org/en/countries/). The economic indicators of TRACECA countries are given in the table 1 below.

Table 1 - Economic indicators of TRACECA countries (2019)

Countries	Population (million people)	Population growth (annual%)	GDP	GDP growth (% per annum)	Export	Import
Armenia	2,9	0.24	12433089919	5.2	4700348851	6647280643
Azerbaijan	9,9	0.87	46939529412	1.41	25484473000	17705199000
Bulgaria	7,02	-0.72	65132951116	3.08	43450810000	41496250000
Georgia	3,7	-0.04	17599660629	4.80	8896617467	10768594069
Iran	81,8	1.39	4.54013E+11	3.76	-	-
Kazakhstan	18,2	1.29	1.7934E+11	4.10	67083014658	46224938814
Kyrgyzstan	6,3	1.99	8092836609	3.50	2600152769	5483703329
Moldova	2,7		11443671436	3.40	3451540000	6383920944
Romania	19,4	-0.62	2.39553E+11	3.95	1.00511E+11	1.07679E+11
Tajikistan	9,1	2.45	7522947810	7.30	1116258706	3220202290
Turkey	82,3	1.49	7.7135E+11	2.83	2.23448E+11	2.39533E+11
Ukraine	44,6	-0.47	1.30832E+11	3.34	59135000000	70502000000
Uzbekistan	32,9	1.73	50499921558	5.12	14135137288	23443547241
Source: World Bank (http://data.worldbank.org/indicator)						

The Central Asia Regional Economic Cooperation (CAREC): Another project led by the United Nations Social Commission for Asia and the Pacific in the 2000s aims to integrate and upgrade the transport infrastructure of developing Asian countries on land and in transit. Within the framework of this project, 3 transport corridors were involved in Central Asian countries. Another transportation project is the Asian Development Bank's Central Asia Regional Economic Cooperation Program for Transport and Trade Facilitation. 33 out of 80 transportation-related projects have been completed, 37 of the remaining 47 projects have been delayed due to various reasons, and about 40% of these projects have been completed. In addition, CAREC is at each customs gate in terms of trade facilitation between countries in the region. conducts research on the creation of the necessary infrastructure to create a single window system that will reduce waiting times [9].

The Silk Road Economic Belt project

The New Silk Road, an important trade and logistics project of the 21st century, was formed and implemented in accordance with the established policy of China. This trade route, where empires have been at war with each other for hundreds of years, will be a great economic zone for modern states with modern projects.

During his visits to Central Asia and Southeast Asia in September and October 2013, President Xi Jinping of the People's Republic of China proposed a joint project to build the Silk Road Economic Belt and the 21st Century Maritime Silk Road, which attracted much international attention. As a result of China's economic growth and aspiration to find new markets, this project, based on its history, connects many countries with their economies. In addition, the "East-West" trade network will be established and will be continuous in the exchange of goods. The necessary infrastructure for the full implementation of the project has been created and funds from many countries have been attracted to complete the network [10].

$ 40 billion has been transferred to the Silk Road Economic Belts Fund, which China has set up for its investment in the Silk Road. It has invested $ 100 billion in the Asian Infrastructure Investment Bank, which was established to support and develop infrastructure and is a member of Kazakhstan [11]. These Chinese investments underscore the importance of the Silk Road. The road, which is expected to affect trade and the economies of the countries through which it passes, will have a significant impact on international trade.

As part of the Silk Road project, it is planned to create two types of land and sea routes (figure 2). The first is the so-called "Silk Road Economic Belt", which connects China and Europe. The project includes high-speed railways, highways, ports, airports, natural gas networks and other infrastructure projects. The second line is the so-called "Sea Silk Road", which connects China with the Persian Gulf and the Mediterranean Sea through the Indian Ocean. It is planned to develop maritime trade through the Persian Gulf and the Indian Ocean. The Tengiz Silk Road allows access to markets outside China. Thus, China receives a significant share of world trade.

Source: The One Brief, 2019 https://theonebrief.com/chinas-global-ambition-balancing-opportunities-and-risks-in-one-belt-one-road/

A study of the countries in the area shows that the project includes mainly developing countries. Given that the economic volume of these countries under the project is about $ 21 trillion, the New Silk Road project has significant economic potential. The project includes railway, road, air, sea and pipeline crossings. Upon completion of the project, transport networks from China to Europe will contribute to the differentiation of trade routes and the development of technology will reduce the time of trade between countries. Costs will be reduced if logistics systems are improved. Pipeline trade is important in the energy sector. China supplies most of the oil needed for its heavy industry through pipelines. The rest is done by sea trade. The project envisages a complex trade network with the construction of a pipeline.

With the New Silk Road project, the People's Republic of China seeks to increase its growth rate and stimulate domestic consumption [12].

Environmental hazards of the Silk Road economic belt

The Silk Road Economic Belt is popularly known as the New Silk Road. Reconstruction of the Old Silk Road will bring great benefits to China and the underdeveloped regions of Central Asia, creating wealth and prosperity that will create many needs. However, the main task is to ensure the safety of the New Silk Road and its sustainability. For example, the fact that most of the route is located in vulnerable areas and semi-arid and arid areas of water resources can pose a threat to the environment.

Problems related to limited natural resources and climate change, human activities have a vulnerable impact on the environment. The natural complexity of the natural system and the lack of scientific research on the natural environment and resources of these regions make it difficult to find effective solutions [2].

First of all, the dry climate of the region and limited water resources. Global climate change is exacerbating the situation. The eastern basin of the Aral Sea in August 2014 was completely dry for 600 years [13]. Now it is a desert. In addition, glaciers in the Himalayas and the Tianshan Mountains are a cause for concern due to climate change. Melted glaciers will generate additional flow in the short term, but when glaciers are removed, future catastrophes will have irreversible consequences. Today, about 3 billion people live along the new Silk Road; this number will increase significantly with the implementation of the project. Today, water resources in the region are used inefficiently in most of the water used for agricultural irrigation [14]. The problem is exacerbated by declining water quality due to human health. To solve the problem, it is necessary to make radical changes in water resources management.

Fossil energy sources are also consumed at an increasing rate. China is the world's largest consumer of coal, natural gas and oil annually, especially in the East. If consumption continues to grow, China's coal reserves may be depleted in just 19 years [15]. Climate change and environmental pollution are inevitable consequences of this trend and threaten the economic viability of the New Silk Road initiative. Air and water quality are a clear concern, but land degradation is also an important issue, as soil pollution, soil salinization and desertification can disrupt agricultural productivity. Research can help solve or prevent

some potential problems. However, government-sponsored research is currently limited. Priority areas of emergency research should be based on the following:

• A detailed assessment of the project's required water and energy, including an assessment of transboundary waters and how to manage them.

• Full assessment of the project's environmental potential and environmental impact, along with options for improvement.

• Full assessment of possible geological hazards as a result of design work.

Conclusion. The Silk Road is one of the oldest trade routes in history, and thanks to it, many countries have historically been engaged in economic activities. In addition, the possibilities of the Silk Road influenced different cultures in social, political, military and religious aspects. Because at that time the most important route from East to West was the Silk Road. The creation of the Silk Road Economic Belt is an interesting prospect that will bring huge economic benefits to the countries of Eurasia. However, intensive human activities could double the water crisis in Central Asia, worsen the vulnerable environment and accelerate energy consumption in the region. In order to create a new and stable economic belt of the Silk Road, it is necessary to promote research, strengthen international cooperation and improve education. Ecologically sustainable development of the Silk Road economic belt is necessary through careful planning, specific research, and the support of governments and the people. Local governments need to invest in research in relevant areas.

At the same time, society must understand the need to protect the environment and the devastating consequences of the abuse of natural resources. The New Silk Road can be built in a useful and sustainable way through careful planning, relevant research and close cooperation between the relevant regions and countries.

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ЖІБЕК ЖОЛЫ ЖӘНЕ «ЖІБЕК ЖОЛЫ ЭКОНОМИКАЛЫҚ БЕЛДЕУІ» ЖОБАСЫНЫҢ МАҢЫЗДЫЛЫҒЫ

Аннотация. Қоғамның түрлі саяси, экономикалық, тарихи және мәдени динамикасының өзара ықпалдасуы өркениеттердің пайда болуында маңызды рөл атқарады. Динамиканың бір-бірімен өзара қарым-қатынасы сауда, көші-қон, соғыс, дипломатия сынды себептерге байланысты көлік құралдары арқылы жүзеге асырылды. Көлік жолдары – тарихи деконструкция үдерісінде дамыған көлік құралдары арқылы адамдар мен қоғам арасындағы кеңістіктік қатынастарды қамтамасыз ететін маңызды элемент. Көлік жолын құнды және берік ететін фактор оның геосаяси және геостратегиялық жағдайына, қоғамның әлеуметтік және экономикалық қатынастарын қауіпсіз жүзеге асыруды қамтамасыз етуге байланысты. Бұл тұрғыда адамзат тарихындағы ежелгі және құнды көлік жолы – Еуропадан Азияға, Азиядан Африкаға дейінгі үлкен географияны қамтитын көптеген ежелгі өркениеттер дүниеге келген Жібек жолы.

Соңғы жылдары маңызы артқан энергетикалық ресурстардың ұлғаюымен бірге Жібек жолы бағытында орналасқан өңірде шоғырланған елдердің әлемдік экономикадағы орнының артуы нәтижесінде Жібек жолының маңыздылығы арта түсті. 2013 жылғы 7 қыркүйекте ҚХР Төрағасы Си Цзиньпин Астанадағы Назарбаев университетінде маңызды баяндама жасап, Қытай мен Орталық Азияны жаңа «Жібек жолы экономикалық белдеуін» құруға қосылуға шақырды. Бұл жоба Қытай мен Еуразияның еуропалық экономикалық аймағын және Азия – Тынық мұхиты экономикалық дәлізін қамтиды. Кейбір зерттеушілердің пікірінше, Қытайдың Жібек жолын жандандыру жобасы утопиялық бастама емес, Қытайдың экономикалық және саяси негізделген аймақтық және жаһандық үміті мен алаңдаушылығы нәтижесінде пайда болды.

Зерттеуімізде Жібек жолын жандандырудағы жаңа жобалар бағаланып, «Жібек жолы экономикалық белдеуі» жобасы зерттелді. Әлемдегі 65 елдің қатысуымен жүргізіліп жатқан ірі транспорттық жобаның аймаққа төндіретін экологиялық қаупі талқыланды.

Түйін сөздер: Жібек жолы, «Жібек жолы экономикалық белдеуі, сауда, экологиялық қауіп.

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ШЕЛКОВЫЙ ПУТЬ И ЗНАЧЕНИЕ ПРОЕКТА «ЭКОНОМИЧЕСКИЙ ПОЯС ШЕЛКОВОГО ПУТИ»

Аннотация. Взаимодействие различных политических, экономических, исторических и культурных динамик обществ играет важную роль в возникновении цивилизаций. Взаимодействие этой динамики осуществлялось посредством транспорта по таким причинам, как торговля, миграция, война, дипломатия. Транспортные пути стали наиболее важным элементом в процессе исторической деконструкции, обеспечивая пространственные отношения между людьми и обществом с помощью развитых транспортных средств. Фактор, который делает путь ценным и сильным, зависит от его геополитического и гео-стратегического положения, обеспечивающего безопасную реализацию социально-экономических отноше-ний общества.

В этом смысле старейшим и наиболее ценным транспортным маршрутом в истории человечества является Шелковый путь, где родились многие древние цивилизации, охватывающие большую географию от Европы до Азии, от Азии до Африки. Наряду с увеличением значимости энергетических ресурсов, которые становятся все более важными в последние годы, значение Шелкового пути возросло в результате растущей роли стран, сосредоточенных в регионе вдоль Шелкового пути в мировой экономике.

7 сентября 2013 года президент Китая Си Цзиньпин выступил с важной речью в Назарбаев Университете в Астане, призвав Китай и Центральную Азию присоединиться к созданию нового «Экономического пояса – Шелкового пути». По мнению некоторых исследователей, этот проект охватывает Европейскую экономическую зону от Китая и Евразии до Азиатско-Тихоокеанского экономического коридора. Многие эксперты считают, что Китайский проект по возрождению Шелкового пути – это не утопическая инициатива, а результат экономических и политических, региональных и глобальных надежд и перемен.

В этом исследовании были оценены новые проекты по оживлению Великого Шелкового пути и изучен проект Экономического пояса Великого Шелкового пути. Были обсуждены экологические угрозы для региона, связанные с крупнейшим в мире транспортным проектом, который реализуется с участием 65 стран.

Ключевые слова: Шелковый путь, Экономический пояс Шелкового пути, торговля, экологические угрозы.

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THE GEOPOLITICAL POSITION OF THE TURKIC WORLD AND THE GEOGRAPHY OF TRANSPORT AND ECONOMIC RELATIONSHIPS

Abstract. Notwithstanding the fact that our planet is characterized by scientific, technical, political and economic achievements from the beginning of the XXI century, there is still problems in development, socio-economic backwardness, and problems in the management and determination of borders between countries. The Turkic states, which recently gained independence, are trying to determine their geopolitical position in the political arena of the world, which is mainly associated with the development of their transport and economic relationhips. The favorable geostrategic position of the Turkic world countries, their location at the crossing of various transport corridors accelerated their integration into the world economic system. Therefore, the valuation of the capabilities of the Turkic states in the modern world is of great relevance.

This paper uses historical, statistical, comparative, analysis method, systematic and other methods. Using these methods was carried out a geographical analysis of the geopolitical situation and the transport and economic relations of the Turkic world. Economic development, mutual cooperation, positive demographic dynamics and other processes in the modern world are among the interests of the Turkic world. Because the geopolitical situation in the Turkic world and its ability to influence international political situation serve the interests of the region as a whole.

Key words: turkic world, transport, geopolitics, TRACECA, TANAP, TAP, INSTC.

The geopolitical position of the turkic world. The geopolitical ideology of the Turkic world is rooted more in Eurasianism from a spatial point of view. Simultaneously, being an integral part of the Atlantic region is an important ideological strategy. The Turkic world provides for integration into the political, economic and cultural systems of Europe and Asia. These national-state entities include Tatarstan, Bashkortostan, Chuvashia, Karachay-Cherkessia, Kabardino-Balkaria, Yakutia, Altai, Tuva and Khakassia in Russia, Xinjiang Uygur Autonomous Region in China and others.

The Turkic world currently have border with 14 states. Economic relations of the Turkic world countries with each other, with neighboring states and with most countries of the world are on the rise. The ability of Azerbaijan, Turkmenistan and Kazakhstan to access to the World Ocean through the Caspian Sea, Black Sea and Volga-Don Canal can show great perspective for the region and the Turkic world as a whole [2].

The Turkic world is a territory with rich natural resources. That is why the geopolitical forces of the region are constantly struggling for this region. According to the thoughts of the famous American geopolitician Zbigniew Brzezinski, the strategic position of Kazakhstan, Turkmenistan and Azerbaijan is of particular importance in terms of providing cheap and high-quality energy resources to the three fastest economical growing regions of the world: North America, Europe and East Asia [3].

In general, oil and gas reserves discovered in the Turkic world are estimated at 4.2 billion tons and 11.7 trillion. m^3, which is respectively 2.4% of world oil reserves and 6.2% of gas reserves (table 1).

Key oil and gas countries of the region are Azerbaijan, Kazakhstan, Uzbekistan and Turkmenistan. These countries began to export their natural resources to the European market since the 1990. During this period, a number of energy projects were realized.

Table 1 - Indicators of the oil and gas industry of the Turkic world countries, 2018

Country	Oil reserves, million barrels	Oil production, barrels / day	Natural gas reserves, billion m3	Natural gas production, mln. m3
Azerbaijan	7 000	833 538	991	16 700
Kazakhstan	30 000	1 595 199	2 407	20 200
Kyrgyzstan	40	1 000	5.66	10
Uzbekistan	594	52 913	1 841	61 740
Turkey	300	49 497	5.10	632
Turkmenistan	600	230 779	7 504	83 700

Source: CIA World Fact Book

The realization of a number of major transport projects is important for the involvement of Central Asia in regional economic integration. The main goal of these projects are to ensure the delivery of rich oil and gas reserves from Central Asia to Europe and reduce the dependence of European energy security on Russia. The first of these major projects was TRACECA.

Transport and economic relations of the turkish world. The formation of political, economic and cultural relationships between Turkic countries in the modern time, in addition to socio-economic factors, is also determined by the possession of a favorable transport and geographical position of the countries. Since transport covers almost all areas of the economy and is one of the key areas in the formation of the economic infrastructure, it is a way of ensuring the normal functioning of the country. Transport participates in industrial and agricultural complexes of various regions of the countries with favorable natural and economic conditions, transportates products from production to consumption [6].

Azerbaijan. The favorable geographical position of Azerbaijan has historically caused to the development of all types of transport here. At present, Azerbaijan, which has a modern transport infrastructure, is using its transit potential to develop the country's economy. The modern Azerbaijan transport complex consists of automobile, railway, air, water and pipeline transport.

Azerbaijan is taking certain steps to develop international cargo and pasanger transportation in the East-West and North-South directions through its territory, which are important parts of the transport and trade routes of Eurasia.

The development of the transport sector has become one of the main challenges facing the country since independence. After the development and modernization of the transport complex, Azerbaijan began to intensively use its transport and transit potential. For instance, transport corridors like Baku-Tbilisi-Kars and North-South, which cross the country. Such transcontinental transport corridors have a positive effect not only on the transit potential of countries, but also on their socio-economic development, geopolitical status and overall economic development.

Turkey. Central Asia, South Caucasus and Anatolia are regions with a rich cultural, religious and commercial heritage for Turkic and Islamic world. The Great Silk Road, which is very important for world trade relations, connects Central Asia, the South Caucasus and Anatolia (Turkey) commercially and culturally.

Turkey controls the strategically important sea straits of the Dardanelles and the Bosphorus, which is one of the key features of its transport-geographical position. Due to this advantageous geographical position, the railways and highways connecting Europe with the countries of Asia pass through Turkey.

With well-developed manufacturing industry, Turkey has good trade relations with foreign countries. Albeit, sea transport of Turkey has a higher portion in trade relations, other modes of transport are also developing speedily. Road transport plays an important role in the Turkish economy, which is actively involved in the TRACECA project.

At the present time, the Baku-Tbilisi-Ceyhan oil pipeline, the TANAP gas pipeline, the Baku-Tbilisi-Erzurum gas pipeline and the Baku-Tbilisi-Kars railway corridor pass through Turkey for transporting oil and gas through the Caucasus and Central Asia to Europe. Turkey, in turn, aims to promote the development of its energy, transport and other sectors by participating in such transport projects. With the support of Azerbaijan, reliable steps are being taken to achieve these goals. For example, the port of Petkim and the START oil refinery plant were built in Izmir. In the future, the Azerbaijani side also intends to realize a number of energy projects in Turkey.

Kazakhstan. Kazakhstan plays a special role in creating a global transcontinental transport corridors in the Central Asian region. The fact that this country has a special geographical position makes it an important area for integration of the Turkic world countries, as well as for the integration of Europe and Asia. Several largest and important transport corridor pass through Kazakhstan.

One of the key priorities for this country is the realization of the country's transit potential and providing transport access to the global market. To achieve these goals, Kazakhstan has performed a number of transport and energy projects not only on its territory, but also abroad. The Kazakhstan-China joint logistics terminal in the Chinese port of Lianyungang on the Pacific coast, the "Khorgos-East Gates" free economic zone on the border with China and others can give for examples for such projects. The choice of the port of Lyanyungan as the starting point of the transport route "Western Europe - Western China" and passing through the "Khorgos-East Gates" free economic zone also reflects Kazakhstan's focused policy in this area [15].

In the future, the time of transportation of goods to China will be reduced by the connecting of Baku-Tbilisi-Kars railway corridor to the Aktau-Aktogay railway line and to the Trans-Kazakhstan Railway project. So, if this project is realized, the existing Istanbul-Kars-Tbilisi-Baku-Altai-Dostik route will be reduced to 800 km and will be 6,297 km of length. In addition, with the construction of the Jetigen-Khorgos road on the border with China in southeastern Kazakhstan, this route will be reduced by an additional 293 km.

Turkmenistan. Unlike the four other countries of Central Asia, Turkmenistan was formally involved in the TRACECA project. But starting in 2009, this country has been trying to strengthen its position in the region, turning its rich energy resources into real geopolitics. As a result, today Turkmenistan shows great interest in the TRACECA project.

Within TRACECA, three main routes with a total length of 3,000 km pass through the territory of Turkmenistan: 1) Turkmenbashi-Ashgabat-Uzbekistan; 2) Marie-Sardadabad; 3) the route along the border with Uzbekistan.

Turkmenistan shows great interest in the Baku-Tbilisi-Kars (BTK) railway corridor. At a recent meeting between the presidents of Azerbaijan and Turkmenistan in Ashgabat, an agreement was reached on the implementation of the Lyapis-Lazuli transcontinental railway. This route will be of great importance for the transportation of NATO military equipment from Afghanistan to the west.

Uzbekistan. Uzbekistan occupies a special geopolitical and geoeconomic position among the countries of the Turkic world in Central Asia. The presence of the border with Afghanistan, rich natural resources and great prospects for economic development are clear evidence of this.

Within TRACECA, 4000 km of railway lines pass through the territory of tUzbekistan, of which 762 km are double-track railway, and 618 km are fully electrified [15].

Uzbekistan is considered one of the most important countries in solving the problems of the USA and NATO in Afghanistan. This country will continue to use its transit value to ensure stability in Afghanistan and create a security buffer there.

Kyrgyzstan. Kyrgyzstan supports the reconstruction of the Kungrad-Beineu-Aktau road and the construction of the Andijan-Kashgan railway through the country as part of the TRACECA project. The Kungrad-Beineu-Aktau railway is an important route from Central Asia to Europe. The construction of the Tashkent-Dushanbe and Termez-Dushanbe transcontinental highways will provide Kyrgyzstan, Turkmenistan and Tajikistan with access to eastern Eurasia - China and Japan, as well as to South Asia and India.

Transport corridors uniting the turkish world. The countries of the Turkic world have always played the role of a bridge between Europe and Asia for the main trade routes. Starting from the historical Silk Road, these routes have expanded and modernized in recent years (new ones have been added). However, most of the trade operations between Europe and Asia is still realizing over maritime transport. Central Asian countries are interested in creating new transcontinental transport networks that can compete with maritime transport. This interest can be justified by the accession of the countries of the region to the TRACECA project, as well as the intention to deliver their goods to Europe via the Baku-Tbilisi-Kars railway corridor, as well as to support the North-South transport corridor.

TRACECA was established in May 1993 in Brussels, upon the signing of an agreement between the EU member states, the Caucasus and Central Asian countries. This transport corridor is of exceptional importance for the interaction of Turkic countries (figure 1).

Source: http://www.traceca-org.org
Figure 1 - International transport corridors

TRACECA transport and communication lines run from China through the Central Asian-Persian Gulf to the Mediterranean Sea (about 6.5 thousand km long). The countries participating in the program cover 2/3 of the planet, that is 48.7 million km2. Under this program, $ 250 million was initially allocated to improve the transport systems of the participating countries, including the restoration of railways and roads [7].

Two Turkic states - Turkmenistan and Azerbaijan are actively involved in the realization of the **Lapis Lazuli** railway corridor, which will be a continuation of the TRACECA. This road will begin in Afghanistan and connect with the Baku-Tbilisi-Kars railway. This multimodal transit line, which is very significant for the Turkic world, will connect Afghanistan, Turkmenistan, Azerbaijan, Georgia and Turkey.

On this route, Turkmenistan, like Afghanistan, will be able to export up to 80% of its products to world markets. The total length from Agina, Afghanistan to Istanbul, will be 3280 km, and the transportation time will be 7-8 days, and from Torgundi, Afghanistan to Istanbul - 3050 km and 6-7 days [11].

Trans-Anatolian Gas Pipeline (TANAP). On June 26, 2012, Azerbaijan and Turkey signed an agreement on the TANAP project, and on June 12, 2018, a gas pipeline project was launched. The project expanded the infrastructure of the South Caucasus gas pipeline, which connects Azerbaijan and Georgia with a total length of more than 3,500 km. The project cost is $ 8 billion [13].

The TANAP gas pipeline, which transports natural gas, is of great importance for the economies of Turkic countries, as well as for the energy security of Europe. This factor once again emphasizes that the TANAP project will play an exceptional role in the formation of the East-West energy corridor.

Transadriatic Pipeline (TAP). In 2013, the TAP project was selected as the main route for the export of energy between Azerbaijan and Turkey. The total length of the gas pipeline is 878 km [14]. The TAP pipeline will be connected to the TANAP pipeline on the Turkish-Greek border. This route provides for the direct transportation of natural gas produced in Azerbaijan to Western Europe.

TAP, which will supply natural gas to Southeast Europe, will expand the supply of natural gas from the Turkic countries of the Caspian region to other major gas consumers in Europe - Germany, France, Great Britain, Switzerland and Austria.

Baku-Tbilisi-Kars Railway. The opening of the Baku-Tbilisi-Kars railway took place on October 30, 2017. The total length of the road is 825 km. Of these, 503 km pass through the territory of Azerbaijan, 244.5 km through Georgia and 77.5 km through Turkey [5].

At the same time, with the commissioning of the railway, the duration of freight from China to European countries such as England, France and Germany will be reduced from 45-62 to 12-15 days. This will reduce temporary losses and allow timely and quick delivery of goods [4].

One of the main advantages of the Baku-Tbilisi-Kars railway project for Azerbaijan is the exit of the Nakhchivan Autonomous Republic from the blockade. Thus, as a result of the aggression of Armenia against Azerbaijan, the land transport links connecting Baku with Nakhchivan were closed, and the Nakhchivan-Julfa-Baku railway was excluded from regional and transit traffic. In this regard, as a continuation of the Baku-Tbilisi-Kars railway project, the construction of a separate railway line from Kars to Nakhchivan is on the agenda. Thus, the problem of transport independence of the Autonomous Republic will be fully ensured [8].

North-South International Transport Corridor (INSTC). The agreement on the creation of the North-South transport corridor between Russia, Iran and India was signed on September 12, 2000 in St. Petersburg. In total, 13 countries joined the project: Azerbaijan, Belarus, Bulgaria, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Ukraine, Armenia, India, the Islamic Republic of Iran, the Russian Federation and the Sultanate of Oman.

The main advantages of the North-South transport corridor are: increasing the efficiency of international transport links in transit freight and passenger traffic; create conditions for the entry of rail, road, sea, river and air traffic between member countries on the international market; increase in transit traffic; implementation of an agreed and adopted transport policy.

The transit and transport potential of the seas of the Turkic world. The transport and transit potential of the seas of the Turkic world has an ancient history. Because in ancient times, the seas had both strategic and economic significance for the Turkic-speaking countries. The geographical position of these countries has always played a key role in establishing geopolitical relations with countries around the world, as well as in the economic development of states.

The seas of the Turkic world include the Black Sea, the Caspian Sea and the Mediterranean Sea, where marine economy is also widely used. The transit and transport potential of Turkic-speaking countries through these seas is very high and this is mainly done through sea ports like Istanbul, Baku (Alat), Kuryk, Izmir, Turkmenbashi and etc.

The Caspian Sea provides shorter freight transport traffic from Asian countries to Europe, which directly affects the economic development of Azerbaijan, Kazakhstan and Turkmenistan. The coastline of Azerbaijan on the Caspian Sea is 825 km, Turkmenistan 1,035 km and Kazakhstan 1,422 km. The Caspian countries can access to the world's oceans via the following route - the Caspian Sea - the Volga River - the Volga-Don Canal - the Don River - the Sea of Azov [12].

The port of Baku, which is the starting point of all sea routes in Azerbaijan, is not only the oldest port, but also the largest port on the Caspian Sea. Baku port has been put into operation since 1902. In 2018, the opening ceremony of the new Baku port was held in Alat. The port has a carrying capacity of 15 million tons [10].

The ports of Aktau, Bautino and Kuryk are located on the Kazakhistan coast of the Caspian Sea. Among these ports, Aktau port, is of great importance for the transport of international goods. Currently, the annual capacity of this port is 1.5 million tons of dry cargo and 800 million tons of oil [1].

The main ports of Turkmenistan are Turkmenbashi, Hazar, Aladzha and Ekerem. Turkmenbashi, Turkmenistan’s largest seaport, includes ferry, passenger and cargo terminals. The total capacity of the port excluding oil products is 17 million tons. The port has a shipbuilding and ship repair plant [9].

The length of the ***Black Sea*** coast of Turkey reaches 1700 km, which is about 34.9% of the total Black Sea coast. Thus, Turkey controls the entire southern part of the Black Sea coast. In this area, there are such ports as Istanbul, Trabzon, Samsun, Filyos, Hopa and others.

The Bosporus and Dardanelles are used for transportation and trade between the Black Sea and the Mediterranean, having international transport and commercial importance. About 27 tankers and 136 vessels pass through these straits during the day. The traffic intensity on the Bosphorus and Dardanelles is 4 times higher than that of the Panama Canal, and 3 times higher than that of the Suez Canal. Depending on the category of ships crossing the Dardanelles, the fee is about $ 1,000. This once again proves that the Black Sea has great geopolitical and economic importance for Turkey.

The coastline of Turkey in the ***Mediterranean Sea*** is 1,500 km. These coastlines of Turkey are intensively used for tourism purposes and each year brings a large income to the country's budget. Turkey's largest port in the Mediterranean are İskenderun, Antalya, Mersin, Ceyhan and etc.

Conclusion.

1. The main role in increasing the geostrategic, geopolitical and geoeconomic importance of the countries of the Turkic world is played by transport corridors of international importance, such as TRACECA, INSTC, INOGATE, TANAP, TAP, which combine the activities of these countries. Over the past 10 years, the growth of passenger and freight traffic in the countries of the Turkic world through these transport corridors has increased by more than 2-3 times.

2. International transport and communication networks accelerated the integration of the countries of the Turkic world into the European economic system and expanded their foreign trade turnover. This led to the rapid development of the economies of these countries, as well as to an additional influx of foreign investment there. For example, over the past 10 years, cargo operations only through international transport corridors have led to an increase in the share of the transport sector of the Turkic countries in GDP to 3%.

3. These corridors connecting the countries of the Turkic world have led to a reduction in economic risks, the strengthening of the Neighborhood Policy and the further intensification of the geostrategic partnership. The Baku-Tbilisi-Kars railway initially plans to transport 1 million passengers and 6.5 million tons of cargo per year, but in 2030 it is expected that these figures will reach 2 million passengers and 15 million tons of cargo. During the fight against the Covid-19 pandemic, in addition to the existing freight traffic on the Baku-Tbilisi-Kars railway, work is underway to transport 3,500 tons of cargo per day.

4. 2.4% of world oil reserves and 6.2% of gas reserves are concentrated in the Turkic world countries. These countries have been using the Baku-Tbilisi-Ceyhan oil pipeline since 1994, the Baku-Tbilisi-Erzurum gas pipeline since 2005, and the TANAP gas pipeline since 2018 to export their hydrocarbon resources to European markets. Joining such global transport and energy projects stimulated the discovery of new oil and gas fields in these countries and their export to the European market.

5. The countries of the Turkic world, which are not fully industrialized, have achieved high income, performing the functions of transit corridors in these transport corridors, and have also achieved geopolitical and geo-economic stability. In Azerbaijan alone, the total profit of the transport sector in 2018 amounted to 2,395 million US dollars, most of which (46.6%) accounted for only pipeline transport.

6. The countries of the Turkic world, occupying 1/6 of the world, also have a positive impact on the economies of neighboring countries bordering them. It is also seen as a positive development in terms of job creation and sustainable development of the region. The level of migration among the population decreased, and citizens who migrated to other countries to work returned to their countries.

7. An example of a “leadership model” is proposed on the example of Turkey and Azerbaijan among the countries of the Turkic world. Bilateral political and economic relations between Turkey and Azerbaijan are rapidly developing in the direction of "strategic partnership" and are important not only for the integration of both countries, but also for the geopolitical space of the Turkic world as a whole.

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ТҮРКІ ӘЛЕМІНІҢ ГЕОСАЯСИ ЖАҒДАЙЫ ЖӘНЕ КӨЛІК-ЭКОНОМИКАЛЫҚ ҚАТЫНАСТАР ГЕОГРАФИЯСЫ

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ГЕОПОЛИТИЧЕСКОЕ ПОЛОЖЕНИЕ ТЮРКСКОГО МИРА И ГЕОГРАФИЯ ТРАНСПОРТНО-ЭКОНОМИЧЕСКИХ ОТНОШЕНИЙ

Аннотация. Несмотря на то, что наша планета характеризуется научно-техническими, политическими и экономическими достижениями с начала XXI века, все еще существуют проблемы в развитии: социально-экономическая отсталость, проблемы в управлении и определении границ между странами. Тюркские

государства, недавно обретшие независимость, пытаются определить свое геополитическое положение на политической арене мира, что в основном связано с развитием их транспортных и экономических связей. Благоприятное геостратегическое положение стран Тюркского мира, их расположение на пересечении различных транспортных коридоров ускорили их интеграцию в мировую экономическую систему. Поэтому оценка возможностей тюркских государств в современном мире имеет большое значение.

В данной работе используются исторический, статистический, сравнительный, аналитический, системный и другие методы. С помощью этих методов был проведен географический анализ геополитической ситуации и транспортно-экономических связей тюркского мира. Экономическое развитие, взаимное сотрудничество, позитивная демографическая динамика и другие процессы в современном мире входят в число интересов тюркского мира. Потому что геополитическая ситуация в тюркском мире и его способность влиять на международную политическую ситуацию служат интересам региона в целом.

Ключевые слова: тюркский мир, транспорт, геополитика, TRACECA, TANAP, TAP, INSTC, INOGATE.

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CLIMATE CHANGE AND PRIORITY RESEARCH AREAS IN AGRICULTURE

Abstract. The effect of global climate warming on agriculture, as the most threatened sector of the economy, in the form of reduced crop yields and more frequent manifestations of extreme weather events, is one of the urgent problems that need to be paid close attention. Adaptation of agriculture to climate change is becoming one of the key priorities that need to be developed through the creation of new models of farming systems that would combine the effectiveness of traditional and alternative farming systems while being environmentally friendly and cost-effective. This article considers research issues in agriculture, including the creation of stress-resistant varieties, soil and water and resource-saving technologies, adapted to climate changes, adaptive-landscape, accurate and biological farming systems.

Key words: climate change; adaptation; agro landscape, accurate and biological farming system; technology; potential varieties; productivity.

Introduction Global climate change and its impact on the environment is one of the main problems of the 21st century. It is manifested by an increase in the level of the World Ocean, the melting of glaciers and polar ice sheets (especially in the Arctic), a decrease in the surface area covered by snow and ice, a decrease in the amount of rainfall in the regions, an expansion of arid zones, more frequent tropical cyclones, etc. Changes in precipitation, rising temperatures and other manifestations of global climate change will inevitably lead to more extreme and harsh weather conditions.

Since the beginning of the industrial revolution, atmospheric CO2 reserves have increased by a third, there has not been such a growth rate in the previous 20 thousand years, at least the current level of greenhouse gas concentrations in the atmosphere exceeds the natural level observed over the past 650 thousand years [3]. The main reason for this is the large-scale human use of hydrocarbons as energy sources.

The increase in carbon dioxide emissions (the main component of greenhouse gases) became noticeable with the beginning of the industrial revolution in Europe, marked by the transition to the widespread use of coal, and then, from the late 19th to the early 20th centuries more and more inclusion in the energy balance of the global economy of oil and natural gas. Since the middle of the 19th century the increase in CO2 emissions is strictly correlated with the growth of GDP per capita [4]. Thus, in recent years, the accumulated scientific potential of knowledge has revealed that with a probability of at least 90% climate change is caused by anthropogenic emissions of greenhouse gases.

Agriculture is a major part of the climate problem as one of the participants in global change. It is one of the main sectors of the economy affected by climate change with local, regional and global implications. Currently, it generates 19–29% of total greenhouse gas emissions [5, 6]. Anthropogenic factors have played, are taking place and are playing an equally important role, especially in the degradation of soil and other agricultural lands, as well as the whole biodiversity - vegetation, wildlife, and microorganisms. According to FAO estimates, 50 million hectares of arable land have already been lost due to irrational land use in the world. Currently, 24% or 1.5 billion hectares of the soils in the world are in a state of degradation [7]. And the reason for this process is the unreasonable use of agricultural land and various natural processes. Land degradation and the onset of deserts, up to 5% of agricultural production in the world are lost annually due to droughts, [8]. According to the UN, specialized commission responsible for this problem, the social consequences of land degradation are even more impressive, if we recall that the

number of chronically starving reaches 870 million people. The lives of approximately 250 million people are endangered and the living conditions of 1 billion people are getting worse [9, 10].

Climatic conditions of research zones. The impact of climate change on agricultural production conditions is considered on the example of Kazakhstan and Serbia.

The climate features of Kazakhstan that characterize its continental nature include a large amplitude between winter and summer temperatures, air dryness, little rainfall in most of the country, long harsh winters and short summers in the north, short winters and long hot summers in the south. The geographic location of Kazakhstan in latitudinal terms corresponds to the Mediterranean countries with a humid subtropical climate, and the countries of central Europe, characterized by a temperate continental climate. Since Kazakhstan is located in the center of the vast continent of Eurasia, at a considerable distance (thousands of kilometers) from the oceans and seas, their mitigating effect on the climate is insignificant [11].

The climate of Serbia is characterized by continentality in the north with hot in summer (average July temperature 23-25 ° C, maximum 50 ° C) and lingering cold in winter (average January temperature – 1-2 °C, minimum - 25 ° C), moderate continentality in the south and mountain climate in the mountains. Winters in Serbia are short, cold and snowy, summers are warm. The coldest month is January, the warmest is July. The average temperature is 10.9 ° C. Summer does not become so hot with an increase in absolute altitude, winters are more severe with a significant increase in rainfall. The average annual rainfall is 896 mm. Rains most often fall in June and May [12].

Discussions and solutions. The negative effects of climate change are felt in the form of reduced yields and more frequent manifestations of extreme weather events. One of the most important factors in the stability of yield is a sufficient supply of moisture in the soil and the amount of rainfall in the spring, which was defined as a critical period for the moisture demand of wheat. It was found that as a result of higher air temperatures and the sum of effective temperatures, fewer days are expected for flowering and ripening periods after analyzing the results of the number of days required from sowing to flowering and from sowing to ripening.

Yields in northern Serbia are limited by cool temperatures, while yields in southern Serbia are limited by high temperatures and low rainfall [13]. It was established that under the expected climatic conditions of 2030 and 2050 at a CO2 concentration of 330 ppm, winter wheat grain yield remains unchanged in most regions except southern Serbia, where the yield will decrease to 12% in 2030 and to 11% in 2050. Forecast of the results of the corn grain yield for 2030 and 2050 at a CO2 concentration of 330 ppm shows a significant decrease in yield both in dry conditions and on irrigated lands for all production regions of Serbia. This will be due to higher summer temperatures (June - August) and increased physiological stress in plants due to an increase in the number of summer and tropical days, a significant decrease in precipitation and an increase in the number of dry days during the same period. We can expect a reduction in the growing season due to higher air temperatures and the sum of temperatures analyzing the duration of the growing season for both regimes of growing corn, [14].

The agricultural sector in Kazakhstan is very vulnerable to drought, as it directly depends on the presence of moisture. Although each culture has a different resistance to lack of moisture. Droughts can cause crop failure if weather conditions are unfavorable at the most sensitive growth stage. Most of all from soil and atmospheric drought, the probability of occurrence of which reaches up to 25-68%, crops in the desert zone suffer, where a possible decrease in yield can reach 50-100%. Accordingly, these indicators in the dry steppe zone reach 25-53% and 30-80%, in the steppe 20-47% and 20-60% and in the forest-steppe 15-22% and 10-50% [15].

The main condition for overcoming the current situation many scientists consider the transition to the development and implementation of adaptive landscape farming systems (ALFS) in agricultural production [16.17]. When designing ALFS, the stability of agro landscapes is associated with the biological requirements of plants and must have a specific agro ecological address [18]. Studies have found that on the slopes of the southern and western expositions of the highlands of southeastern Kazakhstan, plane-cutting basic cultivation of light chestnut soils is more adaptive, providing a reduction in their erosion by 3-4 t/ha and an increase in the content of humus and nutrients by 2.0-3.5 c/ha compared to ploughing. A comparative assessment adaptation of winter wheat varieties to the elementary ranges of agro landscapes in the conditions of erosive agro landscapes of the highlands in southeastern Kazakhstan showed that on mountain chernozem (mould humus) and dark chestnut soils. The used variety Bogarnaya

56 provides an average yield of 19.0 kg/ha, while varieties Vitreous 24 and NAZ show yields in the range of 21.1-23.0 kg/ha or 2.1-4.0 kg/ha more, which indicates their higher adaptability [12.13].

These data indicate a high level of ALFS to improve soil ecology, increase crop yields without any means of intensification, that is, due to adaptation, which are a serious reason and the need for more research to develop ALFS in various natural zones of Kazakhstan.

In turn, ALFS is provided with soil-landscape mapping and geographic information system (GIS), agro ecological land assessment using modern informatization tools and remote sensing methods, including a set of various electronic maps [21].

In Serbia large agricultural systems rely on geographic information systems in agriculture in two segments: through the concept of "precision farming" and as part of a decision support system for monitoring and managing the agricultural system. Precision farming allows, in real time, agricultural producers to manage technological processes associated with the cultivation of agricultural land, pre-sowing, sowing and harvesting, as well as to plan future work on the basis of timely information received [22]. The system of precision farming involves designing ALFS and agricultural technologies based on electronic GIS, the allocation of production sites with a uniform soil cover and optimal conditions for moisture, heat supply and soil fertility, precision pre-sowing tillage, precise sowing, differentiated application of fertilizers and other agrochemical products. In accordance with the microstructure of the soil cover and the state of crops, regulation of the production process of special plant varieties according to micro periods of organogenesis using self-tuning automated tools based on electronic control systems.

The spectral reflectivity of green vegetation is a characteristic feature of its elements and must be used for remote diagnostics of the supply of plants with nutrients in the practice of precision farming. The chlorophyll content in plants during the diagnosis of plant mass in the bushing out phase (the responsible phase of planting and crop formation) is necessary for calculating the doses of nitrogen fertilizers during feeding, and the obtained data are used to compile programs for calculating differentiated doses of mineral fertilizers in the precision farming system [23].

Thus, the possibility of maneuvering the sown area structure make it possible to flexibly respond to the level of moisture supply, change the structure of arable land use quickly and use bioclimatic more fully potential in precision farming. It is also possible in accordance with the prevailing weather conditions, as well as, making adjustments to the soil cultivation system; the use of fertilizers; plant protection products and others.

In future water availability will become a serious limiting factor in the development of the economy of Kazakhstan. This is caused by an increasing shortage of water resources associated with their interstate distribution, tight limits on water use, and changes in river flow regimes in the regional water management system, deterioration in the quality of water resources, and salinization of soil.

According to forecasts, the FAO global demand for water resources under the scenario of usual development will increase by 2 times by 2030. A particularly acute situation with water supply is forecasted in the countries of Central Asia [24].

An effective way of rational use of irrigation water is to drip irrigation of crops, where water throughout the entire growing season is supplied in small portions evenly to the roots of plants and irrigation moisture flows only to plants, and is not consumed between aisles. High efficiency of drip irrigation in Kazakhstan was shown when cultivating the most water-consuming field crops, such as rice and sugar beets [25]. A fundamentally new environmental technology has been developed for rice cultivation based on drip irrigation under a mulching film. The improvement of the crop sector should be achieved under the circumstances, first of all, through the use of water, soil, energy and resource saving technologies. The technology of soil-resource-saving agriculture is represented by minimal and zero tillage. Zero tillage is currently practiced from the Arctic Circle to approximately 50 ° south latitude, from sea level to a height of 3000 m, from extremely rainy areas from 2500 mm to extremely dry conditions from 250 mm [26]. Their application allows you to save and even improve soil fertility, significantly reduce production costs, especially in the consumption of fuel and lubricants and significantly increase the efficiency of agriculture as a whole. The issue of increasing potential soil fertility with this technology is solved by creating a biologically active mulching layer through the use of crop residues cultivated in crop rotation.

The experience of world agriculture shows that direct sowing of agricultural crops radically changes the living conditions of plants. Soil temperature is usually lower and humidity higher with zero tillage [27].

Ensuring environmental safety and economic efficiency of modern farming systems is also associated with the biologization of agriculture, which includes the concept of maximum use of biological factors in the farming system and a decrease in the anthropogenic load on the soil. It is due to the composition and alternation of crops in crop rotation on the principles of fertilization, as well as the use of green manure and non-market part of the crop for fertilizer, the use of organic fertilizers and the maximum use of symbiotic nitrogen fixation. It is widely known, for example, the role of plants in increasing soil bio-productivity based on the natural mechanism of its self-healing. Therefore, leguminous plants (white melilot, alfalfa, fluffy vetch, etc.) produce from 2.3 to 10 t/ha of dry matter and fix from 76 to 367 kg/ha of nitrogen [28, 29]. The crop residues of wheat bind mineral nitrogen, thus stimulating the fixation of atmospheric nitrogen by legumes in the next rotation.

Thus, compliance with effective agricultural practices (crop rotation, biologization, etc.) ensures the formation of humic substances in an amount no less than its annual mineralization. So, the biologized crop rotation fields for more than 25 years had a deficit-free humus balance, despite the fact that these crop rotations went through several rotations (eight-field - 3 rotations; five and six-field - 4-5 rotations, and three-field crop rotation - 8 rotations) in southeastern Kazakhstan. [30].

It is known, that ensuring sustainable growth in the size and quality of the crop yield is primarily associated with an increase in the environmental sustainability of cultivated species themselves through selection and agricultural technology; selection of crops and mutual insurers; their adaptive macro-, meso- and micro-zoning increase in species and varietal diversity of agro ecosystems. The emphasis should be placed not only on increasing productivity, but also on the development of stress tolerance of varieties (drought tolerance; frost and winter hardiness; salt and sun resistance).

In Kazakhstan, scientific breeders for 2005-2018 years created 196 varieties and hybrids of agricultural crops, 73 of them are resistant to extreme conditions, namely heat, drought, winter and salt tolerance. 84 of them are resistant to common fungal (stem rust, dusty and hard smut of crops, powdery mildew, blistering smut of corn, rot, fusarium, ascochyta, anthracnose, etc.), bacterial (bacterial spotting, bacterial necrosis or cancer, nectric or tuberculum necrosis), viral (jaundice) plant diseases [31].

Climate warming will also entail the spread of crop pests. The connection has been established between temperature and the expansion of the spectrum of pests over the past 50 years. The variety of phytophages continues to expand (there are 612 pests). New strains are evolving [32]. So, new races of stem rust, such as Ug99, are widespread already in the bordering countries with the Republic of Kazakhstan, the development of which can be intensified on crops of wheat and barley with the expected drought; resistant pathogen - in the past, Phytophthora infestans caused potato hunger in Ireland, etc. In this regard, it is necessary to know the features of climate change for scenarios with a significant increase in average temperatures and precipitation. As well as integrated pest management based on the use of agricultural techniques, crop rotation and optimization of mineral nutrition, widespread use of biological products, scientifically based use of pesticides with differentiation when high-, medium- and poor development of pests taking into account ESTh (Economic severity threshold), the use of modern molecular genetic methods for the diagnosis of phytopathogens, etc.

Findings:

1. Global climate change is caused by more frequent manifestations of extreme weather events, significant fluctuations in the hydrothermal conditions of the growing season, changes in the phases of weed vegetation, susceptibility of pests and diseases to plant protection products and other consequences, which ultimately lead to lower crop yields.

2. It is necessary to intensify research on the possibilities of adapting agriculture and crop production to its change in the context of global climate change:

-use of a science-based farming system, including the optimal structure of sown areas (crop rotation), tillage, wide diversification of crop production and innovative technologies for cultivating crops;

-provision of environmental safety and economic efficiency of modern farming systems, including reducing energy costs and reducing the environmental burden on land resources;

- conducting targeted selection, primarily related to the creation of improved varieties and hybrids of crops that are resistant to environmental stress factors, suitable for various ecosystems and farming methods;

- pilot model creation of a new system of agricultural science organization, integrated into the training process, based on a combination of fundamental and applied science, transfer and adaptation of advanced world achievements.

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КЛИМАТТЫҢ ӨЗГЕРУІ ЖӘНЕ ЕГІНШІЛІКТІ ЗЕРТТЕУДІҢ БАСЫМ БАҒЫТТАРЫ

Аннотация. Климаттың ғаламдық жылыну жағдайының экономиканың қауіпті салаларының бірі ретінде ауылшаруашылығына әсері егін шығымының азаюына және төтенше ауа-райы құбылыстарының жиі қайталануы негізінде байқалады және бұл қазіргі уақытта ерекше назар аударуды қажет ететін өзекті мәселелердің бірі болып саналады. Ауылшаруашылығының негізгі басым бағыттары: егіншілікті климаттың өзгеруіне бейімдеу, экологиялық тұрғыдан қауіпсіз, экономикалық тұрғыдан тиімді, егіншіліктің дәстүрлі және балама жүйелерінің тиімділігін қамтитын жүйелердің жаңа модельдерін құру болып саналады.

Бұл мақалада ауыл шаруашылығындағы зерттеулер, соның ішінде стресске төзімді сорттарды құру, климаттың өзгеруіне бейімделген топырақ-су және ресурстарды үнемдеу технологиялары, бейімделгіш-ландшафт, егіншіліктің нақты және биологиялық жүйелері қарастырылады.

Түйін сөздер: климаттың өзгеруі, бейімделу, агроландшафттық, нақты және биологиялық егіншілік жүйесі, технология, сорттардың әлеуеті, өнімділік.

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ИЗМЕНЕНИЯ КЛИМАТА И ПРИОРИТЕТНЫЕ НАПРАВЛЕНИЯ ИССЛЕДОВАНИЙ В ЗЕМЛЕДЕЛИИ

Аннотация. Последствие глобального потепления климата на сельское хозяйство как наиболее угрожаемого сектора экономики в виде снижения урожайности сельскохозяйственных культур и более частых проявлений экстремальных погодных явлений – одна из актуальных проблем, на которую необходимо обратить пристальное внимание. Вопросы адаптации сельского хозяйства к изменениям климата становятся одним из ключевых приоритетов, которые необходимо развивать на основе создания новых моделей систем земледелия, которые бы сочетали в себе эффективность традиционных и альтернативных систем ведения сельского хозяйства и при этом были бы экологически безопасными и экономически выгодными.

В данной статье рассматриваются вопросы исследований в сельском хозяйстве, в том числе создания стрессоустойчивых сортов, почвенно-водных и ресурсосберегающих технологий, адаптированных к изменениям климата, адаптивно-ландшафтных, точных и биологических систем земледелия.

Ключевые слова: изменение климата; адаптация; агроландшафтная, точная и биологическая система земледелия; технология; потенциал сортов; урожайность.

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LABOR MARKET UNDER THE CONDITIONS OF THE GLOBAL PANDEMIA

Abstract. The labor market in Kazakhstan, as it is changing around the world and is probably transforming beyond recognition in a year. A pandemic dictates its own rules to the labor market: many companies have begun to cut staff costs, parting even with valuable employees. In conditions of forced self-isolation during the coronavirus epidemic, for many people, the problem of employment came first. People working in quarantined sectors are left without means of subsistence and are forced to look for a place in other areas. The decline in quantitative indicators since the beginning of March is observed in almost all sectors. Previously, it was possible to work for decades by the same standards, but now approaches to work change several times a year. In conditions when many competencies quickly become obsolete, "flexible skills" come to the fore - logical and critical thinking, creativity, adaptability to changes, the ability to build relationships with people and solve complex problems. The pandemic will bring significant changes to the labor market. According to the authors, self-development and the acquisition of new skills will be the only trend in the modern labor market. In order to successfully overcome the crisis, it is necessary to provide affordable financing for business and the public. In the conditions of this kind of crisis, it is necessary to increase the responsibility and coordination of all state bodies and their orientation towards job creation and employment. To this end, it is proposed to strengthen the functions of state bodies in facilitating information support to business in times of crisis. It is also necessary to ensure the complete digitalization of public services and the provision of high-quality and relevant data on the labor market to the population.

Keywords: labor market, global pandemic, reduction, recession, self-isolation, remote employment, crisis.

Introduction. The Kazakhstan labor market is currently facing the simultaneous shock of falling oil prices and the economic consequences of the global COVID-19 pandemic with the introduction of a quarantine and self-isolation regime. Maintaining activities and employment will be especially difficult for small and medium enterprises, given the low level of cash flows and liquid assets. Self-employed, informally employed and low-income groups of the population are especially vulnerable at such a time.

As countries around the world are quarantined, working remotely becomes the norm for many people, and this format can be used after the crisis, but there are certain barriers. According to a recent survey conducted by the Association of HR Managers of Kazakhstan, one of the main problems for small enterprises is adaptation to new working conditions and internal communication systems. Only 37% of companies confirmed the availability of remote IT services and HR support. The development of digital technologies in the long run will allow companies to introduce innovations not only in their business models, but also in their working methods.

Of course, it is inevitable that HR models will be significantly transformed in the long run. In addition, labor productivity will be measured on the basis of performance rather than working time, then employees will become more independent in managing their own time. Remote work can become an integral part of the labor market after a pandemic crisis.

Main part. Sectors of the economy should be prioritized in accordance with their vulnerability to such shocks and criticality (social significance) in order to determine measures of state support. The most important sectors are interdependent sectors with a higher multiplier effect for the rest of the economy. Sector vulnerability is measured by output reduction if necessary measures are not taken. Retail and wholesale, construction, transport and storage, real estate, the hotel business and catering are the most vulnerable and critical sectors that require targeted support from the state.

According to forecasts, the extent of partial unemployment will also increase significantly: the economic consequences of a viral pandemic will be expressed, among other things, in a reduction in working hours and wages. In developing countries, self-employment often helps to mitigate the effects of shocks, but this time due to restrictions on the movement of people (for example, service providers) and goods, this factor may not work.

The authors believe that the estimates of the impact of a pandemic on the labor market obtained in the study can also be conservative. The calculations do not take into account that partial blocking can be saved even after 3 months and that performance is not restored immediately. In addition, labor relations that remain during the lock-up may also be interrupted due to the fact that enterprises close more often than usual; and workers and employers may not agree on the terms of renewal of labor, which will lead to additional losses.

The growth of uncertainty leads to a reduction in household employment and consumption: because of caution, they revise their consumer behavior - spend less, save more. A decrease in demand leads to a reduction in employment and an increase in unemployment and its duration. Thus, household expectations become one of the most important channels for the influence of uncertainty on the economy and its main macro-parameters.

ILO experts believe that authorities should take comprehensive measures to minimize the negative impact on the labor market.

• First, it is necessary to stimulate the work of the economy, including monetary measures and targeted support for the most sensitive sectors.

• Regarding business, the authorities should take a number of measures that will allow them to preserve their jobs as much as possible: temporary tax cuts, expansion of social packages.

• For workers, states need to “stimulate a more active transition to remote work,” while maintaining employment, providing greater access to health services, and introducing or activating paid leave systems.

• The fourth set of measures is seen by ILO experts as “strengthening public dialogue” between employers, the state and workers - the authorities should strongly promote the conclusion of temporary agreements on job preservation and intensify the work of state institutions whose work is aimed at protecting the rights of workers [1-21].

In the conditions of the crisis caused by the epidemic, the best development prospects are the information technology industries, especially those related to the provision of distance communication and training, as well as delivery services. In other words, all those industries that have become active in self-isolation mode.Now the economy is actively rebuilding: some specialists are being reduced or transferred to part-time jobs, while the demand for such employees as logisticians, couriers, contact center operators, and online sales managers has sharply increased. No less need business in the current conditions, truck drivers, pickers. There are still vacancies in the IT field. It requires, for example, specialists who are able to quickly create sites of online stores, delivery services, companies are looking for big data analysts and developers of artificial intelligence systems. Kazakhstan also provides financial support for the most vulnerable categories of the population. Compensation is provided by existing unemployment benefits and additional funds. However, it is important to strengthen the status of such funds, including identifying priority areas of financing and allocating the respective responsibilities of state bodies for the targeted use of these funds and the mechanism of public control. It should also be emphasized that requests for social assistance will help provide additional information about employment, the labor market as a whole, and real incomes of the population to implement a more effective state policy in the field of the labor market in the future.

The government should provide appropriate financial assistance to digitalize education and eliminate inefficient regulatory restrictions in the local online education market to make it more flexible and competitive [3-19].

In the conditions of the crisis caused by the epidemic, the best prospects for development are the information technology industries, especially those related to the provision of distance communication and training, as well as delivery services. In other words, all those industries that have become active in self-isolation mode.

In order to successfully overcome the crisis, it is necessary to provide affordable financing for business and the public. In the conditions of this kind of crisis, it is necessary to increase the responsibility and coordination of all state bodies and their orientation towards job creation and employment. To this end, it is proposed to strengthen the functions of state bodies in facilitating information support to business in a crisis. It is also necessary to ensure the complete digitalization of public services and the provision of high-quality and relevant data on the labor market to the population [7-11].

In the longer term, Kazakhstan will need to eliminate its main structural weaknesses through greater economic diversification of the economy, moving up the value chain, investing in technological infrastructure and innovation.

Work in connection with the coronavirus today for many has become a luxury. In connection with the regime of self-isolation and high preparedness, citizens were left without sources of income. In a pandemic in Kazakhstan, the job market for job placement has undergone major changes. Remote work in connection with the coronavirus has become extremely popular. People are retraining for the remote type of employment without changing employers. Work in connection with the coronavirus began to bring much lower income. Small businesses are actively shutting down, and employees are left without a livelihood. According to analysts, the unemployment rate will continue to grow. The coronavirus epidemic hit those areas of activity where employees worked directly with clients, that is, personally, such as hairdressers, taxis, etc. Because of self-isolation and quarantines, such services become unnecessary. Those who are fired have to look for new sources of income. It is noted that during the period of self-isolation, the importance of courier and postman services increases [7-21].

Kazakhstan should continue to deploy and take advantage of its information and communications infrastructure to expand training and commerce opportunities through digital communication channels. It is necessary to ensure that households have access to the Internet within the framework of the state program Digital Kazakhstan. Moreover, through special training and support in the field of digital technologies, the government can provide support for small and medium enterprises.

The lack of clear and well-developed anti-epidemiological plans leads to feverish, spontaneous decisions that place additional burdens on society and the economy, sometimes delusional experiments, such as, for example, restrictions on the use of personal vehicles, which pose the least threat to others in terms of spreading the virus while maintaining work public transport, taxi and sharing, rental cars.

The positions of such areas of traditional services for the population as hairdressers, beauty salons, nail salons, cosmetology services, repair and repair of products, household appliances, clothes and shoes look more stable. The faster they integrate into the field of digital activity and delivery, the faster they will increase momentum [1-21].

There are forecasts that after a pandemic the number of those engaged in agriculture and processing will increase significantly in the world: countries will think about their own food security and independence.

At the same time, in the field of education, which gets along well with digital technologies, a flourishing is expected. Construction professions will be no less in demand: firstly, many countries will stimulate the economy with the help of infrastructure construction projects, and secondly, it is easy to maintain social distance at the construction site and ensure safe working conditions.

Conclusion. Thus, now the economy is actively rebuilding: some specialists are being reduced or transferred to part-time jobs, while the demand for such employees as logisticians, couriers, contact center operators, online sales managers has sharply increased. No less need business in the current conditions, truck drivers, pickers. There are still vacancies in the IT field. It requires, for example, specialists who are able to quickly create sites of online stores, delivery services, companies are looking for big data analysts and developers of artificial intelligence systems. Self-development and the acquisition of new skills is, in principle, a trend in the modern labor market. Previously, it was possible to work for decades by the same standards, but now approaches to work change several times a year. In conditions when many competencies quickly become obsolete, “flexible skills” come to the fore - logical and critical thinking,

creativity, adaptability to changes, the ability to build relationships with people and solve complex problems.

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ЖАҺАНДЫҚ ПАНДЕМИЯ ЖАҒДАЙЫНДАҒЫ ЕҢБЕК НАРЫҒЫ

Аннотация. Әлем бойынша еңбек нарығы тұрақсыз болып тұрғандықтан, Қазақстандағы еңбек нарығы да бір жылдан кейін адам танымастай өзгеруі мүмкін. Пандемия еңбек ережелерін еңбек нарығында талап етеді, мысалы, көптеген компания қызметкерлер шығынын, тіпті құнды қызметкерлер санын да қысқартуға кірісті. Коронавирустық індет барысында өзін-өзі оқшаулау жағдайында көп адамға жұмыспен қамту мәселесі бірінші орынға шықты. Карантинге жатқызылған секторда жұмыс істейтін адамдардың күнкөрісі қиындап, басқа аудандардан орын іздеуге мәжбүр. Наурыздың басынан бері барлық салада сандық көрсеткіштердің төмендегені байқалады. Бұрын сол стандарттар бойынша ондаған жыл жұмыс істеуге болатын еді, бірақ қазіргі уақытта жұмыс жылына бірнеше рет өзгереді. Көптеген құзырет жылдам ескірген жағдайда «икемді дағдылар» – логикалық және сыни ойлау, шығармашылық, өзгерістерге бейімділік, адамдармен қарым-қатынас құру және күрделі мәселелерді шешу мүмкіндігі пайда болады. Пандемия еңбек нарығына айтарлықтай өзгерістер әкеледі. Авторлардың пікірінше, өзін-өзі дамыту және жаңа дағдыларды игеру қазіргі еңбек нарығындағы дара бағыт болып есептеледі.

Дағдарысты сәтті еңсеру үшін бизнес пен халықты қолжетімді қаржыландыру қажет. Осындай дағдарыс жағдайында барлық мемлекеттік органдардың жауапкершілігі мен үйлестіру жағдайын арттыру және олардың жұмыс орындарын құруға, жұмысқа орналасуға бағыттау қажет. Осы мақсатта дағдарыс жағдайында бизнесті ақпараттық қолдауды жеңілдетудегі мемлекеттік органдар функциясын күшейту ұсынылады. Сондай-ақ, мемлекеттік қызметтердің толық цифрландырылуын және халыққа еңбек нарығы туралы сапалы, қажетті мәліметтерді ұсынуды қамтамасыз ету қажет.

Түйін сөздер: еңбек нарығы, жаһандық пандемия, төмендету, құлдырау, оқшаулау, қашықтан жұмыспен қамту, дағдарыс.

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РЫНОК ТРУДА В УСЛОВИЯХ ГЛОБАЛЬНОЙ ПАНДЕМИИ

Аннотация. Рынок труда в Казахстане, как во всем мире, меняется и за год, вероятно, трансформируется до неузнаваемости. Пандемия диктует рынку труда свои правила: многие компании начали сокращать расходы на персонал, расставаясь даже с ценными сотрудниками. В условиях вынужденной самоизоляции во время эпидемии коронавируса для многих людей на первое место вышла проблема занятости. Люди, работавшие в блокированных карантином отраслях, остаются без средств к существованию и вынуждены искать себе место в других сферах. Падение количественных показателей с начала марта наблюдается практически во всех отраслях. Раньше по одним и тем же стандартам можно было работать десятилетиями, а сейчас подходы к работе меняются несколько раз за год. В условиях, когда многие компетенции быстро устаревают, на первый план выходят «гибкие навыки» – логическое и критическое мышление, креативность, адаптивность к изменениям, умение выстраивать отношения с людьми и решать комплексные проблемы. Пандемия внесет значительные перемены на рынок труда. По мнению авторов, саморазвитие и получение новых навыков будет единственным трендом современного рынка труда.

Для того чтобы успешно пройти кризис, необходимо предоставить доступное финансирование для бизнеса и населения. В условиях подобного рода кризиса необходимо повысить ответственность и координацию всех государственных органов и их ориентацию на создание рабочих мест и занятость. Для этого предлагается усилить функции государственных органов по содействию в информационной поддержке бизнесу в условиях кризиса. Также необходимо обеспечить полную цифровизацию государственных услуг и предоставление качественных и актуальных данных о рынке труда населению.

Ключевые слова: рынок труда, глобальная пандемия, сокращение, спад, самоизоляции, дистанционный тип занятости, кризис.

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САЛАНЫҢ БӘСЕКЕГЕ ҚАБІЛЕТТІЛІГІ: ШАРТТАРЫ МЕН ФАКТОРЛАРЫ

Аннотация. Зерттеудің мақсаты – бәсекеге қабілеттілік факторлары мен шарттарын анықтау және оларға ықпал ету тетіктерін әзірлеу үшін жүйелеу. Зерттеу саланың бәсекеге қабілеттілік факторларының ерекшеліктерін ғылыми танудың жүйелік және диалектикалық тәсілдерін қолдануға негізделген. Зерттеудің ақпараттық базасын зерттеу тақырыбындағы монографиялық зерттеулер, кезеңдік баспа және электрондық жарияланымдар құрайды. Мақалада бәсекеге қабілеттілік мазмұнын зерттеудің ғылыми тәсілдеріне талдау жүргізілген. Саланың бәсекеге қабілеттілік факторлары олардың сыныптамасы тұрғысынан қарастырылған. Бәсекеге қабілеттіліктің ішкі және сыртқы факторлары егжей-тегжейлі талданған. Саланың бәсекелік артықшылықтарының жиынтығын сипаттайтын ішкі фактор детерминанттарының мазмұны ашылған. Қазақстан нарығында бәсекелік мінез-құлықтың әмбебап сызбаларының болмау шарттарында сыртқы ортаны бағалаудың негізгі параметрлері көрсетілген. Одан басқа, саланың бәсекеге қабілеттілігінің ішкі ортасына талдау жүргізу ерекшелігі анықталып, сыртқы ортаны бақылау деректерімен өзара байланыстылығы негізделген. Саланың бәсекелік әлеуетінің құрылымы әзірленген және негізделген. Саланың бәсекелік әлеуетін жүйелік тәсіл тұрғысынан талдау нәтижесінде оның басты ерекшелігі анықталған. Мемлекеттік және нарықтық реттеу тетіктерінің арақатынасы бойынша қорытындылар жасалған. Одан басқа, ықпалдасу үдерістерінің дамуы және бәсекелестіктің күшею шарттарында отандық өндіріс тиімділігін жоғарылау және жаһанданудың келеңсіз салдарының бейтараптандыру мақсатында шаралар ұсынылған.

Түйін сөздер: саланың бәсекеге қабілеттілігі, бәсекелік факторлар, сыртқы және ішкі орта, бәсекелік әлеует, бәсекелік талдау.

Кіріспе. Бәсекеге қабілеттілікті басқару мәселесі оның факторлары мен шарттарын анықтаумен тығыз байланысты. Факторларды ғылыми жүйелеу саланың бәсекеге қабілеттілігін арттыру мақсатында оларға әсер ету тетіктерін анықтауға және негіздеуге мүмкіндік береді. Айта кету керек, ғылыми әдебиеттерде бұл мәселені зерттеуге жеткілікті назар аударылған. Солай бола тұра, саланың бәсекеге қабілеттілік деңгейіне көптеген факторлардың жеке және кешенді ықпалын бағалау көбіне нақты тарихи және әлеуметтік-экономикалық шарттарға байланысты. Бұл нарықтық ортаның серпінділігіне, нарықтық ортаның белгісіздігінің күшеюіне және жаһандану қаупінің ұлғаюына байланысты. Бұл жағдайда бәсекеге қабілеттілікті басқарудың ғылыми негізделген нысандары мен әдістерін әзірлеу күрделене түседі және байыпты тәсілді қажет етеді.

Әдістер. Зерттеу саланың бәсекеге қабілеттілігі факторларының сипаттамалары туралы ғылыми білімге жүйелі және диалектикалық тәсілдерді қолдануға негізделген. Зерттеу барысында бақылау, сипаттау, талдау және синтез сынды жалпы ғылыми зерттеу әдістері, сонымен қатар танымның формалды-логикалық және басқа әдістері қолданылды.

Нәтижелер. Бәсекеге қабілеттіліктің мазмұнына қатысты ғылыми көзқарастарды зерттеу бірқатар маңызды тұжырымдар жасауға мүмкіндік берді. Бәсекеге қабілеттілік иерархиясының мезодеңгейін ескере отырып, сондай-ақ саланың бәсекеге қабілеттілігінің факторлары мен шарттарын зерттеу тұрғысында олардың дамуы негізінен келесі ережелерге сүйенеді.

Бәсекеге қабілеттіліктің серпінді ұғым екендігіне сүйене отырып, оның мазмұны, ықпал ету объектілері мен нысандары оның белгілі бір сапалы деңгейіне жетуіне байланысты ішінара

өзгеріске ұшырайды. Бұл нақты тарихи және әлеуметтік-экономикалық шарттарда бәсекеге қабілеттілік факторларын анықтаған жөн дегенді білдіреді. Белгілі бір фактордың мәні бәсекеге қабілеттіліктің иерархиялық деңгейіне, аймақ, сала, кәсіпорын ерекшеліктеріне байланысты түрлі болады [1]. Авторлық ұстаным бәсекеге қабілеттілік белгілі бір субъектінің бастапқыда алған бәсекелестік артықшылықтарының белгілі бір жиынтығын ғана білдірмейтіндігіне негізделген; бұл – бақыланатын параметр. Осыған байланысты оның ұлғаю жағдайы қолда бар әлеуетке ғана емес, басқару тиімділігіне де байланысты. Жүйелік тәсіл бойынша кез келген элемент жүйенің басқа элементтерімен өзара байланысты, бұл саланың бәсекеге қабілеттілігін арттыру тетіктерін әзірлеуде ескерілуі керек. Өнеркәсіпке қатысты, авторлардың пікірінше, бәсекеге қабілеттілік факторларын тиімді басқару оның жаңа сапалы жағдайға әкелуі ықтимал негізгі және сатып алынған шарттардың жиынтығы ретінде қарастырған жөн. Бұл анықтама жоғарыдағы тұжырымдарды көрсетеді.

Талқылау. Әлемдік тәжірибе мен Қазақстан экономикасының жұмыс істеу ерекшеліктері көрсеткендей, сала жағдайы көптеген параметрлерден тұрады. Бәсекеге қабілеттілік факторларын бірқатар белгілер бойынша жіктеуге болады: салаға қатынасы, пайда болу түрі, басымдығы, ресурстық әлеуеті, деңгейі, әсер ету сипаты (1-сурет).

Ескерту: авторлар әзірлеген

1-сурет – саланың бәсекеге қабілеттілігі факторларының сыныптамасы

Бәсекеге қабілеттіліктің ішкі факторлары саланың бәсекелік артықшылықтарын білдіреді, бұл оларды үнемі бақылау және жетілдіру арқылы бәсекеге қабілеттіліктің жаңа сапалы өсуіне мүмкіндік береді. Ішкі факторлардың детерминанттары саланың бәсекелік артықшылықтарының жиынтығын сипаттайды және ресурстар, өндіріс және басқару шарттарын қамтиды (1-кесте).

1-кесте – Саланың бәсекеге қабілеттілігінің ішкі факторларының сипаттамалары

Ішкі факторлардың детерминанттары	Бәсекелік факторлары
Ресурстық шарттар	– пайдалы қазбалардың болуы; – саланың көлік инфрақұрылымының мүмкіндіктерін анықтайтын қолайлы географиялық орналасуы; – қолайлы климаттық жағдайлар; – энергия, су, шикізат көздеріне еркін қолжетімділік; – кадрлық ресурстар және т.б.
Өндірістік шарттар	– негізгі қорлардың болуы және оларды үнемі жетілдіру, оларды жаңартуды қамтамасыз ету мүмкіндіктері; – өндірістік-логистикалық әлеует, оның ішінде өндірістік кешенді ғана емес, өнімді кейін сату үшін дамыған инфрақұрылымның болуы (қойма, лифт, жүк көтергіш жабдық, кірме жолдар және т.б.); – заманауи технологиялар мен инновациялар;
Басқару шарттары	– ұйымдастырушылық және басқарушылық әлеует; – корпоративтік басқару және корпоративті мәдениет деңгейі; – меншік иелері мен басқару арасындағы қатынастар жүйесі; – мотивацияны ынталандыру және кадрлардың біліктілігін арттыру жүйесін құру; – өндірісті басқару стратегиясы мен тактикасының заманауи нысандары мен әдістері; – есеп жүйелерінің компьютерлік технологиялары, бюджеттеу, қаржылық-шаруашылық қызметті жоспарлау, бағалау және бақылау, инвестициялық жобалардың тиімділігін бағалау және т.б.
Ескерту: авторлар әзірлеген.	

Ресурстық жағдайлар белгілі бір салада бастапқыда болатын бәсекеге қабілеттілік факторларын сипаттайды. Олар өндірісті дамытуға және бәсекеге қабілетті өнім жасауға қуатты негіз жасайды. Бұл олардың иелік етуі басқарушы қызметкердің бәсекеге қабілеттіліктің басқа факторларына қол жеткізу үшін күш-жігерін шоғырландыру жағдайын білдіреді. Бастапқыда ресурстардың белгілі бір шарттары жоқ бірдей салалар оларға қосымша қаражат (шикізат сатып алу, энергия шығыны, шикізат, көлік шығыны және т.б.) жұмсайды. Әрине, бұл мұндай субъектілердің өндірісті дамытуға және бәсекеге қабілетті өнім шығаруға жағдай жасау мүмкіндігін азайтады.

Өндірістік детерминанттарға сала кәсіпорындарында өнімді өндіру мен өткізуді ұйымдастыру шарттарын сипаттайтын бәсекелік артықшылықтар жатады.

Бәсекелестік артықшылықтарды анықтаушы ретінде басқару шарттары, түптеп келгенде, саланың бәсекеге қабілеттілігін арттырудың стратегиялық мақсатына қол жеткізуге байланысты факторларды анықтайды. Бұл жағдайлар өндіріс факторларымен салыстырғанда субъективті және түзетуге ыңғайлы [2].

Нарықтық экономика жағдайында барлық субъектілер бәсекелестік ортада жұмыс істейді. Осыған байланысты саланың бәсекеге қабілеттілігін арттыру саясатын жасау үшін сыртқы факторлар маңызды.

Бірқатар салалық нарықта кәсіпорындардың жұмыс істеуі үшін сұраныс факторлары бірінші кезекте тұрады, өйткені тиімді сұранысты шектеу кәсіпорындар ассортиментін де, баға саясатын да анықтайды [3]. Бәсекеге қабілетті ұлттық экономиканы қалыптастыру бәсекеге қабілетті өндіріс құру факторларына негізделген.

Әлеуметтік-экономикалық, саяси жағдайлардың күрт өзгеруі, әлемдік экономикалық қатынастар географиясының кеңеюі және олардың күрделенуі, өзгерістердің сапалық сипаты мен қарқынының өзі ұйым басқаруда күрделі мәселелер туғызды және жылдам өзгеріп отыратын жағдайда оларды басқарудың ұйымдастырушылық қағидаларын қайта қарауды талап етті.

Қазіргі жағдайда әр кәсіпкер үшін бір жағынан Қазақстандағы қазіргі нарықтық жағдайға және оның даму үрдістеріне, екінші жағынан, нақты өндіріс ерекшеліктеріне сәйкес келетін тиімді бәсекелестік құралдарын ұсыну үшін қазіргі нарықтық жағдайды дұрыс бағалау өте маңызды.

Нарық конъюнктурасы жыл өткен сайын күрделене түсуде, бұл нарық шекараларының біртіндеп кеңеюіне және жоғары бәсекелі ортада жұмыс тәжірибесі бар шетелдік компанияларды тартуға байланысты. Осы тәжірибені қазақстандық кәсіпкерлердің тікелей қолдануы көбіне оның бірегей-

лігіне, нарықтағы бәсекелестік мінез-құлықтың әмбебап сызбаларының болмауына байланысты қиынға соғады. Бұл жағдайда кәсіпорындарға сыртқы ортаны үш параметр бойынша бағалау ұсынылады [4]:

– ағымдағы қызметтің түрлі аспектілеріне әсер ететін өзгерістерді бағалау;

– ағымдағы қызметке қауіп төндіретін факторларды анықтау. Бәсекелестердің қызметін бақылау көп жағдайда кәсіпорынға ықтимал қауіп-қатерге дайын болуға мүмкіндік береді;

– жоспарды түзету арқылы мақсатқа жету мүмкіндіктерін көрсететін факторларды анықтау.

Сыртқы ортаны талдау бірнеше әдісті қолдануды көздейді; бұл негізінен SWOT-талдаудың (күшті жақтары (strengths), әлсіз жақтары (weakness), мүмкіндіктер (opportunities), қатерлер (threats) бөлігі болып саналады. SWOT-талдауда формалды әдістемесі жоқ және ол талдаушының сараптамалық бағалауының бір түрі болып есептеледі [5], [6].

Кәсіпорын макроортасының талдамасы PEST-талдауын (P – political legal – саяси-құқықтық, E – Economic – экономикалық, S – Sociocaltural – әлеуметтік-мәдени, T – Technological forces – технологиялық факторлар) қолдану арқылы жүзеге асырылуы мүмкін, оның мақсаты – кәсіпорынның ағымдағы және болашақ қызметінің нәтижелеріне әсер ететін сыртқы орта факторларын анықтау және бағалау болып саналады [7]. Сонымен қатар, кәсіпорын бақылауында болмайтын, бірақ басқару нәтижелеріне әсер ететін оқиғалар белгіленеді. Әр оқиғаға белгілі бір салмақ тағайындау арқылы диагностика жүргізіледі, яғни бірден (ең маңызды) нөлге дейін (маңызды емес). Салмақ қосындысы бірге тең болуы керек. Әр оқиғаның әсері 5 балдық шкала бойынша бағаланады (5 – күшті әсер, 1 – қауіп жоқ). Орташа өлшенген баға оқиға салмағын оның әсер ету күшіне көбейту арқылы анықталады. Содан кейін берілген кәсіпорын бойынша жалпы салмақтық балл есептеледі [8].

Ішкі ортаны талдау сыртқы ортаның мониторингтік деректері негізінде дәйекті түрде жүзеге асырылады. Бұл қоршаған ортаның факторлары кәсіпорынның өндірістік қызметіне түрлі дәрежеде әсер ететіндігіне байланысты, демек, оның қаржылық нәтижесінде көрінеді [9].

Өнеркәсіптің бәсекеге қабілеттілік факторларын табиғи және жасанды деп бөлу әсер ету сипаты мен бағытын анықтайтын шарттарды саралаудың орындылығын білдіреді. Табиғи бәсекелестік артықшылықтарға ие болу географиялық орналасу, табиғи-климаттық жағдай, табиғи ресурстардың болуы және т.б. байланысты. Бірқатар өндірістер мен салалар үшін олардың иелік етуі көбінесе жұмысының бастапқы шарттарын анықтайды және иелерін әдейі неғұрлым тиімді жағдайларға қояды. Көрсетілген артықшылықтары жоқ субъектілер оларды алуға қосымша күш жұмсайды, бұл олардың мақсатына жету қабілетін төмендетеді. Сонымен қатар, кез келген ресурстар, шын мәнінде, таусылатындығын атап өткен жөн [10], [11]. Бұл бәсекеге қабілеттілікті серпінді құбылыс ретінде қарастырудың орындылығын және басқаруға бейімделу қажеттілігін көрсетеді. Егер субъект қосымша бәсекелестік артықшылықтарға жету үшін қаражат жұмсамаса, онда ол қалаған мақсаттарға жете алмау қаупі бар. Солай бола тұра, ереже бойынша, жоғары деңгейдегі бәсекелестік артықшылыққа жету үшін маңызды факторлар әрқашан жасанды болып саналады.

Шектелген ресурстар жағдайында ұйым өзінің негізгі күштерін бірінші кезектегі қажеттіліктерді шешуге бағыттайды. Осыған орай субъектінің бәсекеге қабілеттілігін арттыру мақсатына жету көбінесе күштің дұрыс бағытталуына және белгілі бір уақыт кезеңінде мұқият назар аударуды қажет ететін негізделген басым факторларды таңдау негізінде анықталады. Көбінесе басқарушылық шешімдер бірнеше бағытта шашыраңқы болады және басқарудағы қате есептеу салдарынан сапаның жаңа деңгейіне жету мақсатына жете бермейді [12]. Сонымен қатар, саланың бәсекеге қабілеттілігі факторларын негізгі және қосымша факторларға бөлу кәсіп иесі мен басқарушы көзқарасы тұрғысынан өзгеше болады.

Отандық кәсіпорындар, тіпті жеткілікті жақсы, бәсекеге қабілетті өнімге және одан әрі дамыту әлеуетіне ие болса да, халықаралық немесе ішкі нарықта шетелдік кәсіпорындармен бәсекеге қабілетті бола алмайды. Бұл жағдайдың негізгі себептерінің бірі басқару жүйелерінің аса оқшауланғандығы, қатаңдығы және артта қалуы болып саналады.

Ресурстық әлеуетке қатысты саланың бәсекеге қабілеттілік факторларын негізгі (бастапқыда болған) және қол жеткізілген деп бөлуге болады [13], [14]. Авторлық тұжырымдамаға сәйкес, олар

бұрын қарастырылған табиғи және жасанды болып бөлінуімен бірдей емес. Негізгі факторларға тек табиғи ғана емес, еңбек ресурстарының қолжетімділігі, атап айтқанда, аумақта тұратын халықтың құрылымы, құрамы және біліктілік деңгейі жатады. Сонымен қатар, жекелеген салаларда республикадағы меншікті жекешелендіру нәтижесінде сала кәсіпорындары берген материалдық-техникалық базаның және инфрақұрылым деңгейінің негізгі факторы болуы мүмкін.

Саланың бәсекеге қабілеттілігінің қол жеткізген факторларына технологиялар, ақпараттық қолдау, негізгі құралдарды жаңарту, өндіріс үдерісі мен корпоративтік басқару жүйесі, басқару аппараттарының тиімділігі және т.б. жатады.

Саланың бәсекеге қабілеттілігі факторларын жалпы және мамандандырылған деп бөлу келесі ережелерге негізделген.

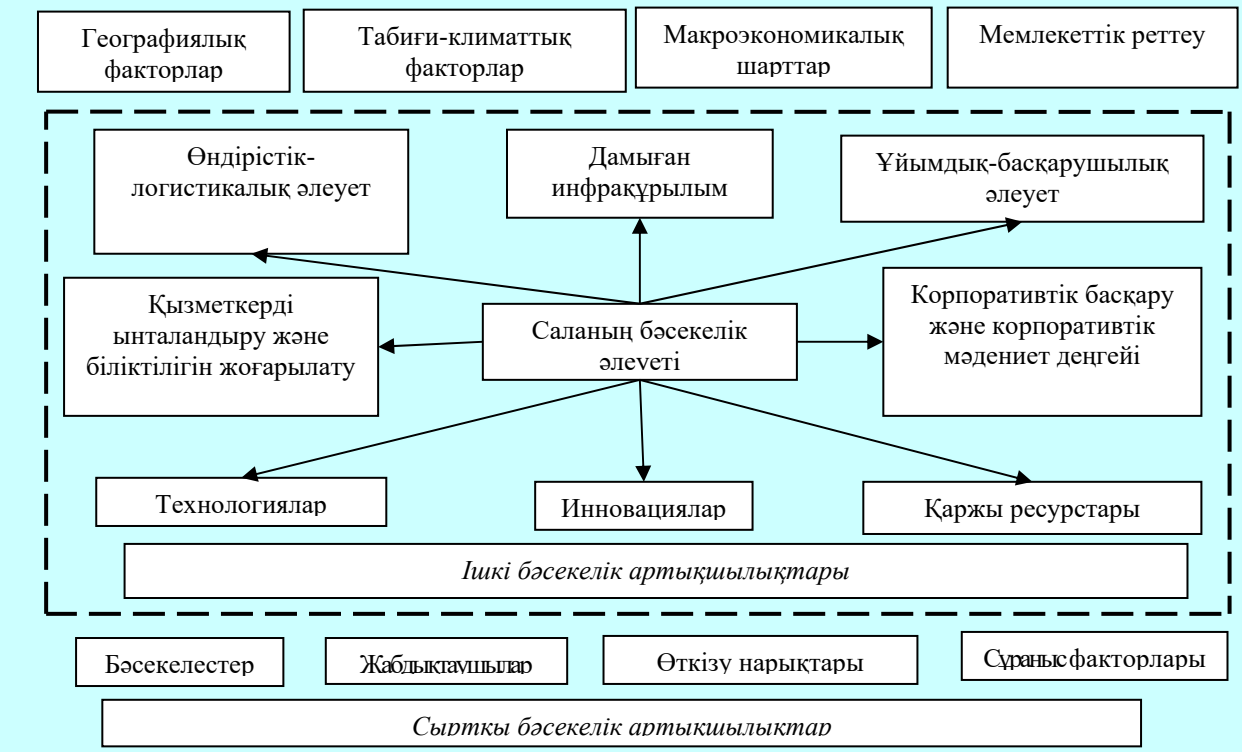
Жалпы факторлар барлық салаға тән. Оларға сыртқы факторлар, климаттық жағдайлар және географиялық орналасуы, заңнама, жалпы инфрақұрылым, білім деңгейі және т.б. жатады.

Саланың бәсекеге қабілеттілік факторларын әмбебап және мамандандырылған деп екіге бөлуге болады [15].

Бірінші топқа субъектілердің көпшілігіне бірдей сәтті қолдануға болатын немесе оларға оң әсер ететін басқару әдістері мен тетіктері кіреді.

Саланың бәсекеге қабілеттілігінің арнайы факторлары басқару құрылымын белгілі бір талаптарға келтіру қажеттілігімен ерекшеленеді. Бұл – бірегей басқару тетіктерін қажет ететін нақты факторлар. Бір жағынан, олар қосымша бәсекелестік артықшылық болып саналады. Сонымен бірге, оларды технологиялық үдеріс талаптарына сәйкестендіру үшін қосымша күш пен ресурс қажет.

Сала бүкіл әлемдік нарықта бірдей дәрежеде бәсекеге қабілетті бола алмайды, бұл әр елдің нарығындағы сұраныс ерекшеліктеріне, мемлекеттің өнеркәсіптік және сыртқы экономикалық саясатына, соның ішінде сыртқы сауда туралы халықаралық келісімге, мақсатты нарық орналасқан елдегі ұқсас саланың құрамына және сапасына байланысты [16]. Осыған сүйене отырып, саланың бәсекеге қабілеттілігін сала қатысатын немесе өзінің қатысуын кеңейтуге ұмтылатын нарықта жүргізген дұрыс.



Ескерту: авторлар әзірлеген.

2-сурет – саланың бәсекеге қабілеттілігі әлеуетінің құрылымы

Ұлттық экономика секторының нақты (нарықтық) бәсекеге қабілеттілігінің екі негізгі критерийі бар.

Біріншісі, саланы сыртқы саудаға тарту, бұл оның кәсіпорындарының ұқсас шетелдік салалармен мемлекеттік протекционистік саясаттың қолдауынсыз бәсекеге қабілеттілігін көрсетеді.

Екінші критерий – өнімнің белгілі бір елдің нарығындағы нақты тауарға деген сұранысына сәйкестігін сипаттайтын әр елдегі сату нарығының әрқайсысына қатысу деңгейі [17].

Кез келген экономикалық субъектінің даму деңгейі көбінесе бәсекеге қабілеттіліктің қол жеткізген деңгейімен анықталады, ол қазіргі заманғы даму жағдайында ең алдымен табиғи ресурстардың, экономиканың жоғары технологиялық секторлары, дамыған инфрақұрылым және нарықтың әлеуетті сұранысына байланысты.

Саланың бәсекелестік артықшылықтарын жүйелеу негізгі сыныптау белгілері ретінде ішкі және сыртқы факторларды бөліп көрсетуге мүмкіндік берді (2-сурет).

Қорытынды. Саланың бәсекелік әлеуетін жүйелік тәсіл тұрғысынан қарастыру оның элементтерінің ішкі өзара әрекеттесуіне байланысты туындайтын синергетикалық әсерде көрінетін оның басты ерекшелігін анықтауға мүмкіндік береді. Дәл сол уақытта, біздің ойымызша, салалық кәсіпорындардың бейімделу тетігі саланы мемлекеттік қолдау тетіктерімен толықтырылуы керек.

Мемлекет араласпайтын жағдайлар тек мінсіз нарық жүйесіне қатысты. Шындығында көптеген нарықтық ақау кездескенде экономикалық үдерістерге үкіметтің араласуы қажет. Мемлекеттік және нарықтық реттеу тетіктерінің оңтайлы арақатынасы саланың бәсекеге қабілеттілігін арттыруға және тұрақты дамуын қамтамасыз етуге көмектеседі деп ойлаймыз.

Интеграциялық үдерістер мен бәсекелестіктің күшеюі жағдайындағы Қазақстан Республикасы ішкі және сыртқы нарығындағы ахуалды талдау жаһанданудың жағымсыз салдарын бейтараптандыру қажеттілігін айқындайды. Қазіргі жағдайда отандық өндірістің тиімділігін арттыруға бағытталған бірқатар шараларды қабылдауды мақсатқа сай деп санаймыз.

Салаларды дамытудың стратегиялық басымдықтары отандық өндірушілердің қызметіне сыртқы ортаның әсер ету факторларын мұқият бағалауды қажет етеді. Салалардың бәсекеге қабілеттілігін арттыру мақсатында олардың бәсекеге қабілетті стратегиялық талдамасы, біздің ойымызша, төмендегілерді қамтуы керек:

– макроэкономикалық факторларды кешенді зерттеу;

– саланың жетекші кәсіпорындарының сыртқы экономикалық қызметінің әлеуетті деңгейін келесі көрсеткіштер бойынша бағалау: сыртқы сауда айналымы; экспорт көлемі (нақты және құнды мәнде); сыртқы сауда айналымының сальдосы; экспорттың (импорттың) географиялық құрылымы; экспорттың (импорттың) тауарлық құрылымы; белгілі бір тауар топтарының импорты (экспорты) мен өндіріс теңгерімі;

– экспортталатын өнімді өндіру тиімділігін төмендететін әкімшілік кедергілерді талдау;

– салаларды мемлекеттік қолдау саласында іске асырылатын шаралар тиімділігін бағалау және бақылау;

– қорғаныс шараларын уақытылы бастау және отандық өндірушілер үшін шамадан тыс импорттық бәсекелестіктің жағымсыз салдарын болдырмау мақсатында нарық серпіні мен импортқа сезімтал нарық сегменттерінің жағдайын бақылау;

– тәуекелді анықтауды, оларды жүзеге асыру барысында болатын залалды бағалауды, оларды басқарудың тиімді тәсілдерін әзірлеуді және жағымсыз салдарды азайтуды қоса алғанда, тәуекелді сапалы басқару;

– контрафактілік және пираттық өнімдер экспорты / импорты жағдайын бақылау және есепке алу.

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КОНКУРЕНТОСПОСОБНОСТЬ ОТРАСЛИ: УСЛОВИЯ И ФАКТОРЫ

Аннотация. Цель исследования – систематизация условий и факторов конкурентоспособности для их идентификации и выработки механизмов воздействия на них. Исследование основано на применении систематического и диалектического подходов к научному познанию особенностей факторов конкурентоспособности отрасли. В процессе исследования были применены такие общенаучные методы исследования, как наблюдение, описание, анализ и синтез, а также формально-логический и другие методы познания. Информационную базу исследования составили монографические исследования, периодические печатные и электронные издания по теме исследования.

В статье проанализированы научные подходы к исследованию содержания конкурентоспособности. Факторы конкурентоспособности отрасли рассмотрены с позиции их классификации. Проведена чёткая систематизация факторов конкурентоспособности по шести основным признакам, выявлены их особенности. Подробно проанализированы внутренние и внешние факторы конкурентоспособности. Раскрыто содержание детерминантов внутренних факторов, характеризующих совокупность конкурентных преимуществ отрасли и включающих ресурсные, производственные и управленческие условия. Выделены основные параметры оценки внешней среды в условиях отсутствия универсальных схем конкурентного поведения на рынке Казахстана. Кроме того, определена специфика проведения анализа внутренней среды конкурентоспособности отрасли и обоснована его взаимосвязь с данными мониторинга внешней среды.

В результате проведения анализа конкурентного потенциала отрасли с позиции системного подхода выявлена его главная особенность, проявляющаяся в синергетическом эффекте, обусловленном внутренними взаимодействиями элементов потенциала.

Сформулированы выводы по соотношению государственного и рыночного механизмов регулирования, оптимальность которого способствует наращиванию конкурентного потенциала отрасли и обеспечению ее устойчивого развития. Кроме того, предложены меры в целях повышения эффективности отечественного производства и нейтрализации негативных последствий глобализации в условиях развития интеграционных процессов и усиления конкуренции.

Ключевые слова: конкурентоспособность отрасли, конкурентные факторы, внешняя и внутренняя среда, конкурентный потенциал, конкурентный анализ.

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COMPETITIVENESS OF THE INDUSTRY: CONDITIONS AND FACTORS

Abstract. The aim of the study is to systematize the conditions and factors of competitiveness in order to identify them and develop mechanisms to influence them. The study is based on the application of a systematic and dialectical approaches to scientific knowledge of the characteristics of the factors of competitiveness of the industry. In the course of the research, general scientific research methods were applied such as observation, description, analysis and synthesis, as well as formal-logical and other methods of cognition. The information base of the research was made up of monographic studies, periodicals printed and electronic publications on the topic of research.

The article analyzes scientific approaches to the study of the content of competitiveness. The factors of competitiveness of the industry are considered from the perspective of their classification. A clear systematization of competitiveness factors has been carried out according to six main features, and their features have been revealed. Internal and external factors of competitiveness are analyzed in detail. The content of the determinants of internal factors characterizing the set of competitive advantages of the industry and including resource, production and management conditions is disclosed. The main parameters of assessing the external environment in the absence of universal schemes of competitive behavior in the market of Kazakhstan are highlighted. In addition, the specificity of the analysis of the internal environment of the competitiveness of the industry is determined and its relationship with the data of monitoring of the external environment is substantiated.

In the result of the analysis of the competitive potential of the industry from the standpoint of a systematic approach, its main feature is revealed, which manifests itself in a synergistic effect due to the internal interactions of the elements of potential.

There are formulated conclusions about the ratio of state and market regulation mechanisms, the optimality of which contributes to increasing the competitive potential of the industry and ensuring its sustainable development. In addition, there are proposed measures to improve the efficiency of domestic production and neutralize the negative consequences of globalization in the context of the development of integration processes and increased competition.

Keywords: Competitiveness of the industry, competitive factors, external and internal environment, competitive potential, competitive analysis.

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QUANTITATIVE CHARACTERISTICS OF LABOR POTENTIAL IN AGRICULTURAL SECTOR OF AKMOLA REGION

Abstract. This article presents an analysis of the current state of the labor market in Akmola region, which gives not only an idea of the degree of efficiency of its functioning, but also allows you to identify promising areas of its development. Various aspects of forming and managing the labor potential of the agricultural sector are analyzed. Quantitative characteristics of the labor potential allowed us to determine the possibilities of its more rational use. The paper presents the features and trends in the development of the regional labor market. There is the differentiation of labor markets in urban and rural areas. The main directions of the state employment policy in the country, which are aimed at increasing the productively employed population and mass entrepreneurship, are considered. The main task in the use of labor resources is to ensure effective employment of the population, improve the quality and competitiveness of the labor force. The availability of the agricultural organizations with the labor resources, their effective use and high level of labor productivity are important for increasing the volume of production in the agricultural sector of the country and the region. Effective use of the labor potential is one of the most important tasks in the forming of socially oriented state, within the framework of the state policy in Kazakhstan.

Key words: labor resources, agriculture, labor potential, employment, population, Akmola region, rural territories, unemployment, labor market, state policy.

The relevance of the topic. The labor potential of the region, as well as the country, is one of the most important indicators of the economic development, the calculation of the main characteristics of which in practice is the quite difficult task. Assessment of the labor potential is the complex task in terms of methodology and organization. There are two characteristics of labor potential - quantitative and qualitative. At the same time, the quantitative characteristic is determined by the demographic factors and the intensity of the labor process. The qualitative characteristic is determined by the ability of the labor resources to produce added value and socio-economic relations. The main component of the resource potential of agriculture, human capital is formed mainly in the rural areas. The availability of the human capital in agriculture and its prospects for the further growth and development depend on its size, structure, density of distribution on the territory, as well as the degree of rational and effective use [1, P.180].

The main principles of the mechanism for regulating the labor market in the agricultural sector, which depend on the current and long-term priorities of socio-economic development of the country, include economic efficiency, social orientation, regionalism, and others. The basis for the formation of the labor resources is the total population. Currently 7693, 127 people live in the rural areas of Kazakhstan. Akmola region with the number of the rural population of 388,618 people is the 7th largest city in the country. In dynamics for the analyzed period, there is the decrease in the total population of the Akmola region by 7,651 thousand people (from 744,386 thousand people in 2015 to 736,735 thousand people in 2019) (table 1).

Table 1-Dynamics of the population of the Akmola region, people

Indicator	2015 year	2016 year	2017 year	2018 year	2019 year	Average annual growth rate 2015-2019 year, %
Population size	744386	734369	738942	738587	736735	-0,26
including: - younger than able-bodied	181016	171645	184700	185200	186927	0,81
- employable	485361	473740	451864	447500	442158	-2,30
- retirees	78009	88984	102378	105887	107650	8,38
Age dependency ratio	0,53	0,55	0,63	0,65	0,52	-0,48
The rural population	393160	385677	390257	390318	388618	-0,29
including: - men	195009	191448	194177	193850	193616	-0,18
- women	198151	194229	196080	196468	195002	-0,40
Migration growth	2609	-15219	-341	-5421	-6807	-

*Note. Calculated by the authors based on data from the statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan

The annual decrease in the population of the region in the period from 2015 to 2019 was 0.26 %. The average annual growth rate of the population younger than the able-bodied was 0.81 %, and of pensioners 8.38 %, while the rate of growth of the able-bodied population decreased by 2.3% annually. The ratio between the three main groups of the population: younger than the working age, working age and older-in the Akmola region is changing in the direction of reducing the working age population. Thus, there is an increase in the number of pensioners with the decrease in the population of working age and an increase in the number of people younger than working age. Thus in 2019 the share of the working-age population decreased by 5.2% compared to 2015 (65.2% in 2015, 60% in 2019). The increase in the proportion of the population under the age of working age was insignificant - by 0.9 % in 2019 compared to 2015.

The share of people of working age in the region has a steady downward trend from 65.2 % in 2015 to 60.02 % in 2019. According to UN international criteria, the population is considered old if the proportion of residents aged 65 years and older exceeds 7 % [2]. In the Akmola region, this indicator in 2015 was 10.5 %, and in 2019 it increased to 14.6 %. In recent years, there has been an aging of the human resources, due to the demographic situation in the Akmola region. It is obvious that the number of people of working age is under serious pressure due to the demographic failure of the 1990s, which in the future may increase the demographic burden on the part of the generation older than working age [3, P.11].

The population continues to decline in the region, mainly due to the growth of youth migration to the city. So in 2019 the migration growth was 6807 people. Due to low incomes and the level of social, cultural and living conditions, there is an outflow of young personnel from the village, and the level of their retention in rural areas is low. This is especially noticeable in socially deprived, geographically remote areas of the republic, with low population density, as well as in the regions, where the peasant farms are primarily developed [4, P.186].

The main reasons for migration of young people from rural to urban areas are: unemployment; limited access to the desired professional education and career growth; poorly developed housing construction; road transport problems; low level of the cultural, medical and commercial services [5, P.148]. In the CIS countries, migration flows have the peculiar changes. They have the special impact on the quality potential of the labor resources in the labor market of each country [6, P.265].

Labor relations are closely related to the labor resources. The problems of the employment in the agricultural countries are relevant. The country's economy employed 8.7 million people in 2019. Effective use of the labor potential, as the main driving force of the modern agricultural transformations and an objective factor of the sustainable development of the agricultural production, is very important in the field of employment in the rural areas [7, P.143].

The number of people, employed in the economy of the region in 2019, compared to previous years, amounted to 408,002 people (table 2).

Table 2 - Distribution of the population by type of economic activity in the Akmola region, people

Indicator	2015 year		2016 year		2017 year		2018 year		2019 year	
	human	%	human	%	human	%	human	%	human	%
Entire population	744386	100	734369	100	738942	100	738587	100	736735	100
including rural	393160	52,8	385677	52,5	390257	52,8	390318	52,8	388618	52,7
employed population in the region, total	408142	100	416432	100	408285	100	408697	100	408002	100
including rural	211468	51,8	17461	52,2	212780	52,1	213970	52,4	213987	52,4
employed in agriculture, hunting and forestry in the region, total	133504	32,7	135496	32,5	128972	31,6	122426	29,9	118159	29
including rural	106677	79,9	108909	80,4	102943	79,8	98307	80,3	94064	79,6

The proportion of the employed population to the total population increased from 54.83 % in 2015 to 55.38 % in 2019.

The main part of the employed population of the region lives in rural areas - 52.4 % in 2019.

In the long term, employment in urban areas will have steady upward trend. Currently, the rural area is characterized by the relatively low level of the employment in the field of agricultural production. Of the 408,002 employed only 29 % work in the agricultural sector. Only one from three employed residents of the Akmola region works in the field of agriculture, hunting and forestry. At the same time, there is the decrease in the share of the employed population in this area of the economy from 32.7 % in 2015 to 29 % in 2019.

Against the background of declining employment in the rural areas, there is the similar growth in urban areas, which indicates the significant flow of the working-age population from the village to the city, which in turn leads to the significant distortions in the regional labor market.

4/5 of the employed rural population is engaged in agriculture, hunting and forestry. Thus, in 2019, the share of the rural population employed in this sector of the economy amounted to 79.6 %.

Overcoming unemployment is one of the most important socio-economic problems of the modern stage of the economic development. The implementation of the additional measures aimed to the reducing tension in the labor market, allowed not only to preserve the personnel potential of employees of organizations, but also to reduce the number of unemployed citizens (table 3).

Table 3 - Assessment of the labor market and employment in the Akmola region

Indicator	2015 year	2016 year	2017 year	2018 year	2019 year
Number of economically active population, people	429908	437991	428878	429212	428253
Level of economic activity of the population, %	75,7	76,5	76,3	76,1	76,1
Number of employees, people	408142	416432	408285	408697	408002
Level of employment, %	94,9	95,1	95,2	95,2	95,3
The number of unemployed people	21766	21559	20593	20515	20251
Unemployment rate, %	5,1	4,9	4,9	4,8	4,7

The situation in the labor market of Akmola region has improved recently. In comparison with 2015, the number of people, who do not have the job or permanent income, are actively looking for it and are ready to start work, decreased by 1515 people, or by 6.96 %, and amounted to 20251 people. This led to the decrease in the overall unemployment rate. At the end of 2019, the unemployment rate was 4.7 % of the economically active population. Compared to 2015, it decreased by 0.4 %. The solution to the problem of providing rural personnel is possible if the prestige of the agricultural sector increases, which ensures high motivation of the agricultural labor. Improving the social infrastructure of the village is the priority. First of all, this applies to increasing the volume of housing construction, developing transport

infrastructure, gasification, providing rural residents with drinking water, sanitary standards, improving the quality of the education, health care, and living in the rural areas [8, P.81].

One of the reasons for the unfavorable situation in the rural development is the low level of comfort of living in the rural areas. In order to attract and retain the population in the rural areas, it is necessary to implement the set of measures (table 4).

Table 4-Set of measures to attract and retain the population in rural areas

No.	Description of measures
1	Ensuring the growth of the economically active population: - improvement of the internal labor market development system; - ensuring the mobility of labor resources by regulating the rational migration of labor resources; - implementation of the measures to prevent and reduce informal employment; - increasing the competitiveness of jobs to prevent further outflow of the working-age population from rural areas; - increasing the level of remuneration and improving working conditions for this purpose; - improving the level of comfort of living in rural areas, creating conditions for attracting graduates of agricultural universities and colleges, social workers to the village.
2	Taking measures to ensure productive employment: - rational employment of rural population; - stimulate the creation of jobs; - development of small forms of entrepreneurship and self-employment of the rural population; - development of integration and cooperation in rural areas; - improving the efficiency of using their own labor resources by attracting young people to the development of working professions.

Modern large agricultural formations are well equipped with high-performance equipment and apply effective technologies. It does not require large number of the workers and employees. Personal subsidiary farms are losing their appeal to the villagers from year to year, but they are not in a hurry to organize farms. The level of technical equipment of small farms of agricultural production does not meet modern requirements: high wear and tear, low technical and operational characteristics, which affects the state of provision of their labor resources, changes the qualitative composition and structure of the labor force [9, P.201].

Materials and methods of research. The research methodology is based on the dialectical method, freed from materialistic or idealistic monism and based on the pluralistic, multilinear interdependence of all social phenomena. We also used the method of dialectical interdependence and interaction of methods: theoretical and empirical, historical and logical, induction and deduction in the study of the quantitative characteristics of labor potential in agricultural sector in our country. The theoretical basis is based on existing theoretical and empirical publications. In this article were used abstract-logical, analytical, monographic economic-statistical, sociological, expert methods, as well as the methods of economic-mathematical analysis, modeling and forecasting.

Research results. Improving the quality of life is the necessary condition for preserving and expanding the reproduction of human capital in the rural economy. At the same time, the main direction of improving the standard of living of the rural population is to increase income by increasing the efficiency of the enterprises in the agricultural sector and rural development.

In the agricultural sector, from one hand, low wages cannot stimulate the improvement of the financial condition of the enterprise, from another - the financial condition of the enterprise cannot provide the employee with high level of the wages. This contradiction does not contribute to improving the standard of living and makes it necessary to solve the problem. It should be allowed within the framework of the mechanism of material incentives for labor at the enterprise [10, P.32].

Conclusion. In the conclusion we would like to note, that in recent years, Kazakhstan has taken the number of measures to solve the problems of developing social and labor relations in the country, which have allowed timely and flexible response to the situation in the rural labor market, and regulate the provision of professional personnel for economic sectors. However, despite the outlined changes, the problem of personnel shortage is clearly noticeable in the agricultural labor market. As the result of active state support, the current state of the country’s labor market is characterized by relatively high

employment rates and fairly low unemployment rate. But in the conditions of the outflow of economically active population from the village to the city, the pressure on the urban labor market and the transformation of rural society is increasing. Therefore, it is necessary to ensure the economic and social effectiveness of the labor market, balanced regulatory policy, aimed not only at increasing the flexibility of the labor market, but also at creating the conditions for the social justice and social protection.

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АҚМОЛА ОБЛЫСЫНДАҒЫ АГРАРЛЫҚ СЕКТОРДЫҢ ЕҢБЕК ӘЛЕУЕТІНІҢ САНДЫҚ СИПАТТАМАСЫ

Аннотация. Мақалада Ақмола облысы еңбек нарығының қазіргі жағдайын талдау жұмыстары ұсынылған. Еңбек ресурстарын пайдалану саласындағы басты міндет халықты тиімді жұмыспен қамтуды қамтамасыз ету, жұмыс күшінің сапасы мен бәсекеге қабілеттілігін арттыру болып саналады. Агроқұрылымдардың еңбек ресурстарымен қамтамасыз етілуі, оларды тиімді пайдалану және еңбек өнімділігінің жоғары деңгейі ел және облыстың аграрлық секторында өнім өндіру көлемін ұлғайту үшін маңызды мәнге ие. Еңбек әлеуетінің сандық сипаттамасы оны ұтымды пайдалану мүмкіндігін анықтауға мүмкіндік берді. Мақалада аймақтық еңбек нарығының ерекшеліктері мен даму тенденциялары көрсетілген. Қалалық және ауылдық жерлерде еңбек нарықтарының сараланууы байқалады. Нәтижелі жұмыспен қамтылған халықты және жаппай кәсіпкерлікті арттыруға бағытталған елдегі мемлекеттік жұмыспен қамту саясатының негізгі бағыттары қаралды. Еңбек ресурстарын пайдалану кезіндегі негізгі міндет халықты тиімді жұмыспен қамтуды қамтамасыз ету, жұмыс күшінің сапасы мен бәсекеге қабілеттілігін арттыру болып табылады. Ауыл шаруашылығы ұйымдарында еңбек ресурстарының болуы, оларды тиімді пайдалану және еңбек өнімділігінің жоғары деңгейі елдің және өңірдің аграрлық секторында өндіріс көлемін ұлғайту үшін маңызды мәнге ие. Еңбек әлеуетін тиімді пайдалану Қазақстандағы мемлекеттік саясат шеңберінде әлеуметтік бағдарланған мемлекетті қалыптастырудағы маңызды міндеттердің бірі болып табылады.

Түйін сөздер: еңбек ресурстары, ауылшаруашылығы, еңбек әлеуеті, жұмыспен қамту, халық саны, Ақмола облысы, ауылды аймақ, жұмыссыздық, еңбек нарығы, мемлекеттік саясат.

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КОЛИЧЕСТВЕННАЯ ХАРАКТЕРИСТИКА ТРУДОВОГО ПОТЕНЦИАЛА АГРАРНОГО СЕКТОРА АКМОЛИНСКОЙ ОБЛАСТИ

Аннотация. В данной статье представлен анализ современного состояния рынка труда Акмолинской области, который дает не только представление о степени эффективности его функционирования, но и позволяет выявить перспективные направления его развития. Анализируются различные аспекты формирования и управления трудовым потенциалом аграрного сектора. Количественные характеристики трудового потенциала позволили определить возможности его более рационального использования. В статье представлены особенности и тенденции развития регионального рынка труда. Наблюдается дифференциация рынков труда в городской и сельской местности. Рассмотрены основные направления государственной политики занятости в стране, направленные на повышение продуктивно занятого населения и массового предпринимательства. Основной задачей при использовании трудовых ресурсов является обеспечение эффективной занятости населения, повышение качества и конкурентоспособности рабочей силы. Наличие у сельскохозяйственных организаций трудовых ресурсов, их эффективное использование и высокий уровень производительности труда имеют важное значение для увеличения объемов производства в аграрном секторе страны и региона. Эффективное использование трудового потенциала является одной из важнейших задач в формировании социально ориентированного государства, в рамках государственной политики в Казахстане.

Ключевые слова: трудовые ресурсы, сельское хозяйство, трудовой потенциал, занятость, численность населения, Акмолинская область, сельские территории, безработица, рынок труда, государственная политика.

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DEVELOPMENT OF THE BANKING SECTOR OF UKRAINE IN THE SPACE OF FORMATION OF DESTRUCTIVE CONSEQUENCES OF THE INFLUENCE OF THE GLOBAL FINANCIAL AND ECONOMIC CRISES: ECONOMIC AND LEGAL ASPECTS

Abstract. The article examines the impact of globalization on the development of the world and national economic systems. The high probability of a global economic recession due to the coronavirus outbreak is projected to have significant consequences for both the global economy and the economy of Ukraine. Due to the probable change in the structure of the world economy and logistics, there is a growing need to study the risks of the national banking system, which demonstrates a high dependence on global financial markets. The peculiarities of the manifestation of financial and economic crises in the conditions of turbulence of the international financial markets and strengthening of financial instability have been considered. The causes and consequences of crises in the banking sector of Ukraine have been studied. The analysis of macroeconomic indicators of economic development of Ukraine during 2006-2019 with identifying of crisis periods has been carried out. Particular attention has been paid to the study of the preconditions for the emergence and consequences of the global financial and economic crisis for the economy of Ukraine in general and the banking sector in particular. Indicators that characterize the degree of penetration of the banking system into the economy of Ukraine have been analyzed, that will determine the features of crises at different stages of socio-economic development and conduct a comparative assessment of anti-crisis measures of the NBU aimed at stabilizing the banking sector. Taking into account the fact that the causes of financial and economic crises are not identical, measures used during the Global Financial and Economic Crisis of 2007-2011 cannot be taken to overcome the negative consequences of the Coronacrisis of 2020. Regulatory aspects of the banking system in times of crisis have been systematized. An attempt to predict the possible development of events in the domestic banking sector in the context of the Coronacrisis of 2020 has been made.

The purpose of the article is to study the development trends of the banking sector of Ukraine in the space of formation of the destructive consequences of the global financial and economic crises and to determine the main directions of anti-crisis regulation of banking.

Key words: globalization, financial and economic crisis, coronacrisis, legal regulation, digitalization, banking sector, anti-crisis measures.

Introduction. A banking system as a basic element of the economic system of a state performs the social transformational function of accumulating public financial savings and using them to finance the needs of the economy. Effective functioning and sustainable development of the banking system is possible only in conditions of general financial stability of the country's economy. Financial and economic instability of the macroenvironment leads to accumulation of political, economic and institutional risks in the banking system, which cause the development of crises both at the level of individual banks (banks are unable to meet their obligations to customers) and at the level of the banking system as a whole (the system loses the ability to perform its main functions to maintain the stability of

the exchange rate, efficient allocation of financial resources, ensuring safety of savings, etc.). In particular, the negative consequences of the global financial and economic crisis include a slowdown in GDP growth, worsening of investment climate, devaluation of the national currency, reduction of consumer lending and lending to the real sector of the economy, etc. Against the background of unfolding of the Coronacrisis in 2020, which is projected to cost the world economy USD 8.8 trillion or 10% of global GDP, the research of the causes of global financial and economic crises and the consequences of their impact on the economy in general, and the functioning of the banking sector in particular, is becoming increasingly relevant.

Due to the cyclical nature and systemic nature of financial and economic crises, their nature, factors of influence and features of manifestation have been studied in the works of both foreign and domestic scientists. Given the fact that the development of financial markets takes place in unpredictable and chaotic conditions, the authors [1] with the help of a turbulent approach investigated the patterns of economic systems and the causes of financial and economic crises. Some works are concentrated on the study of the influence of the global financial crisis on the EU integration trends. The work [2] analyzes the peculiarities of the influence of political and economic stability on the European integration processes in Norway; the work [3] determines the peculiarities of the development of financial services markets in Eastern Europe and reaffirms the important role of banking sector stability in ensuring the economic development of the country; the work [4] studies challenges and threats to financial services market due to modern information technologies. Factors of informatization and their influence on the processes of economic development of Ukraine have been studied in the work [5]. The financial and economic crisis has a negative impact on all sectors of the economy, including the manufacturing sector, and the features of its functioning have been studied in the work [6]. Mechanisms of forming strategies for large enterprises in markets with intense competition have been identified in the work [7]. The formation of a new model of the economy to overcome the crisis has been justified in the work [8].

The information base of the study is the current legislation and regulations of Ukraine, official statistics of the World Bank (WB) and the National Bank of Ukraine (NBU), the Cabinet of Ministers of Ukraine (CMU), the State Statistics Service of Ukraine (SSSU), monographic studies and scientific publications.

Results. The intensification of globalization processes has led to the growth of interconnections and interdependencies of national economic systems, and their cyclical nature is accompanied by both the rise and fall of economic activity. Since the banking sector is a basic element of the economic system of any country, banks are among the first to feel the negative effects of global financial and economic crises, or they may be the cause of the occurrence of the crises.

The main cause of all banking crises is excessively risky operations of banks and lack of proper control over them by central banks and governments of different countries. Banking crises are often accompanied by general economic and financial crises, combined with crises in certain sectors of the economy and socio-political crisis, sharpening them and worsening the consequences. The crisis of the banking system of a country can be an element in the chain of crises at the regional and even global level, but at the same time can be relatively independent. However, crisis factors do not always arise directly in the banking sector, sometimes crises arise in other areas (political, social, etc.) and are projected on the banking sector as the most sensitive to external shocks.

In general, a banking crisis is an objective multi-stage process that manifests itself in the inability of the banking system to perform its basic functions, which is shown by the loss of liquidity and solvency by banks and can lead to financial market destabilization and falling economic indicators.

The latest and deepest global crisis, which has affected various areas of financial institutions in many countries, is the Global Financial and Economic Crisis of 2007-2011, which began with the mortgage crisis in the United States and caused serious financial instability in Europe and Asia, in particular in Japan and China, which had placed their assets in US mortgage securities. The bankruptcies of the leading international investment banks Lehmann Brothers and Merrill Lynch affected the US Treasury bonds yields, which fell by almost 2 times, and the fall of the Dow Jones index (on August 30, 2008 it fell by 7%). The downgrade of the US sovereign credit rating led to a decline in confidence in US Treasury bonds, which for many years had served as a benchmark for the international borrowing market, and the

devaluation of the dollar, which inevitably led to chaos in global financial markets. The devaluation of the dollar has jeopardized its use as the world's reserve currency. In response, China, the largest creditor of the United States, offered to replace the dollar with another reserve currency, which could mitigate the effects of the crisis for many countries whose economies were heavily pegged to the US dollar as a currency for international settlements. The situation on the world financial markets was exacerbated by the catastrophic situation in Italy, Spain, Ireland, Portugal and Greece, which emerged after the crisis and affected the depreciation of the euro against other world currencies. The Global Financial and Economic Crisis of 2007-2011, which became widespread, led to a slowdown in GDP growth in many countries, reduced business and investment activity in global financial markets and became a catalyst for liquidity problems in most financially stable banking systems. Globally, the mortgage crisis has actually become a crisis of overproduction – the volume of industrial production in the world has significantly exceeded demand for products, and high purchasing power was stimulated mainly through lending [9].

Most economists and financial analysts predicted the beginning of a new global economic crisis almost immediately after the world had recovered from the Global Financial and Economic Crisis of 2007-2011. The Federal Reserve Bank of New York estimated that the probability of a new recession at the end of 2019 on the bond indicator is at the level of 2007. One of the world's leading investment banks JP Morgan Chase in late 2019 announced the approach of a "super crisis", having conducted a study that took into account the duration of global economic growth, finance of large corporations, asset value and financial innovation [10]. In January 2020, K. Georgieva, the head of the IMF, said that the world was waiting for a new Great Depression, as there was a trend similar to the situation of the 1920s, which had ended with the collapse of markets in 1929 [11]. According to Bloomberg, the losses of the world economy due to the new global financial crisis have already reached USD 3.4 trillion, which has exceeded the equivalent of gross domestic product (GDP) of Great Britain. According to IMF forecasts, GDP in the EU is expected to decline by 2020 at 6.6% (Germany – at 7%, Italy – 9.1%, Spain – 8%, Poland – 4.6%) [12].

The outbreak of the COVID-19 pandemic, caused by the coronavirus SARS-CoV-2, has become a catalyst for negative trends for the world economy, causing GDP loss, a decline in the tourism business (in 2020 the global tourism decline could reach 25% and lead to a reduction in jobs by 12–14%), the collapse of oil prices, and with them – a stock market crash. Bloomberg reported a sharp drop in world oil prices and a drop in the price of a barrel below the mark of USD 50 [12]. Reuters noted the loss of global public companies to USD 5 trillion in just a week. The quotation slumps were the most serious since the crisis of 2007-2011. The volatility index ("the fear index") of markets rose to two-year highs. A stable-negative trend is observed on all European stock exchanges, including the London Stock Exchange FTSE, German DAX and French CAC [13]. March 12, 2020 was called "Black Thursday" due to the closing down of financial markets as a result of a sharp fall in stock prices and the largest collapse of indices (Dow Jones, S&P 500) in the US stock market since 1987. According to the results of trading, the indices fell into the so-called "bear territory" (prices fell by more than 20%). The S&P 500, which includes the world's 500 largest companies, fell by 9.5% that day. In general, it lost 26.7% of the highest mark, which had been set only the previous month. The Dow Jones Industrial Average lost almost 10%. This is the biggest loss since falling by 23% on "Black Monday" in 1987. Thus, an unprecedented growth of indices, which had been lasting for 11 years [14], was completed, and it can be identified as signs of a new global financial and economic crisis of 2020.

The dependence of Ukraine on the global financial system is a key reason for the spread of the crisis to the national banking sector. The causes of the crisis in the banking sector of Ukraine are related to the cumulative effect of a number of negative macroeconomic indicators and risks (imbalances) of the banking sector, which have developed over time and whose impact has intensified during the crisis in global financial markets. The negative macroeconomic factors are amplified by internal political instability in 2014: the government crisis, the Anti-Terrorist Operation in the East since 2014 (part of Donetsk and Luhansk regions), the occupation of the Autonomous Republic of Crimea, inefficiency of public administration and regulation. Figure 1 shows the dynamic trends of the main macroeconomic indicators of economic development of Ukraine during 2006-2019 with identifying of crisis periods.

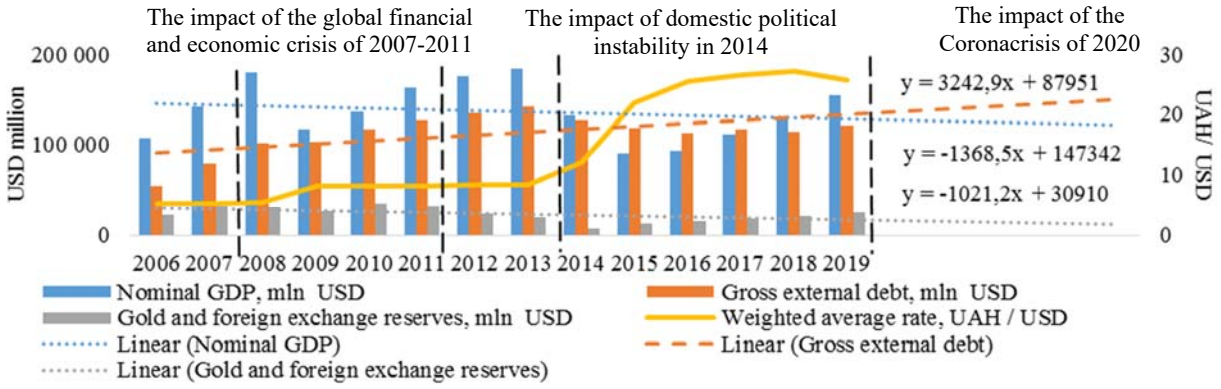

Figure 1 – Dynamics of macroeconomic indicators of Ukraine for 2006-2019 and their forecast up to 2024

Source: compiled by the authors based on [15, 16, 17]

During 2006-2019, macroeconomic indicators of Ukraine's economic development twice underwent significant negative changes: as a result of the Global Financial and Economic Crisis of 2007-2011; due to destabilization of the political situation in 2014. These changes were exacerbated by the devaluation of the national currency, as the data in Figure 1 are presented in USD. That is, the negative dynamics is burdened by exchange rate differences. Since 2016, macroeconomic indicators have been gradually recovering, but the trend line (forecast) up to 2024 is negative. The destabilizing impact of domestic macroeconomic factors, worsened by the turbulence of external world markets, increases the risks accumulated directly in the middle of the national banking system, leading to structural changes in bank capital. The expansion of foreign capital into the national banking sector has led to profound transformations in the structure of Ukraine's banking system, increased vulnerability and reduced controllability of economic processes due to uncontrolled inflow of foreign capital and its concentration in high-profit and high-risk sectors of the banking market.

The analysis of the presence of banks with foreign capital in the banking system of Ukraine in recent years reveals two main trends: the rapid increase in the number of banks with foreign capital in 2006-2012 and the outflow of foreign capital for the period 2013-2019. During 2006-2012, the number of banks with foreign capital has almost doubled, from 35 to 53 banks (up to 30% of the country's bank capital). The period of 2013-2019 is characterized by a significant decrease in the total number of banking institutions by 101 units or 2.34 times and a decrease in the number of banks with foreign capital by 18 institutions, but the share of foreign capital in the banking sector of Ukraine grew annually and amounted to 46.6%, which is the highest figure for the last 15 years. It should be noted that during the crisis, banking institutions with foreign capital proved to be more stable, as evidenced by the lower rate of reduction in the number of banks with foreign capital compared to Ukrainian.

The dynamics of the main indicators that characterize the degree of penetration of the banking system into the country's economy (Figure 2) shows the negative effects of the global financial crisis of 2007-2011 and domestic political fluctuations in 2013-2014 for the banking sector of Ukraine and extremely low activity of Ukrainian banks in ensuring economic growth. The dynamics of the ratio of banks' assets to GDP shows that for a long time the banking sector of Ukraine has failed to recover assets – after the Global Financial and Economic Crisis of 2007-2011. The figure, which previously reached a maximum of 97.7%, despite slight slowdowns, almost all the time tended to decrease and at the end of 2019 amounted to 39%. For comparison, the ratio of bank assets to GDP in France is 280%, in Germany it is 310% [18]. The ratio of bank loans to GDP in Ukraine also continues to decline and in 2019 was 35%, which is significantly lower than the EU average – 157.4% (in France, Germany, and Italy – 100-150%, Portugal, the Netherlands, and Spain – 200-300%) and is typical for developing economies (Brazil, India, Eastern Europe).

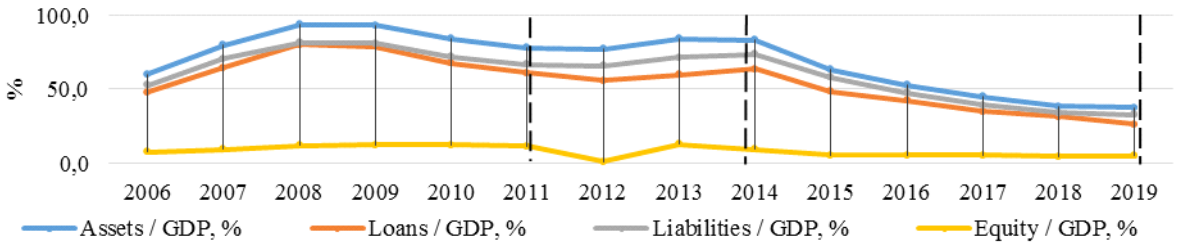

Figure 2 – Dynamics of the degree of penetration of the banking system into the economy of Ukraine during 2006-2019

Source: compiled by the authors based on the official site of the NBU [16]

Credit activity in the national banking sector remains low despite the excess liquidity accumulated by banks (Figure 3). In the pre-crisis period, banks pursued an aggressive credit policy (the growth rate of the loan portfolio averaged 91.22% annually). Since the end of 2008, this trend has changed to the opposite: in 2009 the volume of loans decreased by USD 5,897 million compared to 2008, and the growth rate of lending slowed down by 68.9%. After the growth of loans during 2009-2013 by 40% to the amount of USD 153,568 million in 2013-2019, there was a sharp decrease in lending by 2.6 times to USD 57,925 million. This was facilitated by a reduction in bank resources due to slower growth of deposits, declining effective demand for credit resources, high credit risks and restrictions by the NBU (for example, on foreign currency lending) aimed at curbing inflationary pressures and the devaluation of the national currency.

Corporate loans are the dominant component of the loan portfolio of Ukrainian banks, their share in the loan portfolio has a steady upward trend from 60% in 2008 to 79% in 2019. The total amount of corporate loans in the Ukrainian economy in recent years has shown a declining trend, in particular, to USD 8.5 billion during 2014-2015, to USD 3.7 billion for 2016. During 2017-2019, the corporate loan portfolio gradually grew, but the pace of such growth did not meet the needs of the economy in "long" resources [19].

Against the background of the financial crisis in the conditions of mass non-repayment of loans, there was an increase in bad debts on loans and deterioration in the quality of assets of banking institutions. In 2014–2019, both the volume of non-performing loans increased by USD 9,286 million (from USD 20,573 million to USD 11,287 million), and their share in the loan portfolio by 37.9% (from 13.5% to 51.4% respectively). According to NBU estimates, the 5 largest debtors of banks, which are representatives of large corporate business, account for 39% of banks' loan portfolio; respectively, for 10 debtors it is 60% of the loan portfolio; for 20 debtors – 82% of the loan portfolio; for 40 debtors – 97% of the loan portfolio (a total of USD 10766 million), which indicates a significant concentration of lending and investment activities of banks in the business structures of related parties [20].

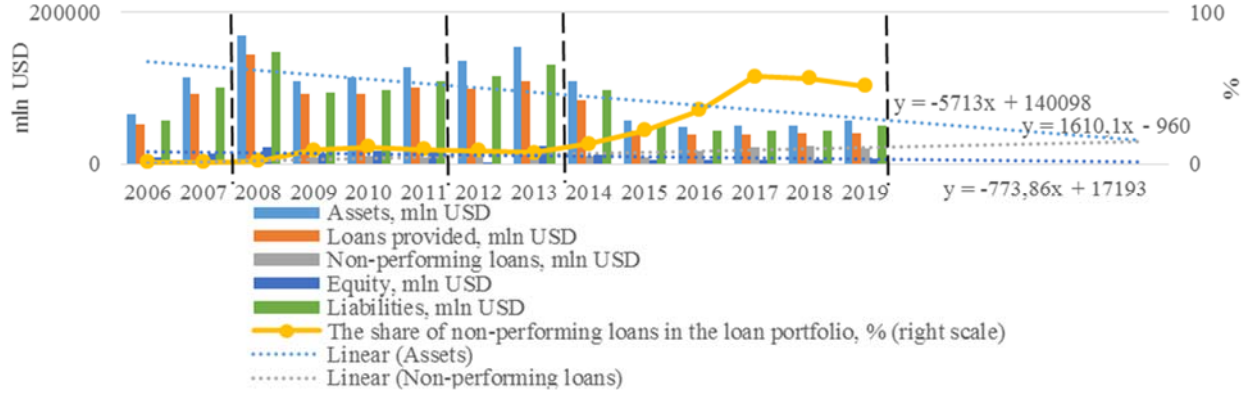

Figure 3 – Dynamics of the main indicators of the development of the banking sector of Ukraine during 2006-2019 and their forecast up to 2024

Source: compiled by the authors based on the official site of the NBU [16]

Comparative characteristics of the crisis in the banking sector of Ukraine,
as a result of the impact of the Global Financial and Economic Crisis of 2007-2011 and the Coronacrisis of 2020

Feature	The Global Financial and Economic Crisis of 2007-2011	The Coronacrisis of 2020
Catalyst	The United States subprime mortgage crisis in 2007	The outbreak of the COVID-19 pandemic, caused by the coronavirus SARS-CoV-2
Causes	rapid growth of foreign capital in the structure of the banking system, hypertrophied growth of consumer lending, accumulation of banking risks, rising inflationary pressures and trade deficit, growing unemployment, decline in real GDP, the threat of default, low capitalization of banks	reduction of trade turnover due to closing of borders, growing gross external debt, growing unemployment, sharp fall of oil prices, decline in real GDP, the threat of default, changes of prices in commodity markets, decrease in level of business activity
Effects	devaluation of the national currency, accelerating inflation, rising banking risks, deteriorating asset quality due to rising share of non-performing loans, reducing the resource base due to withdrawal of deposits from bank deposit accounts, lower interest rates on deposits, rising interest rates on loans and reduced demand for loans liquidity, unprofitable activities, exposing imbalances in banking activities, cleaning up of inefficient banks (withdrawal of unscrupulous agents from the market), reduction of investment activity, etc.	increasing costs of banks to eliminate the effects of the Coronacrisis, accelerating inflation, exposing imbalances in banking, devaluation of the national currency at the beginning of the Coronacrisis, increasing the role of digital instruments and changing the paradigm of banking, growth of non-cash and cryptocurrency payments, reduction of demand for credit resources, reduction of interest rates on deposits and loans, reduction of investment activity, etc.
Regulatory and legal aspects of the application of anti-crisis measures	Law of Ukraine “On priority measures to prevent the negative consequences of the financial crisis and on amendments to certain legislative acts of Ukraine” № 639-VI (the Stabilization Fund was established; the amount of guarantees on deposits of individuals was increased to UAH 150,000); Resolution of the NBU Board “On additional measures for banks’ activities” № 319 (prohibition on long-term return of time deposits, establishment of a marginal deviation between the rate of purchase and sale of cash foreign currency (up to 5%), restriction of active operations); Resolution of the Cabinet of Ministers of Ukraine “On approval of the Procedure for state participation in the capitalization of banks” № 960 (the rules of recapitalization of banks by the state has been determined and the procedure has been simplified); Resolution of the Board of the NBU “On the implementation of diagnostic examination of banks” № 389 (the procedure, methodology and program of diagnostic examination have been developed); Resolution of the NBU Board “The special procedure for implementing measures for financial recovery of banks” № 405 (regulates reorganization of the bank and formation, increase of the bank’s authorized capital by shareholders (participants) of the bank, third parties (investors) or the state under a simplified procedure); Law of Ukraine “On amendments to certain legislative acts of Ukraine on prohibition of banks to change the terms of a bank deposit agreement and a loan agreement unilaterally” (the practice of unilaterally changing the terms of concluded credit agreements and bank deposit agreements to protect the rights of clients); Resolution of the Cabinet of Ministers and the NBU “On the procedure for refinancing banks during the financial and economic crisis” № 44 (refinancing of banks through tenders for more than 14 days, the provision of stabilization loans), etc.	Law of Ukraine “On amendments to the Tax Code of Ukraine and other laws of Ukraine concerning additional support to taxpayers for the period of measures aimed at preventing the occurrence and spread of coronavirus disease (COVID-19)” № 591-IX (the minimum size of the bank’s authorized capital has been reduced to UAH 200 million); Law of Ukraine “On amendments to certain legislative acts of Ukraine aimed at preventing the occurrence and spread of coronavirus disease (COVID-19)” № 530-IX (for the period of quarantine or restrictive measures related to the spread of coronavirus disease (COVID-19), and within 30 days from the date of its cancellation it is prohibited for JSC “Oschadbank” to suspend expenditure operations on the current account of an internally displaced person in the absence of physical identification); Decision of the NBU “On measures of the National Bank of Ukraine to combat crises and the situation in the foreign exchange market of Ukraine” № 9-rd (targeted long-term refinancing of banks to lend to investment projects, small and medium-sized businesses has been introduced; the rate of mandatory reserves has been reduced; the specifics of the application of requirements for credit risk assessment on debt, restructured due to reduced income of borrowers and / or deterioration of their financial condition due to the spread of coronavirus infection, has been identified); Law of Ukraine "On amendments to certain legislative acts of Ukraine aimed at providing additional social and economic guarantees in connection with the spread of coronavirus disease (COVID-19)" № 540-IX of March 30, 2020 (prohibition of raising the interest rate under a loan agreement , change in terms of publication of annual financial statements, annual consolidated financial statements of the bank together with the audit report), etc.

Source: compiled by the authors

For Ukraine, the Coronacrisis of 2020 was the first crisis that was not accompanied by bank failures and panic of depositors, but caused a decline in economic activity of small and medium-sized businesses and a reduction in GDP (according to IMF forecasts, by 7.7%). Also, at the end of 2020 the NBU worsened inflation forecasts (from 5.6% to 8.7%), the consolidated balance of payments to a deficit of USD 1.1 billion from a surplus of USD 3.2 billion at the beginning of the year and other macroeconomic indicators, which allows with high probability to predict the devaluation of the national currency. However, due to the delayed effect of the Coronacrisis of 2020, it is still impossible to assess the consequences of its impact on the banking sector of Ukraine.

Discussion. There are no standard measures to counter the crisis. The measures taken, first of all, must neutralize the causes of its occurrence. Let's make a comparative description of the peculiarities of the development of the banking sector of Ukraine in the conditions of the impact of the Global Financial and Economic Crisis of 2007-2011 and the Coronacrisis of 2020 (table). The study shows that the causes of financial and economic crises are not identical, so the measures used during the Global Financial and Economic Crisis of 2007-2011 cannot be taken. Both the NBU and individual banks should develop measures based on new challenges for the banking sector, carried by the Coronacrisis of 2020.

Conclusions. Based on the study, it can be concluded that significant integration of Ukraine into international financial flows increases the risk of solvency of the domestic financial system in general and the banking sector in particular, which does not have sufficient potential to counter the turbulence of global financial markets, that is why it will only repeat their general trend. However, in contrast to the Global Financial and Economic Crisis of 2007-2011, in 2020, the banking sector of Ukraine has a sufficient level of capitalization to withstand external challenges and cover the negative consequences of banking risks. To mitigate the impact of the Coronacrisis of 2020 on the national economy and the banking sector in particular, a comprehensive approach should be applied, as the problems of the banking sector are interrelated with economic and political processes in the country and, in turn, affect the general economic situation. The main anti-crisis measures under this approach should be: at the macro level – reducing the dollarization of the economy, decelerating inflation rates, limiting external gross debt to reduce the critical dependence of the domestic economy on general trends in global financial markets and stabilizing the fiscal situation, gradual structural changes in the economy, stimulation of the IT-sector and transition to digital technologies; at the level of the banking system – to stimulate the orientation of banking resources in lending to the real sector of the economy, solving the problem of "toxic" assets of banks, limiting the level of banking risks, etc. The comparative characteristics of the impact of the Global Financial and Economic Crisis of 2007-2011 and the Coronacrisis of 2020 allowed to identify differences in the regulatory framework of the banking sector during the crisis to stabilize the banks and mitigate the impact of external shocks. Provided that the efforts of the government and the NBU are combined, Ukraine's losses from the Coronacrisis of 2020 may be lower than in other countries that will allow Ukraine to ensure conditions for rapid economic recovery.

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ӘЛЕМДІК ҚАРЖЫ-ЭКОНОМИКАЛЫҚ ДАҒДАРЫС ӘСЕРІНІҢ ДЕСТРУКТИВТІ САЛДАРЫН ҚАЛЫПТАСТЫРУ КЕҢІСТІГІНДЕ УКРАИНАНЫҢ БАНК СЕКТОРЫНЫҢ ДАМУЫ: ЭКОНОМИКАЛЫҚ-ҚҰҚЫҚТЫҚ АСПЕКТІЛЕРІ

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РАЗВИТИЕ БАНКОВСКОГО СЕКТОРА УКРАИНЫ В ПРОСТРАНСТВЕ ФОРМИРОВАНИЯ ДЕСТРУКТИВНЫХ ПОСЛЕДСТВИЙ ВЛИЯНИЯ МИРОВОГО ФИНАНСОВО-ЭКОНОМИЧЕСКОГО КРИЗИСА: ЭКОНОМИКО-ПРАВОВЫЕ АСПЕКТЫ

Аннотация. В статье рассматривается влияние глобализации на развитие мировой и национальной экономических систем. Высокая вероятность глобальной экономической рецессии из-за вспышки коронавируса, по прогнозам, будет иметь значительные последствия как для мировой экономики, так и для экономики Украины. В связи с вероятным изменением структуры мировой экономики и логистики возрастает необходимость изучения рисков национальной банковской системы, демонстрирующей высокую зависимость от мировых финансовых рынков. Рассмотрены особенности проявления финансово-экономических кризисов в условиях турбулентности международных финансовых рынков и усиления финансовой нестабильности. Изучены причины и последствия кризисов в банковском секторе Украины. Проведен анализ макроэкономических показателей экономического развития Украины за 2006-2019 годы с выявлением кризисных периодов. Особое внимание уделено изучению предпосылок возникновения и последствий мирового финансово-экономического кризиса для экономики Украины в целом и банковского сектора в частности. Проанализированы показатели, характеризующие степень проникновения банковской системы в экономику Украины, что позволит определить особенности кризисных явлений на разных этапах социально-экономического развития и провести сравнительную оценку антикризисных мер НБУ, направленных на стабилизацию банковского сектора. Учитывая тот факт, что причины финансово-экономических кризисов не идентичны, меры, применявшиеся во время Мирового финансово-экономического кризиса 2007-2011 годов, не могут быть приняты для преодоления негативных последствий коронакризиса 2020 года. Систематизированы регулятивные аспекты банковской системы в кризисные периоды. Предпринята попытка спрогнозировать возможное развитие событий в отечественном банковском секторе в контексте коронакризиса 2020 года.

Целью статьи является изучение тенденций развития банковского сектора Украины в условиях формирования деструктивных последствий глобальных финансово-экономических кризисов и определение основных направлений антикризисного регулирования банковской деятельности.

Ключевые слова: глобализация, финансово-экономический кризис, коронакризис, правовое регулирование, цифровизация, банковский сектор, антикризисные меры.

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DIGITALIZATION AS AN ENGINE OF ECONOMIC GROWTH

Abstract. The analysis of modern publications on the stated problem suggests a great interest of the scientific community about the digital development of economic systems at various levels. However, the Russian experience of developing and implementing digital technologies has not been studied well. As a result, Russian features of digital economy development and systematization of existing approaches provide a great scientific and practical interest. It is noted that the digital economy, which generates a continuous stream of innovations, involves the development of human capital, which, in turn, requires a systematic approach to knowledge management. The development of the digital economy in Russia is declared as one of the most important directions of state policy and is considered as a prerequisite for competitiveness in the modern global market and a strategic component of the state's economic sovereignty. An organization that embarks on a digital transformation strategy needs a vision of its final achievement, and that vision should be more than a statement on the website. For the transformation to be successful, the organization must adapt its vision every day, and employees must know the way of their contribution. To make digital transformation real, you need a vision and ability to do it. Digital solutions, meanwhile, represent digital products or services – for example, a medical platform that connected to Phillips or GE's offerings on the industrial Internet.

The results of the study: The analysis of the digital economy of the Russian Federation was carried out. The main directions in solving the identified problems of digitalization in Russia were Proposed. The methodological basis of the research is the scientific works of Russian and foreign scientists in the field of the digital economy, the results of various applied research on the formation of the knowledge economy.

Keywords: media, digital economy, e-government, knowledge, information technology, a national project, program.

Introduction. The rapid pace of penetration of digital technologies into all spheres of modern society leads to changes in the usual models of the economic and social structure of governments. In the wave of this trend, the leading countries of the world to maintain their leadership are betting on the digitalization of the economy; Russia is also involved in this process. E–government and the digital economy are identified as priorities of the Informatization strategy 2019–2024. During this period, the development of the national project "Digital Economy of the Russian Federation" is planned [1–6].

The definition of the "digital economy" was used in 1995 by the American computer scientist Nicholas Negroponte at the University of Massachusetts. However, he did not give a clear definition, he used this concept more as a figurative expression, but not a scientific definition [2–13]. At the present moment, scientists have not come to a common judgment about the digital economy. Scientists' research often uses synonyms of the digital economy such as: "electronic economy", "new technological way of the world", "API economy", "application economy", "creative economy" and others.

Materials and methods. Questions about the analysis of the digital economy are reflected in many scientific studies.

To date, the economy has developed certain methods and approaches for analyzing the digital economy. However, none of them can be considered universal for studying this process.

Dialectical, system-functional, economic-statistical and formal-logical methods are used as a methodological basis.

Results. The digital economy refers to all economic activities based on digital technologies, without structural changes in the organization of key financial flows and the work of regulators. Generally, this is the same consumer economy, but with different emphasizes: the customer interacts with the seller through information platforms and the product represents information. That's why technologies for big unstructured data analysis processing fast, accurate and less expensive are coming to the fore. These terms also indicated as Big Data, DataMining [6–12].

These are also machine learning technologies of neural networks, artificial intelligence, designated by such terms as DeepLearning, AI. There is so much data, and it is so heterogeneous and diverse, that simple computational methods do not give the desired results. This allows you to create global information peer–to–peer (P2P) platforms, that exclude mediator chains from the supply of items or services.

Besides, this term reflects the ability to use technology to perform tasks and apply activities that were not possible in the past. The concept of digital transformation covers opportunities for existing organizations, such as: do better, do something different, and add new things [4-10].

Organizations are implementing digital methods of management, resource accounting, financial accounting, etc. All of this affects not only the employees' activities but also on the life of citizens, significantly reducing time losses in particular. For example, digital technologies allow you to quickly send and receive any information, participate more actively in the discussion of public issues (issues of landscaping, urban planning, etc.) through online services of regional and regional administrations, etc.

To compete in the coming years, whether organizations are for–profit, service–oriented organizations, such as health systems or nonprofit and government agencies, will need both leaders and employees who can add innovative ideas [3]. They'll need to use modern technologies such as IoT and prescriptive Analytics *t*o better connect with existing and potential customers and be more responsive and efficient.

Moreover, they should be either prepared to explore the best ways to develop and use new technologies or there is a risk of being left out as the digital economy evolves.

IT Directors will be required to create a technical basis for digital transformation. Key components include a strong operating basis for efficient and reliable transaction processing, a digital service platform with reusable data and technology components, that enables data transfer between the base station and the platform.

Organizations in the digital economy have built business architectures to improve efficiency. In the digital economy, with a focus on unified product lines and presenting a unified face to customers, companies will need an architect to accelerate and integrate.

Digital transformers can find a solution to a complex architectural issue because it requires a different organizational structure [1-18].

The Russian Federation ranks first in Europe and sixth in the world in terms of the number of Internet users. At the same time, knowledge is an integral factor in accelerating technological development and increasing the competitiveness of products (including on the world market). There is no accident that the digital economy is called the knowledge economy because knowledge plays a crucial role. Thus, it can be claimed that an important component of the digital economy is human capital as a set of knowledge, skills, and abilities. This means that investment in its development, ensuring a continuous stream of innovations that meet dynamically changing needs is the most important condition for creating and implementing digital technologies [12-19].

According to the international development rating, Russia is not a world leader in the digital economy and export of IT services (figure 1) In our country, there are significant barriers for service imports. According to the Organization for Economic Co–operation and Development (OECD) digital services trade restrictions Index, which is used as an indicator of the Going Digital toolkit, Russia ranks 4th out of 44 countries.

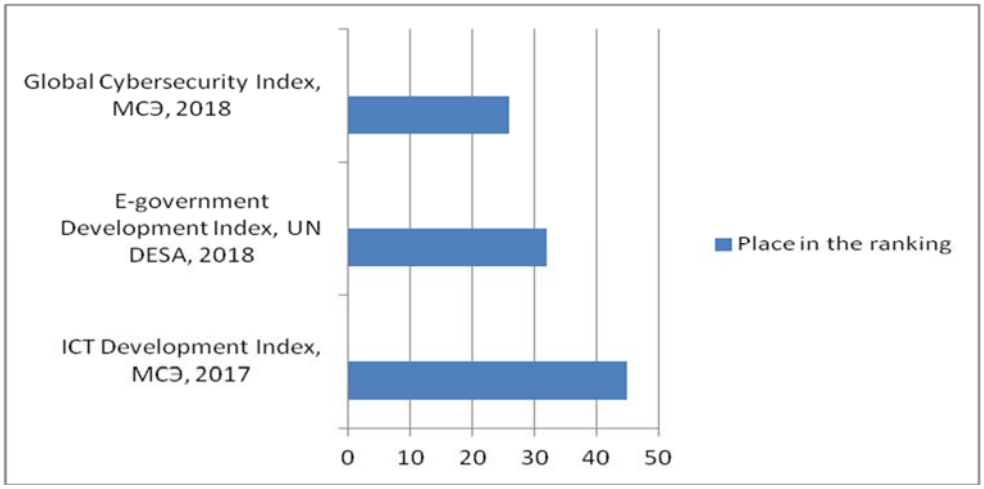

Figure 1 - Russia's place in international ratings of digital economy development

In Russia, there are prospects for the development of the digital economy. First of all, because the Russian school of programming remains strong, developers compete on an equal basis at the world level. For example, the world's leading oilfield services company Schlumberger claims that more than 80% of its specialists in the field of artificial intelligence development are from the CIS. About half of Samsung's advanced artificial intelligence research Department is also "Russian". Also, the country has a high level of readiness for digital transformation: PwC analysts include Moscow in the top 5 cities in the world for this indicator [3-17].

The need for deep legal reform is one of the key challenges of the digital economy. The national project "Digital Economy of the Russian Federation" includes six key areas (Federal projects) required to create good conditions for the introduction of advanced technologies. In General, the project meets the practice of the OECD countries, which also implement strategies and programs for the digitalization of the economy. The project focuses on creating conditions for the development of breakthrough technologies (blockchain, IoT, AI, big data), but does not eliminate barriers to the development of the digital economy (data localization, high load on information mediators). Besides, the development of the platform economy does not pay due attention.

Currently, Federal law No. 34 of March 18, 2019, which creates the basis for regulating relations in the digital economy is still in force. The law establishes the concept of digital rights and their features in the Civil code of the Russian Federation and regulates the use of smart–contracts. Specific rules that information systems must comply with the types of digital rights and the specifics of their issuance, must be established by special laws [5].

The law “Digital financial assets” is currently being adopted. It was expected that these two documents will determine the legal status of cryptocurrencies in Russia, but it has not happened yet. After a major revision, which was subjected to the law on digital rights, the provisions on cryptocurrency were removed from it.

In 2017, the OECD identified four key breakthrough digital technologies: big data analysis technology, artificial intelligence, Internet of things, and blockchain technology. OECD countries develop strategies for these technologies, create observatories for implementing research projects and bringing together stakeholders (for example, the EU's blockchain technology Observatory). In Russia, it is important to develop these four areas [15-20].

The most important tasks to be solved within the basis of the national Digital economy project are to create conditions for the development of the crypto economy, implement a risk–oriented rather than total approach to the data localization requirement, eliminate legal uncertainties in the processing of personal data, and create a favorable condition for the development of big data analysis technologies (usage of new approaches to obtaining consent for data analysis, access to depersonalized data of researchers, and others) [9]. Besides, it is necessary to abolish currency control especially if it restricts the requirement of repatriation. This restriction greatly burdens the development of young companies whose products are

exported. And often such companies refuse to export. The adoption of the Federal law on digital financial assets is won't give a strong effect, but the establishment of an AML/CFT requirement for crypto exchanges, thereby legalizing the activities of banks with crypto assets, as well as the recognition of cryptocurrency as a contractual means of payment will allow the Russian crypto–economy market to develop.

Another main thing is blockchain technology. The emergence of a mechanism of mutual trust and new money changes the structure of society, making a decentralized economy out of just a digital economy. There was a phase transition within the social organism. Now every community can create its own money, or rather, a kind of material containment that needs to be filled with people's labor — capital, the only value of money.

One of the main trends in global digitalization is analytics. New audit tools and automated information security Analytics will soon become key technologies. Information security in Russia was handled by people who came out of law enforcement agencies. In developing security solutions (for example, DLP systems to prevent information leaks), they focused on the real problems of organizations and analyzed the scenarios for which incidents occur. In the West, which traditionally sets trends in the IT industry, they focus only on data, though risks from the human factor are not controlled.

One of the weak aspects is the lack of support for science and research. Support applies only to issues of training of personnel and improvement of IT literacy. In Russia, there are few patents on the Internet of things and AI, blockchain, quantum technologies, automation in production, business, and services. Research and development costs in Russia are no lower than the global average, and their performance is three times lower than the global average [15-20].

In addition, there are regulatory issues. For example, for implementing a "smart" and accessible urban environment, citizens are offered digital services — public transport schedules in Telegram bots. At the same time, regulators recognize Telegram as illegal and try to block it. The Russian software registry requires that Russian software developers support databases and operating systems. There is almost no Russian software system, and even Linux is not widely used both in the country and abroad. Currently, the software is focused on international Windows and iOS. It turns out that the development of software, that is in demand in certain segments of the local market is stimulated. At the same time, based on the national project "Digital economy", the task is to reorient domestic developers for export [10-15].

To change the situation, the first step is to review the current legislation. Taking into account the peculiarities of the Russian economy – uneven rates of development even within one sector – it is necessary to change the laws gradually. And after the contradictions are eliminated, it is necessary to regulate fundamentally new things: the turnover of cryptocurrencies, digital transactions (separate the concepts of digital offer and digital acceptance), the very concept of information and digital financial assets as objects of civil law. Besides, the legal status of robots or unmanned vehicles is not taken into account.

Conclusion. Russia's potential in the digital economy is linked to a traditionally strong technical education and mathematical school, whereas regulatory restrictions and the lack of special support measures for digital companies remain problematic areas.

In order to effectively develop the digital economy we need effectively functioning 3 components:

– legal and regulatory, that would promote competition and market entry for companies, allowing firms to fully utilize digital technologies to compete and innovate;

– skills needed by employees, entrepreneurs, business people, and government employees to take advantage of digital technologies;

– effective and accountable establishments, that use the Internet to empower citizens.

Acknowledgment. We are very grateful to our parents and colleagues who supported us during the research. We would like to mention the research of scientists in the field of digital economy, as well as analytical reports and materials that have helped us to enrich our ideas and knowledge on this issue. Finally, we would like to Express our gratitude and appreciation to all the people who directly or indirectly helped us complete this research.

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ЦИФРЛАНДЫРУ – ЭКОНОМИКАЛЫҚ ӨСУДІҢ ҚОЗҒАУШЫ КҮШІ РЕТІНДЕ

Аннотация. Аталған проблема бойынша қазіргі заманғы жарияланымдарды талдау ғылыми қоғамдастықтың әртүрлі деңгейдегі экономикалық жүйелерді сандық дамытуға деген үлкен қызығушылығын көрсетеді. Алайда, сандық технологияларды әзірлеу мен енгізудің ресейлік тәжірибесі жеткілікті зерттелген жоқ. Нәтижесінде, сандық экономиканы дамытудың ресейлік ерекшеліктері және қолданыстағы тәсілдерді жүйелеу үлкен ғылыми және практикалық қызығушылық тудырады. Инновациялардың үздіксіз ағымын қалыптастыратын сандық экономика адами капиталды дамытуды көздейді, бұл өз кезегінде білімді басқаруға жүйелі көзқарасты талап етеді. Ресейде сандық экономиканың дамуы мемлекеттік саясаттың маңызды бағыттарының бірі ретінде жарияланды және қазіргі әлемдік нарықтағы бәсекеге қабілеттіліктің алғышарты және мемлекеттің экономикалық егемендігінің стратегиялық құрамдас бөлігі ретінде қарастырылады. Сандық трансформация стратегиясын жүзеге асыруды бастайтын ұйым өзінің соңғы жетістігін көруді қажет етеді және бұл көрініс веб-сайтқа кіруден гөрі көп нәрсе болуы керек. Трансформацияның сәтті болуы үшін ұйым күн сайын өзінің көзқарасын бейімдеуі керек, ал қызметкерлер өз үлестерін қалай қосатынын білуі керек. Сандық түрлендіруді нақты ету үшін көру және оны жасау мүмкіндігі қажет.

Зерттеу нәтижелері. Ресей Федерациясының сандық экономикасына талдау жүргізілді. Ресейде цифрландыру бойынша анықталған мәселелерді шешудің негізгі бағыттары ұсынылды. Зерттеудің әдіснамалық негізі – сандық экономика саласындағы ресейлік және шетелдік ғалымдардың ғылыми еңбектері, білім экономикасын қалыптастыру бойынша түрлі қолданбалы зерттеу нәтижелері болып саналады.

Түйін сөздер: БАҚ (бұқаралық ақпарат құралдары), сандық экономика, электрондық үкімет, білім, ақпараттық технологиялар, ұлттық жоба, бағдарлама.

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ЦИФРОВИЗАЦИЯ КАК ДВИГАТЕЛЬ ЭКОНОМИЧЕСКОГО РОСТА

Аннотация. Анализ современных публикаций по заявленной проблеме свидетельствует о большом интересе научного сообщества к цифровому развитию экономических систем различного уровня. Однако российский опыт разработки и внедрения цифровых технологий изучен недостаточно. В результате российские особенности развития цифровой экономики и систематизация существующих подходов представляют большой научный и практический интерес. Отмечается, что цифровая экономика, генерирующая непрерывный поток инноваций, предполагает развитие человеческого капитала, что, в свою очередь, требует системного подхода к управлению знаниями. Развитие цифровой экономики в России декларируется как одно из важнейших направлений государственной политики и рассматривается как предпосылка конкурентоспособности на современном мировом рынке и стратегическая составляющая экономического суверенитета государства. Организация, которая приступает к реализации стратегии цифровой трансформации, нуждается в видении своего конечного достижения, и это видение должно быть чем-то большим, чем просто заявление на веб-сайте. Чтобы трансформация была успешной, организация должна каждый день адаптировать свое видение, а сотрудники должны знать, каким образом они вносят свой вклад. Чтобы сделать цифровую трансформацию реальной, необходимо видение и способность сделать это. Цифровые решения, между тем, пред-

ставляют собой цифровые продукты или услуги – например, медицинскую платформу, которая подключается к предложениям Phillips или GE в промышленном Интернете.

Результаты исследования. Проведен анализ состояния цифровой экономики Российской Федерации. Предложены основные направления решения выявленных проблем цифровизации в России. Методологической основой исследования являются научные труды российских и зарубежных ученых в области цифровой экономики, результаты различных прикладных исследований по формированию экономики знаний.

Ключевые слова: СМИ, цифровая экономика, электронное правительство, знания, информационные технологии, национальный проект, программа.

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PROBLEMS OF INFORMATION AND COMMUNICATION TECHNOLOGIES DURING THE FORMATION OF THE DIGITAL ECONOMY AND SOCIETY

Abstract. Modern society develops under the influence of scientific and technological progress. New relationships in economy, production, education, personal life, new financial instruments and new threats arise. Relevant issues are identifying problems and prospects of development of information and communication technologies (ICT) during the formation of the digital economy and society. The purpose of the article is to systematize the major problems that arise in the development of ICT during the formation of the digital economy and to identify possible consequences of this process.

It is proved that introduction of the newest ICT and digital services leads to significant changes in the quantitative and qualitative indicators of the life of the society and are of an institutional nature. Singled out a number of problems during the development of ICT in the digital society, including: digital divide; lack of funds for innovative upgrades; inconsistency of modern education and public administration with the requirements of a new society; shortage of skilled personnel; contradictions between traditional and up-to-date management practices and corruption; activation of cybercrime; the need to create a list of social digital services; international migration of highly skilled personnel.

Positive signs in ICT: the continuation of old social and labor activity of citizens; change the semantic content of work towards its intellectualization with the possibility of additional income; increase of ecological economy; creation of new remote jobs; new opportunities for education, tourism, medicine, etc. Systematized negative consequences, namely the growth of cybercrime increasing psychological problems of personality, dependent on ICT networks and energy efficiency, the lack of security of personal space, the need for rapid response to innovative replacement.

The proposed measures are aimed at transforming Ukraine into a center of information and communications and digital services for Eastern Europe that can lead to economic breakthrough and overcoming the existing socio-economic crisis. In further studies are planned to develop a model depending on the pace of digitalization processes of society on the pace of economic development.

Key words: information and communication technologies; digital economy; socio-economic problems; innovative transformations.

Problem statement. Modern society is a dynamic system that is developing under the influence of several factors, including not least the scientific and technological progress. Humanity is on the brink of a transition to a new generation of society, called information, the hallmark of which is the dominance of information and communication technologies (ICT), not only in production and business processes. These technologies are actively penetrate the social life, medicine, culture, governance and human personal space, resulting in significant changes in the socio-economic, technological and other processes. There are new relations in economy and industry (network economy) and personal life (social networking), generated new opportunities of education (distance education) and employment (remote work), new financial instruments (cryptocurrency) and new threats (cybercrime). These and other forms of information society naturally led to changes in the legal framework of many countries. In particular, in Ukraine, the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020 [1] was formulated and adopted, which "provides for measures to implement appropriate incentives for the digitization of the economy, the social and social spheres, awareness of existing challenges and tools for the development of digital infrastructures, acquisition of digital competences by citizens».

However, like any process of transformation, digitalization of the economy and society faces a number of problems that can be both predictable and unexpected. And first of all with various challenges facing the ICT sector, which forms the basis of digitalization other areas of economic and social activity. Therefore, relevant scientific matters now is to determine the basic, most important problems that have arisen or may arise in ICT and related areas during the formation of the digital economy and society.

Analysis of recent research and publications. The study of the problems of transitional periods is devoted to the work of many scholars throughout all key changes in socio-economic formations. Here one can recall the works of D. Keynes, K. Marx, A. Smith and other classics of economic science. As you know, they explore the impact of the economy on society. The modern problem is that society from the standpoint of technological development affects the economy. Within these processes, it is worth analyzing more modern works of such scholars as A. Jipp, who formulated the law of proportionally advanced development of the communications industry in relation to the economy of the country (region), which testifies that for the stable economic growth of the national economy should be provided with advanced growth sphere of telecommunications over GDP growth [2]. Later, the theory of A. Jeep developed in his writings L. Varakin [3], which proved that the throughput of communication networks in the n-th year should be determined by the level of GDP in the next (n + 1) year, as otherwise there will be a slowdown in GDP growth. Further research has identified the impact of broadband access (ISD) on the Internet for the development of economics and society [4].Thus, it is established that the state of development of ICT directly influences the development of socio-economic processes.

In the subsequent study of the economic principles of the formation of the future society devoted his work P. Vorobienko [5], identified the main tasks that arise in the process of building a future society, in particular in the educational sphere. L. Kit in his studies has established the stages and manifestations of the evolution of the network economy, proving the inevitability of this process [6]. S. Kolyadenko examines the preconditions and stages of formation in Ukraine and in the world of the digital economy as such [7]. V. Sandoogy investigated how the development of ICT affects the development of the labor market, changes in the patterns of employment of the population in modern conditions [8]. P. Chernyshov defined the state of development of network business in Ukraine [9]. O. Ivanova traced place and importance of ICT in the formation of professional competence of experts in the learning process [10]. The scientific research of I. Ivanova and A. Bodnar discloses the essence of informatization and communications as the basis of economic transformations in society and in enterprises [11], [12]. In the scientific literature, the term "decency" of the economy appeared, the principles, methods and levers of the development of the digital economy were formed.

Unresolved aspects of the problem. Thus, the technological, legal and philosophical aspects of the development of the digital economy, the issue of state regulation of network enterprises, methodical bases of application of ICT in education, approaches to determining the status of employees working remotely, etc. are actively considered. However, in view of the novelty of the issue, research papers devoted to the analysis of the phenomenon of the digital economy not only as a technological but also to its social innovation, to the determination of socio-economic problems of the development of ICT in the digital economy, as well as to the possible consequences of these processes, are rare in scientific publications.

Therefore**, the purpose of the article** is precisely the systematization of the main problems that arise in the process of development of ICT in the new socio-economic and technological conditions - the digital economy, as well as the identification of possible consequences of this process.

The following methods are used to solve the above problems: theoretical - for systematization and analysis of scientific and periodical literature; generalization - to systematize the problems and consequences of ICT development; empirical - for conducting experimental research; simulation - for carrying out the prognostic experiment for the approximation method; visualization - for graphical display of results.

Results of the study. Under the digital economy it is common sense to understand the socioeconomic structure in which the main means of production (as opposed to material resources) are electronic (virtual) data, which are formed using information and communication technologies and exist in the network space. The ICT are a key resource in the digital economy that provides for the functioning of both real and virtual sectors of the economy. At the same time, the implementation of ICT and digital services on their basis leads to significant changes not only in the area of technological and manufacturing processes. There are

systemic innovational changes in quantitative and qualitative indicators and processes of vital activity of both society and individual. That is, these changes are institutional.

However, like any development, the process of ICT development in the period of the formation of the digital economy faces a variety of problems. This paper focuses on the following issues:

1. The problem of digital inequality, that is, the uneven development of modern ICT in countries around the world and in the regions of Ukraine directly. The discussion of this problem has been going on for quite a long time, its decisions are devoted to both scientific research and applied, in particular, legislative decisions at the international level (decisions and resolutions of the International Telecommunication Union, the UN general assembly, etc.). In particular, it was stated that digital inequality is one of the main problems of the development of modern technologies, and the development of the digital economy is capable of increasing the digital divide between countries [13], [14].

Despite numerous scientific and applied developments, the European integration and innovation vector of economic development, as well as numerous socio-economic reforms, the problem of digital inequality in Ukraine has not been resolved sufficiently, as evidenced by statistical data (table 1).

Table 1 – Means telephony

Indexes	City				Village			
	2015	2016	2017	2018	2015	2016	2017	2018
Phone integrity, teleph. sets per 100 inhabit.	26,0	25,5	20,1	19,1	7,9	7,1	6,1	5,4
Payphones integrity, payph. per 100 inhabit.	0,22	0,19	0,18	0,17	0,008	0,007	0,008	0,007
Volume of realized communication services, UAH million for a man a year	0,18	0,14	0,13	0,12	0,035	0,035	0,033	0,031

Source: Data from [15] and the authors own calculations

The data in table 1 indicates a significant inequality in the development of ICT in cities and villages, that is, there is a kind of discrimination against the rural population about access to these facilities and the volume of consumption of these services. There is also a significant inequality in access to communications facilities and in the regions of Ukraine. In particular, the number of Internet subscribers as the leading means of digitization of the economy, which is given in table 2, makes it possible to establish a significant gap between the ability to use digital economy services (the table shows the limit values for some regions).

Table 2 - Number of Internet subscribers in the country (as of the beginning of 2018)

Regions	In total, thousands of users	Population, thousand people	Density, Internet users, %
Vinnitsa (central regions)	833,6	1568,5	53,1
Lviv (western regions)	1410,3	2524,3	55,8
Odessa (southern regions)	2537,0	2380,4	106,6
Kharkiv (eastern regions)	1377,8	2683,5	51,3
Chernivtsi (Transcarpathian regions)	365,5	905,2	40,0
Chernihiv (northern regions)	599,2	1013,6	59,1
Kiev	3120,4	2937,9	106,2

Source: Data from [15] and the authors own calculations

The data in table 2 indicates a significant inequality in the use of the Internet between regions of the country. Yes, the Transcarpathian regions have the lowest rates. At the same time, Odessa and Kiev region shows an excess of one hundred percent density, that is, some users are simultaneously subscribers of different types of Internet access. On average, nearly half of the population are not active users, which is a very negative indicator, even if we consider that all age groups are considered in the total population (in particular, children from birth who are not users for natural reasons).

Given that the digital economy as such and almost all of its manifestations (e-government, trade, education, etc.) are based precisely on the use of ICT, there is a problem associated with the inability to

ensure equal constitutional rights and freedoms of citizens, as is stated in Section II The Constitution of Ukraine, which is a significant socio-economic problem.

2. Lack of money of economic agents of different levels for innovative equipment upgrade, acquisition of the latest ICT and technical devices. This problem is closely linked to the current economic situation in the country. Permanent budget deficit, state financing policy, low average wages, and many other factors create a problem of lack of funds for the development of ICT at the state level and difficulties with the purchase of office equipment and other personal means of access to digital infrastructure tools by business entities and the general public. State capital investments amount to 1-2%, local budgets - 3-5%. More than 75% of investment in entrepreneurship is made up of own funds by entrepreneurs who are building their own innovative investment policy, taking into account the priority of profitability. In this case, the development of ICT in 2018, in general, directed 3,7% of investment funds, and industrial development – 34,5% [15].

Almost 66.5% of households spend on the purchase of food and the payment of utilities. On average, 2.9% of the family budget is spent on communication services for all kinds of people, while rural residents account for 2.7%. In this case, 4.8% in cities and 10.7 % in village of the population live outside of poverty, which does not allow them to actively integrate into modern digitalization processes, given the problem of purchasing the necessary personal access to digital services.

3. Insufficient publicity and educational activity of the state and local self-government bodies concerning the implementation of the digital society and economy in the development of the state and regions. This problem is partly a consequence of the previous ones, because the lack of funding and access to ICT services and digital services sometimes leads to the inappropriate advertisement of those services that for technical and/or other reasons can not be provided in the region or some segments of the population.

Educational activities aimed at developing and deepening digital competencies of citizens are not just education directly received at educational institutions of different levels. It is necessary to create a network of consultation points for the whole population, which wants to improve its educational level in the field of digital competences and opportunities to use modern means of ICT. This educational activity can be carried out by various measures, in particular within the framework of the project "Education for a lifetime", on a volunteer basis, by allocating air time for educational programs on national TV channels, etc.

4. Lack of skilled ICT professionals. Despite the large number of higher education institutions that train specialists in computer engineering, programming, etc., the volume of labor migration of professional specialists abroad and the departure for training of a significant number of students are increasing each year. That is, there is a situation in which, in the presence of vacancies in the field of ICT, wages are not competitive with the same in the EU countries and other industrialized countries, which leads to the departure of specialists.

Each year, the number of university students who give preference to studying abroad for various reasons is increasing, one of which is the future employment abroad. For example, about 40 thousand Ukrainians study in Polish higher education institutions, but only 5-10% of them plan to return after completing their studies at home [16]. This leads to the inhibition of the development of the digital economy from the point of view of the provision of these processes by specialists in the field of ICT of the relevant qualification.

5. Contradictions between traditional and up-to-date management methods, the presence of manifestations of corruption. New vectors of the country's development are aimed at building a social state and fighting corruption. It is the digital society, in which the link of personal communication between administrative staff is meaningless and replaced by electronic document circulation of ICT-based, can lead to the introduction of the newest methods of management in which it is virtually impossible to manifest corruption. However, precisely because of this, in some cases, the inhibition of the digitization of economic and, especially, of management processes. In order to overcome this negative phenomenon, in our opinion, it is advisable, in addition to the introduction of the anti-corruption court, the rejuvenation of all branches of power, the development of appropriate legal support for combating corruption, the formation of a new outlook for youth in the framework of the project "New Ukrainian School" and for the more adult population. All this, among other things, is possible with ICT by posting information on social networks and other modern media.

6. Limited manifestations of the formation of innovation-oriented policy at enterprises. Socio-political instability of the country leads to the formation of such vectors of entrepreneurship development, which are aimed primarily at preserving the volume of production and counteracting the manifestations of the crisis. Innovative upgrade (in this case, the introduction of digital business formats and new ICT) is not the prerogative of most entrepreneurs in view of the unpredictability of demand for new goods and services, the complexity of funding for the development of digital services, high discount rates for businesses, lack of development of the venture market, etc. In a difficult economic situation, it is expedient to consider the possibility of non-lending financing for the development of digital services for enterprises, for example, based on field-surfing or other platforms. This approach has already proven to be effective for the development of innovative projects in most countries.

7. The problem of cybercrime. Crime, unfortunately, is an integral part of any socio-economic formation. The ICT and the digital world has provided new opportunities for the development of this phenomenon. The manifestations of cybercrime are quite diverse - from fraud to financial transactions to industrial espionage, the use of social networks for the organization of terrorist acts, cyber attacks against state authorities, etc. And with the development of the digital economy, the number of possible manifestations of cybercrime will increase in proportion to the number of new services and services, attacks that may bring unlawful benefits. Therefore, along with the development of the digital economy and society, there is also a need to expand the number of objects to combat cybercrime. This, of course, requires significant financial costs mainly of budgetary origin. However, some functions can be transferred on terms of outsourcing to non-government agencies. These may include procedures for legal and economic support, software, etc. Also effective is leasing agreement for the supply of ICT equipment for businesses and governmental bodies. This will significantly reduce the expenditures of state and local budgets.

8. The problem of creating a list of basic digital services. It is necessary at the beginning of the implementation of the digital economy project to determine which services will be generally available and socially significant, that is, those that will be provided in all settlements at tariffs that are accessible to all segments of the population (especially for the poor). It is advisable, on the one hand, to study the experience of economically developed countries on this issue, and on the other hand, to conduct in-depth studies of the existing and potential demand for digital services in order to determine which services can be obtained by consumers on their own (for example, using their own mobile device), and for which it is necessary to form the appropriate infrastructure. The indicated infrastructure is intended primarily for persons who, for a number of reasons, are not able to obtain the desired digital service on their own, and may consist of the following items: separate collective access points, service departments in the communications departments (medical, educational, public, financial institutions), customer windows in outlets, specialist staff in social services, etc.

9. The tension existing laws of the global telecommunications space, namely the relationship between growth of ICT technologies and GDP. Scientists have proved that in developed countries the growth of ICT services (especially broadband Internet) leads to a proportional increase in GDP. However, in Ukraine, this pattern does not have statistics. Thus, in the table 3 provides some data on volumes and dynamics of GDP and ICT revenues. One can see the lack of stable development dynamics of both indicators.

Table 3 – Statistical data on volumes of GDP and ICT

Years	GDP	ICT volumes		Increase, %	
	million UAH	million UAH	% of GDP	GDP	ICT
2010	1079346	33011	3,05	-	-
2011	1299991	38390	2,95	20,44	16,29
2012	1404669	43379	3,08	8,82	12,99
2013	1465198	48372	3,30	4,31	11,51
2014	1586915	52724	3,32	8,30	8,99
2015	1988544	72596	3,65	25,31	37,69
2016	2385367	89268	3,74	19,95	22,96
2017	2982920	110779	3,71	25,05	24,09

Source: data [15] and the authors own calculations

The authors conducted an experiment using forecasting methods and approximations obtained data showing that GDP growth characteristic exponential dependence (with a probability of about 95%) and increase in ICT linear dependence occurs (probability 90%). These trends will occur in the near future (figure 1).

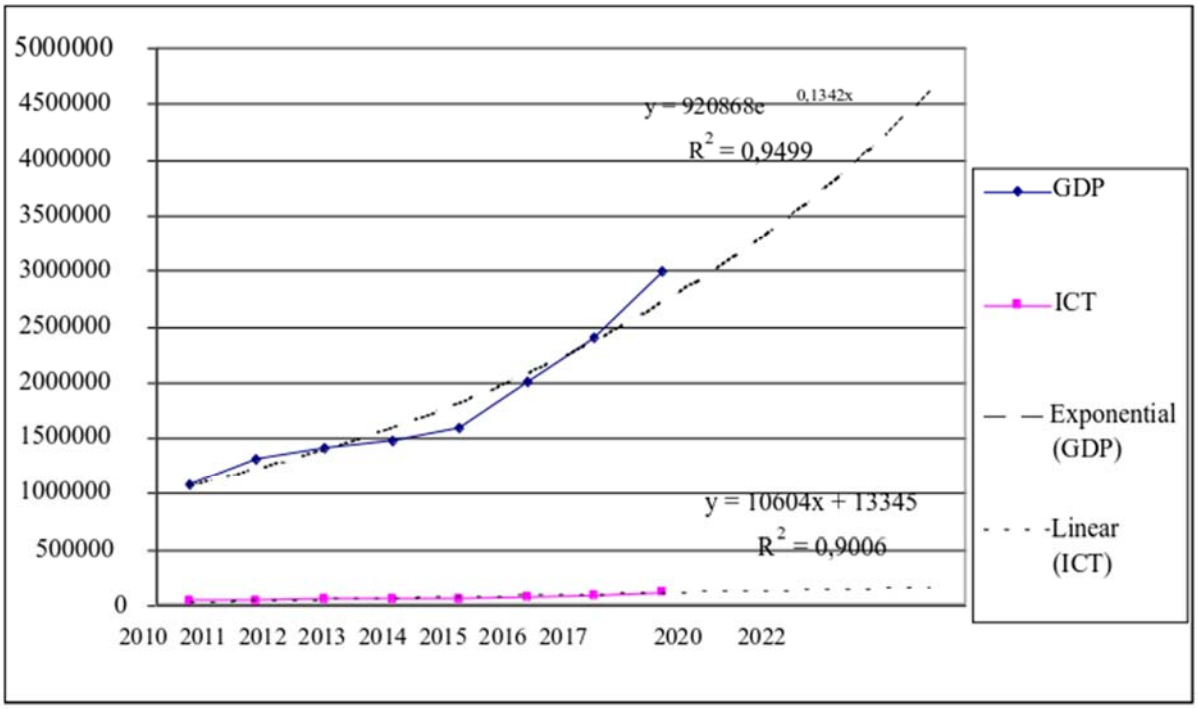

Figure 1 - Results of the prediction experiment (author's development)

The data showed no close relationship between ICT and the dynamics of the GDP in the country.

10. It should also be noted that in the future such a problem as the struggle for migrants may arise. As stated above, specialists from different spheres of activity leave the country today, especially ICT specialists who receive significantly higher wages abroad. But the processes of the development of the digital economy and society will require the presence of these workers. Job vacancies will need to be filled, because without this, it will not be possible to further develop of ICT and the digital society as a whole. Here and there may be a problem of competition in the international labor market for specialists with proper qualifications in the sphere of ICT. Ukraine in these conditions can choose the following scenarios for the development of events:

- promoting the return of their own citizens - ICT specialists. This scenario is possible due to the formation of appropriate financial (competitive wages), social (social services development) and legal (changes in labor legislation) levers. It is also important to ensure overall political and economic stability in the country;
- invitation of foreign specialists from developed countries. This scenario is attractive due to the fact that these experts will have experience of ICT. However, they will require a level of remuneration and social services that are consistent with world standards;
- involvement of specialists from developing countries. This scenario is appropriate in terms of meeting the requirements of such specialists for the domestic wage level. On the other hand, the involved specialists may not have the necessary competencies and perceive employment in Ukraine as a temporary bridge for further employment in more developed countries.

The identified and other problems need to be addressed at the state and regional levels, as they significantly impede the development of the economy and society. However, the ICT and the digital society continues to develop despite the existing problems, so it is advisable to analyze the consequences of this process, which have already manifested itself in society.

The consequences of the development of the ICT, the digital economy and society can be attributed to both positive and negative. To positive we shall mention the following:

1. Continuation of the age of social and labor activity of citizens by acquiring ICT competencies through social networking, distance education in "third-year universities", distance work and other social services of digital society. Thus, society is able to move to the concept of "active aging", which has a number of benefits, including increasing social activity of citizens, raising the overall level of digital literacy, reducing the cost of providing social assistance, which can be obtained remotely and through ICT services so on.

2. Changing the semantic content of work towards its intellectualization, additional income from rent information officer (additional revenues for the use and continued development of the ICT knowledge and competence). This, in turn, leads to the need for continuous self-education and raising competencies. Thus, a certain professional stratum (in the middle class type) is formed that has a steady financial position due to the constant intellectualization of labor and permanent acquisition of skills in the field of leading ICT.

3. Growing greener economy through the formation of a unified system of environmental control and monitoring, integrated with other countries. The digital economy is not denying traditional manufacturing, so ensure completely environmentally safe production activity is currently quite difficult. Today, we are talking about systemic changes in the use of resources and monitoring waste utilization.

4. Creating new jobs, including remote ones. This is unlikely to lead to a significant reduction in unemployment, as there is a shift in production priorities towards the ICT sphere, that is, vacancies in the real economy will be shifted (after the corresponding training) into the network environment. But at the same time, this will increase accessibility to full-time employment of people with disabilities through the ICT.

5. The digital society will give impetus to the development of new opportunities for education, tourism services, medicine, cultural projects, and other social innovations. The development of e-governance will help to reduce the level of corruption and possible sources of its occurrence.

In addition to the positive aspects, of course, it should be noted and possible negative consequences. Among them, first of all, we can state the following:

1. The development of the ICT and the network economy will result in the simultaneous growth of cybercrime. At the same time, such crime easily goes beyond the borders of the state due to network technologies, which will require the involvement of international measures.

2. Increase in psychological problems of the individual, development of sociopathy. The transition of social life into the network space has already affected the personal communication of citizens. Society loses the culture of communication through letters, young people communicate less personally, preferring social networks and other ICTs. This leads to various consequences: psychological barriers in personal communication; difficulties in expressing their own thoughts in society; problems with the creation of a family and the presence of marital aphorism on the network; reduction of emotional intelligence. As a result, there is an increase in manifestations of sociopathy, psychological disorders, depressive states. Lowly controlled youth groups in social networks that promote socially dangerous actions or encourage suicide are also very dangerous.

3. Dependence of ICT by network performance and sustained energy performance, the need for additional costs for backup uninterrupted power supplies. When it comes to smart grid operation, failure of the network will also lead to social consequences in the form of problems of transport logistics, supply of products, impossibility to carry out financial transactions, etc.

4. Electronic identification (eID) and transparency of individual privacy, which on the one hand, simplifies the legal, financial and other aspects of life and activity, while forming an idea of the lack of security of personal space, which is also able to cause some psychological problems. In addition, some religious communities prohibit their members from obtaining electronic documents, which leads to a conflict between the rights and freedoms of citizens.

5. Partial loss of national identity formation through lack of understanding of the boundaries and unification of a number of socio-economic processes, manifestations of globalization.

6. The need to respond quickly to replace innovation in technology, services and digital services. This is not a problem for youth, however, it can lead to negative consequences for the elderly, who for a

number of reasons do not want or are unable to quickly master new knowledge and skills on ICT. Here there is a kind of discrimination on an age-old basis.

The authors conducted a survey of ordinary people of different age groups that are allowed to determine the negative effects of the ICT, digital economy and society:

– change of attitude towards money and planning costs due to the transition to cashless payments. The lack of tactile contact with money in some causes a sense of non-controllability, which leads to increased costs;

– the need to change habits and sustainable outlook, the way of life, approaches to solving social and family-related current problems (for example, obtaining documents and certificates, financial services, etc.);

– availability unfair trade network mail order facilities that offer products and services that do not meet the description of reality that after receiving defective goods mail leads to moral damages to the return of goods;

– the lack of accessible and understandable information for the elderly about the nature and capabilities of digital services, especially in rural areas.

Also, respondents expressed the view that ICT can lead to further stratification of society into those who successfully integrated into the digital space, and those who "remained outside the new life", that is, in fact, confirmed the opinion expressed in [13, 14], about the probability of increasing the digital divide.

To overcome the identified problems, there needs to be solid scientific and applied developments, which at the state level must be coordinated with the general programs and strategies of development and innovation of the transformation of society.

According to the authors, taking into account the geopolitical position of the country, the introduction of the digital economy and society is a chance for Ukraine to become the center of information and communication and financial services of a digital nature for Eastern Europe and a bridge for the integration of the EU with the eastern countries. There are prerequisites for this:

– good geographical position;
– availability of advanced ICT network;
– business and cultural ties that historically the USSR;
– availability of stable trade relations and access to international sea and river routes;
– political will to turn the country into a sustainable, innovative and developed European countries, which is based may have been responsible technological breakthrough is not so much industrial as information and communication and digital character.

However, as has been determined, it is first necessary to overcome existing challenges to implementation of Concept development of the digital economy and society in Ukraine.

Conclusions and perspectives for further studies. The digital economy and society are a new stage in the development of mankind, which is intended to lead to a new quality of life of the entire world through an innovative upgrade of not only technological but also socio-economic processes. The basis of these processes is the integration of ICT into all spheres of life, business processes and management activities. Like any changes, the global restructuring of society and new principles of existence are facing a number of technological, financial, social and mental issues. The successful solution of these problems depends both on the speed and quality of socio-innovative transformations.

During the transition to the digital economy having both positive and negative effects, which is a natural phenomenon that requires a study and implementation of measures to minimize adverse effects.

Overall, we believe that the development of ICT and the formation of Ukraine in the digital economy and society is a chance for the country to become a center of digital integration for Eastern Europe, able to lead to economic breakthrough and overcome the current socio-economic crisis.

In further research is planned to develop a model depending on the pace of digitalization processes of society on the pace of economic development, namely the dynamics of GDP, income and other indicators.

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САНДЫҚ ЭКОНОМИКА МЕН ҚОҒАМНЫҢ ҚАЛЫПТАСУ КЕЗЕҢІНДЕГІ АҚПАРАТТЫҚ-КОММУНИКАЦИЯЛЫҚ ТЕХНОЛОГИЯ МӘСЕЛЕЛЕРІ

Аннотация. Қазіргі қоғам ғылыми-техникалық прогресс ықпалымен дамып келеді. Экономика, өндіріс, білім беруде және жеке өмірімізде жаңа қатынас орнап, қаржы құралдары мен сын-қатерлер пайда болып келеді. Сандық экономика мен қоғамды қалыптастыру кезеңінде ақпараттық-коммуникациялық технологияларды (АКТ) дамыту мен перспективаларын айқындау мәселелері өзекті болып отыр. Сондықтан мақаланың мақсаты – сандық экономиканы қалыптастыруда АКТ дамыту үдерісінде туындайтын негізгі мәселелерді жүйелеу, сондай-ақ осы үдерістің ықтимал салдарын анықтау.

Жаңа АКТ және сандық сервистерді енгізу қоғам өмірінің сандық-сапалық көрсеткішінде елеулі өзгерістерге әкеледі әрі институционалдық сипатта болады. Сандық қоғамда АКТ-ны дамыту барысында туындайтын бірқатар мәселелер, атап айтқанда: сандық теңсіздік; инновациялық жаңартуға қаражаттың жетіспеушілігі; қазіргі заманғы білім беру мен мемлекеттік басқарудың жаңа қоғам талаптарына сәйкес келмеуі; білікті кадрлардың жетіспеушілігі; басқарудың дәстүрлі және жаңа әдістерінің арасындағы қайшылықтар мен сыбайлас жемқорлық; киберқылмысты жандандыру; әлеуметтік сандық қызметтер тізбесін қалыптастыру қажеттілігі; жоғары білікті кадрлардың халықаралық көші-қоны.

АКТ-ны дамытудың келесідей оң көріністері де анықталды: азаматтардың әлеуметтік және еңбек белсенділігінің жасын ұзарту; қосымша табыс алу мүмкіндігімен еңбекті интеллектуалдандыру жағына қарай оның мағыналық толымын өзгерту; экономиканың экологиялық сипатының өсуі; қашықтықтан жаңа жұмыс орындарын құру; білім беру, туризм, медицинаның жаңа мүмкіндіктері. Теріс салдары жүйелендірілді, атап айтқанда: киберқылмыстың артуы, тұлғаның психологиялық мәселесінің көбеюі, АКТ-ның желі мен энергия тасымалдағыштың жұмысқа қабілеттілігіне тәуелділігі, жеке кеңістіктің қорғалмауы, инновациялық алмастыруға жылдам ден қою қажеттілігі.

Түйін сөздер: ақпараттық-коммуникациялық технологиялар, сандық экономика, әлеуметтік-экономикалық мәселелер, инновациялық өзгерістер.

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ПРОБЛЕМЫ ИНФОРМАЦИОННО-КОММУНИКАЦИОННЫХ ТЕХНОЛОГИЙ В ПЕРИОД СТАНОВЛЕНИЯ ЦИФРОВОЙ ЭКОНОМИКИ И ОБЩЕСТВА

Аннотация. Современное общество развивается под влиянием научно-технического прогресса. Возникают новые отношения в экономике, производстве, образовании, личной жизни, новые финансовые инструменты и новые угрозы. Актуальными становятся вопросы определения проблем и перспектив развития информационно-коммуникационных технологий (ИКТ) в период формирования цифровой экономики и общества. Поэтому целью статьи является систематизация основных проблем, которые возникают в процессе развития ИКТ в период формирования цифровой экономики, а также определения возможных последствий этого процесса.

Доказано, что внедрение новейших ИКТ и цифровых сервисов приводит к значительным изменениям в количественно-качественных показателях жизнедеятельности общества и носят институциональный характер. Выделен ряд проблем, возникающих в ходе развития ИКТ в цифровом обществе, в частности: цифровое неравенство; недостаток средств на инновационное обновление; несоответствие современного образования и государственного управления требованиям нового общества; нехватка квалифицированных кадров; противоречия между традиционными и новей-шими методами управления и коррупция; активизация киберпреступности; необходимость формирования перечня социальных цифровых услуг; международные миграция высококвалифицированных кадров.

Определены положительные проявления в развитии ИКТ: продление возраста социальной и трудовой активности граждан; изменение смыслового наполнения труда в сторону его интеллектуализации с возможностью получения дополнительный доходов; рост экологичности экономики; создание новых дистанционных рабочих мест; новые возможности образования, туризма, медицины. Систематизированы негативные последствия, а именно рост киберпреступности, увеличение психологических проблем личности,

зависимость ИКТ от работоспособности сети и энергоносителей, отсутствие защищенности личного пространства, необходимость быстрого реагирования на инновационные замены.

Ключевые слова: информационно-коммуникационные технологии; цифровая экономика; социально-экономические проблемы; инновационные преобразования.

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ANALYTICAL TOOLS IN ENSURING THE CONVERGENCE OF ACCOUNTING AND INFORMATION SYSTEMS

The relevance of the research topic. The accounting system by virtue of the subject and method of the latter, is able to model a picture of the real activities of the enterprise, to provide information about the financial condition of the enterprise, its financial results and more. Thus, it is obvious that accounting, as an accounting system, provides an opportunity to form objective information about the business entity and provides users with useful information about the real model of financial and economic activities of economic entities at the micro-, meso- and macro levels. However, it is obvious that the needs of users of financial statements differ. Accounting systems are the result of user information requests. The perspective of the accounting system depends on the requirements of users for accounting information.

The dialectic of interests is a complex and multifaceted category. At the present stage of socio-economic development, researching economic interests, we should be guided not by the principle of their rigid hierarchy «from general to individual» or vice versa, but to seek attempts to harmonize them at all levels of socio-economic policy. Economic interests determine the direction and motivation of economic entities, which is aimed at meeting their needs. Here we have to take into account that these interests can be considered both at the national level (macroeconomic) and at the level of an individual business entity (micro level). Achieving the goal of all subjects of socio-economic life at different levels is realized in the process of making management decisions based on relevant economic information.

Key words: accounting and information system, convergence of accounting and information systems, information and analytical process, three-dimensional value of national wealth, translevel convergence.

Introduction. The synthesis of approaches of different authors to defining the essence of science makes it possible to define the field of human activity as a consistent, in-depth knowledge of real world objects, in which there are an infinite number of different systems that interact with each other, changing over time. their parameters. So analyzing the information flows of different accounting systems, we find many phrases such as «financial accounting», «IFRS accounting», «GAAP accounting», «tax accounting», «strategic accounting», «management accounting», «statistical accounting», «social accounting». The financial and economic activities of each enterprise can be considered in different areas, but the question arises whether this number of types of accounting is required. Do they not duplicate each other? This number of types of accounting can be explained by the fact that from the standpoint of the theory of knowledge, accounting is not a progressive science. The stereotypical thinking of an accountant is defined by a narrow specialization, which in turn narrows professional interests, limits the ability to synthesize knowledge, integrate new methods of cognition from other areas, and most importantly expand the horizons of research. An example of stereotypical thinking of accountants is the division of accounting into three types: accounting, statistical and operational, which is traditionally given in accounting theory, without awareness of structural economic transformations and as a result of changing requests for information from all stakeholders.

Analysis of recent researches and publications. Scientific and methodological issues of information and analytical support at different levels of government and the problems of harmonization of accounting and information systems at the macro and micro levels are thoroughly investigated in the works of S.V. Bardasha [1], V.M. Kraievskyi [9,10], T.G. Kaminska [5], V.K. Savchuk [14], O.M. Kostenka [7, 15].

Of great importance and scientific and practical role is played by the study of the relationship between economics and ecology, to which the works of S.I. Doroguntsov [3], G.G. Kireitsev [6], L.F. Kavunenko [4], V.O. Shevchuk [18-19], V.Ya. Shevchuk [20].

The **purpose** of the article to investigate the analytical tools of accounting and information systems to assess the performance of the enterprise on the concept of three-dimensional value at different levels of government.

Main results of the study. Historically, the accounting system by virtue of the subject and method of the latter, is able to model a picture of the real activities of the enterprise, to provide information about the financial condition of the enterprise, its financial results and more. Thus, it is obvious that accounting, as an accounting system, provides an opportunity to form objective information about the business entity and provides users with useful information about the real model of financial and economic activities of economic entities at the micro-, meso- and macro levels. However, it is obvious that the needs of users of financial statements differ. Accounting systems are the result of user information requests. The perspective of the accounting system depends on the requirements of users for accounting information.

The dialectic of interests is a complex and multifaceted category. At the present stage of socio-economic development, researching economic interests, we should be guided not by the principle of their rigid hierarchy «from general to individual» or vice versa, but to seek attempts to harmonize them at all levels of socio-economic policy. Economic interests determine the direction and motivation of economic entities, which is aimed at meeting their needs [11, p. 69]. Here we have to take into account that these interests can be considered both at the national level (macroeconomic) and at the level of an individual business entity (micro level). Achieving the goal of all subjects of socio-economic life at different levels is realized in the process of making management decisions based on relevant economic information.

The most important species category, due to such an objective generic concept as information that reflects the purposeful subjective efforts of people in society to implement conscious service activities for the relevant knowledge, is the category of holistic information-analytical process. It is important not only in itself, as a way of implementing solutions, but also as the main system-forming idea that allows users of chaotically mixed, confused, logically separated and not colliding empirical facts to structure, interact and cause-and-effect relationships. languages, finally, to be systematized, logically and ideologically lined up and turned into their own high-quality information and analytical support. It is a holistic information-analytical process, absorbing and arranging in its place literally all the theoretical ideas and practical facts about the subject of activity, is information-analytical activity as a science in its logically coherent system-structural form.

The information-analytical process is based mainly on the information of accounting systems of macro (statistics) and micro (accounting) level.

The economic role of the state determines the concepts and objectives of information. On the contrary, the liberal model of government provides a liberal concept of providing information, in which the main place is given to accounting, and financial reporting is a kind of market product that meets the requirements of information users.

By the end of the twentieth century, there was a situation in the world when the majority were adopted standards that set requirements for financial reporting, a code of ethics for accountants, auditing standards. It should be noted that the vector of economic benefits was not aimed at production, but at servicing the world market, commercial intermediation, and the main income of the economic system was due to large dividends on world trade and financial speculation. In the US stock market, the mechanism of creating «funds out of nothing» was widely practiced. The result of such actions will be analyzed by us a little below.

Following the adoption of the Tax Code in Ukraine, which provides for the maintenance of tax accounting by enterprises, this has created an unfavorable situation with regard to accounting, namely not the obligation to maintain it. This is confirmed by the fact that non-compliance with tax legislation provides for significant penalties, while for non-accounting is not legally responsible. And although the Verkhovna Rada has introduced accounting as a law, many companies keep books of purchase and sale, Statement of gross income and gross expenses, calculate depreciation only by the tax method, do what provides for tax accounting. After the entry into force of the Law on Accounting in 2000, the Regulations (standards) of accounting are implemented. It is believed that accounting is brought to international

standards. However, transformed accounting acquires new features: there are no uniform methods of accounting, there is an alternative in choosing the valuation of objects, methods of depreciation, creation of reserves. And after the accounting reform in Ukraine, there are many complaints from scientists about the informativeness of financial statements. Therefore, it is justified to analyze the results of accounting reform in Ukraine, to follow the latest international developments in the field of accounting, which would provide an opportunity to answer the question of whether the reform can be considered complete? Has the reform protected key users of accounting information?

Accounting will always depend on the economic system. But in modern conditions, accounting in Ukraine can be classified as creative (creative). This leads to the fact that the economic policy of the state loses its economic justification. The necessary information is either simply missing or lacking. No need to be afraid to overload accounting. If we want to have accurate and efficient accounting, it cannot be simplified enough. In the conditions of computer technologies, complicated accounting will not cause additional costs, but will increase its accuracy, efficiency, will prevent the falsification of its data.

In Ukraine, the accounting policy should rise to the level of the state. As the state remains the main user of accounting information, it must take over the regulation of accounting in order to:

– preservation of state property;

– transparency of accounting;

– high level of use of accounting information in the management of the economy as a whole;

– objectivity, truthfulness and accessibility within certain limits of accounting for society.

The investor, in addition to information about profits, needs to know the strategic goals, development of new products of the company. Based on these data, you can make investment decisions without relying on analytical forecasts, as traditional financial indicators covered by accounting regulation, less and less reveal the value of the share.

As a result, investors' interests can no longer be limited by financial information, as it discloses past events and is not predictive. Thus, to meet investor confidence, it is necessary to develop the latest conceptual framework for the preparation of financial statements.

One of the reasons for the negative results of the functioning of the economic system is the wrong choice of targets in the form of economic indicators embedded in the management system at both the macro and micro levels of the economic system. At various levels of government, economic interests are focused on growth. However, in the search for harmonization of interests at different levels of government, we need to talk about economic development.

Economic development as a concept is broader than economic growth. Economic development means not only the increase of production results, but also the formation of new progressive proportions in the national economy, which in turn form the preconditions for further development. The ultimate goal of development is to improve the quality of life of people, to expand their ability to shape their own future. This, of course, requires an increase in per capita income, but contains many other aspects [16, p. 18-19].

These changes in economic and social life had historical consequences for the methodology of accounting – «reporting not only and not so much to the administration, but to investors, creditors and government agencies» [17, p.35]. «Over time, the division of ownership and management led to the creation of various accounting systems, reports published for bankers, creditors and shareholders, management accounting and cost accounting systems designed to assist the manager in the decision-making process» [11, p.35]. Thus, accounting and reporting began to meet the needs not only of the enterprise but also a wide range of external users.

There is no need to prove that accounting as a system of continuous and continuous monitoring of the business unit is an information source of the SNA. Methodological bases of accounting systems have the same technical and practical side. Macro-accounting involves the conceptual compliance with the rules of accounting at the micro level of the economy due to the common approach to the reflection of information in accounting and national accounting through balance sheets. Significant differences in methodological approaches are the inconsistency of the concepts of estimates, objects of accounting in terms of economic doctrine, which is the basis of accounting and national accounting. In our opinion, the advantage in solving this problem should be on the side of the theoretical foundations of macro-accounting, which generates information for public authorities as the main (privileged) user of economic information. In

world practice, it is accepted that when the practice of accounting contradicts the principles of economic theory, which underlies the SNA, priority is given to the latter.

Thus, the completeness, reliability of statistical indicators and their comparability depend on the extent to which the methodology of the accounting system satisfies the rules of construction of national accounts and vice versa. Rationality, optimality and timeliness of statistical information, in our opinion, is primarily determined by the accounting methodology.

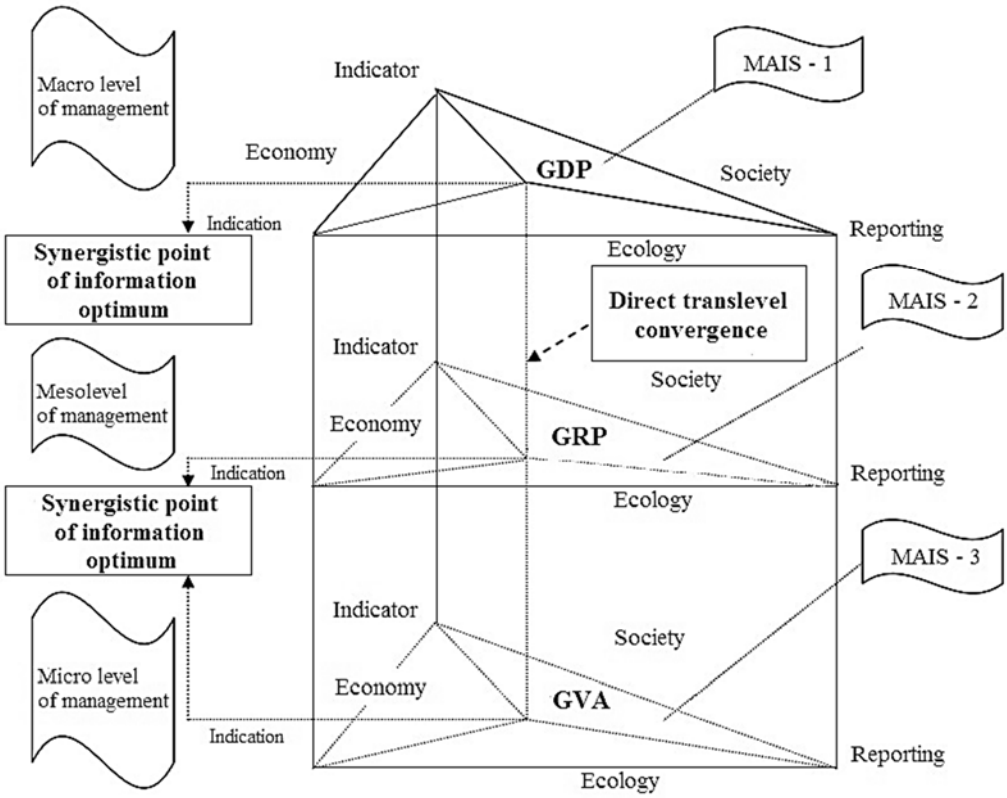
The main common economic category of micro and macro level is gross value added. It is a balancing item of the production account, so named because it measures the value created in production. Since the production account can be compiled for an institutional unit or sector, or institution and industry, so value added can be calculated for each of them. Value added is of decisive analytical interest for management purposes, as the amount of value added for all resident units plus taxes on products (excluding subsidies on products) is the gross domestic product.

Thus, value added, as a fundamental economic category, should combine the two main accounting systems (accounting system and system of national accounts), as its value among the indicators of financial and economic activities at different levels of government we determine based on the use of this indicator in economic analysis. such aspects:

– has an independent significance in the analysis of trends in economic development of the region, country;

– used in microeconomic analysis;

– are used as a basis for comparison to compare indicators of socio-environmental activities at all levels of government.



MAIS – 3 – Micro-level accounting and information system; MAIS – 2 – Meso-level accounting and information system; MAIS – 1 – Macro-level accounting and information system; GDP – Gross domestic product; GRP – Gross regional product; GVA – Gross value added.

Multilevel reflection of the formation of national wealth according to the concept of «three-dimensional value» *Source*: by the authors

The analysis of financial accounting data is considered by domestic authors mainly from the point of view of definition of a financial and property condition. We emphasize that, using financial accounting information, you can investigate the value added created by the company, which, of course, affects its financial and property status.

Value-added analysis allows you to identify the value of own costs without taking into account past work, thereby increasing the managerial value of the analysis and deepening it. Accounting as a stage of the national accounting system should be compatible with the SNA in compliance with its subject, information functions, features, methods and forms, through the integration of data aimed at creating a comprehensive system of accounting and analytical information and simultaneous differentiation of its use.

Thus, we again emphasize that, using financial accounting information, you can and should determine and analyze the value added created by the enterprise. Analyzing the information used to build value added from accounting data, we conclude that the main points of this work are the formation of direct translevel convergence, which allows based on a single database (accounting system) to analyze the main indicators of development at different levels of government (figure).

Conclusions. In science, the problem of the ratio of different types of accounting to date has not been solved. Different opinions were expressed about the essence of the ratio of accounting and reporting of accounting systems and SNA:

– subordination of systems (mainly subordination of accounting as a micro-level system, SNA as a macro-level system);

– sovereignty (autonomy) of accounting systems, which implies their complementarity;

– the fundamental irreducibility of accounting systems is also allowed.

The harmonization of accounting and the system of national accounts should be based on the understanding that in the near future the SNA and accounting will retain their specific features, which are stipulated in the original postulates. The harmonization of the CPR is, first of all, in relation to the interpretation and classification of certain items of income, expenditure, assets, taxes and more. In addition, to obtain the initial data for the compilation of the SNA, it is increasingly necessary to use sample surveys, economic censuses, information from tax authorities, customs statistics, foreign economic activity statistics, which should contribute to the creation of a single information space.

Based on the relationship between accounting and the system of national accounts, in our opinion, the form and content of these systems from a theoretical point of view can be as follows:

– integration based on the SNA, which will offer a special organization of accounting;

– convergence (interpenetration and complementarity) of SNA and accounting;

– interaction (addition) of SNA accounting systems and accounting;

– harmonization (harmonization) of SNA and accounting as independent accounting systems.

The main problem of harmonization, in our opinion, is the need for an in-depth analysis of the conceptual apparatus of the accounting system and national accounts. Currently, the current situation in this area can be described as when people communicate in different languages.

At the same time, socio-economic changes in the XXI century have led to the need to transform accounting in general (there is a need to take into account a large number of variables, in particular those that reflect the social consequences of a decision) and reporting (external reporting of enterprises must take into account growing needs not only owners, but also investors, regulators, other members of society).

The new paradigm should reveal the essence, purpose, mission and objectives of accounting as a complex socio-economic activity of mankind, to determine the model of solving theoretical and practical issues taking into account the achievements of related fields of scientific and practical activities, international socio-economic activities in the field of economic information.

Thus, accounting is a holistic type of socio-economic activity and the object of knowledge, which can be simultaneously presented in research as a process of formation of economic information, information system, science and socio-economic institution. The study of individual forms of accounting makes it possible to identify patterns of its development, internal and external connections and relationships characteristic of the object as a whole, but their study is possible only in in-depth study using interdisciplinary methods.

At first glance, it may seem that the generalization of CHR and tax accounting system (sources for decision-making at the macro level - state and interstate) with an accounting system that appeals to only one company (micro-level decision-making), contrived and artificial. However, we believe that such a generalization takes place if we take into account the processes of globalization of the world economy, which have led to the fact that the annual income from the sale of goods of the largest corporations exceeds the GDP of many countries. Hence the risk of social conflict, which requires the corporation to voluntarily accept the paternalistic functions that are an integral part of public administration.

An example is the concept of financial reporting of Royal Dutch Shell, which clearly demonstrates the above-mentioned relationship between the potential of the state and transnational business. Shell's philosophy of longevity declares that economic growth cannot be separated from its environmental and social consequences. From the philosophy of durability follows the concept of «three-dimensional» value created by the company: value in economic, social and environmental dimensions.

Standard accounting cannot justify the trust placed in it today for two reasons. First, accounting looks inside the company. Its main role is to preserve the property of the enterprise. Second, it focuses on the past. If we need to look back and forth, accounting will do just fine. But today we need to focus on those issues that will create prosperity in the future, on actions that will help increase the value of the company in the market. We need to look to the future. The company will not be able to succeed if it finances the future, constantly looking to the past. The use of new forms and categories of the accounting profession, namely value added and the method of balanced scores, is a step in the right direction.

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ЕСЕПТІК-АҚПАРАТТЫҚ ЖҮЙЕЛЕР КОНВЕРГЕНТТІЛІГІН ҚАМТАМАСЫЗ ЕТУДЕГІ ТАЛДАМАЛЫҚ ҚҰРАЛДАР

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АНАЛИТИЧЕСКИЙ ИНСТРУМЕНТАРИЙ В ОБЕСПЕЧЕНИИ КОНВЕРГЕНТНОСТИ УЧЕТНО-ИНФОРМАЦИОННЫХ СИСТЕМ

Аннотация. В статье определено, что бухгалтерский учет как учетная система предоставляет возможность формирования объективной информации о хозяйствующем субъекте и обеспечивает пользователей информацией о реальной модели финансово-хозяйственной деятельности субъектов на микро-, мезо- и макроуровнях, при этом очевидным является то обстоятельство, что потребности пользователей бухгалтерской отчетности отличаются. Учетные системы являются результатами информационных запросов пользователей. Именно от того, какими будут требования пользователей к учетной информации, зависит перспектива учетной системы.

На современном этапе социально-экономического развития, исследуя экономические интересы, следует руководствоваться не принципом их жесткой иерархии «от общего к единичному» или наоборот, а искать попытки их гармонизации на всех уровнях социально-экономической политики. Экономические интересы обусловливают направление и мотивацию деятельности субъектов хозяйственной деятельности, направленной на удовлетворение их потребностей. Здесь стоит учитывать, что эти интересы можно рассматривать как на общегосударственном уровне (макроэкономический), так и на уровне отдельного хозяйствующего субъекта (микроуровень). Для достижения своих целей всех субъектов общественно-экономической жизни на разных уровнях реализуется в процессе принятия управленческих решений, основанных на релевантной экономической информации.

Ключевые слова: учетно-информационная система, конвергентность учетно-информационных систем, информационно-аналитический процесс, трехмерная стоимость национального богатства, трансуровневая конвергенция.

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HEALTH PERFORMANCE AUDIT

Abstract. The article discusses the directions and key issues of audit of efficiency in healthcare in foreign countries and in Russia. The analysis of the impact of the performance audit on the solution of socially important problems of maintaining public health is carried out.

The authors determined the purpose of the audit of efficiency in the health sector, which is to promote the financial interests of the state, to ensure public health needs, to support accountability and responsibility regarding the activities of healthcare institutions. The medical effectiveness of healthcare institutions is determined as the degree of achieved results in the diagnosis, treatment, prevention, rehabilitation of patients, which is expressed as a percentage (or shares) based on the ratio of the number of cases of achieved results to the total number of observations.

The absence of a specialized and legislatively fixed list of executive bodies endowed with control and supervisory powers in relation to healthcare institutions was noted. It was revealed that the requirement to exercise control related to the licensing functions of state supervision in Russia has not been established. Based on a study of foreign practice of financial control, it was found that performance audits represent a significant proportion of the control measures taken, and is the most progressive form of financial control.

The article systematizes the bodies for monitoring compliance with mandatory requirements for goods, works and services at the level of medical institutions. Their non-systematic work, lack of interconnection in the implementation of supervisory activities as a factor that reduces the effectiveness of their authority is revealed.

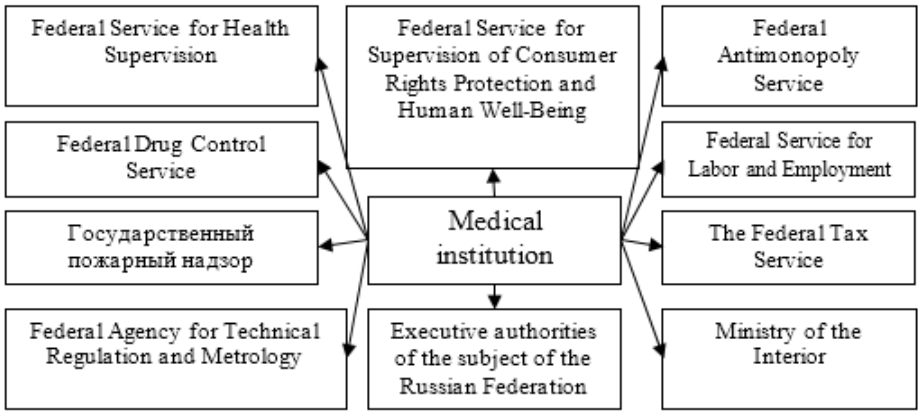
Keywords: audit, efficiency audit, health care, profitability, efficiency, effectiveness.

Introduction. This study is devoted to the disclosure of the internal structure of the relationships used to assess the status of the main areas of audit of the effectiveness of medical institutions. The healthcare sector in Russia has a rather extensive structure and is represented by many institutions that receive budgetary funds that are allocated for healthcare and need proper financial control. One of the problems of financing health care costs is the use of the program-targeted method in the budget process, as a result of which it is advisable to use performance audit methods in the health sector. Performance audit, as a special type of control, arose in the 70s. XX century. When in the Lima declaration of the guidelines for control the term “performance audit” was first used (1977). Consider the current definitions of the concept of performance audit (table 1).

It should be noted that the legislation of the Russian Federation does not establish requirements for the implementation of control related to the licensing functions of state supervision. In addition, there is no specialized and legislatively fixed list of executive authorities vested with control and oversight powers in relation to medical institutions. It has been established that at present, the system for monitoring compliance with mandatory requirements for goods, works, and services at the level of medical institutions includes many federal executive bodies with various powers, i.e. the implementation of activities in the health sector can be controlled by a number of independent, independent from each other controlling structures, the main of which are presented in picture 1.

Table 1 - The main approaches to determining the essence of performance audit

Source	Definition	Determinant
Lima Control Guidelines Declaration	A type of control that is distinctive from financial control, the task of which is to determine how efficiently and economically public funds are spent. Such control includes, in addition to the specific aspects of management, all management activities, including the "organizational and administrative systems".	Type of control
International Organization of Supreme Authorities public finance control (INTOSAI)	Performance audit is an audit of administrative activities that studies the efficiency of the use of labor and material resources in order to provide recommendations on how to achieve better results	Activity audit
Financial Control Standard 104 of the Accounts Chamber of Russia	The type of financial control carried out by means of a control measure, the purpose of which is to determine the effectiveness of the use of budgetary funds and state property received by the audited bodies and organizations to achieve the planned goals, solve social and economic tasks and fulfill their assigned functions	Type of financial control



Picture 1 – Audit bodies in healthcare.
Source: compiled by the authors.

Analysis of publications. The problems of auditing the effectiveness of healthcare are raised in the works of Russian and foreign authors [1-4]. An analysis of the presented scientific works allows us to conclude that at present there is an urgent need to improve the quality of audit of the effectiveness of medical institutions.

Based on the results of our analysis, we identified the main problems, the solution of which will allow us to create a capable mechanism for monitoring the quality of the audit of effectiveness of both medical institutions and authorized state authorities.

The results of a study of foreign practice of financial control show that it is the performance audit that represents a significant proportion of the control measures taken. In foreign countries, performance audit is a more progressive form of financial control. Performance audit uses the results of a financial audit, while there is no duplication of control due to a clear definition of the goals, objectives, functions and principles of the performance audit and financial audit [1].

As can be seen from table 2, the Russian audit of performance in the healthcare sector is significantly different from the content of the audit of performance in this area in the UK. If the main task of the Russian audit of efficiency is direct verification of the economic activities of medical institutions, the “British” version is aimed at increasing the effectiveness of such areas of activity as: studying and evaluating the quality of medical personnel management, checking the effectiveness of the use of medical devices and equipment of medical institutions.

The results of the research. The purpose of the performance audit in the field of healthcare, according to the authors, is to promote the financial interests of the state, to ensure public health needs, to support accountability and responsibility regarding the activities of healthcare institutions.

The implementation of a performance audit in the health sector should increase the medical, social and economic efficiency of the health system [2].

The medical effectiveness of health facilities can be represented as the degree of results achieved in the diagnosis, treatment, prevention, rehabilitation of patients, which is expressed as a percentage (or shares). It can be defined as the ratio of the number of cases of achieved results to the total number of observations.

Social efficiency reflects the state of population's health in dynamics: demographic indicators, indicators of average life expectancy, indicators of the general morbidity of the population, satisfaction of the population's demand for medical care and provision of sanitary and epidemiological services. It is manifested by a reduction in the disability of the population, a decrease in mortality, the negative dynamics of the general incidence for a certain period, etc.

In the healthcare sector, performance audit is quite common in foreign countries, the key areas and issues of which are given in table 2. For audit of efficiency in the health sector, in contrast to financial audit, the following two approaches can be called characteristic: 1) focus on results (on activity); 2) orientation to problems (to inaction).

Table 2 - Areas of audit of efficiency in the field of healthcare in a number of foreign countries and Russia

Country	Audit directions	Key Audit Issues
United Kingdom	Financial system	cost effective management; drug supply contract management
	Information Management and Technology	information flow management, application management, infrastructure
	Performance	activity and data quality
	Clinical quality	quality management structure, clinical audit and quality of metric certificates, ensuring patient safety
	Labor force (employees of medical institutions)	search and selection of personnel, study of compliance with the level of wages, planning and implementation of ongoing training
	Risk Management and Compliance	structure management, risk management by senior managers, management of medical institutions, compliance with legislation (reporting incidents and complaints)
USA	Pharmacy	purchase and receipt of medicines, control over the drafting of contracts by administrations of medical institutions for the supply of medicines, assessment of regulation of the circulation of medical substances and the safety of their safety in institutions
	Cash management	assessment of the internal control system in managing financial institutions (special attention is paid to cash)
	Patient Admission and Registration	assessment of the control system for compliance with the legality of registration and stay of patients in medical institutions, assessment of the security of personal data of patients
	Laboratory	assessment of compliance by health care institutions with procedures regarding the use of medical equipment, establishing compliance with the operation of equipment and the use of medicines as intended
Russia	Procurement management	quality of planning and execution of procurement of medicines, assessment of competitiveness in procurement and clarity of contract execution
	Property Management	efficient use of fixed assets of health facilities
	Personnel Management	assessment of the remuneration system in medical institutions, the correspondence of the qualifications of employees to their positions, advanced training, trainings
	Information disclosure	availability of plans for the financial and economic activities of health care institutions, placement of data in the media
	Non-budgetary revenues of medical institutions	study of extrabudgetary sources of revenue for medical institutions, the legality of such revenue and the effectiveness of the use

In practice, the performance of health facilities may be inadequate to the amount of money spent. Possible reasons for this are the incorrect definition of the most important target areas of expenditures, their insufficient funding; lack of incentives.

The activities of health care institutions are presented in the form of a model "resources - process - product - result / effectiveness". That is, the primary determining indicators in the audit of efficiency in

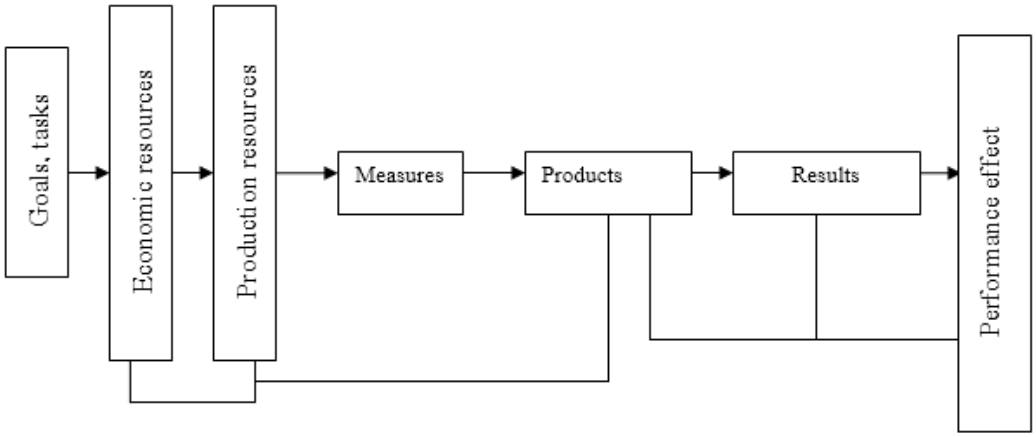
the healthcare sector are resources, processes, products, external factors, results, influences, and derivatives:

• profitability - achieving the maximum result/effect at the minimum cost;

• efficiency - achieving the maximum possible return on available resources;

• effectiveness - the compliance of the actual results with the planned ones, i.e. the desire for the health system to deliver the expected result.

Between these aspects of the performance audit, the authors established a relationship at the level of "goal - performance effect" (picture 2).



Picture 2 – Interconnection of key aspects of performance audit at the level of "goal - performance effect".
Source: compiled by the authors.

The key element of an audit of performance in the healthcare sector is the impact, that is, the benefits it brings to society through quality reports and practical recommendations to reduce costs, rational use of funds, increase efficiency, achieve goals, accountability and responsibility in healthcare institutions. Thus, there are six main types of potential impacts of health audit performance:

1) cost-effectiveness (reducing costs by reducing the incidence rate; reducing the cost of treatment and patient retention by conducting disease prevention; reducing costs by saving the use of personnel and resources; introducing obligations and responsibilities where they did not exist; rationalizing the use of beds);

2) effectiveness (achievement of the possible improvement of the state of health using a given level of resources; support of a given level of health using the lowest possible level of resources; increasing the services provided with the same resources; eliminating duplication or deficiencies in coordination);

3) effectiveness (for healthcare institutions - operational mortality (for surgery), death by discharge (for therapeutic departments), re-admission rates to hospitals);

4) improving the quality of services (patient satisfaction with the services received; staff availability and friendliness; reducing waiting time in queues; reducing the time to receive a response to a request; fair distribution of benefits; improving access to information; improving the range and level of services; assistance to the state, customers, production and others; ensuring equitable access to programs);

5) improvement of planning, control and management (clear priorities and better definition of tasks; understanding of incentives; improvement of control and management of resources; strengthening of control; improvement of accounting and information protection systems; for healthcare institutions, the planning process is the setting of goals, the collection of information; the monitoring process - comparing real and planned results; the management process is collective responsibility, reporting, flexible planning, setting milestones, continuous improvement of the result/effect);

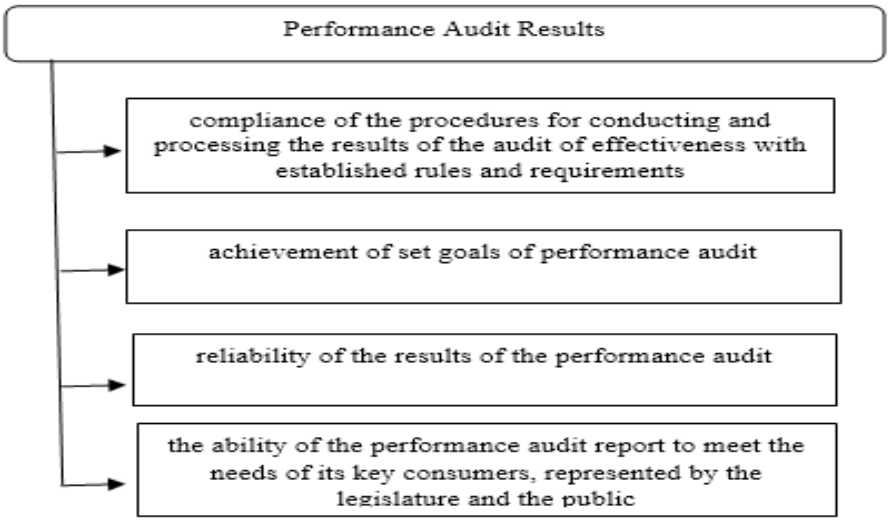
6) improvement of accountability / responsibility (regarding costs; improvement of accounting forms; definition of indicators of administrative activity; comparison with the practice of similar organizations; more understandable and informatively transparent activity).

The prospect of implementing an audit of efficiency in the health sector can be considered a study of the cost-effectiveness, efficiency, profitability of medical institutions in order to increase medical

efficiency, social efficiency, economic efficiency, quality and accessibility of services, achieving goals and planned tasks, further moving on to analyzing the ratio of “cost-quality".

A modern direction in the development of performance audit in the field of healthcare is the quality control of performance audit [31-40].

The need to introduce quality control of performance audit in the health sector is due to the lack of unified standards for conducting performance audit by control entities, the need to strengthen control measures. The level of quality audit of efficiency, properties and characteristics of its results are shown in pic. 3.



Pic. 3. Expected performance audit results

According to the author, the quality control system for the audit of effectiveness should include the following elements: resources (ensuring the audit), strategy, planning, implementation and results, according to which detailed criteria for the quality of the audit of efficiency will be formed and which fully correspond to the stages of this type of audit, and also characterize the process approach to the quality of control measures.

Achieving and maintaining an appropriate level of quality of the performance audit requires that the audit firm has an approved quality policy, which consists of certain specific goals and approaches to their achievement, which will ensure high quality performance of the performance audit. In order to implement the approved quality policy, the audit firm must introduce appropriate changes in the organization of audit activities and the methodology for conducting an audit of performance in the healthcare sector.

Conclusion. The management of the audit firm should ensure the development of requirements for the quality system, their verification and implementation of measures to improve it, as well as distribute the functions and responsibilities for ensuring and monitoring the quality of the audit of performance in the healthcare sector among auditors. General principles, methods and procedures for quality assurance and quality control established by the audit firm should be brought to the attention of all employees of the audit firm. It is also necessary to ensure not only the implementation of these procedures during the performance audit, but also to achieve an understanding by the auditors of their own responsibility for the quality of the results of the audits. Quality control of the performance audit can be carried out by both external and internal controllers. External controllers are the auditors of other audit firms. Internal controllers may be: managers and auditors with special rights and obligations regarding the assessment of the quality of inspections; company auditors who did not participate in its conduct; Specialists of a separate department for quality control of performance audit.

It is advisable to conduct quality checks after the completion of each stage of the performance audit by the official responsible for its implementation or by the head of the relevant unit. Along with this, the quality control of the processes of planning, verification and preparation of a report on the results of an audit of effectiveness can be carried out by independent audits of the actions of groups that are verified by specially designed employees of other departments, but also using a list of relevant control criteria.

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ДЕНСАУЛЫҚ САЛАСЫНДАҒЫ ТИІМДІЛІК АУДИТІ

Аннотация. Мақалада шет елдерде және Ресейде денсаулық сақтау тиімділігі аудитінің бағыттары мен негізгі мәселелері талқыланады. Тиімділік аудитінің қоғамдық денсаулықты сақтаудың әлеуметтік маңызды мәселелерін шешуге тигізетін ықпалына талдау жасалды.

Авторлар денсаулық сақтау саласындағы тиімділік аудитінің мақсатын анықтады. Бұл мемлекеттің қаржылық мүдделерін алға жылжыту, денсаулық сақтау қажеттіліктерін қамтамасыз ету, денсаулық сақтау мекемелерінің қызметіне есеп беру мен жауапкершілікті қолдау болып саналады.

Денсаулық сақтау мекемелерінің медициналық тиімділігі науқастарды диагностикалау, емдеу, алдын алу, сауықтыруда қол жеткізген нәтиже дәрежесі ретінде анықталады, алынған нәтижелер жағдайының саны бақылаудың жалпы санына қатынасы негізінде пайызбен (немесе үлеспен) көрсетіледі.

Денсаулық сақтау мекемелеріне қатысты бақылау және қадағалау өкілеттіктері берілген атқарушы органдардың мамандандырылған және заңнамамен бекітілген тізімінің жоқтығы атап өтілді. Ресейде мемлекеттік қадағалаудың лицензиялау функциясына байланысты бақылауды жүзеге асыру талабы белгіленбегені анықталды. Қаржылық бақылау бойынша шетелдік тәжірибені зерделеу нәтижесінде тиімділік аудиті қабылданған бақылау шараларының едәуір бөлігін құрайтындығы және қаржылық бақылаудың ең прогрессивті түрі екендігі айқындалды.

Мақалада медициналық мекемелер деңгейінде тауар, жұмыс және қызметтерге қойылатын міндетті талаптардың сақталуын бақылау органдары жүйеленген. Олардың жүйесіз жұмысы, өкілеттіктерінің тиімділігін төмендететін фактор ретінде қадағалау қызметін жүзеге асыруда өзара байланыстың жоқтығы анықталды. Денсаулық сақтау саласындағы аудиттің негізгі, атап айтқанда, нәтижеге (белсенділікке) және мәселеге (әрекетсіздікке) көңіл бөлу тәсілдері анықталды.

Түйін сөздер: аудит, тиімділік аудиті, денсаулық сақтау, пайдалылық, тиімділік, нәтижелілік.

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АУДИТ ЭФФЕКТИВНОСТИ В СФЕРЕ ЗДРАВООХРАНЕНИЯ

Аннотация. В статье рассмотрены направления и ключевые вопросы аудита эффективности в сфере здравоохранения в зарубежных странах и в России. Проведен анализ влияния аудита эффективности на решение общественно важных проблем сохранения здоровья населения.

Авторами определена цель аудита эффективности в сфере здравоохранения, которая заключается в содействии финансовым интересам государства, обеспечении общественных нужд в здравоохранении, поддержке подотчетности и ответственности относительно деятельности учреждений здравоохранения. Определена медицинская эффективность учреждений здравоохранения как степень достигнутых результатов в диагностике, лечении, профилактике, реабилитации больных, которая выражена в процентах (или долях), исходя из отношения количества случаев достигнутых результатов к общему количеству наблюдений.

Отмечено отсутствие специализированный и законодательно закрепленный перечень органов исполнительной власти, наделенных контрольно-надзорными полномочиями в отношении учреждений здравоохранения. Выявлено, что требование к осуществлению контроля, связанного с разрешительными функциями государственного надзора в России, не установлено. На основе исследования зарубежной практики, осуществления финансового контроля установлено, что аудит эффективности представляет значительную

долю среди осуществляемых контрольных мер, и является наиболее прогрессивной формой финансового контроля.

В статье систематизированы органы надзора за соблюдением обязательных требований к товарам, работам и услугам на уровне медицинских учреждений. Выявлено их несистемная работа, отсутствие взаимосвязи при осуществлении надзорной деятельности как фактор, снижающий эффективность осуществляемых ими полномочий.

Ключевые слова: аудит, аудит эффективности, здравоохранение, экономичность, эффективность, результативность.

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THE ROLE AND PLACE OF SCIENCE IN THE TECHNOLOGICAL AND SOCIO-ECONOMIC DEVELOPMENT OF COUNTRIES WITH DIFFERENT SCIENTIFIC POTENTIAL

Abstract. This article examines the role of science in modern society. The main research methods were generalization, systematization and economic and statistical method. The statistical base of the study was the data of the statistics Committee of the Ministry of national economy of the Republic of Kazakhstan for the period from 2010 to 2018 years. Based on the analysis of research by domestic and foreign authors, it was determined that science and education are the most important factors and priorities for the development of modern society, especially in developed countries. Based on a comparative analysis of R&D financing and assessment of the scientific potential of Kazakhstan, the crisis state of science in Kazakhstan's society is shown. It was revealed that the main causes of the crisis are insufficient funding, the loss of a large number of qualified technical personnel and the lack of necessary interaction between science and production. The results of the study may be of interest to government authorities in the field of science.

Keywords: science, potential, R&D, science financing, knowledge-based economy.

Introduction. The nature of research activities, the degree of its influence on the economic development of society has undergone significant changes in various historical periods. Historical analysis shows that the view of research activities and its impact on society in general and on the economy in particular has changed from complete denial in the Middle Ages to the introduction into the rank of state policy at present.

Along with intensive scientific and technological progress in the 20th century, the views of economists on scientific, technological and innovative activities evolved. Since these views are present in one form or another in the modern understanding of scientific and innovative activities, let us consider the main ones.

Contemporary economic and political debate revolves around understanding the reasons for the economic success of some countries, based on technological change and the strategic levers that must be used to increase the wealth of nations [1]. The special role of science and innovation in the transition from a resource model of economics to a knowledge-based economy as a dominant resource is described in a number of theories and concepts (table 1).

Literature review. Science and innovation as a decisive factor in economics are studied in their works by E.Avdokushin, T.Ismailov, Yu.Knyazev, I.Materov, A.Porokhovskiy, L.Frolova, I.Shevchenko.

Noteworthy, in our opinion, is the methodological approach to the typology of the knowledge society developed by A.Rakitov [2]. It is based on one criterion – a certain system of social, economic and functional-regional differences due to levels of development. With this in mind, the author proposes the following classification of countries of the world system:

1) commodity donor countries that rely on the production and sale of *raw materials,* especially *irreplaceable natural resources*;

2) countries that rely on *natural resource*s, manufactured goods and services produced through *imported technologies*;

3) countries living and developing through the production of *goods, services and advanced high-productivity technologies*;

4) countries living through *scientific knowledge, knowledge-intensive, innovative and high technologies*, as well as through goods and services of the *highest quality* - world scientific and technological leaders.

Table 1 – Basic theories and concepts of the knowledge-based economy

Authors	Theories and concepts	Proceedings
1	2	3
D. Bell	The theory of «post-industrial society»	«The Coming of Post-Industrial Society: A Venture in Social Forecasting» (1973).
J. Schumpeter	The theory of «innovation processes»	«Theory of Economic Development» (1912)
F. Hayek	The theory of «scattered knowledge"	«Economics and Knowledge» (1936), «The Use of Knowledge in Society» (1945)
I. Nonaka, H. Takeuchi	The concept of a «knowledge carrier»	«The knowledge-creating company: How Japanese companies create the dynamics of innovation», 2003
D. Teece	The concept of «dynamic abilities»	«Dynamic Capabilities and Strategic Management» (2003)
G. Becker	The theory of «human capital»	«Human Capital» (1964)
Yu. Hayashi, F. Machlup, A. Toffler	The theory of the «information society»	«Future Shock» (1970), «The Third Wave» (1980) and « Metamorphoses of power» (1990).
M. Porter	The theory of «industrial clusters»	«The Competitive Advantage of Nations» (1990)
C.Freeman, B.A.Lundvall, R. Nelson	The concept of "national innovation systems"	«Technical Change and Economic Theory» (1987)
Note - compiled by the authors		

The countries of the fourth group have the greatest military, political and financial power and ensure a high level of well-being for citizens. They pursue effective environmental policies and maintain a relatively stable world order. Their society is usually called a post-industrial, informational or *knowledge-based society*. The basis of their financial and military influence is a huge amount of accumulated and created knowledge in all areas of social activity. It follows that in the modern world, science is the foundation of technological development, sustainable economic growth, and spiritual modernization.

A knowledge-based society becomes such only when universities, research centers, research organizations, which create new knowledge, primarily scientific knowledge, take the leading place in it. In our opinion, this approach is more justified, since the leadership of developed countries such as the USA, Japan, OECD in the knowledge industry is provided by national scientific laboratories, corporate research units, universities. The main generators of knowledge in the EU countries are national state scientific laboratories and universities. Currently, more than half of all scientists are concentrated in the USA, Great Britain, Germany and France. The share of universities in R&D activities (Research and development activities) ranges from 25% in Europe to 15% in Japan.

Different strategies for propagating, protecting, and assigning new ideas pose particular challenges for economists who want to measure models of innovation. Patents may not always be good indicators for assessing countries' innovation performance. Since there is no international patent office, patent protection is reserved to national jurisdictions. The US and Europe have variously defined the patentability of new life forms, resulting in different patent registries in these jurisdictions, even if the results of innovation are the same. Registration fees, including transaction costs, are much higher at the European patent office than in the US, which partly explains why the number of patents filed in Europe is lower than in the US. In addition, half of patent applications in the US Patent Office are filed by residents of countries other than the United States. Therefore, an attempt to assess and compare the innovative intensity of countries based on patent analysis does not always lead to correct results [3]. In addition, considering only state investment in research leads to an underestimation of the true level of social investment in basic research,

since the state is not the only source of funding for basic research. It should also be noted that universities are engaged not only in basic research, but also conduct a large number of applied research in the field of materials science, computer science, pathology, oncology and engineering [4].

World economic development is characterized by an increase in the separation of highly developed countries from the rest of the world. This is due to the fact that the US and Western European countries have entered the stage of post-industrial development, acquired and use unlimited opportunities of the main inexhaustible resource of economic development-scientific knowledge and information. In a sense, these countries have become self-sufficient, independent of the rest of the world and imports from them. Their economic development is characterized by an increase in the influence of non-production factors, the contribution of technological changes, research and development. It is generally recognized that countries are sharply polarized by the level of socio-economic development. At the turn of the 21st century, the United States, the European Union and Japan accounted for 62% of global GNP, 80% of global trade flows, 85% of global investment, 97% of global intellectual potential, 90% of production of high-tech goods [5].

If in his work "New Atlantis" Bacon says that science can improve the economy and standard of living of society, also science, technology, politics, industry and religion are closely intertwined [6]. Stefan claims that science is one of the sources of economic growth. In particular, science supports technological innovation and has a relationship with economic growth and other socio-economic forces [7].

Romer and Lukas argue that economic growth depends on investment in research and education, i.e. the theory of endogenous growth has an impact on the current economic policies of both industrialized and developing countries, since investment in higher education, as well as in R&D by firms and government research organizations, is vital for improving new technologies, productivity and economic growth within national innovation systems [8].

According to some researchers, public financing has a side effect on private investment in R&D [9]. In particular, Grossman and Helpman believe that R&D side effects are an important source of growth [10].

And Amendola et al. present a well documented evidence that R&D has an important effect on productivity growth and also on competitiveness of countries [11].

Coccia confirms that high economic performance in countries with low public R&D financing associated with high investment in research by private enterprises (for example, in the UK, USA, Germany, etc.). Private firms are able to invest much better than governments, politicians and bureaucrats in increasing employment, economic growth and the welfare of nations [12].

According to the 2016 Global Innovation Index, Kazakhstan ranks 79th (out of 100) in terms of R&D intensity (Cornell University, INSEAD and WIPO, 2016).

Let's start with an indicator characterizing the place of science in the economy and its contribution to GDP, to the generalized indicator of products (goods, services) produced in Kazakhstan for a year. This indicator is the share of R&D costs in GDP, or research intensity (here it is necessary to understand, that science financing is the allocated funds, and R&D costs are the use of funds to pay for intellectual capital in creating value added, as well as current costs associated with the material support of the scientific and technical process in general).

Today, technology leaders maintain the GDP research intensity indicator at 2.7-4.3%. The value of this indicator equal to 1% or less is considered critical for the country's scientific and technological security. Despite significant efforts, in Kazakhstan, science expenditures amounted to 0.13% of GDP, which, in turn, is 1.5 orders of magnitude less than in the Russian Federation. All EAEU countries are in the range of 0.11-0.65%, with the exception of Russia, which experienced a sharp increase in its R&D intensity, reaching 1.1% in 2017. In Kazakhstan, from the National Science Report for 2017 published in 2018, domestic R&D costs in% of GDP were: 2015 - 0.17%, 2016 - 0.11%, 2017 - 0.13%. This, frankly speaking, is infinitely far from 2-4% of GDP in developed countries, that is, more than six times below the critical level (figure 1).

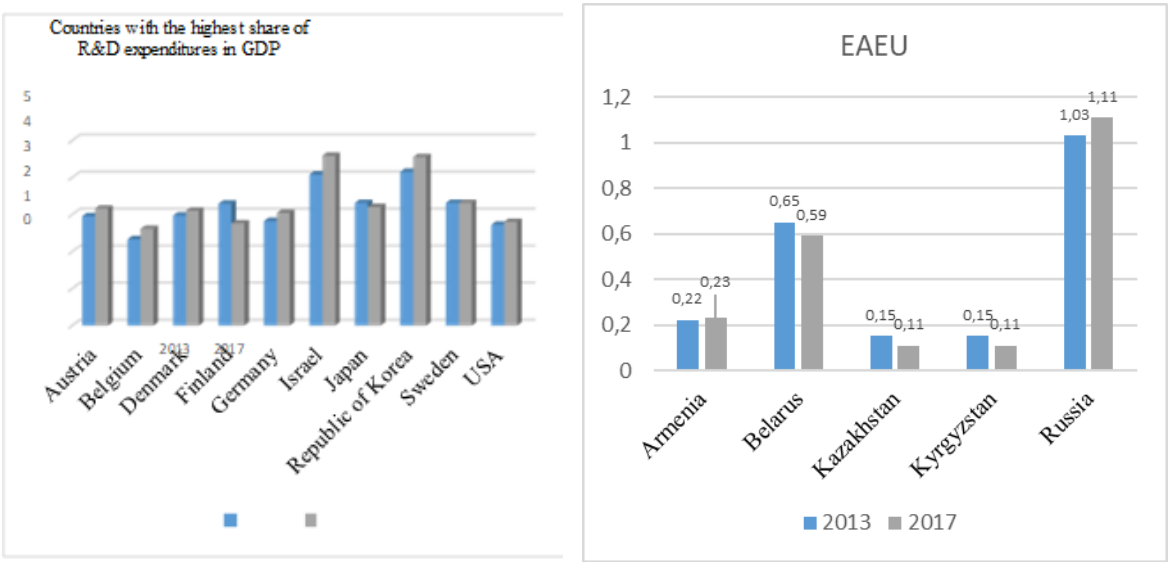

Figure 1 – Gross domestic expenditure on research and development, % of GDP

In innovation transformation, countries distinguish two models of innovation: linear and "model of multiple sources of innovation" [13]. If the linear model involves the introduction of advanced techniques and technologies based on applied research, the latter is aimed at developing innovations not only in the field of applied research, but also in all areas of economic activity (fundamental research).

According to UNESCO research statistics, the structure of funding for various types of research and R&D is quite heterogeneous across countries. For example, in countries such as Germany, Bulgaria, Croatia, Latvia, Argentina, and Italy, the R&D sector is more focused on applied science. The volume of state funding of fundamental research in the structure of expenditures on research and development, in contrast to applied research and experimental development, has a smaller share. And countries such as China, Israel, Japan, Denmark, South Korea, Great Britain invest most of all in experimental development [14].

And the cost of applied research and development (R&D) all these years, and in all previous years, clearly lagged behind the country's economic development. In 2005, expenditures on them amounted to only 0.29% of GDP, and according to international experts, they should be at least one percent in order to keep things on an even keel [15].

In Kazakhstan, a slight increase in R&D financing is mainly due to applied types of work and development. Contributions to fundamental works are insignificant. And in the US, on the contrary, R&D investments are aimed at improving the fundamental research underlying all innovation (figure 2).

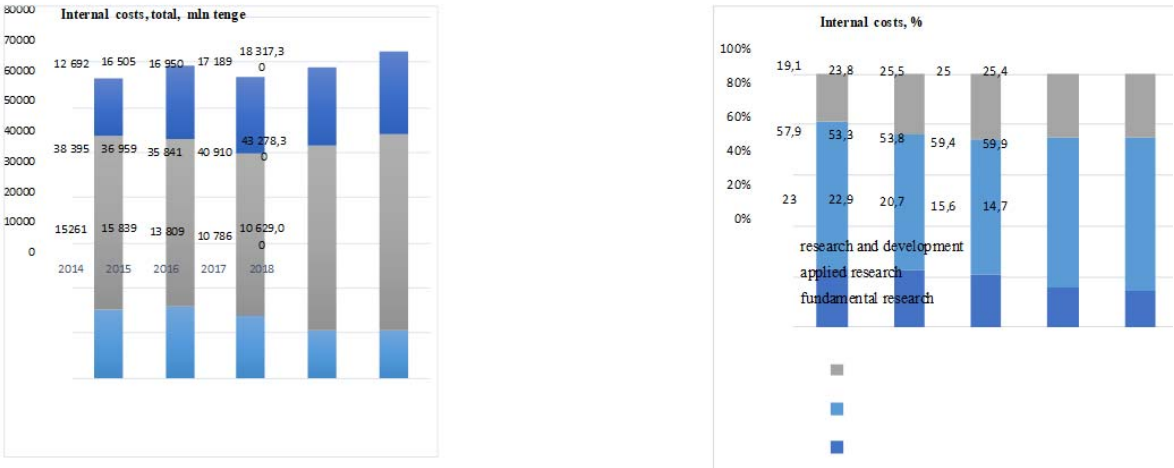

Figure 2 – Internal R&D expenditures by type of research and development

Differences in the volumes and shares of certain types of research institutes in the implementation of domestic R&D indicate different profiles of national innovation systems. In Kazakhstan, all R&D sectors have been steadily increasing their research activities since 2000. This trend has resumed at an accelerated pace since about 2010, when the first shock of the global financial crisis was overcome and major reforms of the innovation system were launched. The latest available data (for 2014 and 2015), supported by unofficial data for 2016, indicate that this growth in resources invested in R&D has stalled due to a less favorable global macroeconomic environment and, more recently, public financial tensions related to falling commodity prices.

Although the respective weights of the executive sectors fluctuated considerably during this period, some general trends over the past 15 years or so can be distinguished: higher education institutions (universities) have become relatively more prominent as R&D organizations in line with international trends. This trend was reflected in the development of public research institutes, which emerged in the Soviet era as the only organizations that carry out scientific research. The share of the business sector has remained fairly stable in recent years, peaking at 52% in 2011. In 2015, the business sector performed about 40% of R&D, while universities and professionals performed 19% and 29% of R&D, respectively (table 2).

Table 2 – Main indices of the human resource potential of science in the Republic of Kazakhstan in 2010-2018

Index	2010	2011	2012	2013	2014	2015	2016	2017	2018
Personnel engaged in research and development, thousand people									
Number of research and development personnel *Including:*	17021	18003	20404	23712	25793	24735	22985	22081	22378
- researchers Of them:	10870	11488	13494	17195	18930	18454	17421	17205	17454
Doctor of Science	1347	-	1065	1688	2006	1821	1828	1818	-
PhD	59	95	131	218	330	431	456	589	856
candidates of Science	3041	3286	3629	4915	5254	5119	4726	4541	4360
profile doctors	-	1 486	719	605	596	549	493	354	-
Technicians	1 078	1102	1310	3586	3 882	3 692	3 326	2 797	2 836
Other personnel	2 319	2 558	2 179	2931	2 981	2 589	2 238	2 079	2 088
Personnel engaged in research and development, by sectors of performance, thousand people									
State	6 557	5 909	4 921	5 516	7 608	7 157	7 643	7 574	7 998
Entrepreneurial	3 749	5 164	4 718	5 036	5 786	5 258	4 222	3 934	3 852
WTO	5 232	5 516	9 405	11 828	10 961	10 623	9 791	9 203	8 808
Non-profit organizations	1 483	1 414	1 360	1 332	1 438	1 697	1 329	1 370	1 720
State	125	115	100	98	112	106	102	104	96
Private property	296	294	240	236	270	276	272	269	275
Property of other states, their legal entities and citizens	3	3	5	7	10	8	9	13	13
Source: compiled by the author using data from the Statistics Committee [16]									

The new model of the science system provides for the stimulation of the private sector, which independently places orders for scientific products. At the same time, only programs corresponding to priority research areas will be financed. Structural transformations should be based on the introduction of innovative technology, major scientific ideas and developments. It is urgent to complete the missing industrial links with high added value, based on the accelerated development and implementation of innovative technologies. Research and innovation programs are scattered, the subjects of ownership are different. The share of science-intensive, innovative products of domestic production remains extremely low: according to the Science Foundation of the Republic of Kazakhstan, it is only 1.1% of Kazakhstan's GDP. But, as it is known, this share is a generalizing indicator of the effectiveness of science, technology and innovation. For comparison, in the countries of the European Union this figure is 35%, the USA - 25%, Japan - 11%, Singapore - 7%, South Korea - 4%, China - 2%. One of the main reasons for this situation is that the programs of scientific institutions and innovative projects are not interconnected in the

Republic. Scientific organizations carry out research and development on their own programs. At the expense of state programs and internal resources, enterprises ensure the introduction of technological innovations at their own expenses [17].

In addition, all leading countries in science policy have a clear vector of transition to a new economic, scientific and technological order. The organizational component is at a high level. State programs and legislative acts for the formation of the knowledge economy are implemented systematically and in a planned manner, in particular [18]:

– Great Britain: 2001 - Science and Innovation Strategy Action Plan; 2004 - long-term investment program in the field of science and innovation (2004–2014); 2007 - Strategy of Intellectual Entrepreneurship, etc .;

– France: 1999 - Law on Innovation; 2002 - Innovation plan; 2005 - National program of action for fundamental changes in the country's innovation environment (scientific and technological development); 2006 - Law on the Poles of Competitiveness (66 poles at the global level).

- USA-The America COMPETES Act, which was passed in 2007 to create opportunities for significant development of America's advantages in technology, education, and science.

– China -the Program of medium- and long-term development of science and technology for 1990-2020, the 863 program-development of high-tech, program Fakel-development and commercialization of knowledge-intensive technologies based on modern production facilities, program Iskra - introduction of high technologies at the township and village enterprises, program Ascent -conducting priority fundamental research.

The government of the Republic of Kazakhstan has undertaken bold reforms to achieve the ambitious goals set for research and innovation at the highest political level over the past decade, a strong commitment was expressed at the highest political level to develop a new model of development based on innovation, and the recent slowdown in growth has strengthened the resolve of the authorities work towards diversifying the economy. The priority that the President and government of Kazakhstan attach to strengthening the country's innovation system is confirmed by significant efforts to develop a regulatory, strategic and programmatic framework for science, technology and innovation policy. Over the past few years, legislation has been revised and developed to cover all stages of research and innovation, from financing to implementation and commercialization of research results. A number of challenges remain in the implementation of these laws, leading to a degree of additional uncertainty faced by public and private innovation actors. This, for example, reduced the impact of the 2012 amendment to the law "On subsoil and subsoil use." Such problems will require rapid diagnosis and action to resolve them. The government has embarked on implementation of multi-year comprehensive development strategies such as the Kazakhstan 2050 Strategy. These are bold initiatives that serve as road maps for government reform over the long term. Although initially focused on economic and social issues, they quickly embraced a wider range of activities, including research and innovation policy, which became a priority for the nation. Highlighted scientific and innovative strategies, such as the concept of innovative development of Kazakhstan until 2020 and the State program for the development of education and science of the Republic of Kazakhstan for 2016-2019, complement the overall development strategies. Although the reform process began shortly after independence, important legal acts and most of the changes in the science, technology and innovation system have only recently taken place. The law "On science", which provides the legal basis for research activities carried out at universities and research institutes, was adopted only in 2011. Even more recent is the Law «On Commercialization of Scientific and Technical Results», which provides autonomy and incentives for universities to commercialize scientific research; it was adopted at the end of 2015 [17, p. 37]. The institutions concerned are still in the process of adapting to these new rules. In this regard, Table 3 presents the SWOT analysis of the scientific and innovative system of Kazakhstan.

Table 3 - SWOT-analysis of the scientific and innovative system of Kazakhstan

Strengths	**Weaknesses**
– Rich natural resources; – A growing young population with international experience; – A genuine commitment to improving and expanding the science, technology and innovation system; – Comprehensive strategic plans and government programs to support economic development and innovation; – Many new legal and policy initiatives and reforms to support R&D activities;	– Insufficient quality of education and insufficient supply of skilled labour; – Low attractiveness of a scientific career; – Low quality of research in international comparison; – Continuing dominance of the “linear model of innovation” in public research; – Lack of interactive links between research institutes and commercial firms; – Low business demand for new knowledge and research results; – Low research and innovation potential of domestic businesses, especially small and medium-sized enterprises (SMEs); – Low involvement of large state-owned companies in innovative activities and new directions; – Weak competition and high barriers to entry into many industries; – Low level of integration into global value chains; lack of entrepreneurship, management skills and venture capital; – Lack of horizontal policy coordination of the problem of implementation of regulations and support measures; – Lack of funding at the general and project levels; – A large number of innovation policy instruments that cover very few enterprises;
Opportunities	**Threats**
– Raising awareness of the potential benefits of innovation and strengthening innovation capacity within firms; – To succeed in directing oil and gas revenues to R&D, including in other sectors (e.g. manufacturing); – To establish ties with foreign companies in Kazakhstan and learn from them; – Shifting production and trade towards more knowledge-intensive goods/services; increasing the involvement of domestic SMEs in more innovative strategies; – Take advantage of the Silk Road initiative; – Using universities as providers of innovative services for domestic companies.	– Unfavorable macroeconomic environment, excessive dependence on the oil and gas sector; – The increase in "brain drain»; – Reduction in the number of graduates of higher education institutions and a small number of incomplete doctoral theses; – Increasing competition, especially from other Asian economies; – Unrealistic or ill-fitting program goals; – Lack of communication and coordination between the subjects of the innovation system; – The trend towards "hyperactive" policies (too ambitious initiatives, too many programs, rapid changes).

Taking into account the SWOT analysis outlined in Table 3 and the strategic objectives to be met by innovation policies, this review identified a number of key issues and policy recommendations. In particular:

- consolidation in legislation of norms aimed at solving social problems;
- approval of a new program of fundamental scientific research.
- adoption of long-term strategies for conducting research and technological development by state authorities, state funds that finance R&D, as well as state corporations of a technological profile;
- launching the preparation of sectoral, cross-sectoral forecasts and programs (strategies) of scientific and technological development;
- transition to a new system for assessing the effectiveness of strategies and government programs in the field of scientific and technological development from the standpoint of assessing not only the expended resources, but also their socially significant final effect.

Conclusion. At the same time, when qualitatively new tasks of industrial and innovative development and Kazakhstan's entry into the list of 50 competitive countries are being solved, the state should play a crucial role in defining and implementing a new scientific and technological policy and effectively solving the problems of catching-up development. In this regard, it is necessary to overcome the minimalist approach in the development of institutional reforms in the field of science and scientific management, especially in the ratio of basic and applied research, as well as in major priority blocks of scientific research.

In our country, the scientific aspects of the components of the national economic system are not sufficiently taken into account when forecasting economic and social development. Today, according to the World Bank, the national wealth of developed countries is only 5% natural resources, 18% - material, manufactured product, and the main link - 77% - is knowledge and the ability to dispose of them. Training of specialized staff and qualified managers for knowledge management is needed [14, p. 4].

It makes no sense to compare the quality of life in Kazakhstan, as in the CIS, with European standards: neither in terms of student scholarships, nor in terms of wages for science workers and teachers, nor in terms of their pensions, nor in general in terms of spending on education, science, and healthcare. In terms of achieving a new quality of life close to European standards, it is necessary to develop special national programs in line with a socially oriented market economy based on modern social democratic ideas. The main contribution in solving the problem should be made by the state by creating conditions for the normal life of members of society, who are capable of serious innovation. Ways to achieve this: general dynamic social policy and special national programs, grants and mortgage lending, support for non-state knowledge-intensive firms at the expense of the budget. This is our competitive advantage in solving important problems of industrial and innovative modernization of Kazakhstan and entering the league of fifty competitive countries of the world.

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ҒЫЛЫМНЫҢ ӘРТҮРЛІ ҒЫЛЫМИ ӘЛЕУЕТКЕ ИЕ ЕЛДЕРДІҢ ӘЛЕУМЕТТІК-ЭКОНОМИКАЛЫҚ ЖӘНЕ ТЕХНОЛОГИЯЛЫҚ ДАМУЫНДАҒЫ РӨЛІ МЕН ОРНЫ

Аннотация. Мақалада қазіргі қоғамдағы ғылымның рөлі зерттелген. Зерттеуде жалпылау, жүйелеу және экономикалық-статистикалық әдістер қолданылды. Зерттеудің статистикалық базасы ретінде Қазақстан Республикасы Ұлттық экономика министрлігі Статистика комитетінің 2010-2018 жылдар аралығындағы деректері алынды. Отандық және шетелдік авторлардың зерттеулеріне талдау жасау негізінде ғылым мен білім қазіргі қоғамның, әсіресе, дамыған елдердің дамуындағы маңызды факторлар мен басымдық болып саналатындығы анықталды. ҒЗТКЖ қаржыландыруды салыстырмалы талдау және Қазақстанның ғылыми әлеуетін бағалау негізінде Қазақстан қоғамындағы ғылымның дағдарыстық жағдайы көрсетілген. Дағдарыстың негізгі себептері ретінде қаржыландырудың және көптеген білікті техникалық кадрлардың жетіспеушілігі, ғылым мен өндірістің қажетті өзара ықпалдастығының жоқтығы анықталды. Зерттеу нәтижелеріне ғылым саласындағы басқару органдары мүдделі болуы мүмкін.

Түйін сөздер: ғылым, әлеует, ҒЗТКЖ, ғылымды қаржыландыру.

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РОЛЬ И МЕСТО НАУКИ В ТЕХНОЛОГИЧЕСКОМ И СОЦИАЛЬНО-ЭКОНОМИЧЕСКОМ РАЗВИТИИ СТРАН С РАЗНЫМ НАУЧНЫМ ПОТЕНЦИАЛОМ

Аннотация. В данной статье рассматривается роль науки в современном обществе. Основными методами исследования были обобщение, систематизация и экономико-статистический метод. Статистической базой исследования послужили данные Комитета статистики Министерства национальной экономики Республики Казахстан за период с 2010 по 2018 годы. На основе анализа исследований отечественных и зарубежных авторов было определено, что наука и образование являются важнейшими факторами и приоритетами развития современного общества, особенно в развитых странах. На основе сравнительного анализа финансирования НИОКР и оценки научного потенциала Казахстана показано кризисное состояние науки в казахстанском обществе. Выявлено, что основными причинами кризиса являются недостаточное финансирование, потеря большого количества квалифицированных технических кадров и отсутствие необходимого взаимодействия науки и производства. Результаты исследования могут представлять интерес для государственных органов в области науки.

Ключевые слова: наука, потенциал, НИОКР, финансирование науки.

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GRAVITATION EQUALITY AS BASIS OF THE STATE'S ECONOMIC DEVELOPMENT ALGORITHM IN THE CONTEXT OF FORMING OF THE INDEPENDENT BALANCED ECONOMIC POLICY

Abstract. This article presents an algorithm of economic development of state, focused on finding the optimal direction of foreign economic activity in the context of ensuring economic security of region. The developed mechanism makes it possible to take into account the gravitational affiliation of states on the basis of the created integral indicator of the strength of economic gravity. Based on a theoretical assessment of the variability of the paths of economic development, a conclusion is made about the effectiveness of bilateralism in the context of global economic instability.

In the process of building macroeconomic policy, the state assesses the bilateral and multilateral aspects of economic activity. The multifactorial nature of economic activity forms the multitasking of country's economic development. Accordingly, solving economic problems requires a systematic approach. The main stages of the algorithm for choosing the path of economic development of the state:

1. Choosing a direction of economy optimization.

2. Assessment of the foreign policy position of the state, on the basis of which the choice of bilateral or international path is made.

3. Evaluation of bilateral optimization in accordance with the state of the economy.

Bilateral optimization is carried out depending on the economic gravity of states, which determines the type of interaction of elements. When assessing the current level of bilateral economic relations and the formation of prospects for cooperation, it is necessary to use the index of economic gravity of countries, which takes into account a level of trade gravity of countries, an indicator of distance dependence between countries, a measure of political calm and an indicator of monetary and financial proximity of countries.

The developed mechanism of economic actions of the state provides for the existence of an economic and political choice of the vector of economic development, taking into account the state national strategy. Reflecting systemic inversely proportional relationship between the rate of economic growth and country's economic sovereignty, the algorithm is focused on overcoming systemic interstate imbalances in the world economy.

Keywords: gravitational equality, algorithm of economic development, force of economic gravity.

Analysis of publications. Economic development is a fundamental indicator of the economic situation in the state which reflects the special features of its functioning. Investigating of the mentioned phenomenon has not lost its relevance for the whole history of the existence of economic theory. This area of knowledge is characterized by multitasking of the mentioned process which touches upon not only economic reorganizations, but also social, organizational-administrative and political transformations. In the context of the global economy particular consideration is given to the issues named above, as the globalization of the world space is a mass phenomenon of complex structure where the change of an element causes transformational processes in the range of other elements.

Various scientists have been involved in the study of national security, world order issues, management of socio-economic systems: A. Montchrestien, T. Maltus, J. Schumpeter, R. Solow, T. Swan, R. Harrod, E. Domar, A. Smith, J. Keynes, A. Muller-Armack, T. Veblen, J. Clarke and others. [1-37]

At the same time, special attention is paid to the issues of developing countries, since their resource economies predetermine their status of raw material colony, which contradicts the principle of mutually beneficial development. Consequently, economic progress of some countries causes poverty and underachievement of others.

Economic development from a perspective of the world economy in the 21st century. Despite the good perspectives of such a model, the world economy has entered the stage of recession. The crisis of the international organizations system determines the necessity for protectionist measures aimed at preserving national economies. The prevailing foundations of the international economic relations have signs of "co-operative power", which discredits international organizations and pushes countries to search new mechanisms for conducting economic activity that imply economic development regardless of the current situation. In the context of countries' striving to ensure the stability of foreign economic activity, the bilateral format acquires the features of the basis for international activity, which predetermines changes in the structure of economic development. The current system provides for the external economic development of the state as a complex element, which shows the need for the algorithm of economic actions that would take into account comprehensive optimization.

Economic gravity and external economic choice of the state. In the process of building macro-economic policies the state evaluates bilateral and multilateral aspects of economic activity conducting. The multifactorial nature of economic activity determines the multitasking of the country's economic development. Accordingly, solving economic problems requires a systematic approach that reflects the search for the most favourable algorithm.

At the initial stage in the process of determining the contents of basic specific indicators the objectivity and accuracy of their selection acquires fundamental importance. Performance of the task involves identifying the causes of external economic activity of the state. The activity mentioned above is focused on commercial growth which is based on economic and financial independence provided there is favourable material and technical condition [52].

Ultimately, one of the key goals of the existence of any state is economic development, which can differ by format and in its most complete form should look like:

$$ED_i = QualG_i^n + QuanG_i^m + ES_i^l, \quad (1)$$

where ED_i is the economic development of the country i, $QualG_i^n$ – n is the number of indicators reflecting the qualitative growth of the economy, $QuanG_i^m$ – m is the number of indicators characterizing the quantitative growth of the economy, ES_i^l – l is the number of determinants of economic security.

In current conditions, this process involves an increase in the well-being of the population, favourable investment climate and continuous scientific and technological progress [35].

Particular importance in these processes must be given to ensuring the economic security of the state. The policy should be aimed at providing economic sovereignty and common economic area (CEA), and the condition of the economic system and government institutions should reflect the country's socially oriented development (SEP) regardless of external (EET) and internal threats (IET) of an economic nature [36,37].

Consequently:

$$ES_i = CEA_i + SEP_i \quad (2)$$

In this way:

$$ES_i^t \neq f(IET, EET) \quad (3)$$

where t is period the of research.

Let us change the initial equation:

$$ED_i = QualG_i^n + QuanG_i^m + CEA_i^t + SEP_i^t \quad (4)$$

The economic development policy of the state should be focused on the four conditions represented in the equation. Its main indicators are the following:

$$EDP_i^t = EDD^t + SR^t = ED_i^t \quad (5),$$

where EDD is the efficient development direction, SR is the source of the economic reformation.

The equation of the maximum resource support of the state is as follows:

$$SR_i^{PCA} = FC_{IO} + \sum FB_i{}^{t_{IO}} \quad (7),$$

where t_{IO} is the time of receiving the loan from the international organizations.

However, international loans (FC_{IO}) are of the primary importance due to the bigger volume of the financing:

$$FC_{IO}^{t_{IO}} > \sum FB_i{}^{t_{IO}} \quad (8)$$

Let us transform the equation taking into account presented conclusions for the international direction of ensuring the economic development of the state:

$$QualG_i^n + Quan_i^m = [(T + Inv + Mon + Tech + Inst) + BSS] + FC_{IO} + \sum FB_i{}^{t_{IO}} \quad (9)$$

Taking into account the multiplicity of factors of economic impact on gravitation processes, the gravitation equation is an incomplete tool with respect to the formation of the initial (modern) point of bilateral interaction. Correspondingly, in assessing the current level of bilateral economic relations and the formation of prospects for cooperation, it is necessary to use the index of economic gravity of countries which has the following formula:

$$IndGrav = \frac{Tgrav + Dgrav + Pol + Fin}{4} \quad (10),$$

where $Tgrav$ is the level of the trade gravity of countries, $Dgrav$ is the indicator of the remote dependence of countries, Pol is the degree of political serenity, Fin is the index of financial and monetary proximity of countries.

The economic gravity index reflects the basic postulates of the gravitation equation (the dependence of total trade on the distance between countries) which together with political, monetary and financial indicators allow a qualitative assessment of the degree and the nature of economic relations between countries.

Let us define the mechanism for calculating the mentioned above indicators:

1. Trade is characterized by the share of the state in relation to the most preferable trading partner and is found by the formula:

$$Tgrav_{ij} = \frac{T_{ij}}{T_{imax}} \quad (11),$$

where T_{ij} is the share of the countries' commodity turnover i and j in the general structure of trade i, T_{imax} is the share of the state taking the first position in the trade structure of i. In other terms, $Tgrav$=1 for the most attractive partner for a country's relationship, and, respectively, $Tgrav$ = 0 if the trade relationship between countries does not exist.

2. The distance between the countries is calculated according to the formula:

$$Dgrav_{ij} = 1 - \frac{D_{ij} - D_{imin}}{D_{imax}} \quad (12),$$

where D_{ij} is the distance between the capitals of the countries i and j, D_{imax} is the maximum distance of the country i from all its partners, D_{imin} is the minimum distance of the country i from all its partners.

In such a way, $Dgrav$ tends to 1 if the distance between the countries is the shortest in relation to the other states and tends to 0 respectively if the distance is the longest.

3. Political tranquility is determined by the principle of dummy variables taking into account the existence of geopolitical conflicts between countries:

$$Pol = \begin{cases} 0, if\ conflict\ exist \\ 1, if\ it\ is\ not \end{cases}$$

4. Financial gravity of countries is determined by the same principle (1 in the presence of a single monetary and financial system, 0 in its absence).

$$Fin = \begin{cases} 1, with\ unified\ monetary - financial\ system \\ 0, if\ the\ opposite\ is\ true \end{cases}$$

It should be noted that the degree of gravity of bilateral economic relations is determined by the ratio of the Indices of the two countries. If their values are in the 1% range from each other, we can talk about the lack of economic dominance and the triggering effect of economic repulsion on an equal basis with attraction. In the opposite case, we can talk about the belonging of one state to the gravitational field of another.

For convenience, we transform this action into a single integral indicator of gravity which has the form:

$$Sgrav_{(A\to B)} = \frac{(IndGrav_B - IndGrav_A)}{(IndGrav_A + IndGrav_B)/_2} * 100 \quad (13)$$

Index analysis: if $Sgrav \in [-1; 1]$, it means that there is gravitational equality between the countries; if $Sgrav > 1$, it means that the country A dominates the state B; if $Sgrav < -1$, it means that the country A is in the relationship of gravitational dependence on the state B. It should be noted that $Sgrav_{(A\to B)} = -Sgrav_{(B\to A)}$, i. e. gravitational dominating and dependence always complete each other.

As a result, countries rely on gravitation equality or dependence as optimization directions (10). Gravitation dependence (11) provides for the political independence of the state from the dominant country, which creates a system of "co-operative power" and leads to a partial loss of economic freedoms. However, the achievement of systemic economic development is possible, but only in the conditions of a favorable economic situation of the hegemon (12).

$$QualG_i^n + QuanG_i^m = [(T + Inv + Mon + Tech + Inst) + BSS] + FB_{ij}^{DEP} \quad (14),$$

where j is the economic hegemon.

The most balanced tool providing for mutually beneficial cooperation and strategic partnership is gravitation equality (13) in which the system of economic development will have the following form:

$$QualG_i^n + QuanG_i^m + (CEA_i + SEP_i)^t = [(T + Inv + Mon + Tech + Inst) + BSS] + \sum FB_i^{EQU} \quad (15)$$

Optimization of these relationships leads to the differentiation of external economic activity. The key disadvantage of this concept is the limited amount of resources that can be obtained within one bilateral chain. Thus, the achievement of economic development is possible only if the complex of bilateral relations of gravitation equality is optimized.

$$FB_{ij}^{DEP} \approx \sum FB_i^{EQU} \quad (16)$$

Gravitation dependence and dominance should be noted as conditions for the creation of regional integration associations, which can be interpreted as an alternative international level.

The developed mechanism of the state economic actions provides for the existence of the political-economic choice of economic development vector taking into account the state national strategy. Reflecting the systemic inversely proportional relationship between the rate of economic growth and the country's economic sovereignty, the algorithm is focused on overcoming interstate imbalances in the global economy.

Conclusions. At the present time in the world there is an objective need for reforming the global system of international relations, which includes is the process of optimizing the economic development of the country and macroregions as an integral element. A key component of the new economic order is the search for a balance between the active external economic activity and the economic security of the state. This approach is focused on the variability of areas of economic development, which suggests the possibility of economic prosperity regardless of the scale and nature of the country's economy. This is particularly relevant for developing countries.

The developed algorithm allows revealing two-sided dominance, dependence or equality accurately. It

complements the gravitational theory of economic relations and is located at the junction of the classical approach, Keynesianism and institutionalism, providing a qualitative assessment of the gravitational force of bilateralism.

This algorithm is characterized by several features. The system works in the absence of external economic shocks which cause is not related to the external economic policy of the state (world crises, pandemics, etc.). In addition, there is no unified system of indicators with the highest quality that would reflect the economic progress of the state as well as the correctness and indifference to politics when deciding on the economic direction of development. Thus, a need to develop universal integrated indicators has emerged. In the basis of the indicators mentioned above it is necessary to take into account groups of specific indicators characterizing the most important sides of the object in the research aspect.

Such a study involves an increase in the number of objects, which leads to an increase in the number of connections between them increasing proportionally to the square of the number of objects. Storing in the memory and analyzing a larger set of relationships between objects is limited by the psychological capabilities of a person. Thus, on the stage of the final ranking of a larger number of objects, there is an objective need to minimize the possibility of construction errors.

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ГРАВИТАЦИЯЛЫҚ ТЕҢДІК ТӘУЕЛСІЗ ТЕҢДЕСТІРІЛГЕН ЭКОНОМИКАЛЫҚ САЯСАТТЫ ҚҰРУ ЖАҒДАЙЫНДА МЕМЛЕКЕТТІҢ ЭКОНОМИКАЛЫҚ ДАМУ АЛГОРИТМІНІҢ БАЗИСІ РЕТІНДЕ

Аннотация. Мақалада өңірдің экономикалық қауіпсіздігін қамтамасыз ету жағдайында сыртқы экономикалық қызметтің оңтайлы бағытын іздеуге бағытталған мемлекеттің экономикалық даму алгоритмі ұсынылған. Әзірленген механизм құрылған экономикалық гравитация күшінің интегралды индикаторы негізінде мемлекеттердің гравитациялық қатыстылығын ескеруге мүмкіндік береді. Экономикалық даму жолдарының вариативтілігін теориялық бағалау негізінде жаһандық экономикалық тұрақсыздық жағдайында билате-ризм тиімділігі негізінде қорытынды жасалды.

Макроэкономикалық саясатты құру процесінде мемлекет экономикалық қызметті жүргізудің екіжақты және көпжақты аспектілерін бағалайды. Экономикалық қызметтің көпфакторлылығы елдің экономикалық дамуының көпфункциялылығын қалыптастырады. Тиісінше, экономикалық мәселелерді шешу жүйелі тәсілді қолдануды талап етеді. Мемлекеттің экономикалық даму жолын таңдау алгоритмінің негізгі кезеңдері:

1. Экономиканы оңтайландыру бағытын таңдау.

2. Мемлекеттің сыртқы саяси жағдайын бағалау, соның негізінде билатералдық немесе халықаралық жолды таңдау жүргізіледі.

3. Экономика жағдайына сәйкес билатералды оңтайландыруды бағалау.

Билатералды оңтайландыру элементтердің өзара әрекет түрін анықтайтын мемлекеттердің экономикалық гравитациясына байланысты жүзеге асырылады. Екіжақты экономикалық қатынастардың ағымдағы деңгейін бағалау және ынтымақтастық перспективаларын қалыптастыруда елдердің сауда гравитация деңгейін, елдер арасындағы қашықтық тәуелділік индикаторын, саяси тыныштық шарасын және елдердің валюталық-қаржылық жақындығының көрсеткішін ескеретін елдердің экономикалық гравитация индексін пайдалану қажет.

Мемлекеттің экономикалық қарым-қатынасының әзірленген тетігі мемлекеттік ұлттық стратегияны ескере отырып, экономикалық даму векторын экономикалық-саяси таңдаудың болғанын көздейді. Экономикалық өсу қарқыны мен елдің экономикалық егемендігі арасындағы жүйелі кері пропорционалды өзара байланысты көрсету арқылы алгоритм әлемдік экономикадағы жүйелі мемлекетаралық теңсіздікті еңсеруге бағытталған.

Түйін сөздер: гравитациялық теңдік, экономикалық даму алгоритмі, экономикалық ауырлық күші.

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ГРАВИТАЦИОННОЕ РАВЕНСТВО КАК БАЗИС АЛГОРИТМА ЭКОНОМИЧЕСКОГО РАЗВИТИЯ ГОСУДАРСТВА В УСЛОВИЯХ ПОСТРОЕНИЯ НЕЗАВИСИМОЙ СБАЛАНСИРОВАННОЙ ЭКОНОМИЧЕСКОЙ ПОЛИТИКИ

Аннотация. В данной статье представлен алгоритм экономического развития государства, ориентированный на поиск оптимального направления внешнеэкономической деятельности в контексте обеспечения экономической безопасности региона. Разработанный механизм позволяет учитывать гравитационную принадлежность государств на основе созданного интегрального показателя силы экономической гравитации. На основе теоретической оценки изменчивости траекторий экономического развития делается вывод об эффективности двусторонности в условиях глобальной экономической нестабильности.

В процессе построения макроэкономической политики государство оценивает двусторонние и многосторонние аспекты экономической деятельности. Многофакторность экономической деятельности формирует многозадачность экономического развития страны. Соответственно, решение экономических проблем требует системного подхода. Основные этапы алгоритма выбора пути экономического развития государства:

1. Выбор направления оптимизации экономики.

2. Оценка внешнеполитической позиции государства, на основе которой осуществляется выбор двустороннего или международного пути.

3. Оценка двусторонней оптимизации в соответствии с состоянием экономики.

Билатеральная оптимизация осуществляется в зависимости от экономической тяжести государств, что определяет тип взаимодействия элементов. При оценке текущего уровня двусторонних экономических отношений и формировании перспектив сотрудничества необходимо использовать индекс экономической гравитации стран, который учитывает уровень торговой гравитации стран, показатель дистанционной зависимости между странами, меру политического спокойствия и показатель валютно-финансовой близости стран.

Разработанный механизм экономических действий государства предусматривает наличие экономического и политического выбора вектора экономического развития с учетом государственной национальной стратегии. Отражая системную обратно пропорциональную зависимость между темпами экономического роста и экономическим суверенитетом страны, алгоритм ориентирован на преодоление системных межгосударственных дисбалансов в мировой экономике.

Ключевые слова: гравитационное равенство, алгоритм экономического развития, сила экономической гравитации.

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ORGANIZATION OF REFINED PRODUCTS SALES IN KAZAKHSTAN

Abstract. The article presents the main theoretical and methodological approaches to the sale of refined products. The views of scientists and economists on the sales of refined products and its categories are considered. Organization schemes of petroleum products sales on domestic and world markets, multilevel marketing system, routes of product movement (logistics chain of product movement) have been substantiated. The main documents (futures), risk insurance (hedging), planning the organization of sales of petroleum products, the impact of marketing programs on the choice of sales channel are considered. The article presents the formation of sales channels for petroleum products in vertically integrated oil companies. The tasks for timely provision of consumers with petroleum products have been clarified. The optimal choice of efficient schemes for cargo transportation of refined products, logistics schemes for their transportation and temporary storage, and rationality of transit forms of delivery of oil products to consumers are indicated. The main goals of achieving optimal sales systems for petroleum products by vertically integrated oil companies are revealed. The possibility of having special divisions for the sale and export of refined products by large oil companies is justified. The analysis of indicators of demand and supply of petrochemical products on the world markets with the author's positions on the current situation on the world oil markets in connection with the coronavirus pandemic. The analysis and assessment of production and consumption of basic petroleum products on the domestic markets of Kazakhstan is given. As a separate example, the analysis of diesel fuel consumption by regions and sectors of the national economy of Kazakhstan was carried out.

Key words. Refined products, petroleum and petrochemical products, petroleum products, sales and exports, production and consumption. the market for oil products, basic products of oil refining, an oil company.

The oil industry of any country is a branch of the national economy, the main activity of which is the extraction, processing, transportation and sale (sale) of crude oil and refined products. Oil refining products consist of various types of fuel and raw materials for subsequent chemical processing.

Oil products are sold on the domestic and world markets of oil and petroleum products. In terms of sales, the world oil market is the largest among all industry markets. The turnover of financial resources in the oil market annually averages $ 300 billion [1]. The history of the global oil market is given in table 1.

Table 1 - The beginning of the creation of a market for oil products

The first oil company	Pennsilvania Rock Oil Co (1854 г.) - Pennsylvania state
The first oil refinery	Built in 1865 in new York city
The first oil exchange	Titusville oil exchange (1871 г.) - the city of Titusville, Pennsylvania
The first major oil and oil products marketing company	Standard Oil Co (1861) was the main seller of oil and refined products in the United States
Creation of the first group of companies for the marketing of oil products	The Organization of petroleum exported countries-OPEC group of companies was established in 1960.)
Compiled by the authors from the source [1]	

The sales of products are the most final phase, which is formed by organizing the movement of the oil product from the manufacturer to the world market.

As such, the category of «product sales» can be studied in both a narrow and broad sense. A narrow understanding of this category implies all the organizational conditions for selling products to the final buyer (consumer). The concept of «sales» should be considered in a narrow and broad sense. In a narrow sense, sales must be understood as the conditions for direct sale to the end user of products.

If we consider the category of sales in a broad sense, this is a whole set of organizational and managerial measures to organize the delivery of commercial products from the manufacturer to the buyer under the influence of various external and internal factors and in risky situations that require the necessary management. The organization of sales of products, especially those as complex as oil, should be focused on the conditions of the world oil markets, which arise under the influence of supply and demand for certain periods of time.

The product sales category has different interpretations. The approaches of authors A.Davydova and V. K. Faltsman [3] determine the sales of commodity products in terms of the turnover of raw materials before they are converted into finished products for sale and receiving new increased financial resources (money) aimed at purchasing new raw materials for its further transformation into new commodity products. Whereas D. I. Barkan considers product sales as a certain type of organization's work to promote manufactured products to industry markets [4] through the use of segmented product sales channels. The author V. N. Naumov interprets product sales as a set of measures that are carried out after the product leaves the manufacturer's territory [5].

If we approach it from a logistical point of view, then the product sales are a whole chain of product movement from the manufacturer to the consumer, which has certain links (intermediaries (dealers), distributors, exchanges, trading and commercial enterprises, warehousing, storage, transportation, etc. In other words, product marketing is a set of actions for promoting finished products from the manufacturer to the end user – the buyer.

Sales of products for each manufacturer depend on its industry affiliation. Petroleum products can refer to both industrial products as such, and are products of the mining and manufacturing industries.

The marketing of petroleum products is a whole trajectory of movement from oil production to places of consumption, where the end result is the transfer of ownership of the final product from one market participant to another, in which all ownership rights of the product are automatically transferred. As a rule, various entities participate in the movement of oil products under the terms of a contract.

The organization of sales and exports of oil products is a rather complex and multi-level system, which involves oil companies, companies that process oil and petrochemical products, companies that store and transport oil, various trade and sales organizations, financial and exchange companies, and infrastructure organizations (service, construction, logistics, etc.). Often, oil market entities have different industry orientation, different forms of ownership (public, private, quasi-public), they can be representatives of both large and small and medium-sized businesses.

In the route of product movement, trade and economic relations between the manufacturer, wholesale and retail sellers and the consumer arise over the change and transfer of ownership rights to products. The transfer of ownership rights to goods – oil products in modern oil markets is carried out through oil exchanges by drawing up various types of contracts.

When selling oil products, ownership rights are transferred with responsibilities through forward term transactions, which are paper goods, which describe all the conditions and terms of trading processes with real goods-oil products, indicating the specific location of the end user. Forward contracts are often standardized in exchange practice, which simplifies exchange turnover and fulfillment of obligations [6].

Another type of document for the sale of oil products is a futures transaction – a document for the transfer of ownership of a commodity production, but not a security. At the same time, the seller has the right to supply oil products of any quality in accordance with the conditions established by the exchange. Oil transactions can be carried out not only between producers and buyers, but also between the broker and the clearing house, with full freedom to vary prices and delivery times. However, deliveries of oil products on futures exchanges can only be allowed during certain limited periods of time [7].

Often there is insurance against price changes (hedging) in the oil markets in order to avoid possible losses as a result of higher prices for goods sold at a fixed price, but not yet purchased. Options are a type

of futures transactions where the specific content of the document is to buy or sell oil products at a pre – set price [8].

When selling oil products, the sales organization system is planned. Marketing system planning is a systematic decision – making regarding the physical movement and transfer of ownership of a product or service from the manufacturer to the consumer, including transportation, storage, and transaction execution [9]. Sales functions are performed through product distribution channels, which include all organizations or all people associated with the movement and exchange of goods and services that are participants in sales channels.

The decisions in this area strongly influence marketing programs. In many cases, choosing a sales channel is the company's most important decision. It takes a long time to build a good relationship with sales channels. When they are already there, it is quite difficult for a new company to introduce itself, and it is easier for an old one to organize the sale of suitable new products. Participants in sales channels should coordinate the planning and implementation of the strategy; if they are influential, the marketing capabilities of manufacturers significantly increase. Consumers prefer not to change the existing C and OS of purchasing goods and services [10].

The choice of sales channels also affects expenses and profits. The firm that takes on all the functions must pay for them: accordingly, it receives all the income. A firm that uses independent (external) channels can reduce the relative costs of product movement; however, it also has a lower relative profit, since the relevant sales organizations must receive their share.

In vertically integrated oil companies, the choice and formation of product distribution channels is important. At the same time, the distribution policy is a course of action of the enterprise for the development and implementation of a marketing mix - a distribution mix, and measures included in it to bring the product to the end consumer. It is aimed at effective interaction of all subjects of the marketing system to ensure the movement of a specific product prepared for sale in a certain quantity and quality, at a specific time and place.

During the period of centralized planning, the volume of direct links between plants and consumers was carefully justified, taking into account the minimization of costs for transportation and storage of petroleum products. At that time, direct connections were 10-15% in the whole country, for example, for gasoline, and 20-30% for diesel fuel.

For the effective functioning of the oil and petroleum products market in Russia, it is necessary to combine the efforts of companies in oil production, processing and marketing in order to save production costs and apply new technologies. These tasks were met by the creation of vertically integrated oil companies.

In order to provide consumers with oil products in a timely manner, it is necessary to solve a whole range of tasks. The coordinated actions of the participants in the technological chain, United within a vertically integrated structure, directly affect the extent to which the needs of the end user will be met.

Here we need to solve some of the most significant problems [11]:

- organization of production and processing of petroleum products at an oil refinery);
- organization of delivery of petroleum products to specific markets through a network of subsidiaries (at the same time, it is necessary to know the most accurate needs of each specific market for certain petroleum products);
- organization of transportation and storage of petroleum products;
- delivery of petroleum products to the final consumer through a network of wholesale trade organizations and a network of gas stations.

With vertical integration, enterprises that perform different stages of the same technological process are combined into a single chain. A specific feature of the oil refining industry is a high concentration of production. Petroleum products are consumed everywhere.

When delivering oil products from suppliers to consumers, different types of transport are used depending on their efficiency, the specific conditions of the supplied area, and the properties of the transported oil products. The most efficient pipeline is transport. The cost of transporting 1 ton of oil products through the pipeline is 3-4 times lower than the cost of railway transport. Depending on the distance, the efficiency of using rail and road transport modes changes. In particular, for a distance of up to 200 km. Road transport is more profitable, and rail transport is more profitable for long distances [12].

Thus, each of the modes of transport used has its own advantages and disadvantages. For this reason, the delivery of petroleum products in mixed traffic, most often a combination of pipeline and rail transport, has developed significantly. The role of pipeline and river transport in the transportation of petroleum products in direct communications in the country as a whole is insignificant.

Determining the optimal cargo flow patterns, the most rational combination of ways to transport petroleum products, and the further development of pipeline transport, which is a significant cost-saving factor in delivering finished products to consumers, are among the most important tasks.

Depending on the nature of product promotion from refineries to consumers, transit and warehouse forms of supply are distinguished. Each form has its advantages and disadvantages [12].

The use of a transit form of supply accelerates the delivery time of oil products to consumers. As a result, their time in the sphere of circulation is reduced. In addition, this form of supply helps to reduce the cost of circulation by reducing the cost of transportation and storage of petroleum products. However, the unjustified use of transit supply may lead to the fact that some consumers will be supplied with oil products in an unsatisfactory quantity that does not correspond to their rational consumption sizes.

In the process of developing a sales policy, the company's marketers must make and implement decisions about sales channels or routes.

An optimal sales system for a vertically integrated oil company should help achieve the following goals:

- maximize turnover and increase the company's market share;
- minimize sales costs;
- optimize the number of sales intermediaries in the chain involved in the product distribution process:
- ensure control of the marketing plan;
- create and maintain the high prestige of the selected sales channel;
- facilitate the creation of long-term relationships within the sales channel and at the same time maintain flexibility.

Planning the needs of a subsidiary company for petroleum products through a network of gas stations taken into franchising is of great importance. Currently, vertically integrated oil companies include the sale of petroleum products under a franchise agreement most often in the wholesale sales section. A vertically integrated structure of an oil company should have a special division for product sales management, which should have functions for managing all divisions whose activities are related to the organization of projects for the sale of oil products.

Today, such a large company in the Republic of Kazakhstan is JSC NC KazMunayGas. It coordinates and controls all activities of its subsidiaries (oil-producing organizations, enterprises that process petroleum products and create petrochemical products, retail outlets for wholesale and retail sales of petroleum products). The national company, as the main operator of oil refining products sales in Kazakhstan, models the domestic market of oil and petroleum products, and also provides continuous monitoring of situations on foreign oil markets. Almost completely controls the entire chain of sales and logistics of petroleum products.

The export is one of the most important sales channels for oil products both in Kazakhstan and in any country.

Currently, global petrochemical markets are significantly affected by price volatility in oil markets due to the global economic crisis of 2020 resulting from the coronavirus pandemic.

But if you think about it, you can take into account that any crisis is a step towards various structural changes in the industry. Currently, all countries are developing their own strategy for overcoming the post-crisis period, setting themselves the goal of avoiding economic catastrophe. Kazakhstan also puts in its state programs, first of all, the transition from exporting crude oil to entering world markets with refined products with high added value.

The diversification of the oil and gas industry in Kazakhstan, the expansion of oil refining and petrochemical products in recent years have been studied quite a lot by scientists-economists O. I. Yegorov, O. I. Chigarkina [13, 14], D. E. Satenova, A. B. Rakhisheva [15], U. Zh. Shalbolova, M. A. Yelpanova, A.K. Baikin [16-21].

Definitely, in the post-crisis period, the role of state regulation in the organization of sales, exports and production of refined products is very important. All measures taken by the government of the

Republic of Kazakhstan to restructure the industry, in particular, the oil and gas industry, are not temporary measures for economic stabilization. These programs for the transformation of the Kazakh economy began their work 10 -15 years ago, and now they are acting as anti-crisis measures that will determine the future of the country's national economy for many years to come.

Despite the global crises, the economy of Kazakhstan is developing, the domestic market of petroleum products is working and will continue to function in the future. In this regard, an analysis of the production of petroleum products and its consumption at the level of domestic consumption is presented.

Analysis of domestic consumption of oil products is important for the organization of export sales of oil products (figure 1).

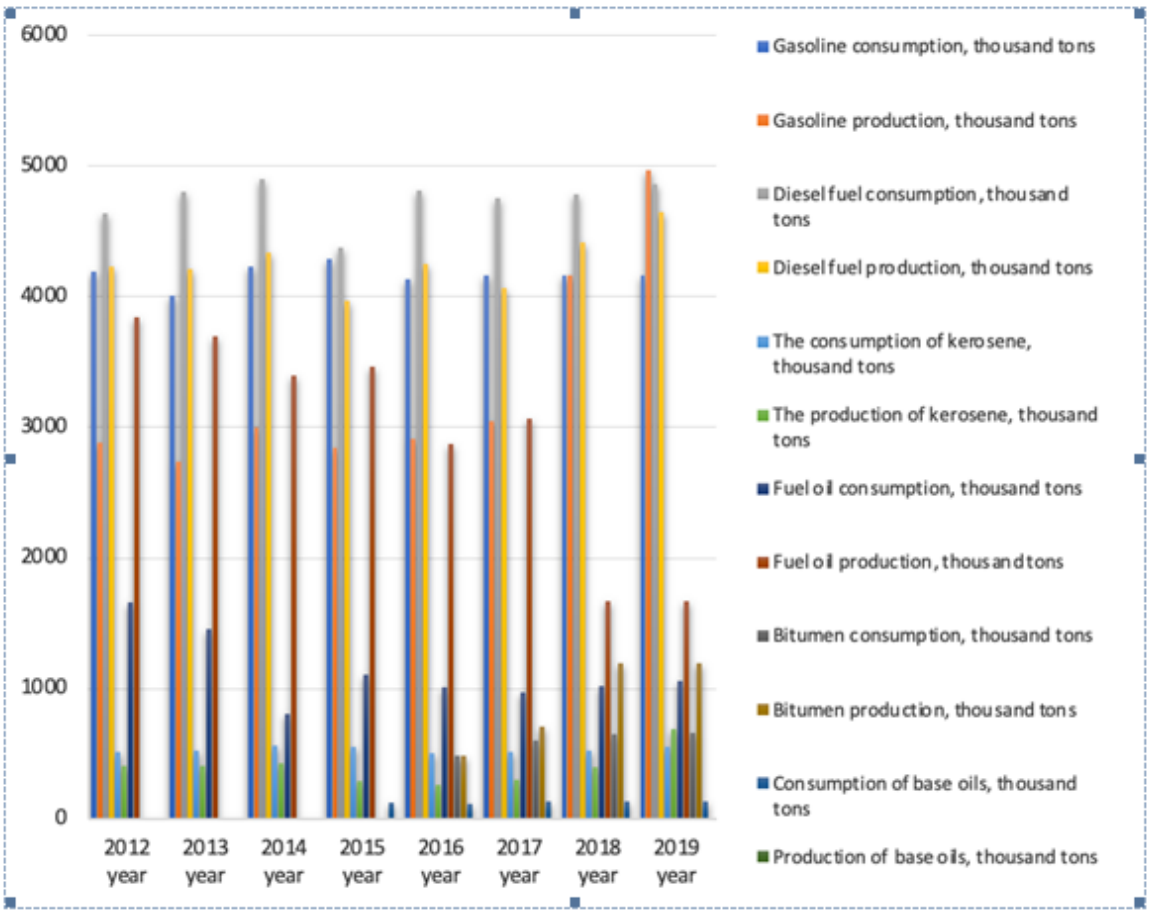

Figure 1 - Supply and demand for petroleum products in Kazakhstan, thousand tons per year

Compiled by the authors from sources [1,2]

So, in the domestic market, gasoline consumption from 2012 to 2019 did not change much. While in 2012, the production of gasoline products was 2 times lower than demand, by 2019 the growth rate was 1.7 and reached the output of 4972 tons, exceeding consumption. According to the saturation of the market with diesel fuel and kerosene during the analyzed period, Kazakhstan provided maximum domestic demand. Fuel oil production in 2012 exceeded consumption by 2 times, and therefore in 2019 the output of this oil product was reduced by 2.3 times and exceeded consumption in the Kazakh market. Bitumen production has grown 2.4 times since 2016 in 2019. Thus, Kazakhstan's refineries are able to meet the demand for petroleum products in the domestic market.

Kazakhstan provides 87% of the domestic market with its own refined products. The share of imports ranges from 2 % (for fuel oil) to 13% (for gasoline).

The sales of oil refining products in Kazakhstan are organized through a network of sales enterprises – gas stations located geographically in all regions of the country.

Analysis of the distribution of diesel fuel consumption by region in the context of economy sectors shows that mining enterprises located in the West, center and North of Kazakhstan have a significant consumption of diesel fuel per year. Thus, in Aktobe consumption is 120 thousand tons, in Atyrau it's 191.0 thousand tons, in Mangistau it's 89.4 thousand tons, in Karaganda, Kostanay, Pavlodar, West Kazakhstan, Kyzylorda regions and Shymkent it's from 40.0 to 80.0 thousand tons per year. The leaders of diesel fuel consumption among manufacturing enterprises are Karaganda (75.0 thousand tons), Pavlodar (45.0 thousand tons), West Kazakhstan (63.0 thousand tons) regions. If we consider the fuel consumption in agriculture, it is mainly a high share in the Turkestan region and the Northern regions of the country, where the production of agricultural and grain crops is developed. Since the dynamic development of construction in Kazakhstan takes place in the city of Nur-Sultan, there is the highest consumption of diesel fuel in the country (231.5 thousand tons). The same pattern is observed in Almaty, Atyrau region, Almaty and Turkestan regions.

In terms of consumption by sectors of the national economy in Kazakhstan, the construction sector consumes the most diesel fuel (1,317 thousand tons per year), transport (1,177 thousand tons per year), then mining (835 thousand tons per year), and various service sectors (570 thousand tons per year). The lowest consumption of refined products occurs in the manufacturing industry (450 thousand tons per year) and in agriculture (462 thousand tons per year). The smallest consumption of diesel fuel indicates the need for structural adjustment of the economy of Kazakhstan towards the expansion of the processing sector of the economy and the development of the agro-industrial complex.

Depending on the volume of consumption and demand for basic refined products, sales facilities are located in the regions of Kazakhstan.

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ҚАЗАҚСТАНДА ӨҢДЕЛГЕН МҰНАЙ ӨНІМІН ӨТКІЗУДІ ҰЙЫМДАСТЫРУ

Аннотация. Мақалада өнімді өткізу категориялары, атап айтқанда, мұнай өнімін өткізу, оны өткізудің негізгі кезеңдері қарастырылған. Ғалымдардың көзқарастары мен мұнай өңдеу өнімін өткізу ұғымының авторлық түсіндірмесі ұсынылған. Олар: мұнай өндіру компаниялары, мұнай өңдеу кәсіпорындары, көлік-логистикалық ұйымдар, сауда өткізу және биржалық компаниялар, қызмет етуші инфрақұрылым, түрлі қызмет көрсету кәсіпорындары. Өндірушіден соңғы сатып алушыға дейін мұнай өңдеу және мұнай-химия өнімін тарату үлгісі берілген. Негізгі құжаттар (фьючерс), тәуекелді сақтандыру (хеджирлеу), мұнай өнімін өткізуді ұйымдастыруды жоспарлау, маркетингтік бағдарламалардың өткізу арнасын таңдауға әсері қарастырылған. Тігінен интеграцияланған мұнай компанияларында мұнай өнімін өткізу арналарын қалыптастыру үлгілері ұсынылған.

Сондай-ақ мақалада мұнай өңдеу өнімін жүк тасымалдаудың тиімді сызбаларын таңдаудың оңтайлылығы, оларды тасымалдау мен уақытша сақтаудың логистикалық сызбалары, тұтынушыларға мұнай өнімін жеткізудің транзиттік нысандарының ұтымдылығы көрсетілген. Мақалада коронавирус пандемиясына байланысты әлемдік мұнай нарығындағы қалыптасқан жағдай бойынша авторлық ұстанымы бар әлемдік нарықтағы мұнай-химия өнімінің сұранысы мен ұсынысына талдау берілген. Қазақстанның ішкі нарығындағы негізгі мұнай өнімін өндіру мен тұтынуға талдау және бағалау келтірілген. Жеке мысал ретінде Қазақстанның халық шаруашылығының жекелеген өңірлері мен салалары бойынша дизель отынын тұтынуға талдау жүргізілді.

Түйін сөздер: өңделген мұнай өнімі, мұнай және мұнай-химия өнімі, мұнай өндіру, сату және экспорттау, өндіру және тұтыну, мұнай өнімі нарығы, өңделген негізгі мұнай өнімі, мұнай компаниялары.

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ОРГАНИЗАЦИЯ СБЫТА ПРОДУКЦИИ НЕФТЕПЕРЕРАБОТКИ В КАЗАХСТАНЕ

Аннотация. В статье представлены основные теоретико-методологические подходы к реализации продуктов переработки. Рассмотрены взгляды ученых и экономистов на сбыт продуктов переработки и их категории. Обоснованы схемы организации сбыта нефтепродуктов на внутреннем и мировом рынках, многоуровневая система маркетинга, маршруты движения продукции (логистическая цепочка движения продукции). Рассмотрены основные документы (фьючерсы), страхование рисков (хеджирование), планирование организации продаж нефтепродуктов, влияние маркетинговых программ на выбор канала сбыта. В статье представлено формирование каналов сбыта нефтепродуктов в вертикально интегрированных нефтяных компаниях. Уточнены задачи по своевременному обеспечению потребителей нефтепродуктами. Обозначен оптимальный выбор эффективных схем грузоперевозок нефтепродуктов, логистических схем их транспортировки и временного хранения, рациональность транзитных форм доставки нефтепродуктов потребителям. Выявлены основные цели достижения оптимальных систем сбыта нефтепродуктов вертикально интегрированными нефтяными компаниями. Обоснована возможность наличия специальных подразделений по реализации и экспорту нефтепродуктов крупными нефтяными компаниями. Проведен анализ показателей спроса и предложения нефтехимической продукции на мировых рынках с позиций автора по текущей ситуации на мировых рынках нефти в связи с пандемией коронавируса. Дан анализ и оценка производства и потребления основных нефтепродуктов на внутренних рынках Казахстана. В качестве отдельного примера был проведен анализ потребления дизельного топлива по регионам и отраслям национальной экономики Казахстана.

Ключевые слова: Продукция нефтепереработки, нефтяная и нефтехимическая продукция, нефтепродукция, сбыт и экспорт, производство и потребление. Рынок нефтяной продукции, базовые продукты нефтепереработки, нефтяные компании.

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METHODOLOGY FOR EVALUATING THE EFFECTIVENESS OF INVESTMENTS IN THE EXPANSION OF UNIVERSITY HOUSING INFRASTRUCTURE

Abstract. The article deals with the problem of assessing the socio-economic efficiency of investment in the expansion of University housing infrastructure. Evaluating the effectiveness of investment design solutions is the main approach to determining the return on investment of financial resources in expanding the Fund of student dormitories, in which both investors and all participants in the implementation of investment projects for the construction and modernization of student dormitories are interested. To determine the socio-economic efficiency of the investment project for the construction of housing infrastructure of higher education institutions, a system of indicators was formed. Methods for calculating the socio-economic efficiency of housing infrastructure investment projects based on qualitative and quantitative criteria are considered. A step-by-step implementation of methods for assessing the socio-economic efficiency of projects for the modernization of student housing stock is presented. Since all regions of Kazakhstan set the task of expanding the University's housing infrastructure through the construction of new and reconstruction of existing dormitories with the use of public-private partnerships, there is a need to expand student housing Fund, which is based on the data of the operator of the state program of JSC "Financial center" of the MES RK, which determines the need, funding sources, manage cash flow to ensure the introduction of new places in hostels for students, undergraduates and doctoral students, draws up contracts with investors.

Key words: investment project, housing sector; University housing infrastructure, student housing stock, student dormitories, project performance indicators; profit; discounted income; project payback period.

Intoduction. The housing sector is an entire industrial sector that accumulates the expansion of the housing stock through the construction of new buildings and reconstruction of existing housing facilities. An important part of the housing sector is the design and calculation of estimated documentation for investment projects. The structure of the housing sector also includes housing and communal services, which ensure the smooth functioning of housing facilities. Each object of the housing sector is a housing infrastructure.

University housing infrastructure includes housing facilities (employee homes, student dormitories, hotels, etc.), as well as housing and communal services. Among them, student dormitories are the most important infrastructure of the University, as they have a socio-economic impact on the level of education.

In the address to the people of Kazakhstan "Five social initiatives" in March 2018, Elbasy N. Nazarbayev outlined the construction of student dormitories up to 75 thousand places by the end of 2022 in order to "achieve the education system in accordance with international standards" by "improving the conditions of study and residence of students" [1]. In this regard, the expansion of the Fund of student dormitories in Kazakhstan is updated at the state level. Today, programs have been adopted and a forecast has been made for the construction of new and modernization of existing facilities for the residence of University students.

To finance the expansion of university housing infrastructure, investors are primarily interested in the cost-effectiveness of the design solution. Scientific research related to the social and economic assessment of the construction and modernization of student dormitories is practically absent today.

The practice of financing infrastructure projects is studied quite a lot by scientists and economists. Among the first research scientists, we can distinguish the works of representatives of the Keynesian and neo-Keynesian schools: P. Rosenstein Rodan, W. Rostow, A. Hirschman, and others [2-4]. In Kazakhstan, the issues of investment in infrastructure projects in recent years have been studied quite a lot by scientists-economists M. Kuttybai, N. Davletbayeva, Y.Orynbassarova, A. Kamenova, U. Zh. Shalbolova, S.Yegemberdieva [5,6]. The works of Russian researchers A. M. Petrov, R. V. Savkina, A. A. Kuzmina, M. Polulekh, T. A. Belousova are also devoted to the assessment of the investment attractiveness of projects [7].

The issues of the economy of the housing sector, housing and communal infrastructure, investments in the expansion of the housing stock were investigated by the following scientists: V. Buzyrev, D. Friedman, N. Ordway, H. Braun, V. Chernyak. [8-11]. But student dormitories do not stand out as a separate object of research.

Since the article examines the economics of university infrastructure, general issues of this direction are considered in the works of Y.V. Podoprigora, E.V. Ufimtseva, A.N. Trotsenko, I.M. Romanova, A.M. Sagatdinova [12-15]. Certain aspects of the university social infrastructure are considered by Noble Akujobi, N. French, G. Bhat, G. Matharu, F.O. Guimarães, D. Solomon, C. R La Roche, M. A. Flanigan, Jr.P. K. Copeland., G. Robert [16-18]. They investigate the quality of services and the standard of living of students on campuses, the assessment of catering establishments on campuses, the quality of housing and communal services, investment issues, the social environment of students, student traditions in dormitories.

Student dormitories have been studied quite a lot in construction science and architecture in terms of their design and architectural planning solutions.

Kazakh scientists who have chosen student dormitories as the object of research also mainly study the technical aspects. But from the point of view of economic science with the object of research of University housing infrastructure, the results in the Kazakh scientific space are still isolated. In Kazakhstan, there are separate scientific studies on the housing market, the housing and utilities economy, and the development of urban infrastructure, but they do not consider the economic relations that arise in the process of investment, design, construction, modernization of student dormitories and their communal and service maintenance.

Government programs in Kazakhstan aimed at increasing the number of student dormitories require questions about their financing. In order to attract investors to the construction and modernization of student dormitories, comprehensive research-based methods of socio-economic assessment of the expansion of University housing infrastructure (student dormitories) will become a guide to the justification of the choice of a particular design solution.

Main part. Economic assessment of investment projects of housing infrastructure is a rather complex process and is carried out using various methods. The effectiveness of design decisions and projects should be determined from the perspective of the resulting effect for various categories of users: society, the state, homeowners and residents at both the macroeconomic and microeconomic levels.

Currently, Kazakhstan is working to expand investment in the modernization of housing infrastructure through various mechanisms using modern economic tools. Each mechanism has obvious advantages and disadvantages, and different implementation conditions. The most affordable mechanism for financing the modernization of the student housing Fund is a state program using budget and private investment. The implementation of this program is being worked out in detail based on the experience of state programs for providing housing to young families. The operator of the state program is JSC "Financial center" of the Ministry of education and science of the Republic of Kazakhstan, which is responsible for its rationalization.

Starting with the implementation of the program for the construction of student dormitories, 4,500 students were able to live comfortably during their studies. Every year, the number of grants for higher education increases, which means that the need for places in student dormitories is growing. It is planned to provide places in dormitories not only for grant students, but for those students who study on a paid basis and need affordable temporary housing.

The structure of the need for places in student dormitories today has the following distribution: Almaty – 36%, Nur-Sultan – 20%, Shymkent – 9%, in Turkestan and East Kazakhstan regions-4%,

Pavlodar – 3%, Akmola – 3%, Aktobe – 3%, Kostanay – 3%, and North Kazakhstan – 3%, Karaganda, Atyrau, Almaty and West Kazakhstan regions – 2%, Kyzylorda and Mangystau regions- 1% [19].

Expansion of the Fund of University housing infrastructure for students, undergraduates and doctoral students is a guarantee of improving the level of education through the growth of the social side of life of young Kazakhstanis.

Today, the priority investment tool for expanding University housing infrastructure is the use of a public-private partnership mechanism. The program operator considers all options: construction of new dormitories, modernization of existing University housing infrastructures, reconstruction and re-profiling of other housing facilities, transfer of public utilities of student dormitories to trust management under PPP.

The investor is interested in choosing a cost-effective project. Any projects should be paid for, which requires a method of comprehensive socio-economic assessment of the expansion of University housing infrastructure. Investment projects for the modernization of University housing infrastructure must meet all quality evaluation criteria, detailed characteristics of which are presented in table 1.

Table 1 – Qualitative criteria used in evaluating investment projects for the modernization of University housing infrastructure

Quality criterion	Requirement	Compliance with the criterion
Quality criterion 1	-reconstruction of existing facilities for student dormitories should be carried out in accordance with the requirements of safety, reliability and quality; - bringing functioning University housing infrastructures in line with long-term plans and programs for the development of territories; - the need to modernize the municipal infrastructure.	an official document (reference, information) justifying the necessity and feasibility of implementing planned investment projects for the modernization of infrastructure housing facilities
Quality criterion 2	-application of modern technologies and energy-intensive materials in the design of a facility for the modernization of housing infrastructure.	reference, the result of an expert opinion, or others.
Quality criterion 3	-tariff policy, pricing system for utilities, execution of contracts and concession agreements for tariff formation	the information contains long-term parameters of tariffs for the sale of services for the considered utility infrastructure according to previously held tariff competitions.
Source: Compiled by the authors from the source [20]		

In addition to qualitative criteria for evaluating the effectiveness of infrastructure projects, an important role is assigned to the system of indicators that represent the ratio of investment spent and results obtained within the billing period for all project participants. The duration of the billing period is determined from the beginning of the project creation, the operational period until the result is achieved, i.e. the investor makes a profit.

Depending on the indicators, the methodology for evaluating the effectiveness of the investment project is determined by quantitative criteria. Since the University housing infrastructure belongs to the social sphere of the economy, it is necessary to assess the investment readiness itself, assess the economic efficiency and assess the social impact of the project. The detailed content of the indicators is shown in table 2.

In general, to assess the effectiveness of investment projects for the modernization of university housing infrastructure, a comprehensive methodology is required, the phased application of which includes the determination of initial data for calculating the efficiency of modernization of the infrastructure using quantitative and qualitative criteria, then the effectiveness of the project is assessed and the selection of the most attractive investment project. the final stage is the preparation of design estimates for the calculation of work and the development of a draft layout of the future investment object.

Table 2 – Quantitative indicators used in evaluating investment projects for the modernization of University housing infrastructure

The indicator	Economic meaning of the criterion	Mathematical expression of the calculation	Conclusion on the project
Investment readiness			
Capital Investment (IC)	Initial investment (capital investment) in an investment project	IC= sum of different funding sources	The composition of investors and the amount of investments are arbitrary.
Statistical methods of economic evaluation of an investment project			
Payback period (PP)	The period for which the investor will return their invested money (investment). The point of equilibrium of cash flows by costs and cash flows by income is determined [21].	$PP = \frac{IC}{CF}$, where: CF-cash flow over a certain period of time	PP ≥min Conclusion: the project with the shortest payback period is attractive.
Accounting Rate of Return) (ARR)	Indicator for reflecting the profitability of the investment object without taking into account the discount rate	$ARR = \frac{CF_{CP}}{IC}$, where: IC - capital investment in an investment project; CF_{cp}- average cash flow over a certain period of time	ARR>0 Conclusion: The higher ARR, the more attractive the project is.
Dynamic methods of economic evaluation of an investment project			
Net Present Value) (NPV)	Shows the change in cash flows and determines the difference between discounted cash income and expenses [21].	$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - IC$, where: CF_t- cash flow over time t; When investing through the mechanism of Public-private partnership, the cash flow of income is formed from the total addition of the size of the monthly state order for the construction and reconstruction of dormitories, rent payment for accommodation by students themselves, rental of commercial premises, co-financing by the University. r- discounted rate	NPV > 0 Conclusion: The investment project is attractive for investment
Internal Rate of Return) (IRR)	Shows the discount rate at which net discounted income is zero.	$0 = \sum_{t=1}^{n} \frac{CF_t}{(1+IRR)^t} - IC$,	IRR > WACC, where: WACC - minimum return on investment Conclusion: the capital invested in the investment project will create a return higher than the value of the invested capital. Such a project is attractive for investment
Profitability index) (PI)	Estimation of the nvestment value for each invested monetary unit.	$PI = \frac{NPV}{IC}$	PI > 1 The project is attractive for investment and provides additional return on capital.
Discounted Payback Period) (DPP)	The time value of the money and the future possibility of reinvesting the money are taken into account.	DPP - > min	
Methods of social evaluation of investment project effectiveness			
Bed space/person		the ratio of beds(m^2) to person	Provision of students, undergraduates and doctoral students with a bed in a student dormitory
Availability of cultural and leisure places		the ratio of places to student population	
Availability of sports areas		the ratio of premises(m^2)to student population	
Availability of canteens		the ratio of places to student population	
Availability of medical facilities		the ratio of beds (m^2) to student population	
Availability of retail space		the ratio of retail space tostudent population	
Security,service, household, etc		the ratio of number of facilities to student population	
Source: Compiled by the authors from the source [20.21]			

Conclusion. Evaluation of the socio-economic efficiency of investments in the modernization of University housing infrastructure is the main economic tool for choosing a future investment project. To determine the effectiveness of investments in small projects, simple static methods of evaluating performance should be used, while more global projects are calculated using complex dynamic evaluation methods.

The use of various methods for evaluating investment projects makes it possible to determine the most attractive object of University housing infrastructure. The presented methods provide a financial description of the life cycle of an investment project, since simple calculations of coefficients allow you to exclude non-profitable investment projects at the first stage of analysis.

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УНИВЕРСИТЕТТІК ТҰРҒЫН ҮЙ ИНФРАҚҰРЫЛЫМЫН КЕҢЕЙТУГЕ ИНВЕСТИЦИЯЛАР ТИІМДІЛІГІН БАҒАЛАУ ӘДІСТЕМЕСІ

Аннотация. Мақалада университеттің тұрғын үй инфрақұрылымын кеңейтуге салынған инвестициялардың әлеуметтік-экономикалық тиімділігін бағалау мәселесі қарастырылады. Инвестициялық жобалық шешімдердің тиімділігін бағалау инвесторлар да, студенттік қоғамдарды салу және жаңғырту бойынша инвестициялық жобаларды іске асырудың барлық қатысушылары да мүдделі, студенттік қоғамдар қорын кеңейтуге қаржы ресурстарын салудың рентабельділігін айқындаудың негізгі тәсілі болып табылады. Жоғары оқу орындарының тұрғын үй инфрақұрылымы объектілерін салу бойынша инвестициялық жобаның әлеуметтік-экономикалық тиімділігін айқындау үшін көрсеткіштер жүйесі қалыптастырылды. Сапалы және сандық критерийлер негізінде тұрғын үй инфрақұрылымы инвестициялық жобаларының әлеуметтік-экономикалық тиімділігін есептеу әдістері қарастырылды. Студенттік тұрғын үй қорын жаңғырту жобаларының әлеуметтік-экономикалық тиімділігін бағалау әдістерін поэтикалық іске асыру ұсынылды. Қазақстанның барлық өңірлерінде ортақ серіктестіктердің жаңаларын салу және барларын қайта құру есебінен университеттің тұрғын үй инфрақұрылымын кеңейту міндеті қойылды, ҚР БҒМ "Қаржы орталығы" АҚ мемлекеттік бағдарлама операторының деректері негізінде қажеттілікті, қаржыландыру көздерін айқындайды, студенттер, магистранттар мен докоранттар үшін жатақханаларда жаңа орындарды енгізуді қамтамасыз ету үшін ақша ағындарын басқарады, инвесторлармен шарттар ресімдейді.

Түйін сөздер: инвестициялық жоба, тұрғын үй саласы, университеттік тұрғын үй инфрақұрылымы, студенттік тұрғын үй қоры, студенттік жатақханалар, жобаның тиімділік көрсеткіштері, пайда, дисконтталған табыс, жобаның өтелу мерзімі.

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МЕТОДИКА ОЦЕНКИ ЭФФЕКТИВНОСТИ ИНВЕСТИЦИЙ В РАСШИРЕНИИ УНИВЕРСИТЕТСКОЙ ЖИЛИЩНОЙ ИНФРАСТРУКТУРЫ

Аннотация. В статье рассматривается проблема оценки социально-экономической эффективности инвестиций в расширение университетской жилищной инфраструктуры. Оценка эффективности инвестиционных проектных решений является основным подходом к определению рентабельности вложения финансовых ресурсов в расширение Фонда студенческих общежитий, в котором заинтересованы как инвесторы, так и все участники реализации инвестиционных проектов по строительству и модернизации студенческих общежитий. Для определения социально-экономической эффективности инвестиционного проекта по строительству объектов жилищной инфраструктуры высших учебных заведений была сформирована система показателей. Рассмотрены методы расчета социально-экономической эффективности инвестиционных проектов жилищной инфраструктуры на основе качественных и количественных критериев. Представлена поэтапная реализация методики оценки социально-экономической эффективности проектов модернизации студенческого жилищного фонда. Поскольку во всех регионах Казахстана ставится задача расширения жилищной инфраструктуры университета за счет строительства новых и реконструкции существующих общежитий с использованием государственно-частного партнерства, возникает необходимость расширения студенческого жилищного фонда, который на основе данных оператора государственной программы АО "Финансовый центр" МОН РК определяет потребность, источники финансирования, управляет денежными потоками для обеспечения ввода новых мест в общежитиях для студентов, магистрантов и докторантов, оформляет договоры с инвесторами.

Ключевые слова: инвестиционный проект, жилищная сфера; университетская жилищная инфраструктура, студенческий жилой фонд, студенческие общежития, показатели эффективности проекта; прибыль; дисконтированный доход; срок окупаемости проекта.

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СОСТОЯНИЕ И ПЕРСПЕКТИВЫ ЭКОНОМИКИ СЕЛЬСКИХ ТЕРРИТОРИЙ ПАВЛОДАРСКОЙ ОБЛАСТИ В КОНТЕКСТЕ УСТОЙЧИВОГО РАЗВИТИЯ

Аннотация. На современном этапе в отечественной научной среде проблемы обеспечения устойчивого развития сельских территорий недостаточно исследованы и требуют дальнейшего изучения. Цель устойчивого развития сельских территорий – это сбалансированное развитие экономической, социальной и экологической сфер, направленное на обеспечение благоприятной жизнедеятельности населения. В статье рассмотрены экономические аспекты функционирования сельских территорий Павлодарской области и проведена их комплексная оценка для решения задач социально-экономического развития данных территорий на текущую и долгосрочную перспективу. В качестве базы анализа и оценки использованы статистические данные официального сайта Комитета по статистике МНЭ РК, а также эмпирические наблюдения и информационные ресурсы местных исполнительных органов области. Определены системные проблемы экономики села, оказывающие негативное влияние на уровень и качество жизни сельского населения. К их числу, прежде всего, относятся доминирующая сырьевая направленность сельской экономики, низкий уровень производительности труда, обусловленный значительным моральным и физическим износом части производственно-технической базы, включая превышение срока эксплуатации подавляющей части техники, а также темпами обновления парка машин не соответствующими нормативным требованиям, использованием отдельными агросубъектами устаревших ресурсозатратных технологий. Показана позитивная динамика важнейших показателей АПК, которая сложилась, в первую очередь, за счет государственного регулирования отрасли и создания благоприятных условий посредством расширения соответствующего пакета мер государственной поддержки, направленных на развитие этого сектора национальной экономики.

Выработаны рекомендации, направленные на активизацию процессов диверсификации сельской экономики. Анализ состояния отечественного пчеловодства показывает, что данная рыночная ниша в национальной экономике недостаточно развита и эта отрасль имеет значительный нереализованный потенциал. Показаны выгоды развития отрасли пчеловодства, которые окажут позитивное влияние на усиление экспортных позиций несырьевой направленности, повышение занятости сельского населения, урожайности сельскохозяйственных культур, решение проблем деградированных агроугодий и др. Обоснована экономическая целесообразность и эффективность реализации инвестиционных проектов в сфере развития пчеловодства, одновременно обеспечивающие значительный социальный эффект.

Для перехода сельских территорий на качественно новый уровень развития авторами обоснованы стратегические перспективы дальнейшего развития с использованием внутреннего механизма их функционирования, резервов экономического роста и на основе учета специфики и особенностей административно-территориальных единиц.

Ключевые слова: экономика сельских территорий, устойчивое развитие, аграрный сектор, инновации.

Введение. Стабильность социально-экономического развития и рост благосостояния граждан страны зависят от развития входящих в ее состав регионов и в большей степени – сельской местности. С момента обретения независимости Казахстана совокупность отраслей и предприятий,

функционально обеспечивающих нормальную жизнедеятельность населения сельских территорий пережила контрцикличное снижение, вызванное распадом крупного сельскохозяйственного производства. Это способствовало тому, что переходный период, характеризующийся сменой одного хозяйственного уклада другим, сопровождался различными проблемами, в том числе финансовой устойчивости субъектов экономики, диспропорциями между совокупным спросом и предложением основных видов продукции, усилением поляризации социально-экономического пространства сельских территорий, углублением различий в стартовых позициях. Фундаментальная трансформация экономической среды функционирования субъектов АПК, негативно отразилась на состоянии занятости и доходах сельского населения.

Современное состояние экономики Казахстана обусловлено положительными качественными структурными изменениями, укреплением производственного и инфраструктурного потенциала, а также ростом экономических показателей, которые основываются на стратегически выверенной экономической политике, нацеленной на диверсификацию национальной хозяйственной системы посредством обеспечения государственной поддержки субъектов бизнеса, осуществляющих деятельность в приоритетных направлениях, включая внедрение инновационных технологий.

В этих целях в рамках реализации различных стратегических и программных документов, ежегодно увеличиваются объемы бюджетных средств, направляемые на инфраструктурное развитие регионов, включая сельские территории, где масштабы качественных трансформаций социально-экономических параметров весьма значительны. Несмотря на это сельские территории еще имеют ряд не решенных ключевых задач социально-экономического характера, и в этих условиях становится актуальной исследование проблем придания новых импульсов для модернизации экономического базиса сельских территорий и обеспечения устойчивости всех сфер общественного развития через призму методологических и теоретических установок парадигмы устойчивого развития.

Проблемам устойчивого развития территорий уделяется достаточно много внимания со стороны как отечественного, так и зарубежного научного сообщества, различные аспекты которых раскрыты в исследованиях таких ученых, как Г.А. Калиева, К. Балгинова, Ш. Ахметова, А. Алибекова, А.В. Мерзлов, В.М. Баутин, А.В. Петриков и др.

Целью настоящего исследования является анализ экономического состояния сельских территорий, идентификация ключевых проблем и обоснование приоритетных направлений устойчивого их развития.

Материалы и методы исследования. Стабильность развития сельскохозяйственного производства является важным составляющим пространственного развития сельских территорий. В связи с этим, именно этот фактор предопределяет успешную реализацию региональной политики, направленной на обеспечение перехода сельских регионов Павлодарской области на траекторию устойчивого развития, понимаемого как триединство экономических, социальных и экологических сфер общественного развития. Это обусловлено тем, что при осуществлении анализа социально-экономического развития данных территорий ключевым аспектом выступает индикатор, оценивающий общий объем произведенной продукции, качественная составляющая которого зависит от масштаба использования инновационных технологий. Формирование высокой добавленной стоимости, повышение производительности труда за счет инноваций создает социально-экономический эффект и позитивно отражается на росте доходов сельского населения.

В связи с этим при формировании и реализации региональной политики одним из важных задач является изыскание внутренних резервов роста, решение которой обуславливается новыми подходами к содержанию, формам и методам оценки ресурсного потенциала той или иной территорий. Данный ресурсный потенциал характеризует интеграцию природных, материальных, финансовых, человеческих и иных ресурсов, используемых в процессе производства общественных благ, направленных на повышение экономического благосостояния, уровня и качества жизни населения.

В рамках настоящего исследования авторами были использованы методы: анализа и синтеза, дедукции, индукции, сравнения и обобщения.

Обзор литературы. Данное исследование основывается на фундаментальных работах отечественных и зарубежных ученых в области устойчивого развития сельских территорий. При анализе экономического положения сельских территорий Павлодарской области авторы опирались

на статистические и ведомственные показатели, а также данные из государственной программы «Развитие регионов до 2025 года», Государственной программы развития агропромышленного комплекса Республики Казахстан на 2017-2021 годы, стратегии «Казахстан-2050».

Актуальность проблемы экономического развития территоий не вызывает сомнений, что подтверждается исследованиями таких ученых как А. Пезенти, У. Ростоу, Р. Йохимсен и П. Самуэльсон, которые указывают на важность развития совокупности отраслей и видов деятельности, обслуживающих производство и хозяйство в целом, поскольку высокий уровень развитости инфраструктуры экономики служит общим фундаментом и опорой для формирования предпринимательского блока, экономических отношений и снижения затрат при производстве продукции, оказании услуг и выполнении работ. Многие ученые полагают, что развитие экономической базы экономики села – сельского хозяйства в соответствии с современным технологическим уровнем производства, несомненно, окажет положительное влияние в целом на пространственное развитие сельских территорий [1, 2, 3, 4].

Большинство исследователей [5, 6] считают, что устойчивость сельской экономики находится в прямой зависимости от кадрового обеспечения, развитие которого осуществляется через социальную сферу в функциональной структуре сельских территорий.

Многие ученые [7, 8] сходятся во мнении, что учитывая ключевую роль сельскохозяйственного потенциала в экономической составляющей села, в качестве одного из приоритетных направлений сельской экономики выступает развитие кооперационных связей среди агро-субъектов.

Результаты и обсуждение. На основе научного метода анализа экономических процессов, происходящих в сельских районах Павлодарской области установлено, что они отличаются друг от друга разнородностью экономического пространства.

Уровень ресурсного потенциала сельских территорий предопределяет их инвестиционную привлекательность и возможность обеспечения стабильности социально-экономического развития.

Инвестиции в основной капитал оказывают значительное влияние не только на развитие экономики, но и иных аспектов сельских территорий. Объем привлеченных инвестиционных вложений в сельскую местность Павлодарской области за период 2015-2019 годы показан в таблице 1.

Таблица 1 - Инвестиции в основной капитал в сельской местности

Годы	Инвестиции в основной капитал	Работы по строительству и капитальному ремонту зданий и сооружений	Машины, оборудование, инструмент	Прочие затраты
2015	214,7	156,0	57,4	1,3
2016	187,9	152,2	34	1,7
2017	76,1	54,0	19,6	2,5
2018	119,4	79,9	38,0	1,5
2019	127,9	72,7	50,9	4,3

Примечание – составлено авторами на основе источника [9].

Динамика инвестиций в основной капитал, направленных на развитие сельских территорий Павлодарской области за анализируемый период, характеризуется снижением ее величины в 2019 году на 40 % по сравнению с 2015 годом. При этом самый низкий объем инвестиций зафиксирован в 2017 году.

Проседание показателя вложенных инвестиций в основной капитал в сельской местности обусловлено, прежде всего, изменением объемов финансирования в рамках различных государственных программ на фоне циклических колебаний конъюнктуры мирового рынка нефти. Вместе с тем, в период с 2018 по 2019 годы по сравнению с 2017 годом наблюдается устойчивая тенденция увеличения объемов инвестиций и здесь следует отметить, что в качестве одного из факторов, способствовавших их положительной динамике является реализация проекта «Ауыл – ел бесігі».

Аграрный сектор является ключевым составляющим в воспроизводственном процессе сельской экономики. Поэтому экономика села и сельские территории взаимосвязаны, так как сельскохозяйственное производство это реальное основание формирования сельских сообществ, которые в той или иной степени связаны АПК. Уровень развития сельского хозяйства выступает одним из основных факторов экономической, социальной и политической устойчивости общества.

Удельный вес аграрного сектора в отраслевой структуре ВРП Павлодарской области за период 2015-2019 годы характеризуются ежегодным увеличением, за исключением 2017 года. В целом, за анализируемый период доля сельского хозяйства в формировании валового регионального продукта области увеличилась с 4,6 % до 5,4 %. Это связано с повышением инвестиционной привлекательности данного сектора экономики, что подтверждается поступательным ростом объемов инвестиционных вложений в отрасль. Анализ показателей инвестиций в основной капитал по направлениям использования показывает, что доля инвестиций в сельское хозяйство за анализируемый период увеличилась с 1,7 % в 2015 году до 10,9 % в 2019 году. Кроме того, анализ данного статистического показателя в абсолютном выражении так же демонстрирует семикратный темп роста (2019 год к 2015 г.). Здесь следует отметить, что позитивная динамика важнейших показателей отрасли сельского хозяйства сложилась, в первую очередь, за счет государственного регулирования АПК и создания благоприятных условий посредством расширения соответствующего пакета мер государственной поддержки, направленных на развитие этого сектора национальной экономики.

Снижение удельного веса сельского хозяйства в отраслевой структуре ВРП Павлодарской области зафиксировано в 2017 году, которое составило 4,8 %. Это обусловлено, прежде всего, высокой волатильностью маржинальности сельскохозяйственного производства, которая зависит от различных факторов, в том числе природно-климатических, что в результате оказывает влияние на урожайность зерновых культур и в целом на объемы их валового сбора (рисунок 1).

Рисунок 1 – Удельный вес сельского хозяйства в экономике Павлодарской области

Примечание – составлено авторами на основе источника [10].

Эмпирический анализ развития сельского хозяйства области показывает, что, несмотря на активную государственную поддержку и позитивные изменения как количественных, так и качественных показателей отрасли, еще имеют место отдельные сдерживающие факторы экономической устойчивости аграрного сектора. Ключевыми из них, на наш взгляд, являются: во-первых, это незначительная доля сельского хозяйства в структуре ВРП области, которая в анализируемом временном диапазоне настоящего исследования в среднем составляет 5 %; во-вторых, несмотря на то, что ежегодно увеличивается государственная поддержка отрасли, все еще сохраняется проблема низкой производительности труда, которая оказывает негативное влияние на повышение конкурентоспособности сельскохозяйственной продукции, как на внутреннем, так и на внешнем рынках.

Современные системы государственной поддержки АПК предполагают развитие институциональной базы агропродовольственных систем как на макроуровне, так и на уровне регионов [11]. Практическая реализация принятых мер финансовой и иной поддержки в рамках различных государственных программ, направленных на развитие сельского хозяйства свидетельствует о том, что они в целом оказывают положительное воздействие на качественную трансформацию отрасли. Однако, принимая во внимания риски по отдельным направлениям мер государственной поддержки, были внесены соответствующие законодательные изменения по способам поддержки сельхозтоваропроизводителей .

В этой связи новая аграрная политика в контексте Государственной программы развития агропромышленного комплекса Республики Казахстан на 2017 – 2021 годы ориентирована на увеличение в течение реализации данного программного документа производительности труда в АПК и экспорта переработанной сельскохозяйственной продукции как минимум в 2,5 раза по сравнению с 2017 годом, а также на повышение конкурентоспособности отрасли АПК посредством увеличения производительности труда с 1,2 млн. тенге на 1 занятого в этом секторе экономики до 3,7 млн. тенге к 2021 году. Достижение указанного целевого ориентира требует более высокой эффективности сельскохозяйственного производства, которое возможно за счет цифровизации отрасли.

На сегодняшний день в АПК применяются цифровые решения по внедрению электронной торговой площадки, созданию цифровых ферм [12].

Динамика производства валовой продукции сельского хозяйства Павлодарской области за 2015-2019 годы отражает последовательное стабильное наращивание объемов производства сельскохозяйственной продукции как в растениеводстве, так и в животноводстве (таблица 2).

Таблица 2 – Валовая продукция сельского хозяйства
и структура продукции сельского хозяйства по отраслям производства

	2015 г.		2016 г.		2017 г.		2018 г.		2019 г.	
	млрд. тенге	%	млрд. тенге	%	млрд. тенге	%	млрд. тенге	%	млрд. тенге	%
Сельское хозяйство	152,4	100	171,5	100	196,4	100	226,2	100	254,1	100
растениеводство	73,8	48,5	83,7	48,8	95,2	48,5	110,0	48,6	122,8	48,3
животноводство	78,5	51,5	87,7	51,2	101,1	51,5	116,2	51,4	128,5	51,7

Примечание – источник [10].

В 2019 году объем валовой продукции сельского хозяйства возрос в 1,7 раза по сравнению с 2015 годом. Вместе с тем, следует отметить, что аграрный сектор Павлодарской области имеет значительный потенциал развития. Системные экономические проблемы отрасли, включая гарантированный сбыт продукции, доступность к заемным средствам, обновление машинотракторного парка, оказывает негативное влияние на интенсификацию производственной деятельности субъектов малого и среднего агробизнеса.

Анализ производства основных продуктов животноводства по категориям хозяйств показывает, что ее значительная часть производится в личных подсобных хозяйствах. Безусловно, домашние хозяйства оказывают существенное влияние в целом на продовольственную ситуацию, однако следует подчеркнуть наличие проблемы недостаточной эффективности сельскохозяйственного производства в личных подсобных хозяйствах.

В целях повышения эффективности малых форм хозяйствования разработан законодательный механизм по укрупнению личных подсобных и иных хозяйств посредством создания сельскохозяйственных кооперативов. Преимуществом кооперативных объединений является то, что их участники охватываются мерами государственной поддержки в виде субсидий и т.д.

Количество действующих сельскохозяйственных кооперативов и их членов в Павлодарской области показаны в таблице 3.

Таблица 3 - Действующие сельскохозяйственные кооперативы в Павлодарской области

	Количество действующих сельскохозяйственных кооперативов	Количество членов в составе			
		Юридические лица	крестьянские или фермерские хозяйства	индивидуальные предприниматели	домашние хозяйства
2017	106	11	185	137	881
2018	119	17	213	194	1 430
2019*	120	26	-	373	1 468

Примечание – источник [10].
*Данные за январь-сентябрь 2019 года

Данные таблицы 3 показывают, что в 2018 году по сравнению с 2017 годом при увеличении количества действующих сельскохозяйственных кооперативов на 12 %, наблюдается позитивная динамика роста участников из числа домашних хозяйств, количество которых увеличилось в 1,6 раза. Для указанных категорий субъектов экономической деятельности развитие кооперационных связей, которые охвачены мерами государственной поддержки, способствует созданию экономических предпосылок для снижения доли беспородного скота и повышения эффективности мясного и молочного скотоводства.

Аграрная политика страны сфокусирована не только на импортозамещении, направленное на снижение доли импорта во внутреннем потреблении по отдельным продовольственным товарным позициям (плодоовощные и мясные консервы, колбасные изделия и сахар, масло сливочное и растительное, сыры), но и на стимулировании экспортных поставок сельскохозяйственной продукции и продовольствия.

Одним из принципов устойчивого развития сельских территорий является диверсификация сельской экономики и в данном контексте в качестве стратегического направления нами предлагается активное развитие пчеловодства, поскольку эта рыночная ниша в национальной экономике недостаточно развита по сравнению с мировым уровнем развития этой отрасли сельского хозяйства, что подтверждается низким объемом потребления продукции отрасли в расчете на одного жителя страны.

Важность развития данной отрасли сельского хозяйства обусловлено рядом следующих положительных моментов:

- расширение ассортиментной линейки продукции пчеловодства позволит увеличить долю отечественного экспорта несырьевой направленности;
- за счет диверсификации традиционных сфер сельской экономики и создания новых рабочих мест имеется возможность снижения числа незанятого или самозанятого населения;
- краткосрочный период окупаемости инвестиционных вложений в среднем 1,5-2 года;
- устойчивый спрос на продукцию пчеловодства в пищевой и фармацевтической промышленности, косметологии;
- тесная корреляционная связь между отраслями пчеловодство и растениеводство, которая обусловлена существенным увеличением урожайности сельскохозяйственных культур от опылительной деятельности пчел.

По нашему мнению, в целях активного развития пчеловодства в Казахстане необходимо принятие специальной программы либо включение данной отрасли в качестве приоритетного направления в действующие меры государственной поддержки в рамках документов Системы государственного планирования в Республике Казахстан.

На сегодняшний день в Павлодарской области насчитывается 352 села, где проживает 221,3 тыс. человек [13]. Как уже выше нами отмечалось, необходимо создание надлежащих условий, которые будут важным фактором для развития пчеловодства.

Кроме того, следует определить в стратегических направлениях Программы развития территорий приоритетность данной отрасли и установить целевой индикатор по созданию в каждом сельском населенном пункте не менее 2 субъектов пчеловодства, ежегодно.

Развитие одного пчелиного хозяйства обеспечит создание минимум 2-3 новых рабочих мест. Первоначальные инвестиции на реализацию проекта составляют в среднем 3 000 тыс. тенге. Средняя стоимость улья с пчелами составляет около 50 тыс. тенге. При покупке 40-50 ульев, за сезон они ориентировочно могут генерировать порядка 1800 кг меда, т.е. при рыночной стоимости 1 кг меда 1500 тенге, общий доход составит 2 700 тыс. тенге. Срок окупаемости инвестиционных вложений в рамках данного проекта ориентировочно 1,5-2 года.

Данные расчеты показывают высокую экономическую эффективность капиталовложений в инвестиционные проекты, направленные на развитие отрасли пчеловодства. Поэтому краткосрочный временной горизонт возврата привлеченного капитала повышает инвестиционную привлекательность проектов отрасли пчеловодства. Кроме того, реализация указанных проектов имеет не только экономические преимущества, но и значительный социальный эффект, включая создание дополнительных рабочих мест, рост доходов населения и др.

Для реализации данного стратегического направления необходимо создание благоприятных условий в рамках государственных программ и определение целевых индикаторов. Достижение предлагаемого выше целевого индикатора в рамках стратегических программ Системы государственного планирования в Республике Казахстан позволит, по нашим предварительным прогнозам создать порядка 1300 новых рабочих мест ежегодно.

В этих целях, полагаем целесообразным на начальном этапе, для вовлечения экономически активного сельского населения к данной деятельности, направить на указанные цели в приоритетном порядке объемы грантового финансирования, выделяемые в рамках государственных программ, а также иные меры финансовой поддержки. К примеру, в РФ действуют субсидии на компенсацию части затрат: на содержание пчелосемей; на приобретение маток пчел и пчелопакетов; на техническое перевооружение сельскохозяйственных производителей, занимающихся пчеловодством.

Таким образом, государственная поддержка отрасли способствует масштабированию аналогичных проектов в сельской местности, что окажет положительное влияние на их социально-экономическое развитие.

Среди множества позитивных моментов развития пчеловодства следует отметить, что оно способствует решению проблем деградированных агроугодий и вовлечению их в сельскохозяйственный оборот. К примеру, решение этой проблемы возможно посредством засева сельскохозяйственной культуры – донника, который не только выступает в роли сидерата, улучшая качество почвы, но и также является наиболее продуктивной медоносной травой.

В этих целях полагаем, что необходимо определить в Программе развития территорий базовое направление «Сохранение и повышение плодородия почв», в рамках которого предусмотреть за счет средств бюджета меры по залужению малопродуктивных земель с учетом предлагаемых нами подходов. В результате решения экологических проблем одновременно создаются благоприятные условия для развития отрасли пчеловодства.

Также следует отметить, что другим преимуществом развития пчеловодства является повышение потребления меда населением страны, что позитивно отразится на снижении потребления основного социально важного продукта ежедневного спроса – сахара. Важность снижения потребительского спроса на эту продукцию актуально тем, что с одной стороны, ценовой параметр на сахар имеет высокую волатильность в течение года, а с другой –в свеклосахарной промышленности страны высокая доля импортного сырья по сравнению с отечественным, соотношение которых 95 % и 5 % соответственно. Поэтому мультипликативный эффект от развития пчеловодства на различные сферы жизнедеятельности очевиден.

Важным условием инвестиционной привлекательности сельскохозяйственных компаний для участия в программах развития государственных, частных и общественных структур, по мнению профессора К.Флора является способность компании показать, что она является эффективной [14].

Для достижения указанной цели, на наш взгляд, в процессе хозяйствования следует исходить из необходимости: во-первых, направления инвестиционных вложений на развитие переработки сельскохозяйственной продукции, во-вторых, широкого использования методов качественного планирования, достижения и измерения конечных результатов и, в-третьих, внедрения принципов

системы сбалансированных показателей, разработанных Р. Каплан и В. Нортон, способствующие приданию устойчивости субъектам бизнеса на долгосрочной основе [15].

Как отмечено выше, в сельском хозяйстве все еще сохраняется проблема низкой производительности труда.

В условиях «Индустрии 4.0» повышение производительности через инновации является одним из главных приоритетов многих стран [16]. В ЕС в число основных факторов, оказывающих значительное влияние на повышение производительности труда, относятся: технологические инновации, повышение квалификации персонала и технологии организации труда [17].

В данном контексте необходимо развивать перспективные инновационные направления, в том числе в сельском хозяйстве и для этого должна быть усилена роль университетов и исследовательских центров [18, 19]. Для активизации данного процесса и привлечения крупных инвесторов в сельские населенные пункты, представляется целесообразным усиление экономических стимулов путем снижения налоговой нагрузки для крупных инвесторов, что позволит создать производственное ядро каждого села.

При снижении ставок налогов, одним из основных условий должно быть обязательное использование в производственной деятельности инноваций [20]. В этой связи, техническое оснащение рабочих мест в сельском хозяйстве на должном уровне (преимущественно за счет развития отечественного производства сельскохозяйственной техники и оборудования) требует системного подхода и активизации интеграции науки, производства и образования.

При этом необходимо осуществлять модернизацию экономической структуры «снизу», т.е. с преобладанием частной инициативы, поддерживаемой непосредственно государством на всех уровнях. В таком случае поддержка заключается в создании качественных условий для модернизации экономики [21].

Исследование вопроса устойчивого развития сельских территорий в сложившихся социально-экономических условиях требует внимательного рассмотрения важной ее составляющей экономического аспекта, являющегося одним из ключевых показателей сельского развития, который оказывает влияние на качество, уровень жизни. В частности, для сельских жителей актуальны различные проблемы, в том числе вопросы, связанные с предоставлением базовых, повседневных услуг [22].

Как свидетельствует опыт развитых стран, партнерство частного и государственного секторов экономики является основой инновационного развития [23]. Поэтому для обеспечения комплексного развития сельских населенных пунктов необходимо создавать благоприятные условия для вовлечения частный инвестиций, расширять государственно-частное партнерство, интенсивнее использовать опыт частного сектора в управлении проектами [24].

Современный этап для развитых государств, характеризуется переходом на постиндустриальное развитие, изменяющее подходы к понятию капитала, в котором начинает доминировать интеллектуальный аспект. По мнению большинства ученых, становится очевидной, что в составе капитала определяющее влияние на эффективность компаний оказывает нематериальный актив - знания человека. Это трансформирует структуру и критерии оптимизации капитала [25]. Поэтому также важно развитие человеческого капитала, предопределяющего стержневую основу системы устойчивости и обеспечивающего интенсивное использование резервов производительности труда, а также повышение эффективности производственной деятельности.

Характерная особенность для рынка труда сельской местности – это низкая оплата труда, обусловленная различными факторами (обесценивание труда в силу превышения предложения над спросом, отсутствия квалификации, навыков, опыта, диспаритет отраслевых цен и т.д.). Это приводит к ограничению мотиваций для улучшения технологического и технического уровня производственной системы, поскольку этому способствует дешевый производственный ресурс – труд. Поэтому решение данной проблемы требует внимания на всех уровнях с участием представителей государственных органов, бизнес-среды, институциональных инвесторов на основе активного осуществления процессов модернизации.

Заключение. На сегодняшний день состояние экономической основы сельских территорий в существенной мере определяется качественными трансформациями, имеющими место в аграрном

секторе. Наряду с этим, сельское хозяйство, представляя собой многофункциональную, динамичную систему, включающую широкий спектр народнохозяйственных функций, а также являясь основной специализацией экономики села, имеет еще ряд проблемных вопросов, требующих безотлагательного решения.

Следовательно, требуется аграрная стратегия, учитывающая анализ текущего состояния и тенденции развития сельскохозяйственной производственной деятельности на основе формирования новых производительных сил в системе АПК, изменения структуры производства. Эффективная и успешная реализация аграрной стратегии во многом определяется качественным исполнением ее базовых положений на местном уровне. Для перехода сельских территорий на качественно новый уровень развития важно обеспечить модернизацию экономического базиса данных территорий. Достижение этой цели требует системности в оптимальном размещении производительных сил и, в целом, развитии сельских территорий.

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ТҰРАҚТЫ ДАМУ МӘНМӘТІНІНДЕГІ ПАВЛОДАР ОБЛЫСЫНЫҢ АУЫЛДЫҚ АЙМАҚТАРЫ ЭКОНОМИКАСЫНЫҢ ЖАҒДАЙЫ МЕН БОЛАШАҒЫ

Аннотация. Қазіргі кезеңде отандық ғылыми ортада ауылды аймақтардың орнықты дамуын қамтамасыз ету мәселелері жеткілікті зерттелмеген, сондықтан бұл мәселені одан әрі зерделеуді талап етеді. Ауылды аймақтарды тұрақты дамытудың мақсаты – халықтың қолайлы тыныс-тіршілігін қамтамасыз етуге бағытталған экономикалық, әлеуметтік және экологиялық салаларды теңгерімді дамыту. Мақалада Павлодар облысының ауылды аймақтарының жұмыс істеу үдерісінің экономикалық аспектілері қарастырылды және аймақтардың ағымдағы әрі ұзақмерзімді перспективаға арналған әлеуметтік-экономикалық даму міндеттерін шешу үшін оларға кешенді бағалау жүргізілді. Талдау және бағалау базасы ретінде ҚР ҰЭМ Статистика комитеті ресми сайтының статистикалық деректері, сондай-ақ облыстың жергілікті атқарушы органдарының эмпирикалық бақылау жұмыстары мен ақпараттық ресурстары пайдаланылды. Олардың қатарына, ең алдымен, ауыл экономикасының басым шикізаттық бағыты, өндірістік-техникалық базаның бір бөлігінің айтарлықтай моральдық және физикалық тозуына, оның ішінде техниканың басым бөлігінің пайдалану мерзімінің асып кетуіне, сондай-ақ жекелеген агроқұрылымдардың ескірген ресурстарды қажет ететін технологияларды пайдалануына сәйкес келмейтін машиналар паркін жаңарту қарқынына байланысты еңбек өнімділігінің төмен деңгейі жатады. Ауыл шаруашылығы саласының маңызды көрсеткіштерінің оң серпіні көрсетілді, ол бірінші кезекте АӨК-ні мемлекеттік реттеу және ұлттық экономиканың осы секторын дамытуға бағытталған мемлекеттік қолдау шараларының тиісті пакетін кеңейту арқылы қолайлы жағдай жасау есебінен қалыптасты.

Ауыл экономикасын әртараптандыру үдерістерін жандандыруға бағытталған ұсынымдар әзірленді. Отандық ара шаруашылығының ахуалын талдау ұлттық экономикадағы аталған нарықтық тауашаның жеткіліксіз дамығанын және бұл саланың айтарлықтай іске асырылмаған әлеуеті бар екенін көрсетеді.

Ара шаруашылығы саласын дамытудың елеулі пайдалы тұстары көрсетілді, ол шикізаттық емес бағыттағы экспорттық позицияларды күшейтуге, ауыл халқының жұмыспен қамтылуын, ауыл шаруашылығы дақылдарының өнімділігін арттыруға, тозған агроугодия мәселелерін шешуге және т.б. оң әсер етеді. Ара шаруашылығын дамыту саласындағы инвестициялық жобаларды іске асырудың экономикалық мақсаттылығы мен тиімділігі негізделген, олар бір мезгілде елеулі әлеуметтік әсерді қамтамасыз етеді.

Ауылды аймақтарды дамытудың сапалы жаңа деңгейіне көшіру үшін авторлар ауылды дамытудың басымдықтары туралы жасалған қорытындылар негізінде олардың жұмыс істеу жағдайының ішкі тетігін, экономикалық өсу резервтерін пайдалана отырып, әкімшілік-аумақтық бірліктер ерекшелігін есепке алу негізінде одан әрі дамудың стратегиялық перспективаларын негіздеді.

Түйін сөздер: ауылды аймақ экономикасы, тұрақты даму, аграрлық сектор, инновациялар.

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THE STATE AND PROSPECTS OF THE ECONOMY OF RURAL AREAS OF PAVLODAR REGION IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

Abstract. At the present stage in the domestic scientific environment, the problems of ensuring sustainable development of rural areas are insufficiently studied and require further study. The goal of sustainable development of rural areas is a balanced development of the economic, social and environmental spheres, aimed at ensuring a favorable life of the population. The article considers the economic aspects of the functioning of rural territories of Pavlodar region and provides a comprehensive assessment to solve the problems of socio-economic development of these territories in the current and long-term perspective. As a base of analysis and assessment used statistical data of the official website of the Committee on statistics of MNE of RK, and also empirical observation and informational resources of local Executive bodies region. Based on the results, which identified systemic problems of the rural economy that have a negative impact on the level and quality of life of the rural population. These include, first and foremost, the dominant raw material orientation of the rural economy, low labour productivity, due to the significant moral and physical deterioration of the production-technical base, including the excess of the lifespan of the majority of equipment, as well as the rate of fleet renewal machines relevant regulatory requirements, using a separate are subject obsolete resource-intensive technologies. It is shown positive dynamics of key indicators of agriculture, which developed in the first place, due to government regulation of agriculture and the creation of an enabling environment through the extension of the relevant package of measures of state support aimed at the development of this sector of the national economy.

Recommendations aimed at activating the processes of rural economy diversification have been developed. Analysis of the state of domestic beekeeping shows that this market niche in the national economy is not sufficiently developed and this industry has a significant unrealized potential. Significant benefits of the development of the beekeeping industry are shown, which will have a positive impact on strengthening the export positions of non-resource orientation, increasing employment of the rural population, crop yields, solving the problems of degraded agricultural land, etc. The economic feasibility and effectiveness of investment projects in the field of beekeeping development, which simultaneously provide a significant social effect, are justified.

For the transition of rural territories to a qualitatively new level of development, based on the conclusions made about the priorities of rural development, the authors justify strategic prospects for further development using the internal mechanism of their functioning, reserves of economic growth and taking into account the specifics and features of administrative-territorial units.

Keywords: rural economy, sustainable development, agricultural sector, innovation.

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CORPORATE SOCIAL RESPONSIBILITY AND PROSPECTS FOR SOCIAL PROJECT MANAGEMENTOF ENTERPRICES

Abstract. The concept of social responsibility is the result of the evolution of traditional views on the nature of management due to the assessment of the organization's activities impact on the external environment; an approach that has shown its effectiveness and efficiency over decades of practice. Along with the contribution of environmental issues to the formation of socially responsible behaviors, a significant contribution to the development of this concept is the revision of the organizations image and their place in society, understanding the hidden power over the formation of favorable economic conditions and defining the complex motives that determine their philanthropic inclinations. In modern conditions the concept of social responsibility is one of the most important strategic management tools used to maintain the competitiveness of the enterprise, it is used in enterprises to assess and plan activities that contribute to the harmonious development of internal and external social environment.

Keywords:social responsibility, enterprise, design, external and internal environment, risks.

Introduction. Social responsibility becomes a tool for maintaining the competitiveness of an industrial enterprise; it allows to determine the main prospects for sustainable development of the enterprise and to form a model of external and internal environment, on which the development of human capital directly depends. The creation of social responsibility financing tools based on the methods of social design and the study of the human capital role in the social policy of enterprises has significant prospects. In addition, the relevant direction is the methodological support for the processes of assessing the level of development of social responsibility systems in enterprises through the analysis of the dynamics of social activity development and the analysis of risks arising in the social sphere.

In modern conditions the strategic importance is acquired by full development of social responsibility, first of all - within the training and development of their employees, providing additional opportunities of social growth for certain categories of industrial personnel, management of their health capital. Every year enterprises declare an increase of considerable volume of investments into the social sphere within the published social reporting, expansion of a package of social guarantees for their employees to increase their attractiveness for employment. In these conditions, the search for and rational justification of key areas of social financing, consideration of potential risks and elaboration of social responsibility become especially relevant.

Methods. Working out any approach to realization of social responsibility is based, first of all, on the modern understanding of its principles and development of this concept in foreign managerial thought. The basis of such principles according to the general definition is a voluntary undertaking by the enterprise to fulfill various kinds of social programs on a gratuitous basis [1]. Initially, this principle was developed primarily in the U.S., being the basis for such concepts as "social responsibility of business," "corporate social responsibility," and "corporate social conscientiousness. Intuitively corporate management began to conclude that social performance is as important as profit making and is the key to sustainable development. According to G. Bowen, social responsibility consists in making such decisions that would determine the company's line of behavior, desirable and favorable for the goals and values of society. The researcher noted that the phenomenon of corporate social responsibility is an act of philanthropy, which is dictated by the desire of communities to support their values [2].

However, with the emergence and formation of new socio-economic phenomena that emerged with globalization and regionalization of the world economy, approaches to the interpretation of social responsibility were significantly rethought and deepened [3]. The heyday of philanthropy, which began in the 1970s and lasted until 1990, was soon replaced by the systematized concepts of "business ethics" and "stakeholders". The very concept of stakeholders specifies the contribution of each enterprise at the individual level, the fundamental principle becoming the consideration of the external social environment along with the direct stakeholders. The new way of business development implied the creation of high standards of life for people inside and outside corporations, along with the achievement of economic efficiency.

The conditions of the 21st century imply qualitative changes in the social activity of enterprises associated with technological changes, which allowed to mark the transition to a postindustrial society. The values of such a society imply freedom and personal development through the fullest professional involvement, which implies high social guarantees and high commitment to their specialization. A number of researchers also note that most modern companies are under pressure to comply with the principles of social responsibility [4], as government representatives are also often involved in stimulating social activity of companies, including requirements for its implementation in their political programs.

The foundation of relations in the labor sphere is the observance of human rights (for example, non-acceptance of discrimination of any kind), as well as the observance of labor legislation.The solution of these issues refers rather to the basic level of development of social responsibility at the enterprise. More developed technologies of social responsibility imply innovative approaches to work with personnel: development of additional social guarantees beyond the scope of labor legislation in the area of medical insurance, provision of free or preferential access to social infrastructure, including psychological assistance, various types of non-material incentives for maintaining high professional status and work efficiency, etc. We note that the lack of investment in the social sphere at the employeeslevel entails significant risks for any enterprise and enterprise management should pay high attention. for this point.

The results of the study. Enterprise managers in modern conditions seek to consolidate the principles of social responsibility implementation in sustainable development strategies, thereby integrating social policy and the practice of organizational and production activities. The formalization of social design and planning, which would allow a systematic assessment of the risks to the long-term activities of companies associated with social activities, becomes a priority. The creation of a social projectsportfolio at each industrial enterprise that meets certain criteria will avoid the loss of accumulated human capital and increase job satisfaction of certain categories of production personnel. A study of social investment trends shows that social projects should also contain elements of ecological policy [5] and reflect the impact of individual managerial decisions on the dynamics of health capital. [6].

The initial stage of social design is the development or refinement of the social policy of the enterprise. The implementation of the system approach to social responsibility consists of the following stages:

- strategic analysis of the external and internal social environment, including the study of the most urgent issues related to the organization's employees, relations with the immediate business environment, the study of obligations in business communities, the environmental situation in the region of presence, etc.;
- clarification of the strategic vision and mission of the organization through the prism of socially responsible behavior, indication of direct or indirect achievement of social goals in the course of social activity;
- development of social policy and implementation of its elements in the operational and supporting business processes of the organization [7];
- forming a balanced portfolio of social projects, taking into account the adoption of risks in relations with key stakeholders, taking into account the interests of each stakeholder;
- forming budgets for social investments and sources of financing of social projects, determination of priorities in financing social responsibility;
- determining the required scope and areas of information disclosure on social responsibility and the formation of non-financial reporting;

The main principle proposed for assessing social responsibility risks is to predict the dynamics of each stakeholder through measuring and predicting their social performance indicators (table 1). Low quality of training projects as the most important internal area of social investments can lead to a decrease in the dynamics of career progression, lower quality of work as a whole, loss of key competences in key business processes, etc. Each of the risky, negative effects will depend on the importance of social investments in a certain area and the dynamics of changes in the external environment. Risks in the area of charity are primarily associated with the inappropriate spending of planned budgets, the emergence of additional financial costs in the case of insufficient or inadequate development of social projects.

Table 1 – Matrix for determining the first group of social responsibility risks

Direction of social work	Short-term (within a year)	Medium-term (within 1-3 years)	Long-term (more than 3 years)
Training and development of production personnel	Decrease in the quality of work and products, organizational and management problems	Loss of employees` key competencies	The decline in innovation and intellectual potencial
The general attractiveness of the employer (e.g., structuring housing conditions)	Job satisfaction lowering, increased turnover and absenteeism	Rising social tension, loss of key employees	"Chronic" need for personnel renewal
Health Capital and Labour safety	Increase in morbidity and occupational injuries	Reduced attractiveness of work, a great need for additional investments	High rate of chronic diseases in the workplace
Organizational culture	Autonomy and haphazard execution of production and management tasks	The overall degradation of corporate culture	Reducing the image and Investment attractiveness oftheenterprise

When developing social projects,two approaches for determining their significance in the activities of the enterprise should be taken into account (figure 1).

Projects of the first type are basic (basic approach to social responsibility), they are action plans that provide the minimum requirements established by the enterprise itself in the field of social responsibility. A risk assessment methodology is applied to such projects, because it is assumed that potentially unfavorable situations arise in the absence of action along the lines laid indicated in the projects. It is important to note that the minimum requirements for social responsibility should be fixed for each enterprise separately. Projects of the second type are aimed at a wider development of social responsibility and are similar to A.Carroll's philanthropic approach [8]. They are aimed at charity (philanthropic approach to social responsibility), and we have to state that the need for them is often associated with the emergence of additional financial reserves. Philanthropy, carried out on the basis of an innovative approach, is designed to have a complex effect on the region of presence - the creation of new small businesses and the development of related forms of business, the formation of an entrepreneurial culture through the creation of subsidiaries. The complex effects of social activities in the external social environment also contribute to the creation of new high-tech jobs, the formation of a sustainable supply on the labor market. In addition, a number of effects are associated with the maintenance of intermediary forms of business, which would perform the functions of outsourcing certain auxiliary business processes, such as those related to material and technical support, quality control of industrial products, research and development.

The first group of risks is associated with the intensity of the decline in the intellectual potential of the enterprise due to the decline in the image of the enterprise as an employer. Short-term risks manifest themselves during the first year of work and are associated with various kinds of organizational and managerial problems arising from a decrease in job satisfaction, an increase in employee turnover and an increase in occupational injury rate.

The identification of the second group of risks (table 2) makes it possible to determine the qualitative composition of social projects, for example, projects aimed at supporting employees as key stakeholders (in the areas of training and development, increasing attractiveness, health capital management) or

projects aimed at the local community (charity, development of social infrastructure in the region of operation). Each stakeholder has its own group of interests, which must be identified.

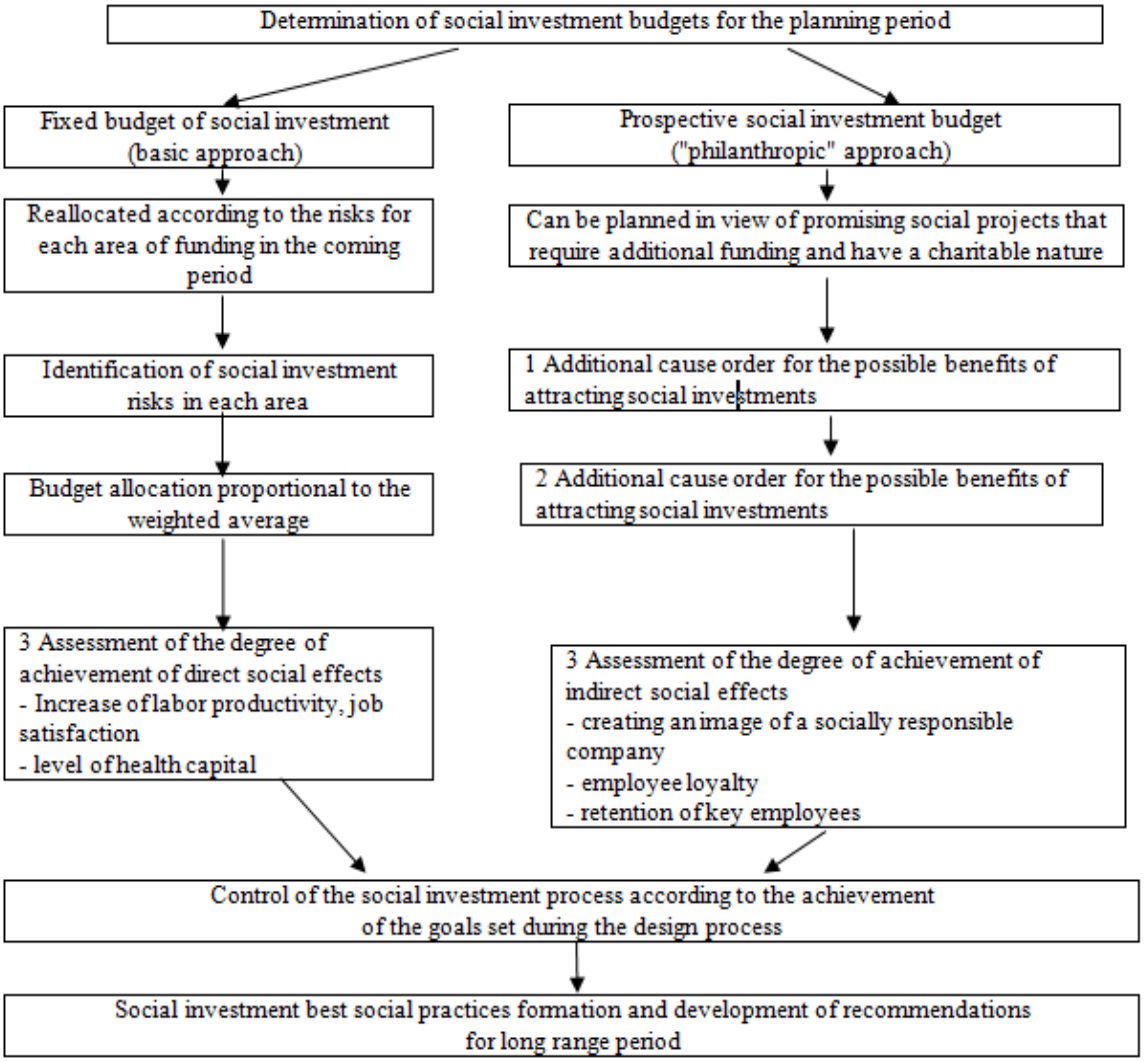

Figure 1 – Formation, distribution and control of social investment budgets of basic and charitable type projects

Table 2 – Identification of social responsibility risks by stakeholder category (second group)

Category ofstakeholders	Directions for social work		
	Training and development	Health Capital	Employer attractiveness
Operational staff	Organizational and managerial problems: decrease in the quality of production processes	Increase in the level of occupational injuries	Reducing the overall level of social guarantees, work satisfaction
Non-production personnel	Loss of key competencies of the management personnel: a decrease in the quality of management processes	Increase in absenteeism	
Shareholders and other investors	Reduced investment attractiveness		
Partners and competitors	Decreased competitiveness of products or services		
Local community	Degradation of social infrastructure, reduction of attractiveness as a potential employer		
Other stakeholders	The image reducing of the company as a social investor		

The methodology of social investment risk assessment can be used only for those categories of stakeholders for whom it is possible to determine the level of risks adequately, first of all, they include the company's employees - existing and potential ones. In questions of distribution of means on charity it is necessary to be guided also by indicators of productivity of each charitable project and to define a degree of risk depending on importance of the certain direction and reputational losses arising at the termination of financing of separate charitable projects [9]. That is why for each charitable project there should be defined the periods of beginning and end, on achievement of which the company will reach certain sustainable results. For example, in the sphere of direct financial support of certain target groups it is necessary to evaluate the contribution of charitable financing in the growth of their intellectual potential (new opportunities of education), socio-economic position (income level, benefits received from access to social infrastructure), health capital (opportunities to achieve certain standards of medical care, reduce the duration of illness, recovery period).

Social responsibility is a conscious investment in the future. The more successful is the business, the healthier is the society, and the healthier is the society, the more successful is the business. This interdependence is simple, obvious and beneficial for all. It is especially important to understand this today, when the volume of social obligations is just starting to increase. Among Kazakh companies, only 57% believe that business should be socially responsible. Moreover, the majority of respondents believe that CSR is the prerogative of large businesses, as well as companies that harm the environment and public health, such as oil and gas and mining companies. Small businesses, unlike medium and large businesses, are not currently ready to engage in CSR actively [10].

In our opinion, the main factors preventing companies from implementing social responsibility activities are: lack of financial resources; lack of incentives from the government; lack of relevant knowledge and skills; imperfect regulatory framework; lack of information in society; lack of public recognition of companies' contribution to society and difficulty in measuring the effect of CSR. Despite the fact that the Tax Code of the Republic of Kazakhstan provides for a 3% tax deduction for charity, for many companies this is not an incentive, as the rate itself is small, and the procedure for submitting documents to confirm this deduction is characterized by a high degree of bureaucracy.

In recent years, as already noted, the influence of the non-financial reporting initiative on the enterprises activities of all areas of economic activity has increased - dozens of large Russian enterprises from the oil and gas, energy sector, metallurgical and chemical industries annually undergo accreditation of their reports at the level of professional communities. The study of the structure of the official websites of large industrial enterprises showed that the invariable element of the sections devoted to investment activity (information for investors) is the disclosure of information on the social activity of enterprises and the level of social investments. Understanding the economic consequences of activity disclosure will provide insight into the costs and benefits of the enterprise in the area of reporting and to outline the ways to develop basic business processes aimed at maintaining information openness. From the theoretical point of view, increasing the degree of disclosure of elements of non-financial reporting allows to increase the information security of potential investors and thereby reduce the uncertainty and the level of perceived risk [11].

A number of foreign studies have shown that full disclosure of information on the state of intellectual capital makes a significant contribution to improve the investment attractiveness of enterprises in high-tech sectors.

In our opinion, a social investment risk assessment tool that takes into account the key areas of investment in terms of specific stakeholders is promising from the point of view of practical application. Such risk assessment can help enterprises to allocate social investment funds in a rational and transparent manner to minimize negative social effects arising in the course of their operations. For most enterprises, risk assessment should also be linked to the development of scenarios for the implementation of anti-crisis social responsibility.

Conclusion. Modern conditions of development of industrial enterprises emphasize the need for a systematic approach to the practical implementation of social responsibility. This approach is based on social designing and assessment of risks of social investments, which together are designed to increase the effectiveness of social activity of the enterprise and to develop effective anti-crisis scenarios of action in terms of economic and social instability.

The basis for defining a rational social policy is the definition of risks in the social sphere, defined as the probability of an unfavorable outcome of events in the field of social development in the absence of adequate management decisions and investments in specific areas. Risk analysis begins with the identification of key stakeholder groups that directly or indirectly determine the prospects for sustainable development of enterprises; these include, first and foremost, employees and their households, as well as direct business partners.

The mechanism of social responsibility on the basis of the project approach functions by means of a set of formalized procedures fixed in the documentation of the strategic and operational levels. The management of the enterprises should pay due attention to fixation of the main elements of social policy at the strategic level, development of a code of ethical behavior and a package of social guarantees provided to employees depending on the level of risks arising with the personnel, suppliers, consumers and the local community. Each social project must have a set of performance indicators, which would allow to estimate the degree of initial objectives achievement.

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БИЗНЕСТІҢ ӘЛЕУМЕТТІК ЖАУАПКЕРШІЛІГІ ЖӘНЕ КӘСІПОРЫНДАРДАҒЫ ӘЛЕУМЕТТІК ЖОБАЛАУДЫҢ МҮМКІНДІКТЕРІ

Аннотация. Әлеуметтік жауапкершілік тұжырымдамасы ұйымның сыртқы ортаға әсерін бағалауға байланысты менеджмент табиғаты туралы дәстүрлі көзқарастар эволюциясының нәтижесі; ондаған жылдар бойы өзінің тиімділігі көрсеткен тәсіл. Экологиялық проблемалардың әлеуметтік жауапты мінез-құлық үлгілерін қалыптастыруға қосқан үлесімен қатар, ұйымдардың сыртқы келбетін және олардың қоғамдағы орнын қайта қарау, қолайлы экономикалық жағдайлардың қалыптасуындағы жасырын билікті түсіну және олардың филантропиялық бейімділігін анықтайтын күрделі себептерді анықтау осы тұжырымдаманың дамуына айтарлықтай үлес қосады. Қазіргі жағдайда әлеуметтік жауапкершілік тұжырымдамасы кәсіпорынның бәсекеге қабілеттілігін қолдау мақсатында қолданылатын менеджменттің маңызды стратегиялық құралдарының бірі болып табылады, ол ішкі және сыртқы әлеуметтік ортаның үйлесімді дамуына ықпал ететін қызметті бағалау және жоспарлау үшін кәсіпорындарда практикалық қолдануды табады.

Түйін сөздер: әлеуметтік жауапкершілік, кәсіпорын, жобалау, сыртқы және ішкі орта, тәуекелдер.

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КОРПОРАТИВНАЯ СОЦИАЛЬНАЯ ОТВЕТСТВЕННОСТЬ И ПЕРСПЕКТИВЫ УПРАВЛЕНИЯ СОЦИАЛЬНЫМИ ПРОЕКТАМИ ПРЕДПРИЯТИЙ

Abstract. Концепция социальной ответственности является результатом эволюции традиционных взглядов на природу менеджмента в связи с оценкой влияния деятельности организации на внешнюю среду; подходом, показавшим свою эффективность и результативность в течении десятилетий практики. Наряду с вкладом экологических проблем в становление социально ответственных моделей поведения значительный вклад в развитие данной концепции вносит пересмотр облика организаций и их места в жизни общества, понимание скрытой власти над формированием благоприятных экономических условий и определение сложных мотивов, определяющих их филантропические склонности. В современных условиях концепция социальной ответственности является одним из важнейших стратегических инструментов менеджмента, используемых в целях поддержания конкурентоспособности предприятия, она находит практическое применение на предприятиях для оценки и планирования деятельности, вносящей вклад в гармоничное развитие внутренней и внешней социальной среды.

Keywords:социальная ответственность, предприятие, проектирование, внешняя и внутренняя среда, риски.

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RESEARCH IN ENGINEERING-GEOLOGICAL CHARACTERISTICS OF FOREST SOILS OF THE CITY OF KYZYLORDA

Abstract. The article analyzes the problem of studying loess rocks. The objects of study in this work were foundations composed of soft soils. In engineering-geological assessment of loess deposits, the conditions of occurrence of loess rocks are of great importance. The research was carried out on the territory of Kyzylorda, where the total thickness of the subsidence layer and overlying technogenic deposits reaches 5-7m.

The processes studied in the work - long-term sedimentation of subsidence soil, as well as fluctuations in the level of groundwater that affect it, are characteristic of many cities. So on 20% of the territory of Kazakhstan there are peat deposits, and changes in the level of groundwater are one of the main factors that have a negative impact on foundations, underground structures and foundations in cities.

The obtained calculation methods, monitoring data, constructive solutions of underground utilities in loess territories can be used in similar engineering and geological conditions, which will increase the reliability of these structures, reduce the cost of their construction and operation

Keywords: base, foundation, subsiding soils, loess rocks, geological research.

For the normal functioning of the foundations, and, therefore, the man-made objects erected on them, it is necessary to have high-quality geotechnical design support, which includes a comprehensive analysis of engineering and geological conditions, the calculation of the stress-strain state of the foundations and the organization of monitoring of the processes developing in them.

The objects of study in this work were foundations made up of weak soils (Figure 1). The studies were carried out on the territory of Kyzylorda, where the total thickness of the subsidence stratum and the overlying technogenic deposits reaches 5-7 m. Long-term sedimentation of loess at the base causes damage to urban infrastructure objects - utilities, roads, sidewalks, landscaping elements, etc.

The research was carried out under the guidance of the senior lecturer of the

Department of Architecture and construction production, candidate of technical sciences A.Budikova.

A number of scientific works, i.e. geotechnical surveys of the projected dormitory building in Kyzylorda were carried out jointly with the associate professor, R.Kubenov, candidate of technical sciences. of the Department of oil and gas engineering, a master's student of the Department of Architecture and construction production, T.Baimanov, as well as students of the STR-19-1u group, E.Aldamnazarov and N.Mambet.

To carry out a comparative analysis of the variability of the properties of loess soils in the city of Kyzylorda in the south of Kazakhstan, we carried out laboratory studies of the physical and mechanical properties of loess subsidence soils before and after their soaking [6].

Physical characteristics of soils - weight moisture w, moisture at the plasticity limit W_p and yield W_L, soil density ρ, particle density ρ_s were determined in accordance with the requirements of the current GOST [2]; strength - angle of internal friction φ and specific adhesion c - on single-plane cut devices PSG-2M, deformability indicators - in compression devices in accordance with the requirements of SP RK 1.02-105-2014 [3] and during stamp tests of samples of undisturbed loess soil in a tray.

The advantage of laboratory research is the ability to study the expected processes taking into account the spatial variability of loess soils, the time factor, the deformed state, etc. These methods provide for obtaining material in the amount necessary for statistical data processing in order to identify correlations between changes in the moisture regime of loess soils and their deformability.

In statistical processing of experimental data to determine the physical characteristics, the values of the standard deviation S and the coefficient of variation ν are used, which characterize the variability of the primordial soil indicators and are determined by the formulas.

$$S = \sqrt{\sum_{i=1}^{n} \frac{(x - x_i)^2}{n-1}}, \quad (1)$$

$$\nu = \frac{S}{X^n}, \quad (2)$$

where n is the number of definitions, x_n is the normative value of the characteristic, which is defined as the arithmetic mean.

For the strength characteristics of the soil φ and c, the method of statistical processing is that the standard values $tg\varphi_n$ and c_n are determined as parameters of the linear dependence of the shear resistance on pressure and are calculated by the least squares method for the entire set of experimental values of τ with the total number of determinations n.

Calculations of the standard value of the characteristics being determined and the standard deviation are made according to the formulas:

for the coefficient of friction:

$$tg\,\varphi_n = \frac{\left(n\sum_{i=1}^{n} \tau_i \sigma_i - \sum_{i=1}^{n} \tau_i \sum_{i=1}^{n} \sigma_i\right)}{n\sum_{i=1}^{n} {\sigma_i}^2 - \left(\sum_{i=1}^{n} \sigma_i\right)^2}, \quad (3)$$

$$S_{tg\varphi} = S_r \sqrt{\frac{n}{n\sum {\sigma_i}^2 - \left(\sum \sigma_i\right)^2}}, \quad (4)$$

or specific adhesion:

$$c_n = \frac{\sum_{i=1}^{n} \tau_i - tg\,\varphi_n \sum_{i=1}^{n} \sigma_i}{n}, \quad (5)$$

$$S_c = S_r \sqrt{\frac{\sum^{i=1} {\sigma_i}^2}{n\sum^{i=1} {\sigma_i}^2 - \left(\sum \sigma_i\right)^2}}, \quad (6)$$

To study the changes in the characteristics of loess soil during soaking, monoliths were selected from 5 pits of various depths, drilled in the Terenozek region of Kyzylorda, Kazakhstan. Loess soil in all five pits is represented by hard loess loam of varying thickness (from 3 to 7m). Laboratory studies of loess soil samples were carried out in the soil laboratory of the Department of Architecture and construction production of the Korkyt Ata Kyzylorda university.

Determination of the characteristics of loess soil was carried out using soil samples of natural moisture, which were cut out of the monolith with a sampling ring with a height of h=1cm, diameter d=7cm and their density ρ_0 was found, then the density of dry soil ρd_0 and the porosity coefficient e_0 at p=0 were calculated. The characteristics of soil of natural moisture content, obtained by statistical processing of data from at least three samples of loess soil for each of the characteristics cut from monoliths taken from different pits, are shown in table 1. The standard deviation *S* was no more than 0.02 at a confidence level α=0,85.

Table 1 - Characteristics of natural moisture soil

Pit №	Sampling depth, *m*	ρ_s т/м^3	ρ, т/м^3	w, %	w_P, %	w_L, %	Coeffi-cient poro-sity,*e*	porosity, *n*
1	4,2	2,73	1,485	7,6	16	25	0,978	0,494
2	3,8	2,72	1,483	8,6	17	28	0,996	0,499
3	4,6	2,70	1,480	7,9	16,6	25,7	0,968	0,492
4	3,3	2,74	1,503	8,5	18	28	0,985	0,496
5	4,5	2,75	1,504	8,1	17	27	0,977	0,494
Average value		2,73	1,491	8,14	16,92	26,74	0,981	0,495

To determine the deformation and strength characteristics, samples of loess soil of natural moisture, cut from the same monoliths, were tested in the odometer and for shear (shear) in a direct single-shear plane shear device. The obtained experimental results were processed by statistical methods according to formulas (1-6).

The processes studied in the work - long-term sedimentation of subsiding soil, as well as fluctuations in the level of groundwater that affect it, are characteristic of many cities. So on 20% of the territory of Kazakhstan there are peat deposits, and changes in the level of groundwater are one of the main factors that have a negative impact on foundations, underground structures and foundations in cities [5].

Table 2 – Average compression test results loess soils of natural moisture w = 8%

Load per sample, p, MPa	Density dry soil, ρ_d, т/м^3	Coefficient porosity, e_{icp}	porosity, n
0	1,378	0,981	0,495
0,05	1,385	0,971	0,492
0,1	1,391	0,962	0,490
0,2	1,402	0,947	0,486
0,3	1,405	0,942	0,485
0,4	1,407	0,940	0,484

The obtained calculation methods, monitoring data, constructive solutions for underground utilities in loess territories can be used in similar engineering and geological conditions, which will increase the reliability of these structures, reduce the cost of their construction and operation.

The most important characteristics of loess soils are porosity, volumetric and specific gravity, moisture, plasticity, granulometric and mineralogical composition, structure and subsidence. These characteristics determine the properties of research according to the methods described in the instructions and manuals.

The total porosity of loess soils ranges from 30 to 38%, but most often it is 40-50%. Non-subsiding varieties of loess soils have a porosity of less than 40%. The highest porosity is characteristic of the upper part of the loess strata. So, in the Karaozek region at a depth of 0-6m, the porosity is 39-44%, at a depth of 6-12m - 37-49%.

The porosity of loess soils also varies over the area, reaching the highest values on watersheds in more arid regions, where soils of type II subsidence are common. The porosity of loess soils of various genesis is not the same. It reaches the highest values in loess soils of aeolian genesis and the smallest in those of water origin.

Figure 1 – Selection of soil samples from a pit (candidate of technical sciences, associate professor R.Kubenov, students E.Aldamnazarov, N Mambet, A.Budikova - senior teacher, candidate of technical sciences, and undergraduate T.Baimanov)

Normal porosity characterizes the volume of gaps between soil particles. This interparticle porosity forms a continuous interconnecting system, which is able to significantly reduce under the action of loads on the soil. Such pores occupy the bulk of the total porosity of loess soils (from 13 to 35%). The highest interparticle porosity is found in loess soils of type II subsidence, which have a granular structure and low natural humidity (less than 12%), as well as a hydrosluidic-quartz or hydrosluidic-kaolinite composition of minerals in clay fractions.

The total porosity of loess soils, determined in laboratory conditions, also includes the porosity corresponding to the maximum volumetric hydroscopicity, and macropores. The amount of porosity that corresponds to the maximum volumetric hydroscopicity depends on the composition of clay minerals in the soil and its moisture content. These include pores between highly dispersed particles and interpacket gaps in clay minerals such as montmorillonite. Such pores are always filled with aqueous solutions. The value of this type of porosity in loess strata is small (2-10%) [1].

Figure 3 - Place of sampling of soil of the designed building (pit 2.2m deep)

Figure 4 - The resulting monolith of undisturbed structure

Macropores of loess soils are usually distinguishable visually, as their size exceeds 0.5mm. They increase the overall porosity of the rock by 3-6%. By the nature of the walls, the macropores are divided into loose and cemented. Loose macropores are easily destroyed in water, cemented ones, on the contrary, are relatively waterproof.

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ҚЫЗЫЛОРДА ҚАЛАСЫНЫҢ ОРМАН ТОПЫРАҚТАРЫНЫҢ ИНЖЕНЕРЛІК-ГЕОЛОГИЯЛЫҚ СИПАТТАМАЛАРЫН ЗЕРТТЕУ

Аннотация. Мақалада орман тұқымдарын зерттеу мәселесі қарастырылған. Бұл жұмыстағы зерттеу нысандары әлсіз топырақтардан тұратын негіз болып табылады. Инженерлік-геологиялық бағалауда орман жыныстарының пайда болу жағдайлары үлкен маңызға ие. Зерттеулер Қызылорда қаласының аумағында жүргізілді, мұнда шөгінді топырақтың қасиеттері анықталды және техногендік шөгінділердің қалыңдығы 5-7 метрге дейін болды.

Жұмыста зерттелген процестер - шөгу топырағының ұзақ мерзімді тұңбасы, сонымен қатар оған әсер ететін жер асты сулары деңгейінің ауытқуы көптеген қалаларға тән. Сонымен, Қазақстан аумағының 20% -ында шымтезек шөгінділері бар, ал жер асты сулары деңгейінің өзгеруі қалалардағы іргетастарға, жер асты құрылыстарына және іргетастарға кері әсер ететін негізгі факторлардың бірі болып табылады.

Алынған есептеу әдістері, бақылау мәліметтері, орман алқаптарындағы жерасты коммуникациялары үшін сындарлы шешімдер ұқсас инженерлік-геологиялық жағдайларда пайдаланылуы мүмкін, бұл осы құрылымдардың сенімділігін арттырады, оларды салу мен пайдалану құнын төмендетеді.

Кілт сөздер: негіз, іргетас, шөгінді топырақтар, лёссті жыныстар, геологиялық зерттеу.

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ИССЛЕДОВАНИЕ ИНЖЕНЕРНО-ГЕОЛОГИЧЕСКОЙ ХАРАКТЕРИСТИКИ ЛЁССОВЫХ ГРУНТОВ ГОРОДА КЫЗЫЛОРДЫ

Аннотация. В статье анализуется задача исследований лёссовых пород. Объектом изучения в настоящей работе послужили основания, сложенные слабыми грунтами. При инженерно-геологической оценке лёссовых отложений большое значение имеют условия залегания лёссовых пород. Исследования выполнялись на территории г.Кызылорды, где суммарная мощность просадочного толща и перекрывающих его техногенных отложений достигает 5-7м.

Изученные в работе процессы – длительная осадка просадочного грунта, а также влияющие на нее колебания уровня грунтовых вод – являются характерными для многих городов. Так, на 20% территории Казахстана имеются отложения торфа, а изменения уровня грунтовых вод являются одними из основных факторов, оказывающих негативное воздействие на основания, подземные сооружения и фундаменты в городах.

Полученные методики расчета, данные мониторинга, конструктивные решения подземных инженерных коммуникаций на лёссовых территориях могут найти применение в аналогичных инженерно-геологических условиях, что позволит повысить надежность указанных сооружений, сократить затраты на их устройство и эксплуатацию.

Ключевые слова: основание, фундамент, просадочные грунты, лёссовые породы, геологическое исследование.

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EVALUATING THE EFFECTIVENESS OF USING FINANCIAL RESOURCES AIMED AT INNOVATIVE INDUSTRIALIZATION

Abstract. In the new global reality, the most appropriate model for long-term development of Kazakhstan is the industrial and innovative model. The need to implement industrial and innovative development is dictated by the challenges of the XXI century, the economic imperatives of globalization. Lagging indicators such as labor productivity, which today is only 39 thousand US dollars, while this indicator in the OECD countries is on average more than 2.5 times higher. The share of manufacturing in GDP in 2017 is only 12%, while this figure in developed countries such as China is about more than 35%. In order to enter the top 30 developed countries, further development of the industrial and innovative model is required. It is no accident that in his last two messages, the President focuses on the development of new technologies, new models of digitalization, the need to accelerate the introduction of more complex products, increase the technological level, and increase the share of exports. The development of Kazakhstan's economy requires qualitative and structural changes in the economy and a shift away from its dependence on raw materials, an increase in the share of manufacturing, high-tech industries and the expansion of exports of finished products. The formation of a competitive economy requires huge financial resources that will be directed to innovative industrialization on a long-term basis. The new global reality has led to a reduction in the ability to attract funding. Lack of internal sources of financing, reduction of external sources of financing of the banking system of Kazakhstan, insufficient development of the Kazakhstan stock market significantly limit the ability to meet the needs of the real sector of the economy in financial resources.

Keywords: capital, investment, finance, innovation, financial resources, industrialization, financing, lending, modernization.

The success of innovative industrialization is largely indicated by the ways of financial support and its organizational forms. The multiplicity of sources of financing and their diversification serve as a guide in organizing the principles of financing the country's industrialization. The financing system includes sources of financing, methods, forms, and mechanisms for attracting financial resources. Consider the sources of financial support for industrial and innovative processes. Sources of Finance are a complex economic category, which in the course of economic activity are transformed into technical, innovative, material and intellectual and other types of resources. Sources of financing are the receipt of funds that are intended for the acquisition of current and long-term assets, in order to meet obligations to investors, creditors, the state, contractors, and costs for conducting current activities. It can also be expressed in other words as money that is used as investment resources. Sources of financing for innovative industrialization can be the state, enterprises, local governments, financial and industrial groups, investment and innovation funds, small and medium-sized businesses, and individuals. All of them are participants in the economic process and contribute to the development of industrial and innovative activities.

There is the following classification of funding sources:

1) on property relations: own sources of financing; attracted sources of financing; borrowed sources of financing;

2) by type of owner: state financial resources (funds of non-budgetary funds and budgetary funds, shares and other fixed and current funds, state borrowings, state property); investment financial resources of economic commercial and non-commercial entities, public associations and individuals (attracted and own funds of enterprises, non-state pension funds, collective investors, insurance companies, etc.); investment resources of foreign investors (foreign States, international financial and investment institutions, institutional investors, banks and credit institutions);

3) by time characteristics: short-term; long-term; indefinite.

4) in relation to the object: internal: own; external: attracted and borrowed.

Thus, despite the significant growth of the above indicators in dynamics for 2012-2016, Kazakhstan still has a low level of technological development compared to other countries, as evidenced by its position in world statistics. For the period 2012-2016, the total amount of all funds allocated for Research & Development financing in the Republic of Kazakhstan amounted to 316 billion tenge. In 2016, expenditures on science and innovation in Kazakhstan as a % of GDP amounted to 0.14%. Kazakhstan is significantly inferior to developed and some developing countries in these indicators, being in the 4th technological order, with low performance of science with weak links to the real economy, while the world is already moving along the 6th technological order. At the same time, the international academic Council recommends that the share of expenditures on innovative and industrial development for developing countries should be about 1-1.5% of GDP. For example, in Russia this indicator is equal to 1.3% of national GDP, in China-1.4%, Germany-2.5%, the United States-2.8%, Japan-3.3%. The volume of issued patents in our country is 1671, while in China-26,292, in Russia-19,641, in the United States-154,760, in Japan-217,364 [1-5].

In developed countries, such as Japan, the United States, and the United Kingdom, the share of spending on research, development, and implementation of new equipment and technologies increases every year. Kazakhstan still has a very low level of R & d expenditures, which causes the low competitiveness of the domestic industry. The share of innovation activity in foreign countries is the result of high competitiveness of innovative-active enterprises. Where, over time, innovatively inactive subjects are forced out of the market. In 2017, Kazakhstan ranked 78th out of 127 countries in the world ranking of the Global innovation index, falling by 3 positions compared to 2016. The key index is based on two subordinate indexes: Innovation Input – the key elements of the national economy that provide innovation activity and Innovation Output-the results of innovation activity in the economy [6-7].

According to the Innovation Input Index, in 2017, Kazakhstan ranked 64th (an increase of 1 position in comparison with 2016), including the indicators of human capital and research – 71st (a decrease of 5 positions), the development of innovation infrastructure – 60th (a decrease of 6 positions), the level of market development – 80th (an improvement of 12 positions) and the level of business development – 87th (an improvement of 9 positions). At the same time, according to the results of innovation activity (Innovation Output) Kazakhstan ranks only 93rd, including 88th in terms of results in the field of knowledge and technology (a decrease of 5 positions), and 95th in terms of creative activity (an improvement of 4 positions).

As a result, there is a decrease in such parameters as human capital and research, innovative infrastructure, knowledge and technology. Thus, according to the rating results, Kazakhstan was in the group of "Underperformers", which indicates the presence of the following problems: insufficient development of the innovation and technology market; low level of business innovation activity; low level of research performance; low level of readiness to turn ideas into successful projects startups; underdevelopment of the venture capital; incorrect / untimely use of certain support tools at different stages of development of innovative projects leads to unjustified financial risks and an increase in the share of stressful assets; weak legislation and the lack of commercially attractive technology companies and projects on the market hampers the development of the venture Finance market. Another important problem is that according to the world economic forum's global economic competitiveness Report for 2017-2018, Kazakhstan's position in 2017 compared to 2016 has deteriorated by 4 points and was recorded in 57th place out of 137 [8-9].

Among the factors in this rating "Technological readiness", Kazakhstan took 52nd place in 2017, improving its position by 4 points (table 1).

Table 1 – Subfactors for technological readiness and innovation

Sub-factors for technological readiness and innovation	2012	2013	2014	2015	2016	2017	Increase or decrease (from 2017 to 2012)
Place from 140 countries	51	50	50	42	53	57	-6
Technological readiness	87	55	57	61	56	52	+35
Innovations	116	103	84	85	72	72	+44
Availability of the latest technologies	103	90	88	93	89	90	+13
Ability of companies to implement modern technologies	113	91	78	90	90	71	+42
FDI and technology transfer	100	85	93	107	103	95	+5
Ability to innovate	101	92	74	69	68	73	+28
Quality of research institutes	121	108	102	99	81	63	+58
Companies ' R & d expenses	107	94	77	68	55	61	+46
Cooperation between universities and business in the field of R & d	119	90	79	88	88	66	+53
Public procurement of high-tech products	93	71	58	74	63	55	+38
Availability of scientists and engineers	106	104	98	83	70	64	+42
Note - compiled on the basis of data [10]							

To develop an internationally competitive national innovation system, Kazakhstan needs to focus on the following factors: creating favorable conditions for increasing the availability and transfer of modern technologies; creating mechanisms to increase business demand for modern technologies; creating effective tools to support innovative projects and promote them to the market; development of the venture industry and increasing the availability of venture capital. Based on the results of the analysis (table 2), the following strengths and weaknesses, opportunities and threats of the research and innovation system of Kazakhstan were identified.

Table 2 – SWOT analysis of the research and innovation system in Kazakhstan

Strengths	Weaknesses
− Commitment to improving and expanding the technological and innovation system; − Strategic plans and government programs for economic growth and innovation; − Increasing the number of legal, strategic initiatives and reforms to support R & d.	− Insufficient level of research achievements at the international level; − Lack of interactive communication between research institutions and commercial firms; − Low demand for new knowledge and research results from business structures; − Insufficient funding in General.
Opportunities	**Threats**
− Raising awareness of the benefits of innovation and strengthening the innovative potential of companies; − Success in distributing revenue from the oil and gas industry to research and other industry sectors; − Strengthening ties and learning from the experience of foreign companies in Kazakhstan; − The course of production and trade towards knowledge-intensive goods and services; − Increasing the participation of domestic SMEs in innovation-oriented strategies; − Using the silk road initiative.	− Dependence of the macroeconomic climate on the oil and gas sector; − «Brain drain; − Decrease in the number of graduates of higher educational institutions and a low number of students who have completed the PhD program; − Increased competition, mainly from Central Asia; − Unrealistic optimistic expectations of short-term impact and success of the commercialization project; − Inappropriate program goals; − Poor communication and coordination between participants in the innovation process.
Note - compiled on the basis of data [10]	

Based on the analysis of financial sources of innovative development we have developed the following key recommendations: expand the scope of grants to support business innovation; promote the development of financial markets for diversification and investment in innovation; improve legislation for

the development of the venture capital market and ensure the introduction of innovative venture capital business into practice; it is necessary to develop a mechanism for joint financing of innovations by both the state and business. World experience shows that the state should not Finance, the state should help the private sector to Finance. Thus, our analysis of the financing of innovative development in Kazakhstan showed that despite the significant scale of measures taken to support innovation, the key problems are still: weak financial incentives for the transfer of advanced technologies; low efficiency of mechanisms for solving and searching for priority technological tasks; weak level of business receptivity to technological innovations; lack of technological and managerial competencies; low activity of innovative technologies in the education system; weak control system for the implementation of innovative projects.

Kazakhstan's innovation policy should be oriented in the following directions: participation in the formation of high-tech industries, in the creation of an effective system for the transfer of foreign and intersectoral technologies; participation in the creation and support of modern scientific and innovative infrastructures (technoparks, national research centers, science and technology parks), where there are scientific and technical and industrial organizations and enterprises with scientific and technological base; application of the existing scientific and technical potential in the development of advanced industries.

Limited investment resources make it necessary to use them effectively. State programs conducted in relation to industrial and innovative development are the main basis for evaluating the effectiveness of investment funds. The efficiency of using investment resources aimed at implementing the SPIIDRK means not only achieving quantitative indicators, but also qualitative ones. The state program of industrial and innovative development of the Republic of Kazakhstan for 2015-2019 has been implemented for 3 years. Accumulated over the years of industrialization potential and government support within the SPIIDRK ensured positive growth rates in the manufacturing sector even in crisis conditions that already characterized its effect on the economy of Kazakhstan. The effectiveness of the state program is determined by the degree of achievement of the set goals and its indicators. The SPIIDRK has set 4 target indicators and 11 indicators of results. 2 of the 11 SPIIDRK results indicators have not been achieved: on the implementation of 4 projects aimed at solving technological problems of industries, as a result of the suspension of funding for innovative grants in 2016 due to the need to bring regulatory documents on the provision of innovative grants in accordance with the Entrepreneurial code of the Republic of Kazakhstan, which entered into force on 01.01.16 (plan for 2016-2017 – 4, fact-2 units).); the creation of 2 technology development centers – as a result of delays in decision-making procedures for the creation and registration of centers, the conclusion of agreements with foreign partner companies (plan for 2016-2017-2, fact – 0).

The effectiveness of the SPIIDRK was confirmed by the growth of the country's industrial production in 2017 (107.1%), overcoming the negative impact of the crisis. At the same time, taking into account the low base of 2016, the mining sector (109.3%) outpaced the manufacturing sector (105.1%) in terms of production growth. However, due to the stable positive dynamics, over the 3 years of implementation of the SPIIDRK, the manufacturing sector (105.9% in 2017 to 2014) is ahead of the mining sector (103.7%) in terms of real production growth. As a result, the contribution of the manufacturing sector to the country's economy has increased. So, in 2017. compared to 2015, the share of the manufacturing industry in the: GDP - by 1.9 % (from 10.1% to 12%), industry – by 0.4 % (from 40% to 40.4%), exports – by 1.6 % (from 30.5% to 32.1%), employment - by 0.4 % (from 6.6% to 7.0%), gross foreign direct investment (FDI) – by 6.6 % (from 17.4% to 24%). The range of engineering products has been expanded with high-tech products that have never been produced in our country before: cargo ships, buses, screw pumps, trailed wheel equipment, railway axles and wheel pairs, bicycles. Well-known companies such as General Electric, General Motors, Alstom, Talgo, LG and others work in the industry. The production of new types of products in the chemical industry (phosphoric-potash fertilizers, 2,4-D acid 2-ethylhexyl ether, liquid fertilizers CAS), the production of building materials (granite slabs) [10-15].

With the help of the industrialization program, the image of the industry has been qualitatively updated. There are 26 new manufacturing sectors, such as the automobile industry, railway engineering, titanium industry, medical equipment and equipment manufacturing, solar and wind energy. This is facilitated by the implementation of projects to modernize existing and create new modern manufacturing industries within the framework of the industrialization Map and the regional business support maps. Over 3 years of implementation of the SPIIDRK, 378 projects totaling more than 3.1 trillion were commissioned. it will create more than 31 thousand new jobs in such sectors as oil refining, production of

construction materials, metallurgy, railway, electrical engineering, agricultural engineering, Agrochemistry, food production. As a result, the contribution of industrial projects to the total number of employees in the sector increased from 1.9% in 2015 to 5.5% in the 4th quarter of 2017. New directions of export of domestic goods are emerging. For example, deliveries of copper, yellow phosphorus and passenger cars to the UAE, zinc and lead to Vietnam, other silicon to Slovakia, Spain and Italy, starter batteries to China and the Republic of Benin, ammophos to Argentina, transformers to Belarus, capacitors to Hungary, etc. [16-17].

Today, Kazakhstan exports a total of more than 800 goods from the manufacturing sector to 115 countries. The country is a world leader in the supply of ferroalloys, yellow phosphorus, flour, and cottonseed oil. The growth of competitiveness of domestic products is confirmed by the entry into foreign markets of metallurgy products (locomotives, switches, fiber-optic cable, electric locomotives, ventilation equipment), chemical industry (hydrochloric acid, polypropylene, sodium cyanides), construction materials (stoneware slabs, multi-layer insulating glass products). At the same time, projects with the maximum IEDP score are oriented towards both domestic and foreign markets, with a significant volume of exports of high value-added products, are characterized by a high level of labor productivity comparable to the world average, and also have a significant socio-economic effect on employment, environmental friendliness and budgetary receipts. IERP is an indicator of the level of expected impact of investment projects and export operations financed by the Bank on the socio-economic development of the country, during the period of their service in the Bank. The IEDI indicator for 2016 exceeds the planned values by 0.9%. The implemented projects have a significant effect on the socio-economic development of the country, creating the basis for the industrial and innovative development of Kazakhstan.

Evaluation of the efficiency of the investment project DBK carries out using three main indicators of the discounted method: net present value, internal rate of return, investment payback period. DBK also requires the provision of the following performance indicators: revenue, gross margin, net profit, debt-to-equity ratio, debt coverage ratio by operating cash flows. All performance indicators are calculated for the full funding period. It is also worth noting that DBK also had problem loans. So in 2013, DBK transferred 42 problem loans to JSC Investment Fund of Kazakhstan (IFK). And this is 35% of 118 projects for the entire period of DBK activity [49]. IFK specializes in supporting and restoring economic activity of industrial, agro-industrial and infrastructure organizations regardless of the sector of the economy, promoting the rehabilitation of enterprises, launching production, improving the socio-economic situation in the regions [18-19].

The Development Bank of Kazakhstan transferred the assets of 42 problem borrowers to the IFK, among which: 5 health-improving measures were planned (ACIG JSC, Astana Polygraphy JSC, Semipalatinsk Leather and Fur Plant LLP, IKBK JSC, Zhanabas Agroholding LLP"); 5 (this is 14.2% of the total number of projects) are not subject to rehabilitation due to their establishment by the court as insolvent and recognition of them or their pledgers as bankrupt; the following works are carried out for 25 borrowers: claims work (debt collection, judicial implementation of collateral), 99 claims were filed, part of them was satisfied (57), are under consideration (5), left without consideration (14), denied satisfaction (14), returned (8), discontinued (1); as a result of the repayment of the debt, the amount of 191.36 million tenge was repaid. The basis of our research was an assessment of the effectiveness of the implementation of state programs on the example of SPIIDRK and SPAIIDRK according to the following main criteria, such as: commercial performance-which takes into account the financial implications of the program for its participants; budget efficiency - through expenditures of the national and local budgets, as well as funds of the national Fund of the Republic of Kazakhstan for the purpose of industrialization; economic efficiency-takes into account the cost effectiveness and results obtained that are not included in the direct financial interests of the participants.

To improve the assessment of the effectiveness of investment use, it is necessary to take into account the impact of financing instruments on the macroeconomic indicators of Kazakhstan. For the effective implementation of DBK's activities, we propose the introduction of new mechanisms for financing investment projects: project financing-carried out by issuing loans and (or) purchasing bonds, if the funds from the placement of bonds are directed by the Issuer to the implementation of the investment project; mezzanine financing-carried out by providing a subordinated loan with the right to convert it into shares or equity interests of the Borrower. This mechanism is proposed to be implemented with a funding period of

5-20 years, and with a minimum amount of funding -7.0 billion rubles; syndicated financing-carried out by issuing a loan through the conclusion of a single agreement with other syndicate participants, where the DBK acts as the organizer or participant of the syndicate, while its participation share should not exceed 50% of the total amount of financing. We suggest setting a minimum amount of syndicated financing in the amount of 7.0 billion tenge, 3.5 billion tenge of which will be financed by the DBK [22-23].

Thus, based on the results of the analysis, we can conclude that today there are problems of attracting investment in innovative industrialization. The lack of long-term money in the banking sector, the weak development of the stock market, reduced competitiveness in the world market, a decrease in exports of finished products, all these factors affect the development of an innovative industrial cluster. It is also worth noting the budget distribution of money, assessing the effectiveness of the state policy and the role of SPIIDRK 2, we can conclude that there is a positive growth in financing innovative industrialization. The Development Bank of Kazakhstan plays a special role in financing long-term projects by the state.

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ИННОВАЦИЯЛЫҚ ИНДУСТРИЯЛАНДЫРУҒА БАҒЫТТАЛҒАН ҚАРЖЫЛЫҚ РЕСУРСТАРДЫ ПАЙДАЛАНУ ТИІМДІЛІГІН БАҒАЛАУ

Аннотация. Жаңа жаһандық нақтылық жағдайында Қазақстанның ұзақ мерзімді дамуының неғұрлым тиімді моделі индустриялды-инновациялық модель болып табылады. Индустриялық-инновациялық дамуды іске асыру қажеттілігі XXI ғасырдың сын-қатерлеріне, жаһанданудың экономикалық императивтеріне байланысты. Бүгінгі күні 39 мың АҚШ долларын құрайтын еңбек өнімділігі сияқты көрсеткіштердің артта қалуын көрсетіп отыр. Бұл көрсеткіш ЭЫДҰ елдерінде орта есеппен 2,5 еседен астам жоғары. Өңдеуші өнеркәсіптің ЖІӨ-дегі үлесі 2017 жылы бар болғаны 12%-ды құрады, ал бұл көрсеткіш Қытай сияқты дамыған елдерде шамамен 35%-ды құрайды. Дамыған 30 елдің қатарына кіру үшін индустриялық-инновациялық модельді одан әрі дамыту қажет. Жолдауда Президент жаңа технологияларды, цифрландырудың жаңа модельдерін дамытуға, неғұрлым күрделі өнімді жедел енгізу, технологиялық деңгейді арттыру, экспорт үлесін ұлғайту қажеттілігіне баса назар аударуды табыстады.

Қазақстан экономикасын дамыту үшін экономикадағы сапалы және құрылымдық өзгерістер және оның шикізатқа тәуелділігінен арылу, өңдеуші өнеркәсіптің, жоғары технологиялық салалардың үлесін ұлғайту және дайын өнім экспортын кеңейту қажет. Бәсекеге қабілетті экономиканы қалыптастыру үшін ұзақ мерзімді негізде инновациялық индустрияландыруға бағытталатын орасан зор қаржылық ресурстар қажет. Жаңа жаһандық жағдайында қаржыландыруды тарту мүмкіндіктерінің қысқаруына әкелді. Қаржыландырудың ішкі көздерінің жетіспеушілігі, Қазақстанның банк жүйесін қаржыландырудың сыртқы көздерінің қысқаруы, қазақстандық қор нарығының жеткіліксіз дамуы экономиканың нақты секторының қаржылық ресурстарына қажеттіліктерін қанағаттандыру мүмкіндіктерін едәуір шектейді.

Кілт сөздер: сөздер: капитал, инвестиция, қаржы, инновация, қаржылық ресурстар, индустрияландыру, қаржыландыру, несиелеу, модернизациялау.

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ОЦЕНКА ЭФФЕКТИВНОСТИ ИСПОЛЬЗОВАНИЯ ФИНАНСОВЫХ РЕСУРСОВ, НАПРАВЛЕННЫХ НА ИННОВАЦИОННУЮ ИНДУСТРИАЛИЗАЦИЮ

Аннотация. В условиях новой глобальной реальности наиболее целесообразной моделью долгосрочного развития Казахстана является индустриально-инновационная модель. Необходимость реализации индус-триально-инновационного развития диктуется вызовами XXI века, экономическими императивами глобализации. Отставание таких показателей, как производительность труда, которая на сегодняшний день составляет лишь 39 тыс. долл. США, в то время как данный показатель у стран ОЭСР в среднем выше более чем в 2,5 раза. Доля обрабатывающей промышленности в ВВП в 2017 году составляет всего 12%, в то время как в данный показатель в развитых странах, таких как Китай составляет порядка более 35%. Для того чтобы войти в 30-ку развитых стран,

требуется дальнейшее развитие индустриально-инновационной модели. И не случайно в своих посланиях Президент делает акцент на развитии новых технологий, новых моделей цифровизации, необходимости ускоренно внедрять более сложную продукцию, повышения технологи-ческого уровня, увеличение доли экспорта.

Для развития экономики Казахстана необходимы качественные и структурные изменения в экономике и уход от ее сырьевой зависимости, увеличение доли обрабатывающей промышленности, высокотехнологичных отраслей и расширение экспорта готовой продукции. Для формирования конкурентоспособной экономики необходимы колоссальные финансовые ресурсы, которые на долгосрочной основе будут направлены на инновационную индустриализацию. Новая глобальная реальность привела к сокращению возможностей привлечения финансирования. Нехватка внутренних источников финансирования, сокращение внешних источников финансирования банковской системы Казахстана, недостаточная развитость казахстанского фондового рынка значительно ограничивают возможности удовлетворения потребностей реального сектора экономики в финансовых ресурсах.

Ключевые слова: капитал, инвестиция, финансы, инновация, финансовые ресурсы, индустриализация, финансирования, кредитования, модернизация.

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MAIN PROBLEMS OF WORKING CAPITAL ORGANIZATION AND MANAGEMENT IN THE COMPANY

Abstract. One of the main functions of the entire enterprise is the production, release of goods, its provision to the consumer, service and success. And the goal of each enterprise is to produce high-quality products, generate revenue and form its place in the market. Currently, the number of foreign and domestic enterprises working in the production sector is growing. Therefore, enterprises should always strive for innovation and consider the possibility of using advanced technologies in the production of goods. Production of goods directly related to the working capital of the enterprise. The article examines the structure of working capital within a certain enterprise and the features of its management. Considering the issues identified in the study, the main directions of working capital organization and management were proposed. Working capital can be divided into three stages of working capital maintenance. They are in the monetary, production, commodity. At the first stage of turnover, funds are advanced for raw materials, materials and labor items necessary for the production of other products. Capital is transferred from monetary form to commodity form. The second stage will produce products that will be consumed and contain the newly created value. At this stage, capital passes into the production form with the addition of labor from the commodity form, after which it passes into a new type of commodity. At the third stage, the production enterprise produces finished products and takes back the monetary form with the release of funds from the commodity form. When funds are credited to the company's current account for the products sold, the turnover is considered terminated. Since working capital is an important asset structure of the enterprise, its effective organization and management are important activities of the enterprise.

Keywords: capital, working capital, working fund, debt, debtor, creditor, commodity, value, price, turnover, funds, stocks, production, material.

The term "Capital" is often used in the economic literature to describe the structure of an enterprise's assets.according to an investment project, it is divided into fixed and working capital. Working capital consists of two main parts: production working capital funds and working capital funds. Stocks of production turnover are items of labor that are fully used in each cycle of the production process and completely replace their natural form and value with finished products. Production turnover reserves include raw materials, supplies, stocks, basic materials, and semi-finished products. Production turnover funds are linked to circulation funds operating in the sphere of circulation. Working stocks serve the process of circulation of commodity products. These stocks do not participate in determining the cost, but are only carriers.

In the process of carrying out production and commercial activities, economic entities attract and use various sources of working capital. The result of the working capital formation policy is: the current financial situation at modern enterprises in connection with the economic feasibility of sources of working

capital use; efficiency obtained from current assets; excess of working capital, a sign of non-use of its liquidity, and the lack of slows down the production process and the speed of economic turnover [1-2].

In the modern economy, the use of working capital by business entities in quantitative and qualitative terms affects the effectiveness of their activities and financial condition. Impossible not to appreciate the role of the company in effective working capital management, development and effective operation, since the optimal management of working capital will belong to indicators of liquidity, profitability, financial stability of the enterprise.

Principles of working capital organization in the company:

1. rationing of working capital. It is important for the company to correctly determine the optimal need for working capital, as this determines the efficiency of use. A decrease in the amount of working capital leads to instability of the financial condition, interruption of the production process, a decrease in production volumes and revenue. And the increase leads to a freeze of funds and reduces the ability of the enterprise to create costs for expanding production. The optimal demand for working capital at the enterprise is determined by rationing.

2. use of funds for the intended purpose. This method is not used in state-owned enterprises. In addition to managerial errors, the tax policy of the state also affected the reduction of the possibility of using this method. Thus, high tax rates, advance payments of income tax lead to the removal of working capital from non-production expenses. Removing working capital slows down its turnover, reduces the efficiency of the enterprise and generally slows down its financial condition.

3. ensuring the effective use and safety of working capital. The organization and functioning of working capital at the enterprise includes systematic control over their safety, effective use of financial services through audits, examination of accounting and operational reporting based on statistical data [3-4].

In Russian practice, special attention is paid to working capital management, but in these studies, special attention is paid to each part of working capital: cash, accounts receivable, inventory. In world practice, it is proved that a comprehensive system approach to managing working resources is required. However, the basis for effective working capital management should be a system that manages all its elements: defining the management goals and objectives; formation of information sources necessary for forecasting, management; analysis of working capital and indicators that characterize its effective use; identification and forecasting of factors affecting working capital; application of management methods. The purpose of working capital management is to form financial sources in the balance between profitability and liquidity in the enterprise and determine their optimal structures. Maintaining liquidity requires the formation of profitability, increasing it and reducing the volume of working capital associated with the formation of a sufficient amount of capital [5-6].

The first group of analysis of working capital management methods includes the direction that is considered as the only object of working capital management. At the same time, the main requirement for making management decisions is the classical indicators in the financial activity of the enterprise. The second group of methods includes the methods in table 1 below.

Table 1 - Structure of the second group of working capital management methods

Parts of working capital	Current management methods
Inventory values	Standardization
	Optimization
	Inventory control
	Qualitative analysis
Accounts receivable	Cash flow planning
Cash and flammable securities	Non-traditional financial transactions
	Cash flow planning
	Optimization
Note - compiled by the author	

Based on the analysis of the experience of working capital management in the systematic way indicated in table 1, proposals and justified aspects for the formation of an effective working capital management system will be identified: integration of working capital management in all divisions of the enterprise; referral of employees for remuneration based on indicators of accounts receivable, inventory, and cash flow management; ensuring the quality of information used in the working capital management system. Based on the working capital management process, a key basis for reliability and speed of information collection is needed, as well as reliable operational indicators for taking concrete measures in the field of accounts payable, receivables and inventory management. Even the largest companies and managers of their industries do not have high quality information. Improving the quality of information includes: increasing the speed of historical signs. As a rule, information on working capital in accounting is formed with certain delays: signs of reliability of working capital on the balance sheet are presented one month after the reporting period, even though they may be predicted and delayed; expansion of the planning space; improving the quality of forecast information; consideration of internal and external factors that affect working capital needs. Assessing the impact of factors allows us to optimally determine the composition of the sources of its formation, i.e. their application in terms of ensuring the liquidity of the economic entity and profitability of activities [7-8].

As the experience of developed countries shows, continuous improvement of the country's commodity production, ensuring the necessary level of product competitiveness, and production of the necessary types of products that are in demand by consumers will serve as the basis for sustainable development of the state's economy. In civilized countries, public authorities have ensured the formation of new types of production products by stimulating innovative activities of enterprises, regardless of ownership forms. Currently, Kazakhstan retains the status of raw materials supplies for the metallurgical, oil and mining industries. Therefore, the main task of innovation activity is to improve the structure of commodity production, export and import products in the direction of developing the share of the manufacturing industry, production of products of high commodity readiness in accordance with the requirements of consumer demand and market competitiveness. The solution of this problem requires preliminary preparation and established scientific and technical support. Kazakhstan state scientific and technical Institute has developed a strategy and tactics of innovation aimed at improving the construction of commodity production [9].

In accordance with the proposed strategy, it is proposed to implement the following actions in the innovation direction: SWOT analysis of the structure of commodity production in the Republic, assessment of opportunities and development of new industries in accordance with the conditions of the world and domestic market; economic and scientific and technical analysis of the potential of domestic producers, generalization of proposals for the development of innovative activities in the field of production of new types of products and the introduction of effective technologies based on production diversification; organization and coordination of cooperation between consumer enterprises and domestic scientific organizations on production diversification and implementation of innovative projects and development of advanced technologies; formation of a legal framework aimed at providing the necessary conditions for the development of innovative activities in enterprises of all types of ownership.

During the implementation of these steps, the state provides scientific and technical support to the enterprise for the development of innovation activities as follows. SWOT analysis of the structure of commodity production allows you to identify the strengths and weaknesses of the enterprise. These include processing of mineral raw materials and development of the ore structure. Also, based on the current situation, it is advisable to identify opportunities for trading the effectiveness of the offered products. The main way of such diversification is the production of high-precision commercial products. In addition, it is necessary to identify the factors that threaten the country's economy. When conducting this analysis, it is necessary to simultaneously study the state of domestic and foreign markets for all types and nomenclature of goods in order to determine the development of demand and the organization of production of specific goods. Based on the results of SWOT analysis, you can develop proposals on the need to create new industries and industries. In other words, the task of scientific and technical support for this analysis is to lead to the formation of a list and monitoring of the value state of goods and products that occupy an authoritative place in the market.

According to the results of the analysis of the financial condition of RBK LLP, in General, the financial stability of the enterprise showed a positive result. In the course of the financial stability study, we were convinced of absolute stability. In addition, we see that such indicators as liquidity and profitability meet their established standards. We also analyzed the management of the elements that make up working capital, i.e. the ratio of accounts receivable and accounts payable, the period of accounts receivable and inventory turnover, as well as their specific weight in working capital. A number of issues related to optimizing working capital management were also identified. Before focusing on these issues, a SWOT table was developed that defines the advantages, disadvantages, opportunities and risks of the enterprise. We see it in the following table 2.

Table 2 - SWOT analysis of the current state of RBK LLP

Advantages	Disadvantages
- Long service in the market; - There are about 300 names of equipment; - Products are distributed in foreign countries; - cooperates with large enterprises of Kazakhstan; - More than 300 employees.	- The volume of reserves in the study of working capital is large; - There are inefficient and obsolete reserves; - There is a lack of world-class technologies in production - It has a low position in world exports.
Possibilities	Threats
- The development of advanced technologies; - Availability of state support for domestic production; - Providing new jobs for the development of the country's economy; - Participation in foreign projects; - Attracting foreign investors to the country; - Increasing the company's revenue; - Increase of wages and bonuses for employees of the enterprise; - Digitalization and automation of technology.	- Emergence of new competitors with modern technologies; - There may be high competition; - Job cuts; - Lack of qualified specialists.
Note - compiled by the author	

Based on the analysis of the company's working capital structure for the period 2017-2019 we have identified the following issues: In the first period of 2017-2019, the company has a large number of stocks. To make sure, let's analyze table 3.

Table 3 - Inventory and accounts receivable indicators, million tenge

Name	2017	Specific weight	2018	Specific weight	2019	Specific weight
Funds	559 264,3	53,9%	564 571,4	70,4%	431 845,8	55,6%
Receivables	414 158,1	39.9%	215 152,3	26,9%	293 222,4	37,9%
Note - compiled based on the source of RBK LLP						

In table 3, the amount of reserves in 2017 compared to 2019 was 127,418.5 million. we can see that tenge is higher. Accounts receivable in 2019 amounted to 215,152. 3 million. we can see that the percentage increased by 12.5%. A large number of stocks in the first place reduces its current. It operates on the basis of a full analysis of the production and economic process, marketing policy, which determines the necessary measures. The main reason for the large number of stocks is a decrease in the production of finished products. One of the most important indicators in working capital management is the payback period of working capital. The analyzed payback period of the enterprise in question is considered in the following table 4.

Table 4 - Inventory and accounts receivable turnover period

Name	2017	2018	2019
Turnover indicators			
Inventory turnover period	2,1	2,2	2,8
Turnover of accounts receivable	2,7	6,1	7,9
Working capital turnover period /date			
Inventory turnover period	171,5	163,7	128,6
Accounts receivable turnover period	133,4	59,1	45,6
Note-compiled based on the source of RBK LLP			

Table 4 shows that the inventory turnover period in 2019 will be 2.8, and the turnover of accounts receivable in 2019 increased by 1.8 compared to 2018. The period of working capital turnover as of the date in 2019 has significantly decreased compared to 2018, but in 2017 the highest indicator. In 2017 and 2018, the working capital turnover periods show high indicators. Therefore, reducing this time is an important direction of financial management, which will lead to an increase in the efficiency of working capital use and increase their return. The presence of working capital in the sphere of circulation does not bring a new product. Reducing the investment of working capital in this area is carried out by optimal organization of finished products, timely processing of documents, compliance with agreed and payment discipline [10-15].

Thus, the speed of turnover of working capital is one of the first tasks of the enterprise. Thus, the identified key problems of working capital management: increase in the specific weight of production stocks; delay in payments required for goods consumed by consumer enterprises, i.e. an increase in accounts receivable. Thus, during the analysis of the working capital structure, we identified the problem of working capital management, which when solving these problems not only improves working capital, but also affects the financial stability of the enterprise, financial indicators. Taking into account the identified problems of working capital management, we looked for ways to solve each of them. Proposals were considered by dividing them into certain groups, i.e. proposals were considered for inventory management, accounts receivable management, and financial aspects. Thus, the proposed proposals for certain working capital management issues can be seen in the following table 5.

Table 5 - Problems and suggestions in working capital management

Main problems	Recommendations
Inventory management:	
1. availability of a large amount of inventory	- stock analysis, identification of illiquid stocks, - optimal use of resources; - elimination of excess inventory; - implementation of normalization; - analysis and application of measures to reduce stocks to the optimal level.
Receivables management	
1. the presence of a large volume of accounts receivable. 2. the weakness of the system oversight of accounts receivable	Providing benefits: - within three days from the date of receipt of the product by the consumer, a 2% discount is provided for payment; - consumers pay the full amount of the product if the payment is made after 10 days; - if no payment was made for the product within a month, the size of the product may be changed depending on the source of payment. - reduction of overdue accounts receivable by factoring; the flexibility of the contract and rates; - monitoring the work of the subscriber Department.
Organizational aspect	
1. clear distribution of duties and responsibilities in the company's working capital management system	- development of a system for managing, reporting, and monitoring the effectiveness of inventory and accounts receivable management.
Financial aspect	
1. improving the solvency of the company. 2. Increasing the company's competitiveness.	- research of the financial condition of consumer enterprises; - attracting attention to the creditworthiness of partner companies; - always use innovations; - search for new, improved forms of manufactured goods; - production of high-quality products that meet state standards; - sales of products to market segments with high quality and service.
Note - compiled by the author	

Table 5 identifies issues and suggestions in working capital management. Working capital management consists in the positive result of its relationship between the components, i.e. inventory, accounts receivable, and cash. It also depends on the financial condition of partner companies, consumer companies, and their positions in the market. If all these circumstances give a positive result, the company

has the opportunity to maintain its position in the market, to resist competitors, that is, to increase its competitiveness [16-17].

According to the results of the analysis of the financial condition of RBK LLP, in General, the financial stability of the enterprise showed a positive result. In the course of the study of financial stability, it was found that such indicators as absolute stability, as well as liquidity and profitability, meet their established standards. The management of the elements that make up working capital is also analyzed, that is, the analysis of the ratio of accounts receivable and accounts payable, the turnover period of accounts receivable and inventory, as well as their specific weight in working capital.

In conclusion, the features of working capital management were analyzed, within which the main problems were identified. According to the results of the SWOT schedule, the advantages, disadvantages, opportunities and risks of the enterprise were identified. It is established that the state of the enterprise is stable and there are opportunities for economic growth, and the main task to achieve this goal is effective working capital management. As a result of the research, the main directions of the organization and management of working capital of the enterprise were presented. In General, the main purpose of the enterprise is to produce products and generate income from these products, which directly relates to working capital.

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КОМПАНИЯНЫҢ АЙНАЛЫМ КАПИТАЛЫН ҰЙЫМДАСТЫРУДЫҢ ЖӘНЕ ОНЫ БАСҚАРУДЫҢ НЕГІЗГІ МӘСЕЛЕЛЕРІ

Аннотация. Барлық кәсіпорынның басты қызметінің бірі – ол тауарларды өндіру, шығару оны тұтынушыға ұсыну, қызмет көрсету және осы арқылы табысқа жету болып табылады. Ал әрбір кәсіпорынның мақсаты – сапалы өнім шығару, табыс табу және нарықта өз орнын қалыптастыру. Қазіргі таңда өндірістік сала бойынша жұмыс жасап жатқан шетелдік және отандық кәсіпорындар саны артып келеді. Сондықтан кәсіпорындар әрдайым жаңашылдыққа ұмтылуы, тауарларды өндіру кезінде озық технологияларды қолдану мүмкіндіктерін қарастыруы қажет. Тауарларды өндіру, ол тікелей кәсіпорынның айналым капиталына байланысты. Айналым капиталы – өнім өндіру үдерісіне толығымен қатысып өзінің құнын тауар өндіруге қолданатын капитал. Мақалада белгілі бір кәсіпорын аясында айналым капиталының құрылымы және оның басқару ерекшеліктері зерттелді. Зерттеу кезінде анықталған мәселелерді қарастырып айналым капиталын ұйымдастырудың және оны басқарудың негізгі бағыттары ұсынылды.

Көптеген зерттеушілердің көзқарастары бойынша қорытынды жасайтын болсақ, капитал кәсіпорын менеджментінің маңызды компонентінің бірі болып табылады және оның құрылымы мен құрамы өте күрделі, соған қарамастан оның жай-күйі шаруашылық қызметінің нәтижелеріне тікелей әсер етеді. Капиталды басқару шеңберінде өзекті мәселелер де шешімін табады, олардың ішінде капиталды қалыптастыру көздерін таңдау, төлемқабілеттілік және өтімділік деңгейі, кәсіпорынның өндірістік және қаржылық циклін қамтамасыз ету мәселелер басым болып келеді.

Айналым капиталын айналымдылыққа қызмет көрсетуі бойынша үш сатыға бөлуге болады. Олар ақшалай, өндірістік, тауарлық. Айналымдылықтың бірінші сатысында шикізаттарға, материалдарға және де басқа өнімді өндіруге қажетті еңбек заттарына ақша қаражаттары авансталады. Капитал ақшалай түрден тауарлы түрге ауысады. Екінші сатыда тұтынылатын және жаңадан жасалған құнды қамтитын өнім шығарылады. Бұл сатыда капитал тауарлы формадан жұмыс күші қосылуы арқылы өндірістік формаға өтеді, одан кейін жаңа тауар түріне ауысады. Үшінші сатыда өндірістік кәсіпорын дайын өнім шығарады және қаражаттар тауарлы нысаннан босатылып қайтадан ақша нысанын қабылдайды. Ақша қаражаттары іске асырылған өнімдер үшін кәсіпорынның есеп айырысу шотына түскен кезде айналымдылық тоқтатылды деп есептелінеді. Айналым капиталы кәсіпорын мүлкінің маңызды құрылымы болғандықтан, оны тиімді түрде ұйымдастыру және басқару кәсіпорынның маңызды қызметі болып табылады.

Кілт сөздер: капитал, айналым капиталы, айналыс қоры, берешек, дебитор, кредитор, тауар, құн, баға, айналым, қаражат, қор, өндіріс, материал.

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ОСНОВНЫЕ ПРОБЛЕМЫ ОРГАНИЗАЦИИ И УПРАВЛЕНИЯ ОБОРОТНЫМ КАПИТАЛОМ КОМПАНИИ

Аннотация. Одной из основных функций всех предприятий является выпуск и производство товаров, предоставление их потребителю, оказание услуг и получение на этой основе прибыли. Цель каждого предприятия – производить качественную продукцию, получать доход и занять свое место на рынке. В настоящее время растет количество иностранных и отечественных предприятий, работающих в производственной сфере. Поэтому предприятиям необходимо всегда стремиться к инновациям, рассмотреть возможность применения передовых технологий при производстве товаров. Производство товаров непосредственно связано с оборотным капиталом предприятия. Оборотный капитал - это капитал, который полностью участвует в процессе производства продукции, использует свою стоимость при производстве товаров. В статье исследуется структура оборотного капитала в рамках определенного предприятия и особенности его управления. Рассматривая вопросы, возникшие в ходе исследования, были предложены основные направления организации и управления оборотным капиталом.

Учитывая мнение многих исследователей, пришли к заключению, что капитал является одним из важнейших компонентов менеджмента предприятия, структура и состав которого очень сложны, тем не менее, его состояние напрямую влияет на результаты хозяйственной деятельности. В рамках управления капиталом также решаются актуальные вопросы, среди которых преобладают вопросы выбора источников формирования капитала, уровня платежеспособности и ликвидности, обеспечения производственного и финансового цикла предприятия.

Оборотный капитал можно разделить на три стадии с точки зрения оборачиваемости предоставляемых услуг – это денежная, производственная, товарная. На первой стадии оборачиваемости авансируются денежные средства на сырье, материалы и другие необходимые для производства продукции средства труда. Капитал переходит из денежного в товарный вид. На второй стадии производится продукция, которая содержит потребительскую и вновь созданную стоимость. На этой стадии капитал переходит из товарной формы в производственную форму путем добавления рабочей силы, а затем преобразуется в новый вид товара. На третьей стадии производственное предприятие выпускает готовую продукцию, и средства высвобождаются из товарной формы и снова принимают форму денег. При поступлении денежных средств на расчетный счет предприятия за реализованную продукцию оборот считается прекращенным. Поскольку оборотный капитал является важной структурой имущества предприятия, его эффективная организация и управление являются важной деятельностью предприятия.

Ключевые слова: капитал, оборотный капитал, оборотный фонд, задолженность, дебитор, кредитор, товар, стоимость, цена, оборот, средства, запасы, производство, материал.

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JOGORKU KENESH AND POLITICAL PARTIES OF KYRGYZSTAN: INTERACTION IN PARLIAMENTARY FORM OF GOVERNMENT

Abstract. The article analyzes using the normative and systematic methods, as well as analysis and synthesis, the content of the statements of the Constitution of the Kyrgyz Republic, the Constitutional Law of the Kyrgyz Republic "On Election of the President of the Kyrgyz Republic and Deputies of the Jogorku Kenesh of the Kyrgyz Republic", the Laws of the Kyrgyz Republic "On Regulations of the Jogorku Kenesh of the Kyrgyz Republic» and «On the Status of a Deputy of the Jogorku Kenesh of the Kyrgyz Republic» and the works of legal scholars.

The study analyzes the issues of interaction between political parties and the Jogorku Kenesh – the parliament of the Kyrgyz Republic in parliamentary form of government. The authors consider the transformation of Kyrgyzstan into a parliamentary republic as a native process, justify the conditioning of the increasing role of political parties in formation of the Jogorku Kenesh and organization of its activities with the signs and requirements of this form of government. Particular attention is paid to the party-political and constitutional-legal foundations of mutual influence of the parliament and political parties of the Kyrgyz Republic.

Researchers came to the conclusion the transformation of modern Kyrgyzstan into a parliamentary republic leads to a significant increase in the role of political parties both in the formation of the Jogorku Kenesh and in the organization of its activities as a whole; the interaction of the Jogorku Kenesh and political parties in the parliamentary form of government, in particular, is manifested in the organization and conduct of elections of deputies of the Jogorku Kenesh, distribution of deputy mandates, formation of parliamentary fractions and organization of their activities, determination of the organizational structure of the Jogorku Kenesh and formation of its bodies and organization of parliamentary activities in whole.

From the point of view of the authors the fact that mutual relations between the Jogorku Kenesh and political parties are based on legal principles and norms, this whole process takes place on political plane and is sent implementing party programs.

Keywords: Jogorku Kenesh, constitutional laws of the Kyrgyz Republic, parliamentary law, parliamentary republic, presidential-parliamentary republic, parliamentarism, elections, political parties, political system.

Introduction. The transformation of the Kyrgyz government into a parliamentary one has fundamentally changed the relationship between political parties and the Jogorku Kenesh – the parliament of the Kyrgyz Republic. Political parties got the real opportunity to influence not only formation of the deputy corps, but also on the whole mechanism of parliamentary activity.

A study of the interaction between the parliament and political parties of Kyrgyzstan will not only reveal the problems of relations between these institutions, but will also help to develop effective ways to solve them.

The study of the parliamentary form of government as a new phenomenon in political and legal reality of Kyrgyzstan is equally relevant for political and legal science. Indonesian scientist R. Adiputri emphasized despite a difference in structural arrangement, parliament must share certain features. The parliamentary members are selected by the regular election; the members are representatives of people from certain constituents, exercising the role of parliament: legislating, overseeing and budgeting (Adiputri, 2019, p. 152). As the Polish researcher V. Zhebrowski notes parliamentarism can be implemented in the parliamentary-cabinet, cabinetparliamentary, parliamentary-presidential and parliamentary-committee forms. Thus, it is an internally diversified system influenced by a number of factors, namely, the type of party system, the way of granting the non-confidence vote and dissolving the parliament, as well as the scope of the so called delegated legislation (Zhebrowski, 2010, p. 114). The

relevance of practice of establishing a parliamentary republic in Kyrgyzstan is compounded by the fact in the post-Soviet countries of Central Asia, the presidential form of government is consistently approved. Thus, the experience of Kyrgyz political modernization, which is based on a significant change in the political and legal status of parliament, as well as political parties and political system, may have scientific and practical interest in perspective of regional development.

As noted by Russian researcher A.V. Nikitina, political parties play important role in functioning of states as necessary institution of representative democracy, ensuring participation of citizens in political life of society (Nikitina, 2019, p. 34). The transformation of Kyrgyzstan into a parliamentary republic has radically changed the role of political parties in the political system of the country. Becoming the only subject of formation of the parliament, the political parties received the real right to determine its structure, form the bodies of the Jogorku Kenesh, elect its officials and change the parliamentary activity as a whole into a fractional regime. Of course, such the political and legal status allows parties to directly influence not only organizational and formal, but also the essential and substantial aspects of the parliament. Moreover, through the power granted to parties in the framework of parliamentary activity, they were able to determine public policy.

Meanwhile, the described political and legal position of political parties in Kyrgyzstan should be considered as the regular process, due to the nature and the specificity of the parliamentary form of government.

Methods. The article analyzes using the normative and systematic methods, as well as analysis and synthesis, the content of the statements of the Constitution of the Kyrgyz Republic, the Constitutional Law of the Kyrgyz Republic "On Election of the President of the Kyrgyz Republic and Deputies of the Jogorku Kenesh of the Kyrgyz Republic", the Laws of the Kyrgyz Republic "On Regulations of the Jogorku Kenesh of the Kyrgyz Republic» and «On the Status of a Deputy of the Jogorku Kenesh of the Kyrgyz Republic» and the works of legal scholars.

Discussion. In foreign and domestic legal and political science literature it is pointed the really established form of government in the state determines role of political institutions in political system of society. Thus, M. Shugart and D. Keri, picking out the parliamentary, presidential and mixed regimes, substantiate the role of the main political institutions in them (Shugart & Keri, 1992, p. 18-20).

The concept of parliamentary state was created at one time by V. Hessen, who recognized this type of organization of constitutional state as its highest (Okatova, 2009, p. 175-204).

Currently, parliamentary form of government has become the subject of the special scientific research by many foreign and domestic authors. From the point of view of A.F. Aliyev, parliamentary form of government is prevalent mainly in Western Europe, which is characterized by stably developed economy, stable democratic traditions and strong political parties. In such conditions, issues come to the fore not so much as stability, but how to protect democratic human rights, taking into account opinions of all groups and others (Aliev, 2000, p. 154).

In our opinion, the concept of A.F. Aliyev may be questioned in context of the transformation of Kyrgyzstan into a parliamentary republic. Despite the "rapid" development of democratic institutions and political parties, about stable democratic traditions and real multi-party, ideologically pluralistic system, and even more so about stably developed economy, there is no need to speak here yet (Arabaeva, 2010, pp. 52-71). This is also evidenced by practice of transition to the parliamentary form of government in the Republic of Moldova.

At the same time, scientists of Kyrgyzstan ambiguously determine the form of government that has developed in the state. Some scholars see this form as parliamentary (A. Arabaev, R. Arabaev, A. Berenalieva, 2015, p. 98-115), while others see it as a presidential-parliamentary republic (Beishenaliev & Rakimbaev, 2013. p. 10-20; Kolsarieva, 2010, p. 9-10). Nevertheless, without going into discussion, we note our point of view is based on recognition in modern Kyrgyzstan of parliamentary form of government (A. Arabaev, R. Arabaev, 2014, p.146-150; A. Arabaev, R. Arabaev, A. Berenaliev, 2015, p. 98-115).

Moreover, it is the transformation of Kyrgyzstan into parliamentary republic, from our point of view, that has led to the significant change in the role of political parties in the political system of the country. The point is election of deputies according to party lists according to proportional system determines essence and content of activities of not only deputies themselves, but also parliament as a whole.

Of course, political parties participate in this process as active subjects of elections. But, very participation of parties in elections leads to struggle of political views and positions. Parties come to polls

with their own political program, which defines directions of political, socio-economic development of state and society, ways to achieve them. The party program, on the one hand, determines not only state of affairs in country and position of party associated with it, forms its election image, but also reflects needs of society and interests of electorate; on the other hand, it becomes agreement between people and political party. As the Uzbek researcher S.N. Berdikulov, the place of political parties in providing them with democracy depends on their participation in parliamentary activities (Berdikulov, 2015, p. 118). With arrival of party in Jogorku Kenesh, such a program becomes political document defines political line of party in parliament as a whole, in organizing activities of its fraction and deputies who are elected according to list of party.

The very fact of election of deputies according to proportional system according to party lists determines increasing role of parties in formation of deputy corps, organization of its activity and, of course, participation of parliamentary parties at the resolution-making level.

Interaction's significance of the Jogorku Kenesh and the political parties of Kyrgyzstan in conditions of parliamentary form of government is not only theoretical but also practical. As analysis of the current national legislation indicates common ground and mutual dominance of the parliament parties of Kyrgyzstan are multifaceted. Moreover, the forms, character and content of their relationship are determined by the following legal provisions and limits.

1. Interaction of the Jogorku Kenesh and political parties is exercised in formation of deputy corps. In accordance with Part 1 of Art. 70 of the Constitution of the Kyrgyz Republic 120 deputies of the Jogorku Kenesh are elected for a five-year term according to party lists according to the proportional system. At the same time, this act distinctly establishes deputy mandates in the Jogorku Kenesh based on the results of elections are received to political parties.

The Constitutional Law of the Kyrgyz Republic "On the Election of the President of the Kyrgyz Republic and Deputies of the Jogorku Kenesh of the Kyrgyz Republic" in part 2 of article 60 establishes only political parties have the right to nominate lists of candidates for parliament. This law contains specific requirements for political parties that participate in parliamentary elections. Among such requisitions are indicated their mandatory state registration (or re-registration) in the manner prescribed by law, and the fact of registration itself must occur at least 6 months before the relevant elections.

Thus, according to the current legislation of the Kyrgyz Republic, political party becomes the only subject of the right to nominate candidates for deputies of the Jogorku Kenesh and, accordingly, an active participant in process of forming the republican parliament.

2. Assignment of deputy mandates. The political party that won the parliamentary elections gets the right to participate in dealing of deputy mandates.

According to the Constitution of the Kyrgyz Republic, assignment of deputy seats takes place between political parties. Moreover, one political party may be the holder of no more than 65 mandates of deputies of the Jogorku Kenesh (part 2 of article 70).

According to Art. 64 of the Constitutional Law of the Kyrgyz Republic on the Election of Deputies of the Jogorku Kenesh, political parties have passed the seven-percent electoral threshold for the republic as a whole, while receiving 0.7 or more percent of the vote in each region and cities of Bishkek, Osh, participate in assignment of deputy mandates for procedure defined by the same Law.

3. Interaction of the Jogorku Kenesh and political parties is demonstrated in formation of parliamentary fraction and organization of its activities.

Deputies who passed to the Jogorku Kenesh on party list are united in parliamentary fractions. The legal basis for association of parliamentarians in fraction is part 3 of article 70 of the Constitution of the Kyrgyz Republic. This constitutional provision has been evolved in current legislation. So, Art. 10 of the Law of the Kyrgyz Republic «On the Rules of the Jogorku Kenesh of the Kyrgyz Republic» defines parliamentary fraction as an association of deputies of the Jogorku Kenesh elected from list of one political party. At the same time, the parliamentary regulation does not allow inclusion in fraction of deputies who have passed on list of another political party.

The Law of the Kyrgyz Republic "On the Status of Deputy of the Jogorku Kenesh of the Kyrgyz Republic" in clause 8, part 1 of Article 9 establishes the rights of the deputies of the Jogorku Kenesh to join a fraction. Moreover, this Law distinctly defines the position of deputy in parliamentary fraction of the Jogorku Kenesh. So, according to the provisions of Art. 14 of the Law, deputy of the Jogorku Kenesh

is, firstly, obliged to join the fraction, which is formed from percentage of deputies elected to parliament on list of political party. Secondly, he can be a member of only one fraction. Thirdly, as a member of parliamentary fraction, deputy has a several specific powers related to formation of this institution and organization of its activities. In particular, we are talking about parliamentary rights such as electing and being elected to governing bodies and positions of fraction; take part in development and approval of provisions on parliamentary fraction; make suggestions and participate in consideration of any issue referred to competence of fraction; make proposals on the agenda of meeting of fraction; submit draft laws, resolutions, deputy inquiries, statements and other documents; take part in discussion and make proposals on formation of position of fraction, on issues to be considered in the Jogorku Kenesh; to speak on behalf of and on behalf of fraction in plenary meetings of the parliament, meetings of committee and interim commission with aim of announcing fraction's position on the issues under consideration. Fourth, deputy of the Jogorku Kenesh, as a member of parliamentary fraction, also assumes certain obligations. So, in accordance with Part 2 of Art. 9 of the Law, he undertakes, in particular, to attend and vote on issues considered at meetings of parliamentary fraction; observe intrafraction discipline; carry out instructions of fraction.

In accordance with the Constitution of the Kyrgyz Republic, the Rules of Procedure of the Jogorku Kenesh strictly stipulate refusal of deputy elected from one political party to join the fraction of the same party is not allowed (part 4 of article 10). Thus, union of deputies into parliamentary fraction, according to the current legislation of Kyrgyzstan, becomes not only their right, but also their obligation.

4. Political parties, through their fractions in parliament, determine the organizational structure of the Jogorku Kenesh, form its bodies and elect officials.

Of course, the organizational structure of the Jogorku Kenesh is determined by the relevant constitutional legal acts. As the analysis of articles 70, 73, 74, 75 and 76 of the Constitution and the Rules of the Jogorku Kenesh reveals, the Kyrgyz parliament, along with the classical structural units (leadership, committees, commissions, apparatus) has purely fractional bodies. First of all, we are talking about parliamentary fraction and their associations. So, part 3 of article 70 of the Basic Law of Kyrgyzstan introduces such concepts as “fraction”, “coalition of fractions”, “parliamentary majority”, “parliamentary opposition”. Moreover, parliamentary majority, according to the Constitution, is defined as “a fraction or coalition of fractions that officially announced the creation of the coalition of the fractions in the Jogorku Kenesh, which has more than half of the parliamentary mandates.” The parliamentary opposition is «a fraction or fractions are not part of the parliamentary majority and have declared their opposition to it».

These constitutional provisions are evolved in parliamentary regulations. So, the Regulation of the Jogorku Kenesh contains the special chapter (Chapter 3), which is devoted to fractional organization of the republican parliament and contains 8 articles (Articles 10-17). It enshrines, firstly, the principles of forming parliamentary fraction and organizing its activities (Article 10); secondly, the powers of fraction leader (Art. 11); thirdly, the powers of fraction (Art. 12); fourthly, issues of ensuring activities of fraction (Article 13); fifthly, the definition, principles and procedure for organizing activities of coalition of fractions (Article 14); sixth, the definitions of “parliamentary majority” and “parliamentary minority” (Art. 15); seventh, the definition, principles of organization of «parliamentary opposition»; eighth, parliamentary opposition guarantees.

At the same time, it should be emphasized the constitutional legislation of Kyrgyzstan has concentrated on legal guarantees of parliamentary opposition. So, according to Art. 70, 74-76 of the Constitution and Art. 12 and 17 of the Rules of the Jogorku Kenesh, the parliamentary opposition has the right, firstly, to nominate its representative to the position of deputy of Toraga; secondly, to nominate their representatives to the posts of chairmen of the Parliamentary Committees on Budget and Law and Order, as well as deputy of chairmen of other committees; thirdly, on equal access to state-owned media; fourthly, to form one third of the composition of (a) the Central Commission for Elections and Referenda, (b) the Accounts Chamber, (c) the Council for Draught of Judges. Moreover, restriction of rights of parliamentary opposition afforded by the Constitution and the laws, and guaranteed by these acts, is not allowed.

Of course, such role of fractions in formation of parliamentary constitutional bodies and officials is based on their respective legal powers. So, according to Art. 12 of the Rules of the Jogorku Kenesh,

fraction has the right to unite with other fractions in coalition; to make proposals on election, dismissal, statement, approval, consent, appointment of officials referred to the powers of the Jogorku Kenesh; to propose candidacies of member's fraction to committees and temporary commissions of the Jogorku Kenesh and make proposals for their recall; withdraw his representative from post of chairman or deputy chairman of committee, interim commission.

5. Interaction of the Jogorku Kenesh and political parties is also demonstrated in organization of parliamentary activities. Fraction in accordance with Art. 12 of the Rules of Procedure of the Jogorku Kenesh has the right, firstly, to submit proposal to Toraga of the Jogorku Kenesh on convening extraordinary meeting of the parliament; secondly, to express a political position on issues considered by the Jogorku Kenesh. At the same time, fraction has the right to submit for inclusion in protocol of the meeting of the Jogorku Kenesh special opinion of fraction on any issue under discussion; thirdly, to delegate his representative to make statements at meetings of the Jogorku Kenesh with statements, reports, co-reports, messages and proposals on behalf of farction; fourthly, to make proposals on plan of legislative activity and annual plan of work of the Jogorku Kenesh; fifth, to submit proposals to the Jogorku Kenesh and parliamentary committees on holding parliamentary hearings; sixthly, to make proposals on creation of working groups and temporary commissions to study individual issues. At the same time, composition of temporary commission of at least 5 deputies is formed on proposals of fractions, taking into account their proportional representation in the Jogorku Kenesh (Article 33); seventh, to make proposals on inclusion (recall) of members of fraction in composition of parliamentary delegations, friendship groups in compliance with principle of proportional representation of all fractions; eighth, to participate in joint meetings with other fractions, invite fractions of interested parties to meeting, and consult with experts and specialists.

Results. We can conclude, firstly, the transformation of modern Kyrgyzstan into parliamentary republic is reason for significant increase in the role of political parties in the formation of the Jogorku Kenesh and in the organization of its activities as a whole.

Secondly, interaction of the Jogorku Kenesh and political parties in parliamentary form of government, in particular, is demonstrated in:

a) organization and conduct of elections of deputies of the Jogorku Kenesh;

b) dealing of deputy mandates;

c) formation of parliamentary fractions and organization of their activities;

d) determining the structure of the Jogorku Kenesh and formation of its organs;

e) organization of parliamentary activities in general.

Thirdly, despite the fact mutual relations between the Jogorku Kenesh and political parties are based on legal principles and norms, the whole process takes place on political plane and is targeted at implementing party political programs.

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Қырғызстан Республикасының Ұлттық ғылым академиясы

ҚЫРҒЫЗСТАНДАҒЫ ЖОГОРКУ КЕНЕШ ЖӘНЕ САЯСИ ПАРТИЯЛАР: ПАРЛАМЕНТТІК БАСҚАРУ ФОРМАСЫ ЖАҒДАЙЫНДАҒЫ ӨЗАРА ҚАРЫМ-ҚАТЫНАС

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ЖОГОРКУ КЕНЕШ И ПОЛИТИЧЕСКИЕ ПАРТИИ КЫРГЫЗСТАНА: ВЗАИМОДЕЙСТВИЕ В УСЛОВИЯХ ПАРЛАМЕНТСКОЙ ФОРМЫ ПРАВЛЕНИЯ

Аннотация. В статье с использованием нормативно-системных методов, а также анализа и синтеза анализируется содержание положений Конституции Кыргызской Республики, Конституционного закона Кыргызской Республики "О выборах Президента Кыргызской Республики и депутатов Жогорку Кенеша Кыргызской Республики", Законов Кыргызской Республики "О Регламенте Жогорку Кенеша Кыргызской Республики» и «О статусе депутата Жогорку Кенеша Кыргызской Республики» и трудов ученых-правоведов.

В исследовании анализируются вопросы взаимодействия политических партий и Жогорку Кенеша – Парламента Кыргызской Республики при парламентской форме правления. Авторы рассматривают трансформацию Кыргызстана в парламентскую республику как естественный процесс, обосновывают обусловленность возрастающей роли политических партий в формировании Жогорку Кенеша и организации его деятельности признаками и требованиями данной формы правления. Особое внимание уделяется партийно-

политическим и конституционно-правовым основам взаимного влияния парламента и политических партий Кыргызской Республики.

Исследователи пришли к выводу, что превращение современного Кыргызстана в парламентскую республику приводит к значительному повышению роли политических партий как в формировании Жогорку Кенеша, так и в организации его деятельности в целом; взаимодействие Жогорку Кенеша и политических партий при парламентской форме правления, в частности, проявляется в организации и проведении выборов депутатов Жогорку Кенеша, распределении депутатских мандатов, формировании парламентских фракций и организации их деятельности, определении организационной структуры Жогорку Кенеша и формировании его органов и организации парламентской деятельности в целом.

С точки зрения авторов, несмотря на то, что взаимные отношения между Жогорку Кенешом и партиями основываются на правовых принципах и нормах, весь этот процесс проходит в политической плоскости и нацелен на реализацию партийно-политических программ.

Ключевые слова: Жогорку Кенеш, конституционные законы Кыргызской Республики, парламентское право, парламентская республика, президентско-парламентская республика, парламентаризм, выборы, политические партии, политическая система.

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INTERNATIONAL AND NATIONAL LEGAL GUARANTEES FOR INVESTMENT ACTIVITIES IN UZBEKISTAN

Abstract. The article analyzes international and national guarantee investment activities on the territory of the Republic of Uzbekistan and discusses the issues of the implementation of the rights and legitimate interests of foreign investors using legal guarantee obligations in the national legislation of Uzbekistan.

The aim of the study is to study the international mechanism for guaranteeing the repatriation of foreign investors, a comprehensive analysis of the most important international legal mechanisms in this area.

The scientific novelty of the research is determined by the fact that the raised problem became for the first time the subject of a special comprehensive study. The author carries out research based on a significant number of international legal acts in the field of international legal guarantees for investment activities, constituent documents of intergovernmental organizations-subjects of international law, conducts a comparative analysis of various aspects of guarantees for investment activities.

The novelty of the article is also enhanced by the fact that the author studies in detail the problems of correlation between the international legal and national legal mechanisms for guaranteeing investment activity. In the article, based on the analysis of international legal material, for the first time are investigated:

- the international legal mechanism for guaranteeing investment activities, its constituent elements; the operation of multilateral and bilateral agreements in this area;

-national legal mechanism for guaranteeing investment activities;

To achieve this goal, taking into account the designated subject of research, the following results were obtained in the work:

- International legal guarantees have been studied and a legal description to them has been given;
- The main aspects of interaction between the international and national legal mechanism for guaranteeing investment activity have been identified;

Key words: international legal guarantees, national legal guarantees, general guarantees, universal guarantees, special guarantees, foreign investors, multilateral agreements, bilateral agreements.

Introduction. The implementation of the rights and legitimate interests of foreign investors is carried out with the help of legal guarantees provided for both in the national legislation of states and in international treaties. In this regard, the legal guarantees of foreign investors can be classified as international legal and national legal. The doctrine offers various definitions of international legal guarantees of the rights of foreign investors.

So, one of the general definitions of these legal guarantees is the following: "Guarantees of the rights of foreign investors are obligations adopted by the state in a legislative or international legal order to perform certain actions with respect to a foreign investor or refrain from actions that violate the legitimate rights and interests of the investor".

In accordance with another definition, international guarantees are understood as “international legal acts providing assurances or guarantees of a state or a group of states in relation to other participants in international relations about a certain course of action, ensuring the observance of the established rights or status of any state (group of states), fulfillment of international obligations or preservation of a certain level of international relations”.

This definition characterizes international guarantees as international legal acts. However, one can hardly agree with this, since these guarantees are obligations enshrined in these international legal acts, and not the acts themselves.

International legal guarantees can be classified by the scope of the rights they grant as general and specific guarantees.

General international legal guarantees are guarantees of human rights in the field of civil and political rights, as well as economic, social and cultural rights; these guarantees are generally recognized basic international legal guarantees that must be followed by states.

International guarantees of the rights of foreign investors can be called **special** in relation to general international legal guarantees, since they have a special subject of regulation - the obligations of states accepting foreign investments in the field of ensuring the protection of the property of foreign investors.

International legal guarantees of the rights of foreign investors, being special guarantees, are contained in international multilateral and bilateral agreements and include guarantees of property rights of foreign investors, compensation, insurance, guarantees for the resolution of international investment disputes, but these guarantees are aimed at ensuring the protection of property rights foreign investors.

It should be noted that international legal guarantees of foreign investors are the legal obligations of the recipient states, enshrined in international multilateral and bilateral agreements, extending their effect in relation to foreign investors, through which foreign investors have the opportunity to exercise their rights and legitimate interests in the field of theirs. on the ownership of investments in recipient states.

National legal guarantees can be classified according to the extent of the general and specific rights they grant. It seems that the implementation of economic, political, spiritual, cultural and other guarantees is carried out through legal guarantees. In this regard, legal guarantees can be classified as **general guarantees,** with the help of which all other guarantees are realized.

In turn, guarantees of the rights of foreign investors contained in the national legislation of states are **special national legal investment guarantees,** since they regulate legal relations in the field of mutual rights and obligations of foreign investors and recipient states. At the same time, it should be assumed that the most important for foreign investors are guarantees for the protection of property rights and guarantees for the movement of property of foreign investors, which are referred to as special guarantees. National legal guarantees of the rights of foreign investors are the obligations of the recipient states, enshrined in their national legislation, ensuring the protection of the property rights of foreign investors.

General international legal guarantees are enshrined in the following documents: "Universal Declaration of Human Rights" 1948 (hereinafter - "Universal Declaration of Human Rights"), International Covenant of 1966 "On Civil and Political Rights" (hereinafter - International Covenant "On Civil and political rights "), the 1966 International Covenant" On Economic, Social and Cultural Rights "(hereinafter - the International Covenant" On Economic, Social and Cultural Rights ").

These documents contain the following guarantees:

All people are equal before the law and have the right, without any distinction, to equal protection of the law, equal rights for men and women to enjoy all civil and political rights, vocational education and training programs, ways and methods of achieving steady economic, social and cultural development and full productive employment in conditions that guarantee fundamental political and economic freedoms.

The role of general international legal guarantees is to ensure the realization of the rights and legitimate interests of the persons in respect of whom they are granted, which is an integral part of a democratic rule-of-law state, which “is characterized by the emergence of relations, mainly in line with the interests of its implementation”.

These international legal acts contain general, universal guarantees of rights, which are guarantees of human rights, in the field of civil and political rights, as well as economic, social and cultural rights, these guarantees are generally recognized basic international legal guarantees that must be followed by states.

The guarantees of the rights of foreign investors, being special guarantees in relation to the above universal legal guarantees, are directly related to them.

For example, such a relationship is seen in the provisions of the preamble of the Convention on the Settlement of Investment Disputes between States and Natural or Legal Persons of Other States (concluded in Washington on 18.02.1965) (hereinafter — the Washington Convention) on the need for international cooperation for economic development and on the role that belongs to private international

investment in this area and which correspond to the content of paragraph 2 of Article 6 of the International Covenant of 16.12.1966" On Economic, Social and Cultural Rights", regulating ways and methods of achieving steady economic, social and cultural development and full productive employment in conditions that guarantee basic political and economic freedoms of the person.

Another example is the provisions of article 7 of the Universal Declaration of Human Rights that all people are equal before the law and have the right, without any distinction, to equal protection of the law and, as it seems, in which the guarantees of article 10 of the Energy Charter Treaty (signed in Lisbon 17.12.1994) (hereinafter-ECT) that each Contracting Party, in accordance with the provisions of the ECT, encourages and creates stable and equal, favorable and transparent conditions for investors of other Contracting Parties to make investments in its territory, and that such conditions include the obligation to provide, without exception, fair and equal treatment to investments of investors of other Contracting Parties.

Thus, it can be concluded that general international legal guarantees are the obligations of States that are contained in international universal multilateral agreements and in which the guarantees of the rights of foreign investors originate.

International guarantees of the rights of foreign investors can be called special in relation to general international legal guarantees, since they, unlike these guarantees, have a special subject of regulation – the obligations of states receiving foreign investment in the field of ensuring the protection of the property of foreign investors.

Recipient States that provide legal guarantees to foreign investors implement their foreign investment policy in this way, since a state can become a party to a multilateral agreement regulating investment relations with foreign investors, thus voluntarily accepting the obligations contained in it or for any reason refuse to participate in it. At the same time, States, concluding bilateral agreements on the promotion and mutual protection of investment, also implement their policies in the field of foreign investment, establishing certain guarantees for foreign investors, as well as certain mutual obligations.

In this regard, the following statement seems to be true. "The State, when resolving issues related to civil relations with a foreign element, in its internal laws or international agreements concluded by it, in all cases determines its attitude to issues of international cooperation in one way or another."

Thus, the recipient countries independently determine their attitude to issues of international cooperation, including in the field of providing guarantees of rights for foreign investors.

In order to attract foreign capital to the development of the economy, States need to provide appropriate legal guarantees, without which it is impossible to create a favorable investment climate.

In addition, according to one of the points of view contained in the general theory of law, "the institution of rights and freedoms ensures the individual's access to the use of material and spiritual goods, encourages public authorities to adhere to generally accepted international standards in this regard."

In international investment relations, such international standards for guaranteeing the rights of foreign investors are contained in such multilateral agreements as the "Convention on the Establishment of a Multilateral Investment Guarantee Agency" (concluded in Seoul in 1985) (hereinafter referred to as the Seoul Convention), the ECT, and the Washington Convention .

The international body responsible for insuring foreign investment against political risks is the Multilateral Investment Guarantee Agency, established under the Seoul Convention.

So, according to N. N. Voznesenskaya: "The task of the established Agency is to stimulate the flow of investment between member countries and especially in developing countries, thus complementing the activities of the IBRD, the International Finance Corporation (IFC), etc."

It seems that such stimulation of the flow of investment is regulated by the provisions of the Seoul Convention, since this international document contains guarantees to protect the property of foreign investors from the following political risks: currency transfer, expropriation or similar measures, treaty violations, wars and civil unrest.

Another international document containing guarantees of the rights of foreign investors in terms of resolving disputes between foreign investors and recipient States is the Washington Convention .

In accordance with the Washington Convention, the International Center for Settlement of Investment Disputes (hereinafter – ICSID) was established as an institution that promotes the resolution of international investment disputes.

As stated in the legal doctrine: "the main idea of the Convention is to organize the settlement of such disputes between foreign private investors and States that accept these investments at the international level through the establishment of a special center for the settlement of investment disputes at the IBRD."

According to article 2 of the Washington Convention," The task of the Center is to provide structures for conciliation and arbitration in connection with investment disputes between Contracting States and natural or legal persons of other Contracting States in accordance with the provisions of this Convention."

The guarantees contained in the Washington Convention are international guarantees for the settlement of international investment disputes.

It should be noted that, in addition to these international legal guarantees contained in multilateral international agreements, the guarantees of the rights of foreign investors enshrined in bilateral agreements on the promotion and mutual protection of investment play an important role.

Thus, according to A. G. Bogatyrev: "bilateral investment agreements create the foundations of international legal regulation necessary for regulating international investment relations in combination with the investment national legislation of the contracting states»

As stated in the legal literature: "Currently, bilateral international treaties contain more detailed regulation of the relevant relations, and most importantly, it is in these agreements that the initial fundamental provisions that determine the investment climate are formulated."

As a vivid illustration of the role of international agreements in the field of guarantees of the rights of foreign investors, the following statement can be cited.

International agreements can serve as a mechanism by which Governments provide foreign investors with irrevocable obligations and guarantees that correspond to the interests of foreign investors and are aimed at protecting these interests from any political acts.

Based on the above, it can be concluded that international legal guarantees of foreign investors are legal obligations of recipient States, enshrined in international multilateral and bilateral agreements, extending their effect to foreign investors, through which foreign investors have the opportunity to exercise their rights and legitimate interests in the field of investments owned by them in the recipient States.

In the doctrine, there are various definitions of legal guarantees, one of which is the following: *"Legal guarantees are legal means expressed in normative legal prescriptions, the implementation of which can provide or provides the possibility of implementing other normative legal prescriptions."*

The procedure for concluding international legal instruments in the Republic of Uzbekistan is governed by the following legal documents: Law "On international treaties of the Republic of Uzbekistan" of 22 December 1995, regulations of the Cabinet of Ministers from January 12, 1998 n 15 "About the order of conclusion, execution, suspension, termination and denunciation of international treaties of the Republic of Uzbekistan of interdepartmental nature" of 12 December 2000 No. 473 "order of drafting international treaties and commitments of the Republic of Uzbekistan according to international treaties".

The law of international treaties determines the modern development of relations between subjects through the process of international law-making, further conclusion of agreements between them.

It seems that the main legal requirements are the constitutions of States, which contain general, fundamental national legal guarantees. For example, in accordance with article 23 of the Constitution of the Republic of Uzbekistan, foreign citizens and stateless persons located on the territory of the Republic of Uzbekistan are guaranteed rights and freedoms in accordance with the norms of international law. They bear the duties established by the Constitution, laws and international treaties of the Republic of Uzbekistan.

General guarantees are considered economic, political, spiritual and cultural guarantees, special ones include legal, psychological and managerial guarantees. In turn, legal guarantees as a type of special guarantees include:

a) measures to improve legislation;

b) measures to detect violations of the rule of law;

c) protection measures;

d) liability measures;

e) measures of supervision and control over the state of law and order;

e) measures to prevent violations of the rule of law and order .

Meanwhile, it seems that the implementation of economic, political, spiritual, cultural and other guarantees is carried out through legal guarantees. In this regard, legal guarantees can be referred to as general guarantees, with the help of which all other guarantees are implemented.

Foreign investors can be called special subjects of private international law, since foreign investors who invest in the development of the economy of the recipient country, on the one hand, are provided with guarantees, and on the other hand, the flow of these investments into strategically important sectors of the economy of the receiving state is restricted, in order to protect state sovereignty and national security.

In the Republic of Uzbekistan, guarantees of the rights of foreign investors are enshrined in various regulatory legal acts.

According to Article 54 of the Law of the Republic of Uzbekistan "On Investments and Investment activities».

In accordance with the decree of the President of the Republic of Uzbekistan №up-4434 10.04.2012 **"On additional measures to stimulate the attraction of direct foreign investments"** stipulates that newly established enterprises with foreign investments where the foreign investor's contribution in cash is not less than 5 million USD, while changes in the tax law may apply within 10 years from the moment of their state registration rules and regulations for tax on profit of legal entities, value added tax (turnover on realization of goods, works, services), property tax, unified social payment the unified tax payment and obligatory deductions to the Republican road Fund and off-budget Fund of development of material-technical base of educational and medical institutions under the Ministry of Finance of the Republic of Uzbekistan effective on the date of their state registration.

In accordance with the Decree of the President of the Republic of Uzbekistan No. UP-5495 dated 01.08.2018 **"On measures to radically improve the investment climate in the Republic of Uzbekistan"** from August 1, 2018, the procedure is established, according to which:

- a bona fide investor and business entity is compensated for property damage caused by trust in the legal force of an administrative act of a state body (official) adopted in respect of them, relying on the legal force of which, they used the property, made a transaction or otherwise took advantage of the benefits and advantages provided, in case of subsequent recognition of this act as invalid or its cancellation;
- the issue of cancellation or modification of an administrative act of a state body (official), in cases where it affects the legitimate interests of a bona fide investor and a business entity, is considered in court, except in cases where its preservation poses a threat to public interests.

We believe that the following document is the central and most important legal source of legal guarantees of investment activity in the territory of the Republic of Uzbekistan.

According to the Law of the Republic of Uzbekistan No. ZRU-598 of 25.12.2019 "On Investments and investment activities", the main principles of investments and investment activities are:

- legality;
- transparency and openness;
- freedom to carry out investment activities;
- fairness and equality of subjects of investment activities;
- non-discrimination against investors;
- presumption of good faith of the investor.

The basic principles of the legislation on investments and investment activities are applied at all stages of the investment process and implementation of investment activities.

According to article 16 of this Law, the income of an investment entity obtained as a result of investment activities may be reinvested or used in any other way at its discretion after payment of taxes and payments.

According to this Law, a foreign investor has the right to terminate investment activities in the Republic of Uzbekistan. After the termination of the investment activity, the foreign investor has the right to free repatriation in cash or in kind of its assets received as a result of the termination of the investment activity, without prejudice to the fulfillment of the obligations of the foreign investor in respect of the Republic of Uzbekistan or other creditors. Moreover, the state guarantees the protection of investments in accordance with the legislation and international treaties of the Republic of Uzbekistan.

Investments and other assets of investors are not subject to nationalization.

Investments and other assets of investors are not subject to requisition (expropriation), except in cases of natural disasters, accidents, epidemics, epizootics and other circumstances of an extraordinary nature.

The decision on the requisition and expropriation of investments is made by the Cabinet of Ministers of the Republic of Uzbekistan in compliance with the requirements under which the requisition or expropriation:

- is limited to the minimum size of investments or other assets of investors necessary to solve problems arising from the cases specified in Part three of this Article;
- it is not carried out on a discriminatory basis;
- accompanied by payment of compensation adequate to the loss caused.
- The State acts as a guarantor of the timely implementation of these compensation payments.
- The investor has the right to challenge in court and arbitration, in particular:
- legality of the purpose used to carry out the requisition (expropriation);
- amount of requisition (expropriation);
- assessment of requisitioned (expropriated) investments and other assets;
- compliance of the payment of compensation to be paid;
- the procedure followed by the state administration and local government authorities in carrying out the requisition (expropriation).

Insurance of investments and risks of investors is carried out on a voluntary basis.

According to article 46 of the Law "On Investments and Investment Activities", foreign investors and foreign investments are granted fair and equal treatment, full and permanent protection and security. Such a regime cannot be less favorable than the regime defined in the international treaties of the Republic of Uzbekistan.

The legal regime for foreign investments cannot be less favorable than the corresponding regime for investments made by legal entities and individuals of the Republic of Uzbekistan.

Restoration of violated rights and interests of foreign investors guaranteed by the laws of the Republic of Uzbekistan is regulated by the legislation and international treaties of the Republic of Uzbekistan. Also, foreign investors, their representatives and employees who are in the Republic of Uzbekistan in connection with investment activities have the right to free movement throughout the territory of the Republic of Uzbekistan.

Conclusion.

In the final part of our article, summarizing all the above arguments, grounds and sources and norms of international law and legislation of the Republic of Uzbekistan, we can conclude that all other national legal guarantees of the rights of foreign investors (legal guarantees, compensation guarantees, guarantees for the resolution of international investment disputes, financial guarantees), being derived from the basic guarantees that ensure the right of ownership, and guarantees of the movement of property of foreign investors, they perform a supporting role in the implementation of the rights and legitimate interests of foreign investors in the sphere of their property.

Thus, national legal guarantees of the rights of foreign investors are the obligations of the recipient States, enshrined in the national legislation of these states, ensuring the protection of the property rights of foreign investors.

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ӨЗБЕКСТАНДАҒЫ ИНВЕСТИЦИЯЛЫҚ ҚЫЗМЕТТІҢ ХАЛЫҚАРАЛЫҚ ЖӘНЕ ҰЛТТЫҚ ҚҰҚЫҚТЫҚ КЕПІЛДІГІ

Аннотация. Мақалада Өзбекстан Республикасының территориясындағы инвестициялық қызметтің халықаралық және ұлттық құқықтық кепілдіктері талданып, шетелдік инвесторлар құқығы мен заңды мүдделерін Өзбекстанның ұлттық заңнамасында көзделген заңдық кепілдіктер арқылы жүзеге асыру мәселелері қарастырылды.

Зерттеудің мақсаты – шетелдік инвесторлар репатриациясына кепілдік берудің халықаралық және ұлттық құқықтық механизмін зерттеу, аталған саладағы маңызды халықаралық құқықтық құжаттарға жан-жақты талдау жасау.

Зерттеудің ғылыми жаңалығы мәселенің алғаш рет арнайы кешенді зерттеу нысанына айналу барысынан бай-қалады. Автор инвестициялық қызметке арналған халықаралық құқықтық кепілдік саласындағы халықаралық құқықтық акті, үкіметаралық ұйымдар – халықаралық құқық субъектілерінің құрылтай құжаттары санына негізделген зерттеу жүргізеді, инвестициялық қызмет кепілдіктерінің түрлі аспектілеріне салыстырмалы талдау жасайды.

Сонымен қатар, авторлардың инвестициялық қызметке кепілдік берудің халықаралық құқықтық және ұлттық құқықтық тетіктері арасындағы корреляция мәселелерін егжей-тегжейлі зерттеуі мақаланың жаңашылдығын білдіреді. Халықаралық құқықтық материалдарды талдауға негізделген бұл жұмыста:

– халықаралық инвестициялық құқықтағы халықаралық құқықтық кепілдік ұғымының анықтамасы мен құқықтық сипаттамалары;

– инвестициялық қызметке кепілдік берудің халықаралық құқықтық механизмі мен элементтері, осы саладағы көпжақты және екіжақты келісім арқылы жұмыс атқару;

– инвестициялық қызметке кепілдік берудің ұлттық құқықтық механизмі;

– халықаралық және ұлттық құқықтық реттеу қатынасы, инвестициялық қызметке кепілдік беру әдістері мен тәсілдері алғаш рет зерттелген.

Түйін сөздер: халықаралық құқықтық кепілдіктер, ұлттық құқықтық кепілдіктер, жалпы кепілдіктер, әмбебап кепілдіктер, арнайы кепілдіктер, шетелдік инвесторлар, көпжақты келісімдер, екіжақты келісімдер.

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МЕЖДУНАРОДНЫЕ И НАЦИОНАЛЬНЫЕ ПРАВОВЫЕ ГАРАНТИИ ИНВЕСТИЦИОННОЙ ДЕЯТЕЛЬНОСТИ В УЗБЕКИСТАНЕ

Аннотация. В статье проводится анализ международных и национальных правовых гарантий инвестиционной деятельности на территории Республики Узбекистан, и рассматриваются вопросы реализация прав и законных интересов иностранных инвесторов с помощью правовых гарантий, предусмотренных в национальном законодательстве Узбекистана.

Целью исследования является изучение международного и национально-правового механизма гарантии репа-триации доходов иностранных инвесторов, комплексный правовой анализ важнейших международно-правовых документов в данной сфере.

Научная новизна исследования определяется тем, что поднятая проблема стала впервые предметом специального комплексного исследования. Автор осуществляет исследование, опираясь на значительное количество международно-правовых актов в области международно-правовых гарантий инвестиционной деятельности, учредительных документов межправительственных организаций-субъектов международного права, проводит сравнительный анализ различных аспектов гарантий инвестиционной деятельности.

Новизну статьи усиливает и то обстоятельство, что автор подробно изучает проблемы соотношения международно-правового и национально-правового механизма гарантии инвестиционной деятельности. В статье на основе анализа международно-правового материала впервые исследованы:

- определение понятия международно-правовых гарантий в международном инвестиционном праве, дана его юридическая характеристика;
- международно-правовой механизм гарантии инвестиционных деятельности, его составные элементы; действие многосторонних и двусторонних соглашений в данной области;
- национально-правовой механизм гарантии инвестиционной деятельности;
- соотношение международного и национального правового регулирования, методов и способов гарантии инвестиционных деятельности.

Для реализации поставленной цели с учетом обозначенного предмета исследования в работе получены следующие результаты:

- изучены международно-правовые гарантии, дана им юридическая характеристика;
- определены роль и место международно-правовых гарантий в международном инвестиционном праве.

Ключевые слова: международно-правовые гарантии, национально-правовые гарантии, общие гарантии, универсальные гарантии, специальные гарантии, иностранные инвесторы, многосторонние соглашения, двусторонние соглашения.

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SOCIAL AND LEGAL PREVENTION OF CRIMES AND OFFENSES OF ORPHANS IN BOARDING SCHOOLS: ON THE EXAMPLE OF THE KEMEROVO REGION

Abstract. The article is devoted to one of the urgent problems, such as social and legal prevention of delinquency of orphans in boarding schools in the Kemerovo region. To date, the problem of legal impact on a child is primarily due to the fact that it achieves the ultimate goal of all legal regulation - the implementation of legal prescriptions in the life of every teenage orphan who is in a boarding school.

Today in Russia the historical and socio-demographic situation has developed in such a way that the reform of Russian society has been accompanied and accompanied by a fairly widespread criminalization of various spheres of public life.

Involvement in illegal activities of large and small social groups also affected minors-orphans who are in boarding schools of the Kemerovo region, as the most sensitive stratum of Russian society, involvement in illegal activities of large social groups, also affected minors - orphans as the most sensitive part of the population in relation to transformational changes taking place in modern society.

Today, prophylactic work is being actively carried out with orphaned children in boarding schools in the Kemerovo Region - this is a complex, multidimensional, long-term process. The specific task of the boarding school for orphans in the field of crime prevention is to carry out early prevention, that is, to create conditions that ensure the possibility of normal development for the students of orphans.

The presented material in the publication does not contain information related to the state secret of the Russian Federation.

Keywords: social and educational prevention, boarding schools for orphans of the Kemerovo region, orphans and children left without parental care, juvenile offenders, educational colonies of the Federal Penitentiary Service of Russia, inspectorate for minors, criminal executive inspectorate, depopulation of family relationships among adolescents, teenage organized crime group, dysfunctional family.

The problem of delinquency invariably attracts interest, since there have always been acts that infringe on the priorities and values of human society. At the same time, it is obvious that the essence, content, specificity of forms of manifestation and other features of such a social and legal phenomenon as an offense cannot be perceived in the same way in different countries and in different historical epochs. In the modern period, the urgency of the problems of delinquency is explained by the significant complication of political, property, financial and other relations associated with fundamental transformations in all spheres of public life in Russia.

The legal behavior of orphans can be defined as a conscious activity in the sphere of the law, conditioned by cultural and moral views and human life experience. Depending on the form of expression, human behavior can be verbal (verbal), consisting of various statements, judgments and assessments that give an idea of the internal state of an individual, and real (practical), which includes certain actions of people. Human behavior consists of thoughts, words and deeds, but the most essential social characteristic of a person is her concrete actions, deeds, position.

So, G.V.F. Hegel in "Philosophy of Law" (1821) expounded in detail the idea that a person is responsible only for his actions, and not for beliefs and intentions, he defined a person as "a series of his actions" [7]. The nature of a person's actions in the field of law can be judged by his actions, lawful or unlawful.

The criteria of legitimacy proposed by various scholars show that in the legal literature there has not yet been a single point of view on what should be attributed to socially useful and legally significant, proper behavior. For example, Academician V.N. Kudryavtsev assumes the existence of "neutral" behavior between socially harmful and socially useful behavior, and Professor Y.A. Tikhomirov singles out a "neutral field" when the norms of the law, being formally observed, do not really regulate behavior. These actions are not assigned to the category that needs any legal mediation, and can be classified as legally indifferent (indifferent to the law).

Also, in the legal literature doubts are expressed about the inclusion of illegal behavior in legal behavior, since: illegal behavior is such behavior that contradicts the requirements of legal norms, therefore, it cannot be within the framework of legal behavior, but then legal behavior is identified with lawfulness. Such a judgment is formally supported by the terminological connection between the words "legal" and "correct". This point of view does not find wide support in the legal literature. Objectively, one should proceed from the fact that "Law", first of all, acts as a means of regulating social relations and determines the measure of individual freedom, draws a line, albeit in some places very conditional and not clear, between a free choice of actions and illegal actions, covering almost everything spheres of society. But, separating one from the other, on both sides there are many unresolved situations that, as a result of the movement of life, often surface and become obvious and quite problematic for modern society.

Indifferent behavior does not contradict the requirements of legal norms, it is "neutral" and can exist on the border of legitimacy. In some cases, this type of legal behavior is characterized by observance of the letter of the law, and in spirit it can very strongly conflict with it. It can also be the basis for the legislator. For example, if there are gaps in the legislation, a repeated violation of someone's interests cannot be considered an offense, although in another legal system this act is such. Until the attention of society, the court or the legislator is attracted, it can be regulated by other norms (moral, religious, ethical, etc.). So, professor N.I. Matuzov expresses his point of view on this matter, he argues that in the field of law, behavior is legal, since it is mediated by legal norms and, therefore, the subject must correlate his actions with their requirements. But indifferent behavior is not legal, since it goes beyond the legal field and, therefore, is not mediated by law [11].

That is why it is necessary to constantly formulate new theoretical concepts of combating offenses, develop new methods and measures. After all, crime, like any social phenomenon, is constantly evolving, taking new forms.

So, today the degree of knowledge of this problem is quite large, but, nevertheless, this does not lead to a significant decrease in the number of various crimes and offenses, the degree of their cruelty.

These or those criminological concepts were expressed by ancient thinkers. We find the first theoretical constructions in this area in Plato and Aristotle. The ancient Greek philosophers Plato and Aristotle thought about this, and several centuries later Sh. L. Montesquieu, G. Hegel, I. Kant, utopian socialists T. More, T. Campanella, C. Fourier, Saint-Simon, lawyer C. Beccaria, thinkers and writers Voltaire and J.J. Rousseau, the founders of the Marxist doctrine K. Marx and F. Engels.

Various aspects of the prevention of juvenile delinquent crimes were developed in the works of such prominent scientists as: A.I. Alekseev, V. Bazhenov, N.I. Vetrov, Y.I. Gilinsky, A.I. Dolgova, D.Z. Ziyadova, K.E. Igoshev, N.G. Kobets, V.N. Kudryavtsev, N.P. Meleshko, G.M. Minkovsky, P.A. Pankratov, E.I. Petrov, J. Ryan, V.P. Revin, T.A. Tretyakov, V.V. Ustinov and others [18, 19].

Minors, due to their age and social immaturity, constitute a special group of convicts from among those serving sentences in prisons. The peculiarities of adolescence, to a certain extent, complicate the work with the contingent, since they force the staff of boarding schools in the Kemerovo region and educational colonies of the Federal Penitentiary Service of Russia. Taking into account the "explosiveness" and "impulsiveness" of their convicts, but at the same time, the "plasticity" of the developing personality-individual, allows us to hope for the success of the purposeful social and pedagogical work of the personnel specially trained in the field of juvenile law and social pedagogy of boarding schools of the Kemerovo region and educational colonies of the Federal Penitentiary Service of Russia [17, 19].

In addition, the maximum possible sentences, limited to ten years, provide social prospects for working with juvenile offenders. The terms of punishment of adults, especially convicts, for life, doom them to long-term living in places of deprivation of freedom and postpone or deprive them of the possibility of release. Thus, convicts under age leave the educational colonies of the Federal Penitentiary

Service of Russia at an active age that allows them to socially define themselves and gain a foothold in the future: continue their studies, find a job, start a family. The "social perspective" of the contingent of boarding schools in the Kemerovo region and educational colonies of the Federal Penitentiary Service of Russia predetermines the differences in the organization of the activities of correctional colonies, colonies of settlements of the system of the Federal Penitentiary Service of Russia [17].

In accordance with the current criminal-executive legislation of the Russian Federation, convicted juveniles serve a sentence of imprisonment in educational colonies of the Federal Penitentiary Service of Russia, in which they are held separately from adults. This is due to the need to prevent the negative influence of more experienced adult criminals on minors. Convicted minors held in the educational colonies of the Federal Penitentiary Service of Russia serve their sentences in "normal", "lightweight", "preferential" and "strict" conditions. The four-stage system of regime requirements, stimulating the process of correcting juvenile convicts, helps to increase the effectiveness of the educational impact on them [5].

The need to study the reform of the system of the Federal Penitentiary Service of Russia and educational work with juvenile convicts is determined by the fact that in recent years (2015-2020) juvenile delinquency in Russia has significantly decreased. Thus, the share of juvenile convicts serving a criminal sentence in the form of imprisonment in penitentiary institutions of the Federal Penitentiary Service of Russia, by type of crime: convicted of theft - 15.2%, for robbery - 14.1%, for robbery - 12.2%, for intentional infliction of grievous bodily harm - 11.8%, for murder - 10.1%, for rape - 12.6%, other crimes - 24.2% of convicted minors [22]. Of course, criminal acts with the use of various weapons began to prevail. Currently, the number of schoolchildren armed with various types of weapons and means of self-defense is about 27.8% [as of 10/01/2020] [12].

To date, the most criminally affected part of the population are teenagers from disadvantaged families, teenagers-orphans (from 10 to 14 years old and 14 to 17 years old), left without parental care, who are brought up in boarding institutions of the Kemerovo region of the Russian Federation.

Among adolescents-orphans and youth, signs of moral demoralization began to appear more and more clearly, expressed in negative phenomena - drunkenness, drug addiction, substance abuse, prostitution, in the emergence and growth of various informal associations of asocial orientation. The consequence of the immoral behavior of these adolescents, firstly, is not a prosperous and not full-fledged family, which is involved in a conflict with the law, who previously served a sentence in places of detention, etc. Secondly, adolescents, former pupils of correctional boarding schools for orphans and children left without parental care (VIII type) of the Kemerovo region of the Russian Federation [15, 16].

The precipitous increase in juvenile delinquency is alarming both for theorists in the field of juvenile law, sociology of law, social pedagogy, criminology, and among practitioners of law enforcement. The dynamics and rates of this growth force the alarm to sound, because, by and large, we are talking about the fate of the country, its future. The problem of juvenile delinquency has become even more relevant in view of the epochal event - with the onset of the third millennium - the 21st century.

Such an increase in crime among juvenile offenders is due to a number of objective reasons: most of the public and state institutions that previously dealt with the problems of the younger generation, including the Komsomol, the system of work in boarding schools, palaces of pioneers, were destroyed, and nothing new was proposed in exchange [12]. A significant percentage of recidivism of minors, especially, this concerns amnestied persons according to 2001 data, thanks to the amnesty (June-November) the number of convicts in educational colonies decreased by 7.8 thousand, of which more than 44.7% of juvenile offenders in 2002-2004 years have come back, having committed new crimes [22].

Today, solving the problem of juvenile delinquency is impossible without a thorough study of the historical experience of correcting juvenile offenders, without studying the characteristics of their personality and the current state of educational work that is now being carried out in the educational colonies of the Federal Penitentiary Service of Russia. The problems of educating the younger generation also remain. Among them, one of the most urgent is the fight against negative (immoral) phenomena among juvenile delinquents and juvenile delinquency [15, 17, 22].

Thus, the problem of juvenile delinquents in modern society is one of the most complex and controversial. Unfortunately, not every teenager who is brought up in a non-family realizes what illegal acts they commit lead to difficult and difficult-to-correct consequences.

In our opinion, an offense is, first of all, a guilty behavior, the right of a legally capable person (an orphan in an orphanage or boarding school of the VII type), which contradicts the prescriptions of the rule of law, causes harm to other persons and entails legal liability [15, 16].

In turn, all offenses are usually divided into two groups: misdemeanors and crimes (the most serious offenses). Offenses can be labor, disciplinary, administrative and civil (tort obligations). As a rule, crimes are understood as criminal offenses, that is, acts that violate the criminal law. They can vary in severity category. Depending on the type of offense, the appropriate responsibility is distinguished - criminal, administrative, disciplinary, civil.

✓ First, criminal liability is responsibility for violation of laws provided for by the Criminal Code of the Russian Federation. A crime provided for by the criminal legislation of Russia belongs to the category that is classified as socially dangerous, infringing on the constitutional and social structure of the state, property, crimes against the person, the rights and freedoms of citizens, public order, etc.;

✓ Secondly, administrative responsibility is applied for violations provided for by the Code of Administrative Offenses. Administrative offenses include: violation of traffic rules, violation of fire safety. For administrative offenses they are brought to justice from the age of 16. Punishment: fine, warning, correctional labor;

✓ Thirdly, disciplinary liability is a violation of labor duties, that is, a violation of labor laws, for example: being late for work, absenteeism without a good reason.

✓ And, fourthly, civil liability regulates property relations. Punishments for the offender: compensation for harm, payment of damage [20].

Today, preventive work is being actively carried out with orphans in boarding schools in the Kemerovo Region - this is a complex, multidimensional, long-term process. The specific task of the boarding school for orphans in the field of crime prevention is to carry out early prevention, that is, to create conditions that ensure the possibility of normal development for the students of orphans. This is, first of all, the identification of students who are inclined to violate moral and legal norms, the study by teachers of the individual characteristics of such students. The reasons for the moral deformation of the personality of the offender are analyzed. Typical crisis situations arising in pupils from 9 to 17 years of age are used. Also, the work uses the possibilities of student self-government and their involvement in the conduct of school social and cultural events. Timely noticed deviations in the behavior of children and adolescents-orphans and properly organized pedagogical assistance can play an important role in preventing situations that can lead to delinquency and crime [20].

We also highlight the following stages of deviant behavior of adolescents-orphans and adolescents from a dysfunctional family (for example, correctional boarding schools No. 66, 88 for orphans and children from dysfunctional families of the VIII type of the city of Novokuznetsk, Kemerovo region):

1) Unapproved behavior - behavior associated with pranks, mischief, disobedience, restlessness, stubbornness;

2) Publicly condemned behavior - behavior that causes more or less condemnation of others, teachers, foster parents, guardians, which consists in an episodic violation of discipline, systematic cases of pugnaciousness, rudeness, impudence, dishonesty, etc.;

3) Deviant behavior - morally negative actions and actions that have taken on the character of systematic or habitual, which manifests itself in: deceit, pretense, hypocrisy, selfishness, conflict, aggressiveness, petty theft (theft) from peers, etc.;

4) Pre-criminal behavior - behavior that carries the beginnings of criminal and destructive behavior (episodic deliberate violations of the norms of requirements governing the behavior and relationships of people in society, hooliganism, beatings, extortion, drinking alcohol, malicious violations of discipline and generally accepted rules of conduct, etc. etc.) [15, 16, 20];

5) Delinquent (illegal, criminal) behavior of a teenager is a system of actions aimed at total violation (destruction) of moral foundations, rules of generally accepted norms and behavior, committing crimes against the person, theft and destruction of other people's property. This behavior manifests itself in the form of disregard for moral and ethical norms, demonstrating asociality, as well as criminal acts pursued by the criminal legislation of Russia [9].

The main signs of problematic orphans brought up in boarding schools may be:

1) Evasion from studies due to: poor progress in most subjects; lag in intellectual development; orientation to other activities; lack of cognitive interests;

2) Low social and labor activity: rejection of public assignments; disdain for class matters; demonstrative refusal to participate in labor affairs; disdain for public property, its damage;

3) Negative manifestations: drinking alcohol; the use of psychotropic and toxic substances; craving for gambling; smoking; unhealthy sexual manifestations;

4) Negativism in assessing reality;

5) Increased criticality towards teachers and adults: rudeness, fights; truancy; missing classes; indiscipline in the classroom; beating the weak, younger ones; extortion; cruelty to animals; theft; public order disturbance; unmotivated actions;

6) Attitude towards educational activities: indifferent; skeptical; negative; fierce [8, 20, 21].

Why is this behavior formed in orphans brought up in boarding schools? What acts as an agent (provocateur) of a negative impact on adolescent orphans brought up in boarding schools? Let's try to answer the formulated questions:

✓ Firstly, it is the unfavorable conditions of the family environment and upbringing (as one of the main reasons for a child who ended up in a boarding school from *a dysfunctional family*[1] aged 7-14 and older). For a child and an orphaned teenager, the most effective model was his parents. Asocial, immoral (behavior contrary to social norms and principles) the behavior of his parents, which manifested itself in systematic drunkenness, family scandals and fights with drinking companions, open debauchery with cohabitants and guests-drinking companions of a drinking mother, a manifestation of cruelty towards young children.

✓ Secondly, insufficient attention and love on the part of parents (*due to the fact that their parents are deprived of this right by decision*). A well-groomed, well-fed and fashionably dressed child can be internally lonely, psychologically neglected, since no one cares about his mood, interests and experiences. Such children especially strive to communicate with peers and adults outside the family, which to a certain extent compensates for their lack of attention, affection and care from their parents. However, if this communication acquires an unhealthy interest, it is detrimental to the moral development and behavior of children;

✓ Thirdly, overprotection of children. There is no freedom of choice for a teenager and an orphan child, since the educators of boarding schools in the city of Novokuznetsk, Kemerovo region, fearing that their pupils would not make mistakes, do not allow them to live, they try to solve everything for them. The consequence is the childishness, lack of independence, personal failure of the orphaned child.

✓ Fourthly, excessive satisfaction of the needs of the orphaned child of the boarding school. In boarding schools, where educators try to please orphans in many ways. Also, they poorly teach them social and everyday skills, which directly in the needy, affects their post-boarding adaptation, when adolescents enter an independent life. From such children, consumers (dependents) grow up, yearning for more and more pleasures and social benefits. And, of course, the lack of a habit of reasonable self-restraint often pushes them to crimes committed under the influence of motives and desires of a purely consumer nature.

✓ And, fifthly, the excessive exactingness and authoritarianism of parents. Excessive severity of educators and teachers of boarding schools, excessive use (abuse) of all kinds of restrictions and prohibitions that carry out various punishments (of a moral, psychological and physical nature), humiliating and insulting the human dignity of orphans. On the part of the teachers, there is a total desire to subordinate the pupil to their will, the imposition of their opinions and ready-made solutions, the categorical judgments and all this in an orderly tone. The use of coercion and repressive measures, including physical punishment, destroy the atmosphere of mutual understanding and trust, often pushing orphans to self-leave residential institutions where adolescents (street children) commit crimes [8, 17, 20, 21].

The logic of prevention dictates the need to create all the necessary conditions in boarding schools in the Kemerovo region that would not provoke deviant behavior of adolescents-orphans, but expand the space that is safe for the orphan, where he feels good, comfortable and interesting. Where he could fully realize his dreams and ideas, become a mature person with the best traits of behavior that reflect his individuality.

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[1]***Dysfunctional family*** - the word combination "*Dysfunctional family*" comes from lat. dis - "*violation*", "*frustration*", "*loss of something*", and function - "*activity*". This is a family that engenders maladaptive, destructive behavior of one or more of its members, in which conditions exist that, impede their personal growth.

Today, it is considered the most effective in the prevention of offenses in a boarding school with a developed structure of extracurricular activities that takes into account the interests of different ages, especially adolescents. This is the compulsory creation in boarding schools of the Kemerovo region of structural subdivisions of additional education, the implementation of leisure programs, the organization of amateur performances (artistic, technical, sports), the organization of family leisure, which will directly be a powerful source of attractiveness of the orphanage and a resource for the prevention of deviant behavior [13, 14, 15, 16].

So, in turn, crime prevention presupposes that the boarding school for orphans becomes a place where the pupil really finds use of his capabilities and initiative, where he can fully realize himself as a person, reveal his creative and scientific potential.

In boarding schools of the Kemerovo region today, it is necessary to form social norms and rules of behavior, since without this it is impossible to effectively solve the problems of teaching and educating the younger generation [13, 14, 15, 16].

In this regard, it is necessary: 1) to form the way of boarding life following the example of the "Gorky boarding school", where all pupils will be vocationally oriented, and also focused on the development of creative, scientific, technical, mathematical and analytical potential; 2) help the pupils learn their rights and learn, use them, protect them in case of violation; 3) help adolescents see the relationship between personal freedom and responsibility of each individual; 4) help orphans learn how to resolve disputes in a legal way; 5) to form the skills of legal culture among pupils [20].

So, in preventive activities with a specific person, as Professor G.A. Avanesov, it is important not to waste time. At the very early stage, when the person has not yet acquired stable attitudes and habits, it may be easier to achieve success.

If early prevention measures prove to be insufficient, then they can be replenished with measures of a different level, since a certain reserve of time remains for this. Early prevention can be defined as a set of measures taken in order to: 1) Improve the living conditions and education of minors in cases where the situation threatens their normal development; 2) Suppress and establish the actions of sources of antisocial influence; 3) To influence minors who admit deviations in behavior in such a way as not to allow antisocial views and habits to take hold [20].

The main areas of early prevention are: 1). Identification and establishment of unfavorable living conditions and upbringing even before they have affected the behavior, the formation of the views of specific adolescents-orphans of boarding schools; 2). Identification and elimination (neutralization) of sources of negative influences on adolescent orphans, who can form an antisocial position of the individual and contribute to the commission of crimes [20].

This direction assumes:

- ✓ the application of measures to improve the unfavorable conditions of the family upbringing of an orphaned teenager of a boarding institution with the help of various measures of influence towards his peers;
- ✓ removal of adolescent orphans from the environment negatively affecting the adolescent (immoral environment);
- ✓ the application of measures provided by law to persons involving teenage orphans in drunkenness and other antisocial activities [13, 14, 15, 16, 20].

Providing a deterrent and corrective influence on orphans of boarding schools in the Kemerovo region with socially deviant behavior. Moreover, measures can be singled out: impact on teenage orphans, whose antisocial views have not yet strengthened and are manifested in the commission of individual minor offenses.

The purpose of their application is to prevent antisocial attitudes and habits from gaining a foothold; impacts applied to adolescent orphans with a rather pronounced antisocial position of the individual who commit offenses that are not of a criminal nature. Their goal is to prevent an individual's antisocial position from becoming a crime [20, 21].

Here, along with providing, if necessary, assistance to a teenager who has fallen into unfavorable conditions of family upbringing, up to withdrawal from a negative environment and referral to an orphanage, boarding school, etc. It is also possible to apply specific measures to organize control over his behavior and individual educational and preventive work (registration and inspection for minors, appointment of a chief, public educator, etc.). This also includes the application of various measures of

influence (public, administrative, civil law, compulsory measures of an educational nature) against adolescents who commit offenses [19, 20, 21].

Based on the foregoing, social and pedagogical work with juveniles prone to delinquency should solve the following tasks: 1) implementation of complex medical, psychological and pedagogical diagnostics in order to determine the causes of problems in learning, communication and others; 2) the choice of the optimal way of teaching for each child and the choice of measures of psycho-corrective influence on his personality; 3) provision of individually oriented pedagogical, psychological, social, legal and medical assistance to children and adolescents-orphans of boarding schools. [19, 20, 21].

Special emphasis should be placed on the educational and social and legal direction in the activities of the boarding school for orphans and children left without parental care.

In our opinion, the educational direction of the activity of any boarding institution is the implementation of education for orphans who have difficulties in mastering educational programs due to the peculiarities of psychophysical development and unfavorable social conditions of life, within the federal state educational standard.

Creation of conditions in boarding schools for student-centered learning, providing a variable nature of education with the setting of correctional and developmental tasks, as well as for the restoration of learning and raising the level of education of orphans.

The social and legal direction provides for assistance to adolescents-orphans in social and labor adaptation, career guidance, obtaining a profession and employment, in protecting their rights and interests protected by law; advising minors and their parents on legal issues; prevention of asocial behavior, vagrancy, homelessness, attempts at suicide of juvenile delinquents who are brought up in boarding schools in the Kemerovo region.

So, at the present time, in boarding schools No. 66, 74, 88 and 95 in Novokuznetsk, Kemerovo region, a data bank is being created for students who find themselves in a difficult life situation, and their families in a socially dangerous situation, with the aim of further assistance to them [13, 14, 15, 16].

Employees of the social and educational service - work with adolescents with deviant (delinquent) behavior is carefully planned, such as: 1) a plan for the work of the Council for the Prevention of Offenses is drawn up, a plan for joint work of a boarding school for orphans and a unit for juvenile affairs on the prevention of offenses among juvenile offenders, a work plan for the prevention of the use of mentally active substances among orphans, an action plan for anti-alcohol, anti-nicotine propaganda; 2) sanitary and educational work is planned [20].

At the meetings of the Council for the Prevention of Offenses, questions of the behavior and performance of "difficult" teenagers-orphans of boarding schools in the Kemerovo region are regularly heard. In solving the problems of preventing delinquency among minors, the "Months" of prevention of delinquency are effective. They are organized by employees of the traffic police, teaching staff, fire brigade, representatives of public organizations represented by members of the commission on juvenile affairs, a psychologist, deputy director for educational work of a boarding school for orphans in Novokuznetsk, Kemerovo region. Also, as part of the month of crime prevention, conversations are held for students on traffic rules, about a healthy lifestyle, about rights and obligations, and the promotion of legal knowledge.

Planning and carrying out a set of activities within the framework of the month on crime prevention allows you to involve all participants in the educational process in the prevention of juvenile delinquency and crime, which, in turn, has a positive effect on the operational environment and contributes to the qualitative improvement of preventive work in adolescents. Creative circles work in all children's homes in the Kemerovo region. Sports sections for table tennis, football, and chess are successfully operating. Orphans are willingly engaged in them in their free time [13, 14, 15, 16, 20].

The leading role in organizing cooperation of boarding schools in the Kemerovo Region is played by class teachers. It is their work that determines the extent to which families understand the policy pursued by the school in relation to the education and upbringing of orphans in senior classes and participate in its implementation. Class teachers are doing a lot of work to promote pedagogical knowledge among parents, lectures are regularly held on educating students according to their age characteristics, parent meetings, joint events with children and parents. All these activities are aimed at improving social skills, healthy lifestyles and legal culture of orphans [13, 14, 15, 16, 20].

From the positive practice of boarding schools in the Kemerovo region: So, in the 2019/2020 academic year, the work of the teacher-organizer of the crime prevention department L.A. Elizarova was aimed at the implementation of measures for the prevention of offenses in children, unauthorized departures from the boarding school and the formation of a healthy lifestyle. Employees of the Zavodskoy police department and the branch in the Zavodskoy district of Novokuznetsk, Federal State Institution UII of the Main Directorate of the Federal Penitentiary Service of Russia for the Kemerovo Region, took an active part in the preventive measures carried out by the organizer teacher [13].

In the 6th and 7th grades with the guys from the "Garant" detachment, in cooperation with the psychologist "Children's Home-School No. 95" and the senior inspector of the PDN, Police Major V.A. Amelchenkova gave a lesson “We and Conflicts”. lesson was devoted to the ways of effective communication. During the lesson, they clarified the concept of "conflict", "conflict situation", sorted out what are the causes and consequences of conflicts, to what offenses a conflict can lead, the children mastered the skills of constructive conflict resolution [13].

For the 7th, 8th and 9th grades were carried out by inspector V.A. Amelchenkova lessons-workshop on the topic: "My safety". The purpose of the lesson is to prevent unauthorized departures from the boarding school. In the course, we analyzed using a specific example what consequences occur when minors do not follow the rules of safe behavior on the streets and other public places. What types of crimes are committed by street children during the period of independent stay on the streets of the city and village. Who do they communicate with, which organized crime groups they are involved in, and carry out raid attacks in order to loot kiosks and shops. Examples of criminal proceedings over juvenile offenders are given. The punishment for theft, robbery, murder, etc. is determined in accordance with the Criminal Code of the Russian Federation. We watched and discussed the info-lesson “Rules of communication with strangers” [13].

In the 4th and 5th grades, in cooperation with the psychologist "Orphanage-School No. 95" O.V. Koshkina spent an hour of communication on the topic: “Don't let yourself be fooled! Know how to say no!" The goal is to form a healthy lifestyle in orphans. Also during the conversation, they discussed issues related to people's health, repeated what health is. The orphans made a conclusion about how bad habits affect human health, why people become dependent on bad habits and how to behave in order not to become hostage to bad habits. In the course of work with the pupils, we analyzed the rules of safe behavior on the street and in other places [13].

In cooperation with the psychologist of the branch in the Zavodskoy district of Novokuznetsk, the FSI Penitentiary Inspectorate of the Main Directorate of the Federal Penitentiary Service of Russia in the Kemerovo Region, Major of the Internal Service O.S. Bobyleva held a drawing competition on the theme "My family". The competition was attended by pupils of the "risk group" (8th - 10th grades), consisting of different types of accounting. The purpose of the event is to form a conscious attitude towards family, family relations, family values, respect and reverence, kindness and mercy to the older generation in orphans, fostering patriotism and citizenship based on initiation to creativity. Not a single participant was left without prizes [13].

Students in grades 4, 5, 6 and 7 went on an excursion to the Center for the temporary detention of juvenile offenders. The purpose of the excursion is the prevention of delinquency and unauthorized departures from the boarding school. During the excursion, the pupils got acquainted with the rules of keeping adolescents in the Center, learned about the offenses for which adolescents can be placed in this center and about the negative impact on the fate of a person of an asocial lifestyle. The guys listened with interest, asked questions to the staff of the Center, they were interested in what their peers do in their free time, what they can do, what is prohibited. Within the framework of the “Day of Good Deeds” action, pupils of the 7th, 8th and 9th grades made handicrafts, souvenirs and postcards for the children of the “Hospice, Children's City Clinical Hospital No. 3” in Novokuznetsk, Kemerovo Region [13, 14].

In December 2019, in Orphanages No. 74 and No. 95, meetings were held with 4th year cadets of the Kuzbass Institute of the Federal Penitentiary Service of Russia. The cadets conducted a conversation "On the dangers of snus" for pupils of the 7th, 8th and 9th grades. Representatives of the Institute told the orphans about the consequences of drug use, about physical and psychological dependence, answered the questions of the inmates of orphanages in Novokuznetsk.

The children asked the cadets how to behave in a situation when you are offered to try snus or offered to a classmate. The cadets in an accessible manner, talking on equal terms, explained to the children how to behave in such situations, what tricks the snus sellers use so that the child is not afraid to try the

"poison". Such meetings are always very beneficial for both parties. The children receive information in an accessible form from their almost peers, and the cadets will find out what questions are of interest to teenage orphans brought up in boarding schools in the city of Novokuznetsk, Kemerovo region [13, 14].

In conclusion of the publication, we present a systematic analysis of the social and pedagogical work of boarding schools in the city of Novokuznetsk, Kemerovo region on the prevention of delinquency and crime among orphans:

I). ***Diagnostic activity:*** *1)* identification of orphans with behavioral deviations in the first grade and timely organization of work to correct their behavior; *2)* studying the level of development and upbringing of orphans; *3)* monitoring orphan students in various situations; determination of the position of an orphan child in a peer group (in a group, class); *4)* conducting a sociometric study to determine the reference groups and the position of an orphan child in a team (in a group, class); *5)* determination of the level of self-esteem, self-control, self-education skills; *6)* identification of positive qualities and shortcomings in behavior, communication; *7)* studying and identifying the interests and inclinations of an orphan child; *8)* studying the characteristics of the character and temperament of an orphan child; *9)* determination of the motives of behavior and communication; *10)* registration of the health status of an orphan child; *11)* monitoring the contact of an orphan child (guardians).

II). ***Individual correctional work***: *1)* individual counseling on the issues of correcting behavior defects of an orphan child;*2)* the study of individual characteristics, the level of education of orphans and, on the basis of the studied, the definition of specific tasks and methods of further pedagogical influence; *3)* keeping a diary of psychological observations of the behavior, communication, position of the pupil of the boarding school in the team, starting from the 1st grade and transferring the diary to the class teacher of the 4th grade for further consistent work; *4)* individual work of the class teacher, group educator, social teacher, psychologist, boarding school administration for orphans with students requiring behavior correction; *5)* creation of conditions for the development of the creative abilities of an orphan child, assistance in organizing reasonable leisure time (circles, hobby clubs, sports clubs, etc.); *6)* involvement of students in active social work; *7)* unobtrusive control by a teacher, class teacher, psychologist, social teacher, administration of a boarding school for orphans over the behavior of an orphan student in the classroom and after school hours; *8)* conducting communication trainings; *9)* conducting trainings of psychological relief; *10)* attraction to reading fiction, enrollment in the library; 11) individual conversations, meetings with interesting and outstanding people (artists, scientists, politicians) in Russia.

III). ***Interaction with interested organizations:*** *1)* cooperation with the commission on minors' affairs of the Department of the Ministry of Internal Affairs of Kuznetsk, Central, Zavodskoy districts of the city of Novokuznetsk, Kemerovo region; *2)* cooperation with doctors: psychologists, narcologists, sex therapists, gynecologists, venereologists, etc.; *3)* cooperation with the city Center for Children's Creativity named after N.K. Krupskaya town of Novokuznetsk, Kemerovo region.

IV). ***Information, organizational and methodological activities of municipal boarding schools in the city of Novokuznetsk, Kemerovo region:*** *1)* conducting joint small and large pedagogical councils, targeted meetings, discussions, etc.; *2)* interaction of methodological associations of senior class teachers and primary school teachers (continuity in work); *3)* development of a comprehensive target program "Prevention of delinquency and crime among orphans"; *4)* development of an individual program for correcting the behavior of difficult teenagers-orphans; *5)* drawing up a psychological and pedagogical map of orphans who are on the inside of school control and in the commission on juvenile affairs of the department of the Ministry of Internal Affairs of the city of Novokuznetsk, Kemerovo region; *6)* development of materials to help the class teacher; *7)* compilation of psychological and pedagogical characteristics of the senior classes of municipal boarding schools; *8)* organization of exhibitions of literature, posters; *9)* conducting a sociometric study of correctional and general education classes of boarding schools in the Kemerovo region.

V). Legal education of orphans from municipal boarding schools in the city of Novokuznetsk, Kemerovo region: *1)* study of the UN Convention on the Rights of the Child, 1989; *2)* study of the Constitution of the Russian Federation as amended in 2020 [1, 4]; *3)* study of the Criminal Code of the Russian Federation on the responsibility of minors, 1996; *4)* study of the Federal Law "On additional guarantees for social support of orphans and children left without parental care" dated December 21, 1996 No. 159-FL; *5)* study and discussion of the Rules for orphans of boarding schools in the Kemerovo region; *6)* organization of meetings with employees of the juvenile affairs department of the Ministry of Internal Affairs of Novokuznetsk, Kemerovo region; *7)* holding a month of legal knowledge in municipal boarding

schools in the city of Novokuznetsk, Kemerovo region; *8)* conducting disputes, conferences on the basis of the Institute for Advanced Training of Teachers and the Inspectorate for Minors of the Department of the Ministry of Internal Affairs of Novokuznetsk, Kemerovo Region.

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ИНТЕРНАТ МЕКЕМЕЛЕРІНДЕГІ ЖЕТІМ БАЛАЛАРДЫҢ ҚЫЛМЫСЫ МЕН ҚҰҚЫҚ БҰЗУШЫЛЫҒЫН ӘЛЕУМЕТТІК-ҚҰҚЫҚТЫҚ АЛДЫН АЛУ: КЕМЕРОВО ОБЛЫСЫ НЕГІЗІНДЕ

Аннотация. Мақала Кемерово облысы интернатындағы жетім балалар арасындағы құқық бұзушылықтың әлеуметтік-құқықтық алдын алу сынды өзекті мәселенің біріне арналған. Бүгінге дейін балаға құқықтық әсер ету мәселесі, ең алдымен, оның барлық құқықтық реттеудің түпкі мақсатына – интернатта оқитын әрбір жасөспірім жетім баланың өмірінде заңды рецептілерді жүзеге асыруына байланысты.

Бүгінде Ресейде тарихи және әлеуметтік-демографиялық жағдай осылай қалыптасты, сондықтан Ресей қоғамын реформалау қоғамның түрлі саласын кеңінен криминалдаумен қатар жүрді.

Үлкен және кіші әлеуметтік топтардың заңсыз әрекеттеріне қатысу орыс қоғамының ең сезімтал қабаты ретінде Кемерово облысындағы интернатта оқитын кәмелетке толмаған жетім балаларға әсер етті, ірі әлеуметтік топтардың заңсыз іс-әрекеттерге тартылуы қоғамда болып жатқан трансформациялық өзгерістерге байланысты халықтың ең сезімтал бөлігі ретінде кәмелетке толмағандарға – жетімдерге де ықпал етті.

Бүгінде Кемерово облысында интернат мекемелерінде жетім балалармен профилактикалық жұмыстар белсенді жүргізілуде, бұл – күрделі, көпөлшемді, ұзақ мерзімді үдеріс. Құқық бұзушылықтың алдын алу саласындағы жетім балаларға арналған мектеп-интернаттың нақты міндеті – ерте профилактика жүргізу, яғни жетім балаларға қалыпты даму мүмкіндігін қамтамасыз ететін жағдай жасау.

Басылымда ұсынылған материалда Ресей Федерациясының мемлекеттік құпиясына жатпайды.

Түйін сөздер: әлеуметтік-педагогикалық алдын алу, Кемерово облысының жетім балаларға арналған мектеп-интернаттары, жетім балалар мен ата-ана қамқорлығынсыз қалған балалар, кәмелетке толмаған құқық бұзушылар, Ресей ФҚАҚ тәрбие колониялары, кәмелетке толмағандардың ісі жөніндегі инспекция, қылмыстық-атқару инспекциясы, жасөспірімдер арасында отбасылық қатынастар депопуляциясы, жасөспірімдердің ұйымдасқан қылмыстық тобы, дисфункционалды отбасы.

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СОЦИАЛЬНО-ПРАВОВАЯ ПРОФИЛАКТИКА ПРЕСТУПЛЕНИЙ И ПРАВОНАРУШЕНИЙ ДЕТЕЙ-СИРОТ В ИНТЕРНАТНЫХ УЧРЕЖДЕНИЯХ: НА ПРИМЕРЕ КЕМЕРОВСКОЙ ОБЛАСТИ

Аннотация. Статья посвящена одной из актуальных проблем, такой как социально-правовая профилактика правонарушений детей-сирот в школах-интернатах Кемеровской области. На сегодняшний день проблема правового воздействия на ребенка обусловлена прежде всего тем, что в нем достигается конечная цель всего правового регулирования - реализация правовых предписаний в жизни каждого подростка-сироты, находящегося в интернате.

Сегодня в России историческая и социально-демографическая ситуация сложилась таким образом, что реформирование российского общества сопровождалось и сопровождается достаточно широкой криминализацией различных сфер общественной жизни.

Вовлечение в противоправную деятельность больших и малых социальных групп также затронуло несовершеннолетних-сирот, находящихся в интернатах Кемеровской области, как наиболее чувствительный слой российского общества, вовлечение в противоправную деятельность больших социальных групп также затронуло несовершеннолетних - сирот как наиболее чувствительную часть населения по отношению к трансформационным изменениям, происходящим в современном обществе.

Сегодня активно проводится профилактическая работа с детьми - сиротами в школах-интернатах Кемеровской области-это сложный, многоплановый, длительный процесс. Специфической задачей школы-интерната для детей-сирот в области предупреждения преступности является проведение ранней профилактики, то есть создание условий, обеспечивающих возможность нормального развития воспитанников детей-сирот.

Представленный в публикации материал не содержит сведений, относящихся к государственной тайне Российской Федерации.

Ключевые слова: социально-педагогическая профилактика, интернатные учреждения для детей-сирот Кемеровской области, дети-сироты и дети, оставшиеся без попечения родителей, несовершеннолетние правонарушители, воспитательные колонии ФСИН России, инспекция по делам несовершеннолетних, уголовно-исполнительная инспекция, депопуляция семейных отношений в подростковой среде, подростковая ОПГ, дисфункциональная семья.

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IMPROVING THE LEGISLATION OF THE KYRGYZ REPUBLIC ON ORPHANS AND CHILDREN DEPRIVED OF PARENTAL CARE

Abstract. Using analysis, synthesis, historical legal, law and sociological methods, unfavourable factors in Kyrgyz society are studied contribute to the appearance of orphans and children left without parental care, such as divorce of parents, growth of percentage of single-parent families, unemployment, poverty, alcohol and drug addiction, child violence in families (physical, psychological, sexual abuse), migration and others.

The most significant and relevant aspects of organizing the placement of orphans and children deprived of parental care, related to adoption and foster families in Kyrgyzstan, as well as the problems of state children's institutions of the Kyrgyz Republic are considered. The necessity of improving legislation on orphans, children deprived of parental care and the development of relatively new forms of device for orphans, children deprived of parental care (foster family) is being studied. The authors notes that in the Kyrgyz Republic insufficient attention is paid to the forms of placement of orphans in families, for example, over the eight years of the existence of foster families, their number was 57, and the number of children transferred was only 167, which is caused by insufficient material base and small wages foster parents paid by the state, which makes this institution unattractive. Transfer for adoption to a family is not always realized, since in such institutions 94% of children have parents. In this connection, it is not possible to completely eliminate or reduce the number of state-run children's institutions for orphans and children left without parental care in the Kyrgyz Republic.

Keywords: orphanage; boarding school for children, foster family; orphans; children deprived of parental care; social orphan, adoption, child rights, single-parent family, unemployment, poverty.

Introduction. Foster care of children and adolescents who have had their rights violated is being discussed both in the scientific literature and in agencies involved in the development of public policies (do Amaral Costa & Rossetti-Ferreira, 2009, p. 111). Rights of child arise from the moment of the birth and state is obliged to provide them, regardless of whether child is raised in family, state institution or is in prison, whether child is mentally, mentally or physically healthy, or he is found to be mentally or physically inferior. Child is a special right-holder. In the legal system, status of child is characterised by substantive rights that are typical only for children and by different means of exercising and safeguarding rights, i.e. the rights of child are exercised by custodians acting on behalf of child (Kudeikina, 2019, p. 1). Protection of rights of minors deprived of parental care should be considered as the integral part of the human rights system and, in the first place, deserves consideration. Rights of child include best interests, participation/respect for the child's views, non-discrimination and life, survival and development (Gillett-Swan & van Leent, 2019, p. 1).

Methods. Using analysis, synthesis, historical legal, law and sociological methods, unfavourable factors in Kyrgyz society are studied contribute to the appearance of orphans and children left without parental care, such as divorce of parents, growth of percentage of single-parent families, unemployment, poverty, alcohol and drug addiction, child violence in families (physical, psychological, sexual abuse), migration and others.

Results. Historically, in Kyrgyz society there is the tradition embodied eternal wisdom of the people – together, with all the people, to help a person in need. The life of the ancient nomads depended on one authorsity – custom, the only living source of law at that time. At the same time, the nomadic community was one of the forms of existence and functioning of all individuals, for survival of which it was necessary to establish the determined mode of coexistence based on the customs and the traditions. Kyrgyz nomad obeyed the law of his ancestors. This right, not being written, possessed steady force and constancy. History of the formation and the development of orphanages in Kyrgyzstan, in which there were orphans, children left without parental care, has its own root causes, its origins, i.e. there are certain patterns in the emergence and existence of very acute social problem of child neglect and homelessness. Kyrgyz custom law contains historically established rules for adoption of children, establishes guardianship of children left without parents. Orphanage, as social phenomenon, as we understand, is, unfortunately, inherent in every stage of development, every era of human life, but at all times they fought for children, tried to at least somehow soften blow of fate and create certain conditions for such children could become full members of society.

The initial idea of rights of child was formed in custom law of the Kyrgyz. Child of the Kyrgyz never remained without parents. If his parents were dying, he was adopted by close relatives. Adopted as orphaned children of relatives, and other children whose parents were not known. The mandatory rule included the adoption of thrown babies ("tashtandy bala"). Foster children, as indicated by N.I. Grodekov was called the "inciles bala" (Grodekov, 1889, p. 7). The adoption ceremony was carried out as follows, with adoption of witnesses was announced, relevant rites were carried out. At the same time, adoptive mother gave the child breasts, so adoptive son became a son. They were more readily adopted by their sons, since they were considered the successors of clan.

Adopted children had the same rights as relatives. For example, the Kyrgyz proverb says: “Child is not of one who gave birth, but of one who raised”.

In Kyrgyz custom law, protection of trights of children deprived of parental care was expressed in the form of guardianship (asyrap aluu) and the adoption (bagyp aluu), there was no other form of protection in Kyrgyz society.

Kyrgyz custom law on adoption and guardianship have functioned for many centuries. Many scientists believe child homelessness is a result of the difficult socio-economic situation of the Republic, caused by war, famine and devastation (Karsakova et al., 2018, p. 46). However, during the years of devastation, civil war and social upheaval, serious-minded modifications were made to the regulation of family relations. The reason for this was in the second half of the XIX century, Kyrgyzstan was affiliated to Russia. Now, the legal acts of the Russian Empire were introduced into the social life of the Kyrgyz community. The legislative development of adoption was also formed in the beginning years of Soviet power, when the first separate family law was adopted - the Code of Laws of the RSFSR “On acts of civil status, marriage, family and guardian law”. However, in connection with fear of “exploitation of child labor under the guise of adoption”, Art. 183 of the Code did not define the institution of adoption. But life made its own adjustments: because of the Second World War, the devastation and hunger, the appearance of great percentage of children left without parental care, there was wide demand for legislative consolidation of adoption’s institution.

Due to these circumstances, in order to better safeguard interests of orphans and children deprived of parental care, several normative legal acts have been adopted specifically dedicated to the institution of adoption, such as: The Ordinance of the Council of People's Commissars of the USSR of January 23, 1942 “On Ensuring Children without Parents”; Instruction of the People’s Commissariat for Education of the RSFSR, People’s Commissariat for Health of the RSFSR, People’s Commissariat of Justice of the RSFSR, approved by the Council of People's Commissars of the RSFSR on March 8, 1943. "On patronage, guardianship and adoption of children without parents"; Decree of the Presidium of the Supreme Council of the USSR of September 8, 1943 "On adoption"; The Ordinance of the Plenum of the Supreme Court of the USSR of June 29, 1945 "On Procedure for Defining of Fact of Adoption after Death or Missing on War of Adoptive Parent or Adopted, if during their Lifetime Adoption was not Formalized". Due the adoption of these acts during the Second World War, many families in Kyrgyzstan willingly and lovingly

took up orphans: Russians, Ukrainians, Belarusians, Jews, Karachais, Chechens and other nationalities evacuated to our republic (Isakov, 1966, p. 21).

For many centuries, aspiration for social protection of children without parents has been formed and established in Kyrgyz custom law. At all times, the Kyrgyz sought child to remain in family and in clan. Brothers, in the event of the death of one of them, were obliged to marry on deceased brother's wife of in order to take care of orphans. The rules of adoption and establishment of guardianship of children without parental care contributed to conservation of clan and ensured survival and protection of rights and interests of orphans. There were other approaches in the countries of the Socialist camp, for example, in the Czech-Slovak Socialist Republic the origin practice can be traced to the 1950s, when foster families were cancelled by the communist regime and the ideology of collective upbringing triumphed (Vavreckova, Tichaticha & Ondrushova, 2017, p. 237).

Recently, context with street children is often said at the present stage to be very similar to the situation in the 20-30s of the 20th century. Only reasons for this context have changed. If in the 20-30s reasons for enlargement of percentage of street children were civil war and hunger, today at the heart of this unfavorable process for our society are such factors (Osmonalieva, 2009, p. 3):

- crisis phenomena in family (collapse of its structure and functions, growth of percentage of divorces (according to statistics, every sixth marriage breaks up, for example, compared to 2017, quantity of divorces increased by 846, amounting to 10,434 in 2018) and percentage of single-parent families (children born for women who were not registered in marriage amounted to 36,790 in 2018); unemployment (in republic of officially registered unemployed was women 49.9%, men 50.1%); poverty rate was 22.4%; asocial image lives of individual parents (alcohol addiction of women aged 20 to 45 and older was 128, men – 1045. Drug addiction for men and women was 282).

- dissemination of child abuse in families and boarding schools (in 2018 crimes against minors was registered 1,497, 412 times more than in 2017) – these are only official statistics, unofficially there are a lot more of them. Children in institutions for orphans practically do not contact law enforcement agencies. In 2018, 419 children suffered from domestic violence, including 143 physically, 11 psychologically, and 6 sexually. From their father 252, from their mother 11, from other relatives 272 children;

- commercialization of the education sector (according to unofficial data, monthly payment at school varies on average from 300 to 600 soms).

And, probably, the worst of all this is that large quantity of children become orphans with living parents (external migration for 2018 – 7077, internal – 22,551; according to media reports in Kyrgyzstan there are more than 200.000 children of migrants, some of parents have not seen them for years, some children live with relatives, some parents have completely abandoned them; in 2019, migrants living abroad abandoned 21 children, and in 2018 this figure was 96).

Due to the high growth dynamics of percentage of children who have lost parental care, it is hardly possible to determine the exact amount of orphans and children left without parental care in our country. According to media reports, in 2020 in children's institutions the percentage of children was about 9,783. According to the UNISEF, 94% of them have biological parents. At present, there are about 137 children's institutions in Kyrgyzstan for orphans and children left without parental care:

a) in the system of the Ministry of Education and Science of the Kyrgyz Republic:

- orphanage and boarding schools for orphans and children left without parental care - 735 children,

- mass and status boarding schools - 5023 children,

b) 414 children in boarding schools of the Ministry of Labor and Social Development of the Kyrgyz Republic,

c) boarding schools of the Ministry of Health of the Kyrgyz Republic - 98 children,

d) non-governmental boarding schools - 711 children.

e) religious boarding schools - 19 children,

f) municipal boarding schools - 160 children,

g) foster families - 46 children. In other countries, for example, Brazil, other structures taken orphans, for example, welcoming families, are used (Valente, 2012, p. 576).

Percentage of children in foster families is very few, in order to enlarge amount of family forms of assistance of children, it was proposed to close orphanages in the Kyrgyz Republic. For example, in 2018, the deputy of the Jogorku Kenesh of the Kyrgyz Republic M. Mavlyanova proposed to liquidate orphanage. In her opinion, children should be sent to foster families. In November of the same year, President of the Kyrgyz Republic S. Jeenbekov supported the idea of introducing a moratorium on opening orphanages. Chairman of the League of Defenders of the Rights of the Child, N. Turdubekova, proposed to liquidate boarding schools for 10 years. The project is currently under development.

In accordance with paragraph 4 of Article 36 of the Constitution of the Kyrgyz Republic, the State guarantees the provision, maintenance, upbringing, education of orphans and children left without parental care. The basic guarantees of the State are reflected in social security.

According to Article 43 of the Code of the Kyrgyz Republic on Children dated July 10, 2012 No. 100, children without parental care are subject to transfer to foster care (for adoption), guardianship), and in absence of such opportunities - in organizations for orphans or children without parental care of all types (educational, social welfare, medical and other analogical institutions).

Children who are left without parental care and reside in educational medical welfare and analogical institutions regardless of ownership, have right:

1) for maintenance, upbringing, education, comprehensive development, respect for their human dignity, ensuring their interests;

2) for alimony, pensions, allowances and other social payments due to them in personal deposit savings accounts until they reach age of 18;

3) to observe the right of ownership of a dwelling or the right to use a dwelling, and in the absence of a dwelling, to acquire a dwelling in accordance with housing legislation;

4) for benefits provided by labor legislation for employment upon termination of stay in these institutions.

On February 21, 2020, the deputy of the Jogorku Kenesh of the Kyrgyz Republic M. Mamataliev proposed the Government of the Kyrgyz Republic provide quotes for orphans to enter universitis of the Kyrgyz Republic without entrance examinations. It should be noted each year the Kyrgyz Republic provides 5,700 budget places to universities. In 2020, the percentage of orphans in the republic amounted to 2,000, and 17,500 half-orphans.

It should also be noted the Law of the Kyrgyz Republic “On the Basics of Social Services for the Population in the Kyrgyz Republic” dated July 28, 2008 No. 177 guarantees social assistance to children left without parental care:

- for living in specialized organizations of social services and receiving free social services;
- assistance in form of social services in search for guardians, foster parents and foster families;
- getting education and profession;
- to receive material assistance;
- promoting the organization of summer recovery and recreation;
- for legal services;
- to receive consultations, carry out individual preventive work (Article 23).

In the Kyrgyz Republic, in accordance with the Model Regulation on State Boarding Educational Institutions for Orphans and Children Left without Parental Care dated December 21, 1995 No. 556 following types of state boarding schools for orphans and children left without parental care function:

- preschool orphanage;
- mixed-type orphanage (for children of preschool and school age, or only at collective or school age);
- boarding school for orphans and children left without parental care (mass and auxiliary);
- family-type orphanage.

In orphanage and boarding schools are constantly taken:

- orphans;
- children taken away by court decision from their parents;
- children left without parental care, whose parents were convicted, deprived of parental rights in manner prescribed by law, found to be incompetent with prolonged treatment, being wanted, whose whereabouts have not been established.

The disadvantages of these residential services are indicated children usually do not have meaningful contact with their families or friends; there have been revelations about physical and sexual abuse in residential care over several decades, and monitoring to ensure that children are safe, healthy and receiving proper services, appears as a permanent weakness of the system; at the same time, residential care for children is perceived as staffed by a largely unqualified workforce (Munoz-Guzman Fischer Chia & LaBrenz, 2015, p. 220).

Temporarily children from low-income large families can be taken to boarding schools for orphans.

In contrast to our legislation, the norm has been admitted in the Republic of Tajikistan since 2017 that only orphans or partially half-orphans are taken in orphanages, and "social orphans" are not taken in orphanages.

We believe there is the need to adopt the experience of the Republic of Tajikistan and also prohibit the admission of "social orphans" to orphanages. In addition, paragraph 11, according to which children with single parent, can be admitted to these institutions, should be removed from the Model Regulation on state boarding schools for orphans and children without parental care.

In this case, firstly, children will stay at home with their parents; secondly, the country's budget can be saved, according to the media, the state allocates from 6 to 11 thousand soms per month for maintenance of one child in orphanage, but child receives only 40 percent of these funds. Remaining money is spent on boarding, repairs, staff salaries. It is better to give these funds in the form of benefits to such families. There are alternative options, for example, in France, faster family is used for temporary custody of orphans (Poitras & Tarabulsy, 2017, p. 1). Another example is Slovakia, where space was created for adoption of children with disabilities (until then they were considered unsuitable for adoption) as well as adoptive parents and foster parents - individuals. (Shkoviera, 2015, p. 66).

Remind children without parental care, in addition to transferring to nurturing by family (for adoption), guardianship or foster care), are also transferred to orphanage, of all types (educational institutions, organs for social protection of the population, hospitals and other analogical bodies (Article 43 of the Code of the Kyrgyz Republic on Children). But, the legislation does not establish about taken of children in state orphanage, law focuses on placement of children in families. Perhaps the legislator, stepping forward, wants to show orphanage will not exist in modern times. Unfortunately, so far, due to a large number of orphans and children left without parental care, we cannot transfer them all to families. For example, in Kyrgyzstan from 2012 to 2018 6,713 children were adopted, of which 87 children were adopted by foreign citizens, and in 2019 – 207 children, 7 of them by foreigners. The reason a small amount of children are adopted from orphanage is because 94% of them have biological parents.

Since 2012, there have been 67 foster families in Kyrgyzstan and 157 children have been transferred to foster care. Currently, 25 families nurture 46 children – this is a scanty amount, compared with how many children are in orphanage. In 2018, 211 families wanted to be foster parents, of which 132 were trained and received certificates. Children under 16 years of age, no more than three children can be transferred to a foster family, total number of children in one foster family, including their own, should not exceed 5 children (Clause 4 of Article 1 of the Regulation on Foster Family of October 1, 2012 No. 670). The state pays 12,000 soms for parenting child in such family, of which 6,000 to parents and 6,000 to child. In our opinion, in order to develop foster family, you need to pay more, stimulate, and encourage future foster parents. For example, in Lithuania there is the general program of the preparation of foster parents and adoptive parents, who have completed introductory and continuous trainings (Gudzinskiene & Raudeliunaite, 2019, p. 8).

Results. Based on the foregoing, we conclude, while our society can not abandon orphanage. Therefore, it is necessary to fill lacuna and include in the 11th chapter of the Code of the Kyrgyz Republic on Children legal norms regulating taken of orphans and children left without parental care in child care facilities. Without including this type of orphanage in this code, we will not solve the problem, but rather create difficulties in using legal acts. All norms regarding orphans should be systematized in one code.

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ҚЫРҒЫЗ РЕСПУБЛИКАСЫНЫҢ ЖЕТІМ БАЛАЛАР МЕН АТА-АНА ҚАМҚОРЛЫҒЫНСЫЗ ҚАЛҒАН БАЛАЛАР ТУРАЛЫ ЗАҢНАМАСЫН ЖЕТІЛДІРУ

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СОВЕРШЕНСТВОВАНИЕ ЗАКОНОДАТЕЛЬСТВА КЫРГЫЗСКОЙ РЕСПУБЛИКИ О ДЕТЯХ-СИРОТАХ И ДЕТЯХ, ЛИШЕННЫХ РОДИТЕЛЬСКОГО ПОПЕЧЕНИЯ

Аннотация. С помощью анализа, синтеза, историко-правовых, правовых и социологических методов изучаются неблагоприятные факторы в кыргызском обществе, способствующие появлению детей-сирот и детей, оставшихся без попечения родителей, такие как развод родителей, рост процента неполных семей, безработица, бедность, алкоголизм и наркомания, детское насилие в семьях (физическое, психологическое, сексуальное насилие), миграция и другие.

Рассмотрены наиболее значимые и актуальные аспекты организации размещения детей-сирот и детей, лишенных родительской опеки, связанные с усыновлением и приемными семьями в Кыргызстане, а также проблемы государственных детских учреждений Кыргызской Республики. Изучается необходимость совершенствования законодательства о детях-сиротах, детях, лишенных родительской опеки, и разработки относительно новых форм устройства детей-сирот, детей, лишенных родительской опеки (приемная семья). Авторы отмечают, что в Кыргызской Республике недостаточное внимание уделяется формам устройства детей-сирот в семьи, например, за восемь лет существования приемных семей их количество составило 57, а количество переданных детей-всего 167, что обусловлено недостаточной материальной базой и небольшой заработной платой приемных родителей, выплачиваемой государством, что делает данное учреждение непривлекательным. Передача на усыновление в семью осуществляется не всегда, так как в таких учреждениях 94% детей имеют родителей. В связи с этим полностью ликвидировать или сократить количество государственных детских учреждений для детей-сирот и детей, оставшихся без попечения родителей, в Кыргызской Республике не представляется возможным.

Ключевые слова: детский дома; детские учреждения интернатного типа, приемная семья (фостерная), дети-сироты; дети, лишенные родительского попечения; социальная сирота, усыновление, права ребенка, неполная семья, безработица, бедность.

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SOME FEATURES OF MUSLIM LAW: NEW TRENDS IN ITS DEVELOPMENT

Abstract. The essence of the integration process in Muslim law has expressed in the enlargement and consolidation of the social relations through the definite points, objects of the concentration of the tension and gradual incorporation of the human being into the community with the system of the relations, with the global order, based on the balance of the regulating influence of the legal systems of the different states and synchronic of the regulating behavior in the different societies. The movable force of the process of the integration is inside the system of the society and social relations in the world scale. Muslim law is an Islamic doctrine about the rules of behavior of the Muslims. The main content of Muslim law is the rules of behavior of believers, that follow from the Sharia and sanctions for non-compliance with these regulations. It was formed in the VII-X centuries in the connection with the formation of the Muslim state - Caliphate. The formation of Muslim law was caused, on the one hand, by the need to bring the actual law in line with the religious norms of Islam, on the other hand, by the need to regulate public relations on the principles, based on the religious and ethical teachings of Islam.

Key words: Muslim law, Koran, Sharia, legal system, integration, self-regulation, legal families, institutional characteristics, global challenges, harmonization of law.

The relevance of the topic. The participation of the legal systems of the family of religious and community law in the legal integration, the form of this participation and the evolutionary development of law are quite interesting. For example, most authors are united in understanding the mutual integration between the families of common and Romano-German law, but there is no such more or less unified understanding and approach in the relation to religious and community law, in the face of Muslim law.

Islam is the unique religion in light of the legal nature of its institutions and stands out among all other the world religions in terms of its influence in the modern world. This suggests that the legal integration of the Muslim legal family will be the most difficult and lengthy process of primary legal integration. The integration of the Romano-Germanic and common law families is much faster and easier than the integration of the Muslim family of law, according to the unified model of the legal system. This explains the lack of sufficient scientific research on the participation of Muslim law in the legal integration and development of law.

The doctrine sees the future of Muslim law in different ways. There are opinions, that Muslim law will be completely absorbed by other legal families, equal legal integration between the legal traditions of the families, and there are even opinions that Muslim law has already ceased to be “legal” and replaced in Muslim countries by the legal traditions of other legal families.

Materials and methods of research. The research uses such methods as historical, system-structural, comparative-legal, logical, concrete-sociological, complex research of scientific sources, induction and deduction, and analysis of statistical data.

Well-known researcher of Muslim law, L.R. Syukiyainen, speaks about the possibilities of mutual and equivalent integration of Muslim law and legal traditions of other systems and families of law. It is necessary to briefly describe this approach, which in our view, however, is not applicable to the study of the legal integration of Muslim law in the long term [1, P.117]. In particular, he States: “... many Muslim

countries have their own national legal culture, which organically combines the achievements of the Islamic and European legal civilizations in their unity and interpenetration". In Western scientific doctrine, one can also find opinions about the reverse influence of Muslim law on the traditions of other legal families. For example, R. David and C.J. Spinosi note the opinion of L. Millio: "the last word in the discussion about the reception of Western institutions will probably be... their Islamization" [2, P.64]. Although they also reasonably add that this process will not lead to Muslim law as the result of this entering fully into the family of Roman legal systems, at least in the short term.

L.R. Syukiyainen sees a real possibility of introducing the norms and traditions of Muslim law into secular legal States through the observance of two interrelated conditions: consistent legal approach to the selection and use of Islamic heritage [1, P.120]. This is expressed in the fact that the secular legal system can only accept those elements of the Islamic way of life that fit into it, and therefore are not directly related to the religion.

L.R. Syukiyainen considers the following branches and institutions as traditions of Muslim law that reflect the interest to the secular state: the branch of Muslim law on the personal status (marriage, family relations, mutual obligations of relatives, guardianship and some other related issues), the Institute of Waqf (property withdrawn from circulation and intended for use for charitable purposes), issues of inheritance and charity, and some other traditions

Research results. Research results are determined by the provisions, concerning guarantees, benefits, advantages, as well as prohibitions, restrictions and exceptions that constitute the necessity to note some truncation of this approach and the stated provision. We see that the process is not mutually integrated, but is still a process of deformation of Muslim law and its absorption by the foreign legal traditions of the secular nature. The entire process of "mutual influence" takes place on the unilateral basis: the legal systems of Muslim countries significantly change the content and form of Muslim law, while other legal systems and families can possibly and potentially, in the future, only accept certain traditions of Muslim law, if they do not contradict their principles and the rule of law. Moreover, this borrowing of the traditions of Muslim law, according to L.R. Syukiyainen, will only apply to the part of the society that professes Islam.

And although the doctrine also provides examples of the Western systems, borrowing some of the principles of the Islamic system, for example, the principles of banking, this side of the issue is not purely legal and justice. In the issue of borrowing the legal components of the families of Muslim law and Western families of law, we see the same one-sided process of absorption and deprivation of Muslim law of its "legal" and "justice" origin and essence.

Thus, the current trend of the substantial changes in the legal systems that make up this family of law, represented by the legal systems of Muslim countries, is clearly visible. Some scholars identify three significant trends in the development of Muslim law in the modern times, XIX and XX centuries, namely: westernization, codification and secularization of justice.

In this article was showed, that the legal systems of the Muslim family of law cannot be outside the process of law development and legal integration. They are included in the General process, obey the General laws of the development and increasingly change their orientation from the religious dogmas in favor of the social purpose of the entire legal system. This means refocusing the system on the new principles, values and goals that underpin legal integration, as well as on the basis of the new model of the universal legal system will function. We can say that even today the legal systems of this family of law are gradually losing their independent significance at the level of the legal system as a whole. In the future, this trend will continue and lead to the full integration of the legal systems of the family of Muslim law into the common integrated system. As the result, these legal systems will come to the model of the universal legal system, formed as the result of the mutual integration of all three main legal families of our time: the family of common law, Romano-Germanic law and religious-community law. It should be noted, that the influence of Muslim law in this process will be the least and rather it is the question of the deformation of Muslim law and its subsequent absorption by other families of law [3, P.58].

The analysis of the entire array of applicable material and information suggests that Muslim law will participate in the process of the legal integration in the direction of its own deformation and absorption by foreign legal traditions. In this process of the deformation and absorption Muslim law will undergo the following aspects of development. Depriving Muslim law of the possibility of direct regulation of public

relations, mediating the regulatory influence of Muslim law by the system of normative legal acts of the state and legislation. Distortion of the content, casual character of the norms of Muslim law, deformation of the form of technical and legal features of Muslim law, introduction of the foreign legal traditions and structures - westernization of law. The gap between dogmatism (theology) and the legal principle in Muslim law, the complete predominance of non-legal religious principle in Muslim law shows, that Muslim law becomes the part of the culture and legal consciousness.

In accordance with the doctrine, even today, the legal systems of Muslim countries do not correspond to the traditional Muslim law in their form, content and relationship with the positive legislation. Indeed, today, even in the most Islamized countries, where Islam is the state religion, Muslim law is very rarely used in the traditional form of doctrine, and then only in relation to the few branches of law. In most cases, the influence of Muslim law is manifested through the consolidation of its norms in the legislation of the relevant country. As the result, the traditional doctrine (fiqh) as the main source of Islamic law has given way to legislation and no Muslim state is guided exclusively by Muslim law in the legal practice.

The essence and content of the process of deformation of Muslim law by itself consists from changing the casual essence of its norms due to the fact that the role of the source of Muslim law has been assigned to the normative legal act issued by the competent state body. This applies not just to the form of the presentation of the norm, but changes the content of the norm of Muslim law in the traditional senses, which have the casual character and individual solutions to the specific disputes, which in the new conditions is increasingly becoming “familiar to the modern legislation in the form of uniform General rules of conduct”. Indeed, this is the radical change in the classical content of the rule of Muslim law, when it becomes universalized instead of individually defined in the relation to the particular case and issue, thus in its essence it acquires the character of the norm peculiar to the foreign legal traditions.

The most important example of the influence of European legal culture on the Muslim law is the codification of fiqh and the inclusion of Muslim law in the models of the legislation, based on the European legal models. This direction of the deformation of Muslim law concerns the changes in the form of expression of its legal norms. Modern Islamic law by itself has developed and evolved mainly under the decisive influence of European legal models. The proposed by L.R. Syukiyainen very interesting classification of the forms of interaction between two cultures (European and Islamic): parallel regulation of similar issues in the relation to Muslims and non-Muslims (the right of personal status); inclusion of Islamic legal norms, principles and institutions in legislation, based on European models, and the introduction of the legislation that cannot be clearly attributed to the Islamic or European legal system, i.e., represent their synthesis; adoption of the legislation, based on Sharia in its content and basic constitutional approaches, and reproduces European legal models in its form and technical, legal features. As A.Kh. Saidov notes: “The influence of European-type sources of law has turned out, in General, an irreversible process that has affected all Islamic countries, where previously Muslim law prevailed in all its originality of the sources” [4, P.10]. However, he also writes, that the intensity of this trend should not be exaggerated, since modern practice shows the process of activation of Islam in the political life of many states.

In this regard, of course, the question of the parts, branches of the modern legal system of Muslim countries is most susceptible not only to codification processes, but to the influence of the traditions of Islam and Muslim law. R. David and C.J. Spinozi wrote, that even today some areas of the public relations continue to be regulated by the norms of classical law, the sphere of the personal and family law, so-called “personal status”, more of the Koran’s prescriptions are devoted to this. Also in other areas, the degree of application of the rules, borrowed from the Romano-Germanic family or the common law family has increased. According to these scholars, these areas in many Muslim countries are westernized as the result and the process of intensive “secularization” (for example, criminal law, constitutional law, labor law, administrative law, fiscal law, and others contain the small number of the norms from the original Muslim law [2, P.16].

This process is very complex and cannot be tied only to the development of law. Law does not develop outside of the society, objective social relations and the subjective world of people. Westernization of Muslim law is directly related to the process of changing the thinking, legal awareness and legal culture of the societies and people towards the adoption of new alien principles, approaches and

standards. As A.Kh. Saidov notes, “globalization transforms the culture, morals and traditions. The reference points are mainly Western values, which often meet with disapproval and resistance from the traditional societies, but the General trend of Westernization is the pragmatism of Muslim law. Pragmatism expresses the desire of the society for the development and prosperity” [4]. A.Kh. Saidov also wrote: “globalization encourages people around the world to reconsider their cultural values and personal relationships in the discussion about preserving traditional society against achieving prosperity and modernization [4].

When examining the question of influence of the legal integration of Muslim law, it is necessary to talk only about the possibilities and prospects of full absorption and replacement, or about the mutual integration of Muslim law with the foreign legal traditions. There is no need to consider the possibility and prospect of preserving the integrity of Muslim law in its previous or current form. All doctrinal opinions of the scholars agree, that the system of Muslim law has a relatively high level of conservatism and closeness, but, nevertheless, it is undergoing certain changes in form, content and the process of the development.

The perspective of the future of Muslim law is interesting, if we use an approach that considers Muslim law as non-legal phenomenon to analyze the development of the legal integration. This approach is used by the author R.H. Gilazutdinova. She claims the original non-legal nature of Muslim law. This position and point of view is seen as erroneous [5, P.41].

If we consider Islamic law as corporate, religious law, this logic concludes that the complete disappearance of the direct influence of Muslim law on the legal system of the states concerned. Islamic law remains part of the internal world of the individual, and the legal system of the state will be built on the different legal traditions, based on the predominance of the principles of rationality that is more characteristic of secular law rather than religious law [6, P.19].

The use of this approach really leads to the conclusion about the absolute unilateral absorption of Muslim law by foreign legal traditions, since Muslim law is considered as the part of the public consciousness, as the internal representations of a person and his place on the level of the ideas about the morality, customs and other similar social regulators. Muslim law does not recognize the nature of “universal regulator of public relations”. Muslim law does not meet the need of the society for the legal regulator of the relations (legal law), especially at the moment, when such need is higher than the development and complexity of public relations in all spheres of life. This need of the society can be met only within the framework of the functioning of the secular legal system [7, P.32].

If we consider Muslim law in the future as corporate law and part of the legal consciousness of the certain societies, we can conclude that Muslim law will retain its indirect regulatory role, since the legal consciousness largely determines the current legislation [8, P.15]. However, changes in the legal systems of the religious and communal legal family will affect not only the legal traditions and technical issues of the form and content of law, but also changes will be expressed in issues of the legal culture, legal awareness of people and societies. This is caused by the processes of General globalization in the sphere of culture, knowledge, information, etc. Globalization of life changes not only the external content of social relations, but, first of all, the thinking and representations of a person [9, P.68]. The culture, morals, values and beliefs of all the people of the world are in the process of the development and globalization; this is an important and integral part of the overall globalization. If we consider Muslim law as an internal attitude of the society and people, it cannot fail to significant changes in the future, when humanity is moving towards the contradictory community of the individuals. This change in the social consciousness, attitudes, values, and perceptions can be expressed in a variety of unifying forms.

Indeed, the significant change in the historical situation cannot affect the legal consciousness and legal culture of Muslim societies, which changes the law in chain reaction, since it is indisputable that all legal reality is the process, reflecting the needs of the subjects of legal consciousness and law-making to respond to significant social problems and contradictions [10, P.78].

Thus, this provision on the complete transition of Muslim law from the legal sphere to the religious sphere is fully justified, since the change in the society and new requirements of the time determine this process, and this is required by both the situation and society. Changing the nature of Muslim law, its transformation into purely religious law, the natural requirement of the time, and this process began in the

XIX century. Today, society needs a law with predominant weight of the rational principles to regulate the most acute and complex issues, and this predominantly secular law is a manifestation of “social necessity and social regularity”.

Conclusion. In the conclusion, we would like to stress, that the development and change of Muslim law is in the process of participation in legal integration, since legal integration became the requirement of the time, manifestation of self-regulation of the society as the system, social necessity and social regularity of the process of the development of the society.

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МҰСЫЛМАН ҚҰҚЫҒЫНЫҢ КЕЙБІР ЕРЕКШЕЛІКТЕРІ: ҚАЛЫПТАСУЫНДАҒЫ ЖАҢА ТЕНДЕНЦИЯЛАР

Аннотация. Мұсылман құқығындағы интеграциялық процестің мәні белгілі бір нүктелер, шиеленістің шоғырлану объектілері арқылы қоғамдық қатынастардың кеңеюі мен шоғырлануынан және адамның қарым-қатынас жүйесімен, әртүрлі мемлекеттердің құқықтық жүйелерінің реттеуші әсерінің тепе-теңдігіне және әртүрлі қоғамдардағы реттеуші мінез-құлықтың синхрондылығына негізделген әлемдік тәртіппен біртіндеп қосылуынан көрінді. Интеграция процесінің қозғаушы күші қоғам мен әлеуметтік қатынастар жүйесінде әлемдік масштабта болады. Мұсылман құқығы-мұсылмандардың мінез-құлық ережелері туралы исламдық ілім. Мұсылман құқығының негізгі мазмұны-шариғаттан туындайтын діндарлардың мінез-құлық ережелері және осы ережелерді сақтамағаны үшін санкциялар. Ол VII-X ғасырларда мұсылман халифат мемлекетінің құрылуына байланысты қалыптасты. Мұсылман құқығының қалыптасуы, бір жағынан, нақты құқықты исламның діни нормаларына сәйкес келтіру қажеттілігімен, екінші жағынан, қоғамдық қатынастарды исламның діни-этикалық ілімдеріне негізделген қағидаттарға реттеу қажеттілігімен туындады.

Түйін сөздер: мұсылман құқығы, Құран, шариғат, құқықтық жүйе, интеграция, өзін-өзі реттеу, құқықтық отбасылар, институционалдық сипаттама, жаһандық сын-қатер, құқықты үйлестіру.

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НЕКОТОРЫЕ ОСОБЕННОСТИ МУСУЛЬМАНСКОГО ПРАВА: НОВЫЕ ТЕНДЕНЦИИ ЕГО СТАНОВЛЕНИЯ

Аннотация. Сущность интеграционного процесса в мусульманском праве выразилась в расширении и закреплении общественных отношений через определенные точки, объекты концентрации напряжения и постепенного включения человека в общность с системой отношений, с мировым порядком, основанным на балансе регулирующего влияния правовых систем различных государств и синхронности регулирующего поведения в различных обществах. Движущая сила процесса интеграции находится внутри системы общества и общественных отношений в мировом масштабе. Мусульманское право - это исламское учение о правилах поведения мусульман. Основным содержанием мусульманского права являются правила поведения верующих, вытекающие из шариата, и санкции за несоблюдение этих правил. Она сформировалась в VII-X веках в связи с образованием мусульманского государства - халифата. Формирование мусульманского права было вызвано, с одной стороны, необходимостью приведения фактического права в соответствие с религиозными нормами ислама, с другой стороны, необходимостью регулирования общественных отношений на принципах, основанных на религиозно-этических учениях ислама.

Ключевые слова: Мусульманское право, Коран, шариат, правовая система, интеграция, саморегуляция, правовые семьи, институциональная характеристика, глобальные вызовы, гармонизация права.

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CIVIL LEGAL NATURE OF RELATIONS BETWEEN LEGAL ENTITY AND ITS FOUNDERS

Abstract. The article analyzes using the normative and systematic methods, as well as analysis and synthesis, the content of the statements of Civil Code of the Kyrgyz Republic, the Law of the Kyrgyz Republic "On economic partnerships and companies" and the Law of the Kyrgyz Republic "On state registration of legal entities, branches (representative offices)" and the works of Kyrgyz and Russian legal scholars.

Within the framework of this article, the features of civil-legal nature of relations between legal entity and its founders are considered on the example of such legal entity as Limited Liability Company.

The result of the authors' research is the statement – legal address of organization is determined in the decision to create legal entity, and is also established in all of its constituent documents. The legislation only stipulates when legal address changes, legal entity must notify state authorities about it. The authors come to the conclusion such lacuna in the legislation of the Kyrgyz Republic contributes to violation of rights of creditors of legal entity, since if it fails to fulfill obligations, it is rather difficult to find location of legal entity or location of its property.

According to the authors, it is necessary to provide for minimum amount of authorized capital of legal entity in the norms of legislation and establish this capital should be placed in special bank account. Such decision will allow, firstly, to guarantee availability of any compensation to creditors for obligations of legal entity, and secondly, it will somewhat reduce number of registered such entities.

Keywords: civil law, legal entity, founders, society, state, capital, charter.

Introduction. According to generally accepted practice, the main subjects of civil relations are legal entities. This position of legal entities is due to the fact they produce most of the goods, services, tax payments. As Russian researchers note, the transition to market methods of management is accompanied by the intensive introduction of new organizational and legal forms of enterprises, which are fundamentally incompatible with the previously existing structures (S. Zinchenko, V. Lapach, B. Gazaryan, 1995, p. 73). In context of developing market economy in the Kyrgyz Republic, there is an annual increase in registered legal entities. Overwhelming majority of legal entities registered in the Kyrgyz Republic operate in form of business partnerships and companies, among which limited liability companies continue to be the leading ones.

The popularity of such organizational and legal form is explained by simplicity in organizing and creating such legal entity, convenient tax regimes, wide range of economic activities that limited liability company can carry out activities without obtaining special permit (license), legal requirements for minimum amount of authorized capital. In this regard, this form is especially popular with small businesses.

For clear and effective functioning of legal entities, detailed legislative framework for their activities is required. The current legislation does not always reflect the objective needs of developing social relations. It should be noted despite the fairly detailed legal regulation of all stages of creation, registration and registration of termination of activity of legal entity, a number of problems of relations between them

and their founders remain unresolved. Anticipating their identification and formulation of certain areas to overcome them, we consider it necessary to investigate the features of legal regulation of activity of legal persons in the Kyrgyz Republic.

Methods. The article analyzes using the normative and systematic methods, as well as analysis and synthesis, the content of the statements of Civil Code of the Kyrgyz Republic, the Law of the Kyrgyz Republic "On economic partnerships and companies" and the Law of the Kyrgyz Republic "On state registration of legal entities, branches (representative offices)" and the works of Kyrgyz and Russian legal scholars.

Discussion. In accordance with paragraph 1 of Art. 83 of the Civil Code of the Kyrgyz Republic of May 8, 1996 No. 15, legal entity is an organization that owns, economically or operatively manages isolated property and is liable for its obligations with this property, can acquire and exercise property and personal non-property rights on its own behalf and responsibilities, and be a plaintiff and a defendant in court. Legal entities must have their own balance sheet or estimate.

The civil law clearly establishes moment of creation of a legal entity – in accordance with paragraph 2 of Art. 86 of the Civil Code of the Kyrgyz Republic law person is considered created from moment of its state registration. However, even before state registration of legal entity, its founder (founders) performs a number of legally significant actions aimed at creating new subject of law.

It should also provide legislative definition of the concept of founder of legal entity. In accordance with paragraph 2 of Art. 87 of the Civil Code of the Kyrgyz Republic, founders of legal entity may be property owners or their authorized bodies or persons, and in cases specifically provided for by legislation, other organizations or citizens. At the same time, legal entities that own property on basis of right of economic or operational management may be founders of other legal entities with consent of owner or his authorized body. In Kyrgyz Republic founders of legal entity in the form of Limited Liability Company may be domestic and foreign law persons and individuals. At the same time, the combination of one or several individuals and (or) legal entities among founders of legal entity is quite acceptable. Most scientists agree that the legal regime of Limited Liability Company is close to the mode of private corporations and in this case is permissible to draw direct analogy between them (Moll, 2005, p. 917; Pinto, 2014, p. 362). Referring to foreign experience, it should be noted the principle of limited liability of participants was enshrined in the Law of England in 1855, but participants of unlimited company were ubiquitous. The High Court of New York in 1822, in its interpretation of the General Industrial Corporation Act of 1811, clearly defined the course of limited liability as the basis for the state's general corporate policy to stimulate economic growth (Presser, 1992, p. 155). Nevertheless, in the United States, this feature was recognized only by the end of the 19th century. (Henn, Alexander, 1983, p. 130). One of the most important principles of modern civil law is the rule of limiting liability of participants for obligations of corporation. Its use can reduce transaction costs and reduce the uncertainty of the future, ensuring economic development (Easterbroo, Fischel, 1985, p. 89), respectively, abandoning it will lead to collapse of the modern economy.

To create legal entity in the form of the Limited Liability Company founder(s) decides on the establishment of legal entities and defines its name; registered address and legal form; approved Charter on the basis of which law person acts; appoints executive body of legal entity, as in the case of several founders; they also conclude Memorandum of Association, form authorized capital and distribute shares in it according to contributions of founders (participants), etc.

It should be noted until moment of state registration of legal entity, there is already a mutual agreement between its founders aimed at achieving the main joint aim – creation of legal entity, and at this stage there is mutual independent responsibility between founders in case of violation of agreement's terms. At the same time, since legal entity has not actually been created yet, founders are responsible for their obligations to third persons as individuals.

Historically, in the doctrine of civil law, the point of view has developed that from moment of signing constituent documents of legal entity and until moment of state registration of such person, founders are united and act as a simple partnership. Such union acts as a temporary form, as it operates for a rather short time. In accordance with Part 1 of Art. 8 of the Law of the Kyrgyz Republic "On State Registration of Legal Entities, Branches (Representative Offices)" dated February 20, 2009 No. 57 state registration (re-registration) of legal entity, branch (representative office) is carried out within 3 working days from date of submission to registering authority of necessary list of documents. However, if mistakes

committed to and inaccuracies, and not provided with all documents necessary for registration of legal entities, as well as upon occurrence of other reasons, listed in Part. 2, Art. 21 of same law, registering authority makes reasoned decision to refuse registration of legal entity with mandatory reference to legal norm. In this case, relationship of founders, as participants in conditional simple partnership, is prolonged due to the need to eliminate defects in documents submitted for registration of legal entity, conclude contracts with professional lawyers and pay for their services for procedure of state registration of legal entity, development of constituent documents, notarization of powers of attorney representatives, decision on state registration of legal persons, as well as distribution and coverage of such costs between founders. Moreover, if one of founders acts in interests of future legal entity on behalf of other founders, his powers must be confirmed by duly issued power of attorney.

Outstanding Russian scientist and jurist G.F. Shershenevich wrote claim of eye are founders of legal entity yet. When legal entity appears, there are no founders anymore, since they turn into its participants (shareholders, comrades) (Shershenevich, 2003, p. 406). Similar norms are contained in the civil legislation of the Kyrgyz Republic. So, according to Part 11 of Art. 4 of the Law of our country "On Business Partnerships and Companies" dated November 15, 1996 No 60 after state registration of economic partnership and community members are participants of partnership and of society. Thus, taking into account foregoing, we believe in the relationship between founders of legal entity and itself when it has not passed state registration procedure, there is, as N.V. Kozlova notes, special case of conducting other people's affairs without an order, and not only in interests of future legal entity, but also in the interests of its founders themselves, acting with due diligence and discretion required by circumstances of case, based on obvious benefit or benefit of these actions. If a transaction made by founder in interests of not yet registered legal entity is approved by state authority of this law person after its state registration, rights and obligations under such transaction are transferred to legal entity in whose interests transaction was made (Kozlova, 2004).

It should be noted at considered stage of relations between founders and legal entity that has not yet passed state registration procedure, a number of problems arise that can have a negative impact on activities of legal entity after passing state registration procedure. So, in the legislation of the Kyrgyz Republic, regulating registration procedures, legal status and activities of legal entities, to date, no procedure has been formed for mandatory verification of legal address of law persons, or the provision of relevant documents on valid ownership of such an address. In accordance with paragraph 2 of Art. 89 of the Civil Code of the Kyrgyz Republic location of law persons determined by place of its state registration, unless otherwise specified in constituent documents of legal entity in accordance with the law. At the same time, when submitting application for state registration of law person, applicants (founder, trustee) can indicate as legal address: the place of residence of its founders, location of rented office, or any address in general. At the same time, legal address is fixed in decision to create law person, and is also indicated in all of its constituent documents. The legislation provides only when legal address changes, law person is obliged to notify by state authorities. In our opinion, such lacuna in domestic legislation contributes to violation of creditors' rights of law person, since if legal entity fails to fulfill its obligations, it is rather difficult to find location of law person or its property.

The disadvantages of legal regulation of the process of establishing legal entity in the form of Limited Liability Company in the modern realities of the Kyrgyz Republic also should mention the fact that the stipulated requirements of the law to determination of minimum authorized capital of legal entity. As a general rule, the minimum size of authorized capital cannot be less than one calculated indicator approved by the Government of the Kyrgyz Republic. At present, the size of one calculated indicator is set at the amount equivalent to 1.2 US dollars. In accordance with paragraph 3 of Art. 91 of the Civil Code of the Kyrgyz Republic, trustee (participant) of legal entity or the owner of its property is not liable for the obligations of law person, and it is not responsible for obligations of founder (participant) or owner, with exception of cases provided for by the Civil Code of the Kyrgyz Republic, by law or by constituent and documents of legal entity. The legislator details the provisions of this civil legal norm in Art. 36 of the Law of the Kyrgyz Republic "On Business Partnerships and Companies", according to which participants of Limited Liability Company are not liable for its obligations and bear risk of losses associated with activities of the company, within value their contributions.

In accordance with the same act, private owners of Limited Liability Company who have not fully made contributions to authorized capital bear joint and several property liability for company's obligations

within value of unpaid part of contribution of each participants. Thus, situation arises when, in absence of legislative fixation of size of authorized capital of legal entity, it can conclude transactions and conduct economic activities in amounts are many times greater than size of authorized capital, and will be responsible for its obligations only within these limits. Moreover, at present, legal entities have the opportunity to keep their authorized capital at the company's cash desk, actual existence of which can not be verified. In our opinion, the legislation should provide for a minimum amount of authorized capital of legal entity and establish authorized capital of law person must be placed in special bank account. This decision will allow, firstly, to ensure the availability of some compensate creditors for obligations of law person, and secondly, some will reduce the number of registered legal entities. Currently, there are a huge number of legal entities, including in the form of the Companies and Limited Liability Company, which, since its state registration has not begun to engage in economic activities and the only kind of their activity is in delivery of so-called "zero" reporting.

These problems, which arise even at initial stage of creating legal entity, can significantly reduce further economic efficiency of law person, and require more scientific understanding and implementation in practice and legal regulation.

From the moment of state registration of legal entity legal nature of relationship between founders changes. Most decisions aimed at creating law person are made before state registration procedure. After passing this mandatory procedure, founder must pay for the state registration, obtain certificate of state registration from registration authorities, make seal and (or) stamps, and proceed with the implementation of immediate purpose of created legal entity.

It should be noted direct management of law person is carried out by specially created its bodies. For example, in accordance with paragraph 1 of Art. 131 of the Civil Code of the Kyrgyz Republic in the highest body of Limited Liability Company is general meeting of its participants, in event company is created by one person, he is the supreme body of company.

In Limited Liability Company, executive body (collegial or sole) is created that carries out current management of its activities and is accountable to general meeting of its participants. The sole management body of company may be elected not from among its members.

According to the Civil Code of the Kyrgyz Republic, establishment of company may provide for formation of Directors' Board. Powers of legal entity's bodies are quite diverse and are regulated in detail by the norms of the current legislation. Without dwelling on their detailed consideration, we consider it necessary to note responsibility for all actions and obligations of law person of considered organizational and legal form rests with its executive body. There is a certain logical collision here, since formation of the executive body (in practice, it occurs through appointment of director of Limited Liability Company during state registration or subsequent notification of change of executive body to the registration authorities), all significant economic aspects of life of legal entity (approval of annual reports and the company's balance sheets and distribution of its profits and losses, etc.), making decisions and re-registering, registering termination of activities, electing audit commission and much more belongs to exclusive competence of general meeting of company's participants.

Management of company's current activities is carried out by sole executive body of Limited Liability Company or its sole (collegial) executive body. Executive bodies manage current activities of legal entity and are accountable to general meeting and board of directors. At the same time, entire responsibility for decisions made lies precisely with executive body.

Results. Because under applicable law person is considered to be formed only from date of its registration, corporate relationship between legal entity, its founders and managers can not occur before new law person is created. Legal entity as artificial entity arising on basis of civil transactions made by founders and administrative act of authorized state body (act of state registration) becomes an independent, legally able and capable subject of law, having its own will, not reducible to will of its individual founders (participants, members), as well as to will of other persons performing functions of its bodies, however, in accordance with the law, constituent documents and agreements, all participants in corporate relations must obey will of legal entity, just as law person must obey will of founders (participants, members) and others persons performing functions of its organs.

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ЗАҢДЫ ТҰЛҒА МЕН ОНЫҢ ҚҰРЫЛТЫШЫЛАРЫ АРАСЫНДАҒЫ ҚАРАЖАТТАРДЫҢ АЗАМАТТЫҚ ҚҰҚЫҚТЫҚ МӘНІ

Аннотация. Мақалада нормативтік және жүйелік әдістерді, сондай-ақ талдау және синтездеу, ережелерінің мазмұнын қолдану арқылы талдау жасалады. Қырғыз Республикасының Азаматтық кодексінің ережелері, «заңды тұлғаларды, филиалдарды (өкілдіктерді) мемлекеттік тіркеу туралы» және «шаруашылық серіктестіктер мен қоғамдар туралы» Қырғыз Республикасының заңдары, сонымен қатар заңгер ғалымдардың еңбектерінің ережелерін зерттеді.

Осы баптың шеңберінде заңды тұлға мен оның құрылтайшылары арасындағы қатынастардың азаматтық-құқықтық сипатының ерекшеліктері жауапкершілігі шектеулі серіктестік сияқты заңды тұлға мысалында қарастырылады. Авторлық зерттеудің нәтижесі ұйымның заңды мекен-жайы заңды тұлғаны құру туралы шешімде анықталады және оның барлық құрылтай құжаттарында белгіленеді деген қорытынды болды. Заңнамада заңды мекен-жайы өзгерген кезде заңды тұлға әділет органдарына бұл туралы хабарлауға міндетті екендігі ғана айтылған. Авторлардың пікірінше, Қырғызстан Республикасының заңнамасындағы мұндай олқылық заңды тұлғаның кредиторларының құқықтарының бұзылуына ықпал етеді, егер заңды тұлға өз міндеттемелерін орындамаса, заңды тұлғаның орналасқан жерін немесе оның мүлкінің орналасқан жерін табу өте қиын.

Авторлар заңнама нормаларында заңды тұлғаның жарғылық капиталының минималды мөлшерін қамтамасыз ету және заңды тұлғаның жарғылық капиталын арнайы банктік шотқа орналастыру керек деп санайды. Мұндай шешім, біріншіден, несие берушілерге заңды тұлғаның міндеттемелері бойынша қандай-да бір өтемақы алуға кепілдік беруге мүмкіндік береді, екіншіден, тіркелген заңды тұлғалардың санын біршама азайтады.

Түйін сөздер: азаматтық құқық, заңды тұлға, құрылтайшылар, қоғам, мемлекет, капитал, жарғы.

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ГРАЖДАНСКО-ПРАВОВАЯ ПРИРОДА ОТНОШЕНИЙ МЕЖДУ ЮРИДИЧЕСКИМ ЛИЦОМ И ЕГО УЧРЕДИТЕЛЯМИ

Аннотация. В статье проанализированы с применением нормативного и системного методов, а также анализа и синтеза, содержание положений Гражданского кодекса Кыргызской Республики, Законов Кыргызской Республики «О государственной регистрации юридических лиц, филиалов (представительств)» и «О хозяйственных товариществах и обществах», а также трудов ученых-юристов.

В рамках настоящей статьи рассматриваются особенности гражданско-правовой природы отношений между юридическим лицом и его учредителями на примере такого юридического лица, как Общество с ограниченной ответственностью. Результатом авторского исследования стал вывод о том, что юридический адрес организации определяется в решении о создании юридического лица и устанавливается во всех его учредительных документах. В законодательстве предусмотрено только то, что при перемене юридического адреса юридическое лицо обязано уведомить об этом органы юстиции. По мнению авторов, такой пробел в законодательстве Кыргызской Республики способствует нарушению прав кредиторов юридического лица, так как при неисполнении юридическим лицом своих обязательств найти местоположение юридического лица или местонахождение его имущества достаточно сложно.

Авторы полагают, что в нормах законодательства необходимо предусмотреть минимальный размер уставного капитала юридического лица и установить, что уставный капитал юридического лица должен быть помещен на специальный банковский счет. Такое решение позволит, во-первых, гарантировать наличие какой-либо компенсации кредиторам по обязательствам юридического лица, во-вторых, несколько снизит число регистрируемых юридических лиц.

Ключевые слова: гражданское право, юридическое лицо, учредители, общество, государство, капитал, устав.

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SEARCH FOR PRACTICAL AND THEORETICAL SOLUTIONS TO THE PROBLEMS OF MULTICULTURALISM IN KAZAKHSTAN

Abstract. The national development of any multicultural society is associated with a number of problems and challenges, because such a society is a set of different cultures that exist in one space and means the ability of people of different national, religious and cultural backgrounds to live in a single territory. In this regard, the problem of interaction of cultures is relevant, as well as questions about the role and place of individual cultures in a multicultural society, the degree and mechanism of their interaction. The issue of multicultural interaction is an important aspect of domestic research. Kazakhstan requires a reflexive understanding of not only the traditions of Kazakh culture, but also the phenomenon of multiculturalism in Kazakhstani society. In the post-Soviet period, our country has experienced severe emotional and psychological stress that has affected all aspects of society. These changes have led to a change in the attitude of the Kazakh people to other nationalities. The issues of tolerance and multiculturalism are especially relevant in the context of growing interethnic tension, ethnophobia and intolerance in the socio-economic and spiritual life of modern Kazakhstan. Thus, the problem of multiculturalism is associated with the search for practical and theoretical solutions to the problems facing the world community today.

The active process of globalization raises the issue of conformity. The policy of identity is a response to the special effects of globalization: conflicts can arise between people who claim to live in a global world and those who live in a local culture. The relationship between global and local initiatives cannot be characterized by mergers or prohibitions. However, the diversity of society and culture will not disappear with globalization. Accordingly, the conflict between people who think in the global world and those who identify themselves with the local subculture is a conflict of multiculturalism and identity.

As we all know, the core of identity is traditional and national culture, which is the most difficult test of globalization. Dialogue and cultural continuity are the main means of preserving identity.

Elements of multiculturalism can be noted in Kazakhstan today. It can be attributed, first of all, to a multinational community, in which some subjects are divided according to the strength of their national traditions, cultural identity.

Keywords: diaspora, multiculturalism, culture, intercultural, cultural system, traditions.

Introduction. The initial rationale for pluralism, which asserts that in the history of Kazakhstan all cultures are equal and no one is important, leads to the excess of one of the many central ideas of multiculturalism. The question of the existence of a common culture in the public life of Kazakhstan, which is generally accepted in the country, is not only questioned, but also rejected by supporters and participants in the direct implementation of the pluralistic model. The value of individual groups goes against all other societies. As a result, this situation contradicts political conformity, and the emphasis in Kazakhstani society is generally better.

Today, such a general answer is incomplete, and the continuity of dialogue and cultures can be complicated by the crisis of identity or its rapid change, as well as the pluralization of identity. This applies to both the individual and the real society. For Kazakhstan, the pluralism of identity is closer, as it has been seen as a bridge between East and West as a country connecting European and Asian origins. The essence of the crisis of identity in Kazakhstan is not that monistic understanding has lost its uniqueness and pluralism, but that pluralism in the domestic mentality does not exist as a combination of positions, and that unrelated views prevail.

At the same time, the paradox of the policy of multiculturalism, which characterizes the Kazakh society in different areas, which reflects the process of formation and development, has long been established and requires reconsideration of the established consciousness and purpose. In response to the cultural diversity within the state, we can pursue a policy of pluralism, the main goal of which is the coexistence of different cultures, the recognition of worthlessness, the promotion of equality of cultures within a united society.

Changes in purpose meet the requirements of modern society, while all cultures are equal and have equal rights to life and development. In addition, different cultures can coexist peacefully without assimilation. Thus, in the new ideological context, active interaction is replaced by the issue of coexistence in a multicultural space.

In the global world, identity is the main discourse of both science and everyday life. First, the potential field for the interaction of cultures is expanding. Secondly, not only Kazakhstan, but also other societies, nations and individuals are experiencing a crisis of identity. One of the most pressing issues is the search for or replacement of identity for the people of the former Soviet Union.

Undoubtedly, globalization has created a crisis of identity. There is an opinion that the issue of conformity has been completely removed from the agenda, and has been replaced by multiculturalism (in most cases, pluralistic conformity).

And what about Kazakhstan? What is the current situation in Kazakhstan? What is the country's readiness to adopt the principles of multiculturalism?

According to the latest All-Kazakhstan census, 65% of the country's population is Kazakhstan, and among the all-Kazakhstan identity, Kazakh identity may take precedence, which in turn may leave less room for other nationalities in Kazakhstan. The dominance of monoculture, indisputable Kazakh culture is evidenced by his contribution to world culture. However, this does not give it the right to suppress other local cultures.

At the same time, it should be borne in mind that half of the Kazakh people, as well as people of other nationalities, may lose their cultural identity. Thus, it is known that all-Kazakhstan identity can be closed, but it is possible to preserve its own culture. This trend may affect the integration of new conformities to the country's customs, including the integration of carriers into Kazakh society.

The opinion of the First President N.A. Nazarbayev on the state identity should not be ignored: “Thanks to the unity and integrity of the people of Kazakhstan for 30 years, we have achieved today's success. Being a multinational state is our advantage. And this national-state idea as the main political value - is formed around a single, whole, independent Kazakhstan, which is the homeland of all Kazakhstanis, regardless of nationality "[1].

Adoption of the "multicultural" integration model by the state means that it is ready to accept a multicultural population and assume its integration. However, in accordance with the multicultural situation of the local population in Kazakhstan, it is necessary to solve the problem of integration not only of migrants, but also of the population living in the country for a long time. Before Kazakhstan in 1960-1980. The United States, Australia and Canada face the following challenges: to unite culturally diverse peoples, to create a clear vision of Kazakhstan's identity, to unite people of different cultural backgrounds in common values and goals. The urgency of these issues for modern Kazakhstan reflects the rapid growth of nationalism, discrimination and xenophobia against members of other cultures who have acquired Kazakh citizenship.

In order to maintain cultural balance within a multicultural society, it is necessary to adhere to the following condition: cultures should not be "closed" by themselves, they should be constantly involved in the processes of intercultural interaction. In this case, there is a question of creating a new one or supporting the previous interaction between cultural groups. In this regard, in order to achieve the above objectives, K. Zurcher points out 3 important points:

1. Preservation / creation of general institutions;
2. Organization or provision of opportunities for cultural exchange;
3. Support / creation of obscure border areas between cultures.

Such border areas facilitate cultural exchange and facilitate the revitalization of cultures, thus preventing situations that require the choice of "or-or" and interacting with decisions on the principle of "more or less".

It requires several needs to create common institutions. One of them is to maintain a stable balance between the cultural groups that make up a multicultural society. Now one is to ensure the interaction between these groups as much as possible while preserving their uniqueness and protecting them from conflict. There are two important moments that play an important role in this:

1. In the context of a multicultural society, there must be relevant values, norms and ideals shared by the members of that society. At the same time, as Klakhon points out, "... no nation can survive as a nation unless its individuals pursue a specific goal. Such basic goals can be stated in many ways, but these goals must be followed by the majority of members of the group or society" [2].

2. In the implementation of policies aimed at the formation of common goals and values and the maintenance of balance, it should be borne in mind that the idea "above" exists in the absence of the overwhelming majority of the constituent entities of society. Here, any change must take place at different levels of social construction, in most cases it is born inside and approved "above".

Thus, one of the main goals of multicultural policy is to maintain and create a balance of social culture in society. One of the tools for implementing the above steps is the dissemination of value orientations, which are of general importance for the multicultural space. At the same time, the notion of the cultural identity and traditions of "others" should not be discarded, otherwise it can lead to a rapid imbalance. Moral goals pursued by adherents and disseminators of traditions also play a role in a multicultural society. Cultural patterns of a particular group should not be violated. When important elements of a tradition are lost, they must be replaced.

Discussion. It is better to note that one of the most important conditions in a multicultural society is tolerance. The issue of tolerance is one of the most pressing issues today, because the diaspora, the adaptation of migrants is a key condition for the stability of modern society. In this regard, the implementation of the idea of tolerance and the first step in creating a sense of tolerance in modern Kazakhstan should be to identify the existence of various forms of intolerance in society. It is difficult for any of us to acknowledge the existence of Nazism in Kazakhstan, the violation of the rights of the majority, and the fear of many. Understanding that this problem exists requires a positive solution.

The essence of tolerance is explained by tolerance, the subject, and even the group, turning a blind eye to the shortcomings of "others", which is reflected in multicultural discourse, the ability to listen to and respect the views of "others", not to push back from the beginning. The philosophical concept of tolerance provides for the perception of the diversity of cultures in the world, the ability to correctly interpret, to adhere to the form of individual and group self-expression. It shows the absence of dogmatism, the absoluteness of norms and values in a multicultural society, the state, the world as a whole. Also, tolerance, which is reflected in individual and group lifestyles, the preservation and development of their own traditions is possible in any specific situation that does not endanger the world order.

As for the creation and development of multiculturalism in our country, on the one hand, we can say that there is progress compared to the Soviet era. Next, it is too early for Kazakhstan to achieve a comprehensive state policy of multiculturalism as a target ideology. It will be recalled that the policy of multiculturalism seeks the unity of all cultures in society, none of which is defined as a leader. In addition, the influence of Kazakh and Russian cultures in Kazakhstan is very high, so the culture of all nations with national, linguistic and religious aspects is become Kazakh and Russified at all levels. Here we can see that this goal in a multicultural society does not correspond to the realities of Kazakhstan. However, our country is on the path of transformation. In this regard, the issue of factors and reasons that hinder the establishment and development of multiculturalism in modern society requires a special and comprehensive analysis.

As a result, it can be noted that there is no reason to use either multiculturalism itself or the concept of its equivalent in modern Kazakhstan. In theory, multiculturalism, which is useful and inevitably logical, can be a paradoxical phenomenon with side effects in practice. Is it possible to reconsider ways to resolve the contradictions between different cultural and religious groups in modern Kazakhstan? The question is very relevant. In this regard, let's identify practical and theoretical ways to solve this problem:

1. In our view, there is no danger for the survival of these cultures in the event of intercultural interaction within one state. However, in the event of a loss of communication, for example, in Kazakhstan and Kyrgyzstan, there may be problems with Kazakhs and other members of the diaspora. The philosophical solution to the problem lies in determining why communication is interrupted, which may

be due to the use of discursive practice. For example, in the case of Kazakhstan and Kyrgyzstan, the reason for the loss of communication is the inability of people to agree with each other. For example, both Kazakhstan and Kyrgyzstan consider Sh. Aitymatov as their native writer. It will not be possible to agree with each other until the context of this relationship changes.

2. The positive result of intercultural communication lies in the peculiarities of the Kazakh mentality. These features include "universal morality", "universal tolerance", "brotherhood of people regardless of national identity", "ability to creatively use the experience of other nations", "self-confidence and trust, while directly contradicting the beliefs of others." the ability to persevere in faith ". It should be noted that one of the primary features of Kazakhstani society is that the Kazakh people are the unifier. In this regard, it is necessary not only to preserve but also to develop this distinctive feature of the mentality of the Kazakh nation.

3. The diversity of the ethnic composition of Kazakhstan, the inconsistency of cultural and demographic processes causes various problems, conflicts, interethnic conflicts. It should be noted that in the current situation, the future of Kazakhstan will be bright if it can withstand the process of nationalism and national division. We can agree with the following fair remark of S. Tatunz: "One of the important lessons of the systemic crisis in Kazakhstan in the 90s of the twentieth century is the understanding that socio-economic, political and cultural processes in the country are inseparable from ethno-national processes."

4. The way to resolve intercultural conflicts is to pursue the principles of politics and multiculturalism, one of which is tolerance. Today, the concept of tolerance in politics and ideology has been replaced, so the idea of multiculturalism is considered in the Kazakh reality not as an opportunity, but as an ideal of international relations.

5. In the context of the financial and economic crisis and unemployment, there is an increase in intolerance in various fields and nature. Loss of a habitual way of life, loss of a stable source of income, uncertainty of the future cause anger towards the environment, contribute to the growth of intolerance. In this regard, according to the philosophical point of view, it is necessary to make a clear assessment of what is happening today and find a way out of this situation. This is where the development of a sense of tolerance begins.

6. For the real implementation of multiculturalism in Kazakhstan, a well-thought-out, planned state policy is needed. The government of Kazakhstan must take into account the traditions, customs and culture of the peoples living in the country. The policy of multiculturalism should be aimed at the younger generation: young people should learn to respect the traditions and culture not only of themselves, but also of other nations, learn from different cultures and traditions of their country and even the world.

7. Another option to address the formation and development of multiculturalism in modern Kazakhstan is to include in the cultural territory of the country the cultural elements of emigrants from the countries of the former Soviet Union.

It is important to develop people's perception of the traditions and culture of other countries, to explain from an early age the diversity of the world, the interconnectedness of countries, to cultivate international unity and understanding, to teach the norms of intercultural relations and cooperation. In addition, it is important to preserve the diversity of human culture, respect the traditions of your own people, respect the culture and traditions, customs and values of others.

It should be noted that the multicultural model of multiculturalism and integration is not actively accepted in modern Kazakhstani society, and many Kazakhs do not want to accept it.

In order to maintain peaceful relations between different groups, we must take into account that the concept of civil equality in the intuition of the people is closely linked with respect for the values of the nation, that is, respect for its culture. Thus, multiculturalism or its elements is not a new political and philosophical theory for Kazakhstan, but a vital need to preserve the uniqueness of the social and cultural world in society.

As mentioned above, multiculturalism in Kazakhstan exists at the level of ideology, and in everyday practice there is no multiculturalism. This is due to the negative attitude of the majority of the population towards other nationalities, the spread of nationalism, xenophobia and extremism. However, the multinational ideology of the state, the peaceful coexistence of the people, all-Kazakhstan cooperation, respect for the culture of the peoples understand the need to use the principles of multiculturalism to stop the tension in society.

All this does not deny the need to implement a policy of differentiation in the socio-cultural space of Kazakhstan, but rather strengthens, first of all, it is necessary to address the issue of intercultural diversity, which is reflected in the migration flow.

As mentioned above, one of the most socially oppressed groups in Kazakhstan is migrants. In this regard, the threat of racial and ethnic tensions is their group orientation, so the migrant community or minority raises several repeated alarms, and their grouping is considered a threat. The new frontier of multiculturalism is the issue of fair access to all opportunities and resources for all members of modern Kazakhstani society, regardless of nationality. Conflicts between indigenous peoples and members of the diaspora are caused not only by national and cultural independence, but also by social contradictions: the struggle for jobs, affordable housing, and access to education.

In the light of the above, cultural ties are a prerequisite for harmony in the modern world. Culture in the life of a multicultural society is a much more reliable basis for unity than ideology. Therefore, today, culture as a communicative code is considered to be the priority of uniting the "majority" into a common one, and also assigns the role of "meeting place" to the vast majority of the group. It is obvious that the destruction of any culture will be a great loss for the state of Kazakhstan and for all mankind. Therefore, it is necessary to preserve all cultures with their own uniqueness and unique history, to integrate them into the overall process and to understand the importance of a multicultural model of integration.

The policy of multiculturalism is the only option for establishing new interethnic relations in modern Kazakhstan. It is quite possible that in the near future Kazakhstan will become one of the most comfortable and safe countries to live in. Our problems in the field of mass migration are not yet comparable with European or American ones.

We have considered only some aspects of the problem of multiculturalism, and I hope that in the future this issue will be given more attention and research.

I believe that Kazakhstan, taking into account the mistakes of others, thinks deeply and offers ways to solve the problem facing all European civilizations.

Conclusion. The twentieth century has gone down in history as an era of globalization that has affected all areas of human activity. The study of the nature of Kazakhstan's involvement in the globalization process is especially relevant. The problems of the relationship between Kazakhstan and globalization should be formulated as follows: what are the ways and mechanisms of Kazakhstan's adaptation to these processes, how can Kazakhstan participate in these processes and under what conditions we can join the emerging global world.

Analysis of domestic and foreign literature and experience allowed to highlight the most important features of multiculturalism for a country like Kazakhstan. First of all, it should be noted that multiculturalism is not only the policy of national minorities, but also a mechanism for overcoming social and psychological inequalities of different groups. This reflects the compensatory nature of multiculturalism. One of the goals of multiculturalism is to create a structure of national identity that allows to take into account and preserve the cultural identity of all citizens of the country.

Another goal is to remove barriers for people of different nationalities and provide them with equal access to the resources and opportunities of society. In this context, multiculturalism can be seen as a way to build a modern "just" society in which all interethnic contradictions are weakened, especially intercultural.

The role of the state in multiculturalism is, first, to ensure the interaction of different groups; secondly, the creation of multiculturalism itself. In this case, the building blocks are state institutions that interact with the entire population in their functions. Thus, multiculturalism or its elements is not just a Western trend for Kazakhstan, but a vital need to build new interethnic relations in the current situation.

If we summarize the existing approaches to the definition of this term, we can conclude that the concept of "multiculturalism" means the preservation of cultural identity and the implementation of the ideas of tolerance in a multinational state. As a result of the study, we define this concept as the main category of philosophy of culture, which characterizes the conflict-free coexistence and interaction of many cultures in one territory in the conditions of equality and freedom of self-affirmation of each representative of national culture.

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ҚАЗАҚСТАНДАҒЫ КӨПМӘДЕНИЕТТІЛІК МӘСЕЛЕЛЕРІНІҢ ПРАКТИКАЛЫҚ ЖӘНЕ ТЕОРИЯЛЫҚ ШЕШІМДЕРІН ІЗДЕУ

Аннотация. Кез-келген көпмәдениеттілік қоғамның ұлттық дамуы бірқатар проблемалармен байланысты, өйткені мұндай қоғам бір кеңістікте өмір сүретін әр түрлі мәдениеттердің жиынтығы болып табылады және әртүрлі ұлттық, діни және мәдени шыққан адамдардың бір кеңістікте, бір территорияда өмір сүру қабілетін білдіреді. Осыған байланысты мәдениеттердің өзара әрекеттесу проблемасы, сонымен қатар көпмәдениеттілік қоғамдағы жеке мәдениеттердің рөлі мен орны, олардың өзара әрекеттесу дәрежесі мен механизмі туралы сұрақтар өзекті болып табылады. Көпмәдениеттілік өзара әрекеттесу проблемасы отандық зерттеулердің маңызды аспектісі болып табылады. Қазақстанға тек қазақ мәдениетінің дәстүрлері туралы ғана емес, сонымен қатар қазақ қоғамындағы көпмәдениеттілік құбылыс туралы рефлексивті түсінік қажет. Посткеңестік кезеңде біздің еліміз қоғамның барлық жақтарын қамтыған ауыр эмоционалды-психологиялық стрессті бастан кешті. Бұл өзгерістер қазақтардың басқа ұлттарға деген көзқарасының өзгеруіне әкелді. Төзімділік пен көпмәдениеттілік мәселелері этносаралық шиеленістің, этнофобия мен қазіргі Қазақстанның әлеуметтік-экономикалық және рухани өміріндегі төзбеушіліктің өсуі аясында өзекті болып табылады.

Сонымен, көпмәдениеттілік проблемасы бүгінде әлемдік қоғамдастық алдында тұрған мәселелердің практикалық және теориялық шешімдерін іздеумен байланысты. Жаһандану белсенді процесі сәйкестік туралы сұрақ туғызады. Жеке басты саясат - бұл жаһандану ерекше әсеріне жауап: жаһандық әлемде өмір сүремін деген адамдар мен жергілікті мәдениетте өмір сүретіндер арасында қақтығыстар туындауы мүмкін. Жаһандық және жергілікті бастамалардың арақатынасы бірігу немесе тыйым салу арқылы сипатталуы мүмкін емес. Алайда, қоғам мен мәдениеттің әртүрлілігі жаһанданумен бірге жойылмайды. Тиісінше, ғаламдық әлемді ойлайтындар мен жергілікті субмәдениетті анықтайтын адамдар арасындағы қақтығыс - бұл көпмәдениеттілік пен сәйкестіктің қақтығысы. Бәрімізге белгілі, сәйкестіктің өзегі - дәстүрлі және ұлттық мәдениет, бұл жаһанданудың ең қиын сынағы.

Диалог пен мәдени сабақтастық - бірегейлікті сақтаудың негізгі құралы. Бүгінде Қазақстанда көпмәдениетті элементтерін атап өтуге болады. Мұны ең алдымен көпұлтты қоғамдастыққа жатқызуға болады, онда кейбір субъектілер өздерінің ұлттық дәстүрлерінің, мәдени ерекшеліктерінің күші бойынша бөлінеді.

Түйін сөздер: диаспора, көпмәдениеттілік, мәдениет, мәдениетаралық, мәдени жүйе, дәстүрлер.

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ИССЛЕДОВАНИЯ ПРАКТИЧЕСКИХ И ТЕОРЕТИЧЕСКИХ РЕШЕНИЙ ПО ПРОБЛЕМАМ МУЛЬТИКУЛЬТУРАЛИЗМА В КАЗАХСТАНЕ

Аннотация. Национальное развитие любого мультикультурного общества связано с рядом проблем и вызовов, поскольку такое общество представляет собой совокупность различных культур, существующих в одном пространстве, и означает способность людей разного национального, религиозного и культурного происхождения их проживание в одном пространстве, на единой территории.

В связи с этим, актуальна проблема взаимодействия культур, а также вопросы о роли и месте отдельных культур в поликультурном обществе, степени и механизме их взаимодействия. Проблема поликультурного взаимодействия - важный аспект отечественных исследований. Казахстану необходимо рефлексивное понимание не только традиций казахской культуры, но и феномена мультикультурализма в казахстанском обществе. В постсоветский период наша страна пережила тяжелый эмоциональный и психологический стресс, затронувший все аспекты жизни общества. Эти изменения привели к изменению отношения казахов к другим национальностям. Вопросы толерантности и мультикультурализма особенно актуальны в контексте роста межэтнической напряженности, этнофобии и нетерпимости в социально-экономической и духовной жизни современного Казахстана. Таким образом, проблема мультикультурализма связана с поиском практических и теоретических решений проблем, стоящих сегодня перед мировым сообществом. Активный процесс глобализации поднимает вопрос соответствия. Политика идентичности – это ответ на особые эффекты глобализации: могут возникать конфликты между людьми, которые утверждают, что живут в

глобальном мире, и теми, кто живет в местной культуре. Отношения между глобальными и локальными инициативами нельзя характеризовать слиянием или запретом. Однако разнообразие общества и культур не исчезнет с глобализацией. Соответственно, конфликт между людьми, мыслящими в глобальном мире, и теми, кто идентифицирует себя с местной субкультурой, является конфликтом мультикультурализма и идентичности. Как мы знаем, ядро идентичности – это традиционная и национальная культура, что является самым сложным испытанием глобализации. Диалог и культурная преемственность - главные средства сохранения идентичности.

Элементы мультикультурализма сегодня можно отметить в Казахстане. Это можно отнести, прежде всего, к многонациональному сообществу, в котором некоторые субъекты разделены по силе своих национальных традиций, культурной самобытности.

Ключевые слова: диаспора, мультикультурализм, культура, межкультурное, культурная система, традиции.

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FORMATION OF CREATIVE POTENTIAL OF STUDENTS BASED ON INNOVATIVE APPROACHES

Abstract. In the context of the reform and modernization of education in Kazakhstan and the accession of the Republic of Kazakhstan to the Bologna process, Akhmet Yassawi International Kazakh-Turkish University has aimed to train specialists of an international level and improve the quality of education, the main course is to develop new pedagogical grounds for the formation of a future specialist both as a professional and as a creative person with creative potential and professional-creative competence. The search for personnel reserves to improve the professional training of future specialists is shifting to the development of creative potential and communicative competence. There is a need to transform the educational environment of higher education into a single creatively developing educational space that promotes the formation and development of students' creative potential and competence as a factor in successful self-realization in the profession and the prerequisites for competent support for the creative development of students.

Key words: creativity, innovation, creative potential, creative activity.

Introduction. The problem of quality education at the beginning of the 21st century has acquired particular urgency and relevance. A huge number of changes in the life of modern society urges a person to be creative and productive in any transformation. A graduate of a university has to react to changes constantly occurring in society, but often he is not ready for them. In order to survive and adequately respond to them, the future specialist have to activate his creative potential [1].

Universities of Kazakhstan are implementing multilevel professional educational programs in various specialties of higher professional education. In order to implement these programs in the context of social protection of students and increase the mobility of graduates, it is necessary to observe general and innovative principles and methods in the learning process [2].

Main part. With the modernization of education in Kazakhstan and the signing of the Bologna Declaration, Akhmet Yassawi International Kazakh-Turkish University made certain obligations. One of the main tasks of the Akhmet Yassawi IKTU, the flagship of the international education of independent Kazakhstan, is to enter the single European educational space and achieve international recognition of educational programs in leading specialties. In order to solve this problem, the main direction of the development of education at Akhmet Yassawi IKTU is to train qualified specialists of an international level with a high level of professional, communicative competence and creative potential based on a competent and innovative approach.

Currently, there are increasing requirements for the level of preparation of creative abilities of a qualified specialist, in addition to his ability to solve independently various problems that arise in the process of further professional activity. Nowadays, only a specialist who is creative in his work can cope with the whole range of practical and theoretical tasks posed by rapidly developing economic transformations and the scientific and technological process [3].

As our long-term experience at the university convinces, the process of pedagogical design stimulates and develops the creative activity of a student as a future high-demand specialist. The combination of cognitive interest in the subject with professional motivation has the greatest impact on the effectiveness

and efficiency of training and cognitive motivation encourages the student to develop their inclinations and capabilities, has a decisive impact on the formation of personality and the disclosure of its creative potential [4].

With the development of the creative potential of students, special attention is paid to the formation of skills to independently acquire knowledge, to reveal their individual abilities, which provides sustainable motivation for learning. The development of creative potential during the training period will help students to firmly master those areas of knowledge that can be useful in independent professional activities.

Studies have shown that for a student to understand the social meaning of learning, its personal significance, it is necessary to constantly and purposefully cultivate respect for the knowledge itself, the right attitude to their social and professional role. After all, this, in fact, means: educating by teaching. Innovative educational technologies activate not only the cognitive component of the pedagogical process, but also improve the educational aspect associated with the formation and development of personal qualities of students.

The creative potential of students develops in the process of activity in solving various problems. The problematic situation that arises requires a certain solution, which in creativity can be expressed objectively or subjectively for each person [6].

Creative potential is a complex, integral concept, which includes the natural genetic, socio-personal and logical components, in the aggregate, representing the knowledge, skills, abilities and aspirations of the individual to transform (improve) the world around him in various fields of activity within the framework of universal human norms of morality. “Creative potential” manifested in a particular field of activity, represents the “creative abilities” of a person in a particular type of activity, as well as a complex personality-activity formation, including motivational-targeted, meaningful, operational-activity, reflective-evaluative components that reflect the totality of personality qualities and abilities, psychological states, knowledge, skills necessary to achieve a high level of its development. The term itself can often be used as a synonym for “creative person”, “gifted person”. The value of creativity, its functions, lie not only in the productive side, but also in the process of creativity .

It should be emphasized that the student’s internal activity, readiness to make efforts inherent in various types of his inclinations, is at the same time the first condition for the development of creative potential. To activate the personal potential earlier than others, the motivational component of the personality should be involved. Without a developed cognitive interest, the formation of the point of learning, an effective orientation to the personality in the educational process is impossible. In the formed “field of interest”, the self-expression of a person takes place, her assessment of her abilities, the desire to achieve the I-ideal develops. A high level of cognitive interest is usually inherent in students with a developed "I-concept". That is why the identification of psychological and pedagogical characteristics that contribute to the emergence of cognitive motivation, with its subsequent transformation into professional motivation, is one of the strategic areas of psychology and pedagogy of higher education and innovative teaching technologies.

Innovation (from English. "novation" - innovation, innovation is considered in inextricable unity of ideas, processes, means and results of improving the pedagogical system). The introduction of more thought-out methods, the use of active forms of the educational process, new technologies of training and education are constant areas for the implementation of innovative ideas. The main directions of innovative transformations in the pedagogical system are theory, technology (content, forms, methods, means), management (goals and results) of higher education.

Innovative teaching technology should be considered as a tool with which a personality-oriented educational paradigm can be implemented. Personal-oriented education is based on the well-known principles of humanistic pedagogy: intrinsic value of a person, respect for her as a creative individual. The concept of creative individuality objectively includes self-identity. A person acquired the ability to distinguish himself, his “I” from the environment, to examine the external conditions of his being outside his own subjectivity as a result of the development of expedient material activity to transform the objective world [5]. The realization of this ability, the corresponding level of self-awareness, is the most important prerequisite for a creative act. In the framework of creative activity, the self-consciousness of its

subject performs a number of functions. It “protects” and stimulates creative activity, mediates the formation of an appropriate system of internal motives and values. For meaningful self-programming of creative activity, one of the prerequisites for its effectiveness is a sufficiently high degree of development of all levels of self-awareness.

As the prerequisites for successful creative activity, two main areas of the regulatory activity of self-awareness can be distinguished. The first of them is associated with maintaining a stable intellect, the second is with the social determination of its creative activity. The essence of the first is that the processes of awareness of one’s experiences, states, emotions, etc. help maintain the stability of the human mind. Since self-regulation and self-control of the person are carried out through individual self-awareness, to the extent that it acts as an important condition not only for preservation, but also for the self-conscious development of its creative capabilities and abilities. Self-awareness enables the subject to develop his attitude to his own creative activity, evaluate and consciously program its character [7].

Gradually, as a reaction to the results obtained, a subject's cognitive self-relation to his creative activity is formed from an effective point of view, i.e. a criterion for the productivity of creative activity begins to function based on the feedback mechanism. For psychology and pedagogy, it is especially important not so much the manifestation of individuality in activity as the decisive role of activity in the formation of creative individuality.

In the development of creative thinking of students, a special place is occupied by conversation as an interactive teaching method (table 1).

Table 1 - Interactive teaching method

Key indicators of implementation of dialogical relations	A talk as a dialogue method of teaching
First indicator	this is the presence of diverging semantic positions in the discussion. If they interact in the teacher’s speech, then we can talk about internal dialogue; in the case when the diverging semantic positions are represented by several participants in the discussion (at least two), an external dialogue is implemented. In addition to indicators (external dialogue — internal dialogue), the method includes the characteristic “depth of dialogue”, which is assessed by the degree of divergence of semantic positions: the stronger their divergence (up to complete opposition), the higher the degree of dialogicity of the lesson [14].
The second indicator of the methodology (or rather, a system of indicators)	characterizes the form of dialogue, the technology of its implementation. This includes indicators such as the level of personification of message texts: the teacher’s communication style in the scale parameters (authoritarianism) - (democracy), (degree of categorical judgments), etc. [17].
Third indicator	this is the communicative technique of the leader, the structure of which includes the degree of argumentation, statements, possession of the formal logical rules of proof, the listening technique (reflective, not reflexive, empathic); the degree of rigidity of dialogue management (direct, indirect), etc. [19].

Using these indicators, it is possible to build the so-called “profile” of the communicative competence of the teacher, clearly demonstrating the features of the development of the structure of the communicative technique of the top game.

Building a profile of communicative competence allows you to develop guidelines for the development of individual components of the communicative technique of a teacher, which is of great practical importance. One of the important factors in the formation and development of creative thinking is dialogue interaction [8].

Joint problem solving in a situation of dialogue interaction allows you to put forward and test a large number of solution hypotheses, quickly notice errors, overcome psychological barriers. A joint solution is distinguished by increased motivation, creative elevation, greater efficiency and awareness of the solution compared to an individual search.

Unfortunately, in practice, the possibility of developing creative thinking in conditions of dialogue for the most part remains unrealized. One of the reasons is the insufficiency or just the absence of knowledge of psychological characteristics and the principles of making up constructive dialogical interaction, the flow of thought processes in a dialogue, as well as ignorance of the criteria for identifying tasks, the

solution of which is complicated in a dialogue due to the psychological characteristics of the tasks themselves.

Thus, firstly, the idea and rules of innovative technologies are aimed at solving the problems in a new, unconventional way. The teacher only creates the conditions for the direction of self-change and does not impose his plans, thereby forming the ability to think outside the box.

Secondly, as a result of "immersion" in the organizational and professional situation, the awareness of the need for new knowledge and skills is stimulated, the need for analysis of ways of activity and thinking is manifested. The mental process should be aimed at creating the value of reflection, without which the training of a future specialist of a new type, hardly makes sense.

Thirdly, the organization of intra-group and inter-group interaction is aimed at developing students' communication culture and teamwork skills.

Therefore, one of the most important problems is the transformation of games from an episode into an element of the training system of a sought-after specialist.

From the foregoing it follows the conclusion that currently the educational process at universities has become more complex in terms of its tasks, intensity and content. It requires a deep psychological and pedagogical understanding of the patterns of academic discipline, principles, methods of training and education, the formation of the student's creative personality by teachers [9]. The transition to a new pedagogy means updating all sides of a holistic pedagogical process - its content, forms, methods, and what is most difficult in the psychology of teachers and students - their way of thinking, leading to the development of creative activity of a future specialist.

Objects and methods of research. The main research methods were theoretical analysis and synthesis, comparison and generalization, modeling, studying the experience of professional activities of a future primary school teacher, and observation. In research work, to solve the tasks and verify the initial assumptions, the following research methods were mainly used: general logical methods and techniques (analysis of philosophical, anthropological, ethnographic, psychological, pedagogical, regulatory and other literature on the problems of vocational education, synthesis, abstracting, generalization, analogy, structural-functional method and probabilistic-statistical methods); methods of theoretical knowledge (axiomatics, formalization, deduction, ascent from the abstract to the concrete); methods of empirical research: (observation, interviewing, questioning, bibliographic method; in vivo experiment, comparison, description, monitoring, measurement); a systematic approach to conducting historical-pedagogical and logical analysis, generalization and analysis of pedagogical experience; modeling of pedagogical processes; pedagogical design used to develop regulatory and software-technological support. The methodology of experimental work was developed; indicators and criteria for assessing the effectiveness of the identified conditions were specified; a pedagogical experiment was conducted; educational and methodological support was developed for the educational process of professional training of the future primary school teacher, aimed at creating the creative abilities of the future teacher and the competencies of graduates.

The formation of a modern specialist is impossible without a personal approach, based on the identification and mandatory consideration of the student's individual qualities, the comprehensive development of his creative abilities, the widespread assimilation and active use of innovative teaching technologies in order to stimulate the creative potential of future specialists - a key moment in the modernization of higher education [10].

At present such teaching methods that would lead to joint productive activities are needed, where the absolute opposition of the goals of the teacher and students is removed, an atmosphere of co-creation is created in a joint search for ways and solutions to the problem. According to its content and forms of organization, the educational process should develop in student such creative personality traits as the independence of thinking and action. Therefore, the main task of the teacher is not to mechanically convey a certain amount of knowledge, but to instill in the student a methodological culture of thinking, to equip the methodology with an approach to solve the diverse problems put forward by practice [11].

This is how the educational process of group, so-called brainstorming, debates are built, as a result of which the ability to make independent judgments, the ability to conduct a scientific dispute, and the democratic culture of the individual are improved. The ability to hear the point of view of another,

understanding and objectivizing the subject of the dispute is possible only in the process of using a dialogue in the educational process, which should be considered as a source of cognitive activity and psychological and pedagogical conditions for self-expression of the creative potential of the student's personality [12].

In the course of the study, we determined the principles of forming the creative potential of students: the principle of unity in the formation and development of the creative potential of students; the principle of unity of innovative, systemic, competency-based, personality-developing approaches in the formation and development of the creative potential of students; the principle of continuity and succession in the development of the creative potential of students.

The organization of the pedagogical process is impossible without scientifically based modeling of both the system of general pedagogical training and the process of forming the creative potential of students. The modeling process consisted of the following steps: determining the nature of the model, constructing a scheme, and characterizing each element of the scheme.

The experimental work was carried out in the conditions of lecture and practical classes, pedagogical practice of students, in the process of cooperation between student-teacher and scientist in the course and diploma work. In the context of the innovative approach, the parameters for assessing and self-evaluating the development of creative erudition, creative skill and readiness for creative pedagogical activity in students were developed and implemented.

The author's methodology for developing the creative potential of students was composed of: the method of compiling individual student glossaries, the method of individual interpretation of reference schemes for classes in psychology, pedagogy; the method of informational and methodological support for independent research activities of students, independent work of students with printed workbook materials, the method of "oral journals" (preparation and conduct of student pedagogical olympiads, pedagogical mastery contests), the method of creative drama (student improvised theatricalization of pedagogical miniatures)

In order to develop the creative personality of a future specialist, we used such interactive teaching methods as: problematic presentation of material during lectures, a heuristic method for conducting seminars, laboratory and practical classes in psychological and pedagogical disciplines, organizational and activity, problem-oriented, business and role-playing games imitating elements of the future professional activity of students.

Innovative teaching methods should be used in the process of conducting all types of classroom activities with students. For example, a problematic (active) seminar can be held in the form of a theoretical game, when small creative groups organized on the basis of a student group show each other the advantages of their concept, their scientific project. The solution of a series of problematic problems can be submitted to a practical lesson devoted to testing or evaluating a certain theoretical model or technique, and the degree of suitability in these conditions. The main goal is the development of creative skills, the formation of creative potential and professionally-oriented thinking. Systematic learning of subject and social skills in the process of business games contributes to the development of a creatively active, professionally and socially competent personality of a future specialist.

The integrity of the methodology was provided by a system-forming component - a focus on making students readiness for creativity in pedagogical activity, readiness for competent support for the creative development of students. An analysis of the results of the experimental work using a system of non-rigid algorithms of innovative learning made it possible to identify positive dynamics in the development of students' creative potential.

The entire course of the experimental work convincingly showed that with the consistent implementation of the identified conditions in the experimental groups of subjects, there was a positive dynamics in the formation of the creative potential of students.

Results. The experimental work was carried out on the basis of the Historical and Pedagogical Faculty of Akhmet Yassawi International Kazakh-Turkish University. The experiment involved second-year students of "General Pedagogy and Ethnopedagogy" department. Students of the control and experimental groups took part in the experiment. The control group included 42 students, and the experimental group 44 students. The total sample of subjects was 86 students. In the course of the

experimental work, the initial level of development of the students' creative potential was revealed on the basis of determining the degree of formation of its basic criteria: erudition, skill, readiness.

After implementing all the requirements for the experiment in accordance with the student assessment program, the results obtained during the experiment were compared and statistical data were established. Based on the analysis of the results obtained, the advantages and disadvantages of the use of information and communication technologies and the traditional approach in the educational process were identified, and the effectiveness of the integration process of the traditional approach and information and communication technologies in the educational process were established [13-14].

In order to determine the effectiveness of students' creative potential formation on the basis of an innovative approach, the results of students who participated in the experimental group and the results of students who participated in the control group were compared.

To prove the degree of formation of students' creative potential on the basis of an innovative approach, it is necessary to show that the experimental and control samples have significant differences in the chosen indicator - the ability to independently analyze the task, and correlate it with the practice of professional activity. To process the results of the experiment, Student's t-test was used, which allows us to establish similarities and differences between the two empirical distributions.

The mathematical package "Statistica" was used. Using the Descriptive statistics of the Basics Statistics / Tables mode of this tool, the hypothesis of matching samples to normal distribution was tested.

Based on these values, the average score and standard deviation were calculated for each group (table 2).

Table 2- The value for each group of the average score and standard deviation.

Numeric characteristics	1st sample (control group)	2nd sample (experimental group)
N (number of students)	42	44
M (average score)	3,14	3,8
y (standard deviation)	0,61	0,32

For this number of trained df =44+42=83. The obtained empirical value of the t-criterion equal to t = 3,376 exceeds the critical value for c=0,01 (t_{crit} = 2,639), but is less than the critical value for c=0,001(t_{crit}=3,416), therefore, we can conclude that there is a statistically significant difference in arithmetic mean values in two samples and about the advantages of the second (experimental) methodological system for conducting a lesson on the basis of an innovative approach.

The final test conducted with students from the control and experimental groups is aimed at identifying the effectiveness of the formation of students' creative potential based on an innovative approach. The concept of coefficient K is introduced for the relative total assimilation of knowledge by students of one group. The coefficient K of the relative total assimilation of knowledge by students of one group is calculated by the formula

$$K \frac{1 x N_5 + 0{,}9 x N_4 + 0{,}6 x N_3 + 0{,}3 x N_2}{N}$$

where K is the assimilation coefficient, N_5, N_4, N_3, N_2 is the number of students whose answers are rated respectively at “5” - 90-100 points, “4” - 70-90 points, “3” - 50-70 points, and N is the total number of students in the group. The result was evaluated on average by the following relationships: “excellent”, with 0.9_<K_<1; “Good”, at 0.7_<K_<0.9; "Satisfactory", at 0.5_<K_<0.7; "Unsatisfactory", with K<05;

The experimental results were processed and summarized for comparison in table 3.

Table 3 - Generalized comparative results of testing students' knowledge on two tests.

Groups	K	
	Control test	Final test
Control	0.74	0.62
Experimental	0.88	0.93

Conclusions. From the results obtained, reflected in (table 3) and the histogram (figure 1), as well as the results obtained, it can be concluded that the experimental work confirmed the effectiveness of the process of forming students' creative potential on the basis of an innovative approach.

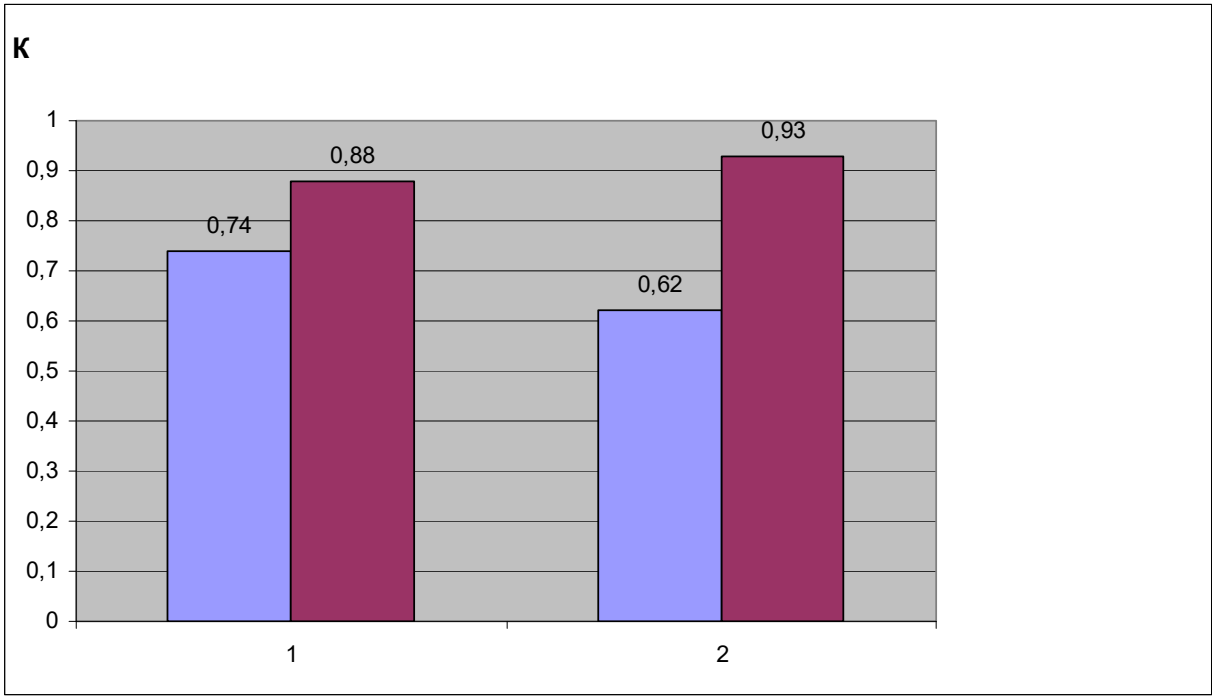

Figure 1 - Generalized comparative results of testing students' knowledge in two tests

Students who actively participated in the group with the use of visualization gave significantly better results in the control and final tests. Statistical results show:

- test results were higher than critical values;
- values were below 0.05;
- the effectiveness of the ratio was higher.

Based on the results obtained, the following conclusions can be drawn:

- the efficiency of meaningful learning the material was much higher among students of the experimental group, where innovative methods and information and communication technologies were used in the classes. Students of the experimental group received high scores in the final tests;
- improvements were observed in students who had difficulty in learning the material using traditional approaches;
- the number of students who learned the material and applied this knowledge in other disciplines increased, which influenced the success of the group as a whole;
- the test results for students of the experimental group were much higher than for students in the control group, which indicates the effectiveness of the use of innovative approaches and information and communication technologies in the formation of students' creative potential;
- the use of an innovative approach and information and communication technologies in the educational process has increased student performance.

The presented visualization of the formation of the creative potential of students at all stages of the experimental work gives grounds to state that, in accordance with the experimental hypothesis, when using the innovative approach and the totality of pedagogical conditions, from stage to stage, there was a positive dynamics in the development of the desired quality in a creatively developing educational space of continuing teacher education systems.

We state the fact that the analysis of experimental work shows that the use of an innovative approach in the process of training is of great importance and contributes to the formation of students' creative potential. Scientific and practical research will be continued by us, and at this stage of our work, we

conclude on the importance and relevance of the formation of students' creative potential on the basis of an innovative approach, modernization of the educational process, updating the content of the training process, which accordingly affect the change in future professional training professionals with a high level of creativity.

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ИННОВАЦИЯЛЫҚ ТӘСІЛДЕР НЕГІЗІНДЕ СТУДЕНТТЕРДІҢ КРЕАТИВТІ ӘЛЕУЕТІН ҚАЛЫПТАСТЫРУ

Аннотация. Негізгі курс Қазақстандық білім беруді реформалау мен жаңғырту және Қазақстан Республикасының Болон үдерісіне қосылуы жағдайында Қожа Ахмет Ясауи атындағы Халықаралық қазақ-түрік университетінде халықаралық деңгейдегі мамандарды даярлау және білім беру сапасын арттыру мақсатында болашақ мамандарды кәсіби маман ретінде әрі жасампаз әлеуетті, кәсіби-шығармашылық құзыретті шығармашыл тұлға ретінде де даярлаудың жаңа педагогикалық негіздерін әзірлеуге бағытталған. Болашақ мамандардың кәсіби даярлығын жетілдірудің резервтерін іздеу оның креативті әлеуеті мен коммуникативті құзыреттілігін қалыптастыру және дамыту жазықтығына қарай ауысады. Жоғары мектептің білім беру ортасын болашақ мамандығы бойынша өз қабілеттерін іске асыра білу факторы және білім алушылардың шығармашылық дамуын құзыретті қолдаудың алғышарттары ретінде студенттердің шығармашылық әлеуеті мен құзыреттілігін қалыптастыруға және дамытуға ықпал ететін бірыңғай шығармашылық тұрғыдан дамытушы білім беру кеңістігіне айналдыру қажеттігі туындайды.

Түйін сөздер: креативтілік, инновация, креативті әлеует, креативті белсенділік.

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ФОРМИРОВАНИЕ КРЕАТИВНОГО ПОТЕНЦИАЛА СТУДЕНТОВ НА ОСНОВЕ ИННОВАЦИОННЫХ ПОДХОДОВ

Аннотация. В условиях реформирования и модернизации казахстанского образования и присоединения Республики Казахстан к Болонскому процессу в Международном казахско-турецком университете им. А.Ясави в целях подготовки специалистов международного уровня и повышения качества образования основной курс направлен на разработку новых педагогических оснований становления будущего специалиста и как профессионала, и как творческой личности, обладающей креативным потенциалом и профессионально-кретивной компетентностью. Поиск резервов совершенствования профессиональной подготовки будущих специалистов смещается в плоскость формирования и развития его кретивного потенциала и коммуникативной компетенции. Возникает необходимость превращения образовательной среды высшей школы в единое творчески развивающее образовательное пространство, способствующее формированию и развитию у студентов креативного потенциала и компетентности как фактора успешной самореализации в профессии и предпосылки компетентной поддержки творческого развития студентов.

Ключевые слова: креативность, инновация, креативный потенциал, креативная активность.

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COGNITIVE STYLE "RIGIDITY-FLEXIBILITY OF COGNITIVE CONTROL" AND THE LEVEL INTELLIGENCE INDICATORS

Abstract. *Aim of the study.* The first goal of the study is to determine the relationship of the cognitive style "rigidity-flexibility of cognitive control" with the level indicators of intelligence. The second goal of this study is to identify possible relationships between "rigidity-flexibility of cognitive control" and the properties of temperament.

Materials and Methods. In this work the authors used the Wechsler Adult Intelligence Scale (WAIS), the Stroop color–word-interference task, the Questionnaire of the formal-dynamic properties of individuality (QFDPI, designed by Rusalov V.M.), and 15 heuristic tasks, 5 tasks each in figurative, logical and figurative-logical form (designed by Kulyutkin Y.N., KrutetskiyV.A., Smallian R.).

Results. The general success of solving heuristic tasks is determined by a complex of factors, which includes indicators of the flexibility of thinking, intelligence and "intellectual" temperamental properties.

The flexibility of thinking is correlated with the level characteristics of intelligence in such a way that high levels of verbal, non-verbal and general intelligence correspond to the flexibility of cognitive control, low values of indicators of intelligence correspond to the pole of rigidity of this cognitive style; intellectually developed subjects are more flexible.

Conclusions. The cognitive style of "rigidity-flexibility of cognitive control" can be considered as a meta-ability. This cognitive style correlates with indicators of temperament and intelligence, and to a certain extent determines the success of solving heuristic tasks.

Keywords: rigidity-flexibility of cognitive control, cognitive style, intelligence, temperament, heuristic tasks.

Introduction. This article is devoted to the study of the nature of the flexibility of creative thinking as the ease of figurative-logical mutual transitions. Vekker's L.M.[1] concept of thinking is fundamental for us, in this concept the specificity of the functioning of the living process of thinking is revealed. He considers the interaction of the figurative and logical components of the thinking process not so much from the genetic as from the functional point of view, and these components are denoted by the concept of "alphabets" of thinking. The psychological specificity of the thought process is created by the obligatory participation and the continuous interaction of both display methods - figurative and logical.

Thus, Vekker L.M. proposed a bipolar model of thinking, whose poles are a figurative and logical "alphabet". The living process of thinking is a continuous interaction of these "alphabets". This interaction or the transfer of information from one "alphabet" of thinking to another is carried out very quickly and so far is not amenable to experimental registration. Therefore, we made the assumption that the dynamics of the process of continuous interaction of the two main components of thinking can be expressed in the cognitive style of "rigidity-flexibility of cognitive control". Indeed, the essence of this style is the characteristics of switching the subject from one information alphabet to another or figurative-logical

translation of information. Style characteristics in our work present the features of the mutual transition of two thinking alphabets.

1. We believe that the flexibility of thinking is an element of mental ability, therefore, on the one hand, it must be connected with the structure and level of intelligence, and, on the other hand, it must be determined by the makings of the individual. We stand on the position of the anthropological approach of B.G. Ananiev, i.e. we see in thinking the manifestation of the abilities of the subject as a whole, we are looking for the determinants of thinking in the structural characteristics of the individual. We believe that flexibility is organically integrated into the mechanisms of cognition by the personality of the surrounding world. Therefore, the flexibility of thinking as an intellectual process is necessarily associated with the structure of intelligence.

2. At the individual level, we take some properties of temperament as the alleged determinants of the flexibility of thinking that characterize its dynamic side. Since the flexibility of thinking is an individual stylistic characteristic, and the carrier of the primary stylistic characteristics is temperament, therefore, flexibility must be temperamental. If we consider the flexibility of thinking as a special kind of private ability, then the question should be raised about the inborn qualities on which it is based in its development.

In the works of V.M. Rusalov [2-4] the relationship between the basic properties of the nervous system, temperament and abilities are indicated in a "chain of inborn qualities": "the inborn qualities of the first level (the properties of the nervous system)" - "the inborn qualities of a second-level (temperament)" - "abilities" (including creative ones).Following V.M. Rusalov, our scheme is as follows: "mobility of the nervous system"[this is discussed by us in article 5] - "“intellectual” temperamental properties” - "flexibility of thinking". One of such special forms of flexibility is flexibility as the ability to quickly and adequately switch from one to another “alphabet” of thinking, presented in a cognitive style - “rigidity-flexibility of cognitive control”. Asserting that the cognitive style can be considered as an ability, we rely on the work of M.A. Kholodnaya, who believes that “cognitive styles are abilities if the latter are interpreted as a subjective tool for organizing intellectual activity” [6, p. 68]. Based on the concept of M.A. Kholodnaya [7], we consider the cognitive style, representing the flexibility of thinking, as an ability.

So, in our work, the flexibility of thinking as an ability is considered in connection with the structure of intelligence and temperamental properties.

Based on the foregoing, we assume that:

I. The flexibility of thinking is correlated with the level characteristics of intelligence.

II. Flexibility is associated with the properties of temperament.

III. The overall success of solving problems is determined by a set of factors, including indicators of the flexibility of thinking, intelligence and temperamental properties.

Independent variables are flexibility of thinking, level characteristics of intelligence, and temperamental properties.

The dependent variable is the success of solving creative (heuristic) tasks.

Methods. Sample: The sample comprised students from Al-Farabi Kazakh National University (N=92 (59 females and 33 male), average age = 23.5 years).

Test procedures:

1. The Wechsler D. test [8] for determining the individual level of development of general, verbal and non-verbal intelligences;
2. The Stroop color–word-interference task [7];

This test was developed for the diagnosis of cognitive style rigid-flexible cognitive control. "This cognitive style characterizes the degree of subjective difficulties in changing the different ways of processing information in a situation of cognitive conflict. Rigid control indicates difficulties in the transition from verbal functions in sensory-perceptual due to the low degree of automation, while flexible indicates the relative ease of this transition due to the high degree of automation" [7, p.56].

Three cards are sequentially imposed to the subject. The first card contains words for names of four colors (the subject is required to read the words as soon as possible) (W-Card). The second card contains multicolored stars of the same colors (the subject must name the color of the stars as quickly as possible) (C-Card). The third card contains color names that are written in different colors, and the name does not

match the color of the ink. For example, the word "red" written in yellow ink (the subject must name the color of the written words' ink as quickly as possible) (CW-card).

The main index (i.e. indicator of interference) is the time difference in performing CW-card (color of the word) and C-card (color). The greater the cognitive control rigidity, the greater the interference. Conversely, low interference indicators suggest the flexibility of cognitive control.

On the Stroop test, we calculate an additional indicator of "Verbal", proposed by Broverman D. This is a quotient between the performance time of the 2nd card (C-Card) and the 1st card (W-Card). High values of this indicator are evidence of the predominance of verbal (semantic-conceptual) methods of processing information; while low values reflect the predominance of sensory-perceptual (perceptual-motor) methods of processing information [7].

The Stroop Test is commonly employed in experimental psychological studies of emotions, personality and creativity [9-15]. Moreover, activation of the left anterior division of the cerebral cortex was experimentally demonstrated during the performance of the Stroop test [16-20].These findings suggest the possibility of using the Stroop test to diagnose mental flexibility.

3. The Questionnaire of the formal-dynamic properties of individuality(QFDPI) by Rusalov V.M. [21];

The questionnaire contains 150 points and allowsto measure 4 basic formal-dynamic properties of personality, such as

1) ergicity - "latitude-narrowness" of afferent synthesis, or the degree of tension of the interaction of the organism with the environment;

2) plasticity - the degree of ease (difficulty) of switching from one behavior program to another;

3) speed - the degree of speed of execution of a particular behavior program;

4) emotionality.

For each formal-dynamic property, it is proposed to distinguish three aspects: psychomotor, intellectual, and communicative. Consequently, as a result of the questionnaire, 12 relatively independent latent variable properties are distinguished that have varying degrees of individual severity or intensity. Each property can have values from 12 to 48 points.

For our work, of particular importance are the manifestations of the four main properties of temperament (ergicity, plasticity, speed and emotionality) mainly in the "intellectual" sphere. Since it is logical to assume that they are the most "related" to the flexibility of thinking.

4. To diagnose the success of solving problems, we compiled a battery of 15 heuristic tasks that were presented to the subjects in 1) figurative, 2) logical and 3) figurative-logical form (designed by Kulyutkin Y.N., Krutetskiy V.A., Smallian R.). The overall success rate for solving all problems was calculated [22-26].

Results. To check the existence of interconnections of the flexibility of thinking with the level characteristics of the intellect, temperamental properties and the success of solving creative (heuristic) tasks, we performed a Pearson correlation analysis using the SPSS 11.5 program. The results are shown in table 1.

Table 1 - Correlation analysis of the relationship of indicators of intelligence, flexibility of thinking, "intellectual" temperamental properties and the success of solving heuristic tasks

	Nonverbal IQ	General IQ	Gradient of IQ	Flexibility	Logical tasks	Figurative tasks	Figurative-logical tasks	Overall success rate	Temperamental ergicity	Temperamental plasticity	Temperamental speed	Temperamental emotionality
Verbal IQ	,446	,917	,684	-,269	,566	,643	,701	,730	,275	,348	,379	-,228
Nonverbal IQ	1	,756	-,347	-,252	,517	,604	,578	,633		,303	,303	-,261
General IQ		1	,344	-,308	,632	,734	,753	,803	,267	,387	,412	-,280
Gradient of IQ			1		,294		,264	,250				
Flexibility				1	-,294	-,366	-,260	-,339			-,231	
Overall success rate								1	,205	,342	,256	
All correlations are significant at the 0.05 and 0.01 levels.												

The following parameters were correlated: indicators of verbal, non-verbal, general intelligence (the Wechsler D. test); an indicator of the flexibility of thinking and an indicator of the dominant way of processing information (Stroop test); indicators of "intellectual" ergicity, plasticity, speed, emotionality and an index of "intellectual" activity, summarizing all of the listed "intellectual" temperamental properties (QFDPI by Rusalov V.M.); the success of solving figurative, logical and figurative-logical tasks, and an indicator of the overall success rate. We used 5 tasks with figurative, 5 tasks with logical and 5 tasks with figurative-logical representation of conditions. The overall success rate is the sum of the points for solving all types of heuristic tasks.

I) Significant positive correlations were found between the flexibility of thinking and level indicators of intelligence (verbal, non-verbal and general). It should be clarified that the minus sign in front of the indicator of rigidity/flexibility of cognitive control indicates precisely the pole of flexibility of this cognitive style. The high rates of verbal, non-verbal and general intelligence correspond to the flexibility of cognitive control, the low values of the indicators of intelligence correspond to the pole of rigidity of this cognitive style. Thus, intellectually more advanced subjects are more flexible.

II) At the level of the entire sample, a correlation between the indicator of the flexibility of thinking and the "intellectual" temperamental speed was revealed. High speed of mental processes is positively associated with flexibility, and the slowdown in operations is associated with rigidity.

III) According to the results of the correlation analysis, the overall success of solving problems, as we expected, is determined by a complex of factors, including intelligence indicators, flexibility of thinking, and "intellectual" temperamental properties. All correlation coefficients of overall success with the indicated characteristics are statistically significant at the level of $p < 0.01$.

I. To clarify the **relationship of the flexibility of thinking with level indicators of intelligence**, we sequentially performed a Pearson correlation analysis among 3 subgroups of subjects with low, medium, and high indicators of general intelligence. We turn to the description and interpretation of the data obtained as a result of this correlation analysis.

The indicators of the Stroop test, the overall success of solving tasks and the "intellectual" temperamental properties were correlated. The results of the correlation analysis of data according to the Pearson method using the SPSS 11.5 program of three subgroups of subjects with low, medium, and high levels of general intelligence are presented in table 2.

Table 2 - Correlation analysis of data from subgroups of subjects with low, medium and high levels of general intelligence

		Flexibility	Overallsuccessrate	Indicatorof "Verbal"
Low level of general intelligence (n=31)	Verbal IQ	-0,080	0,102	-0,183
	Nonverbal IQ	-0,008	**0,361***	0,040
	General IQ	-0,073	**0,367***	-0,134
	Gradient of IQ	-0,042	-0,186	-0,136
	Temperamental Ergicity	0,126	-0,186	-0,255
	Temperamentalplasticity	-0,059	-0,020	0,052
	TemperamentalSpeed	-0,014	-0,286	0,164
	TemperamentalEmotionality	**-0,388***	**0,377***	0,097
Medium level of general intelligence(n=38)	Verbal IQ	0,198	**0,408***	0,165
	Nonverbal IQ	-0,212	0,080	**-0,357***
	General IQ	0,002	**0,479****	-0,227
	Gradient of IQ	0,230	0,186	0,292
	Temperamental Ergicity	0,097	0,240	-0,046
	Temperamentalplasticity	0,176	0,121	**-0,377***
	TemperamentalSpeed	-0,257	0,052	**-0,422****
	TemperamentalEmotionality	0,186	0,012	**0,454****
High level of general intelligence (n=23)	Verbal IQ	0,017	0,137	0,040
	Nonverbal IQ	0,075	-0,063	0,313
	General IQ	0,028	0,187	0,183
	Gradient of IQ	-0,026	0,122	-0,127
	Temperamental Ergicity	0,064	0,068	0,270
	Temperamentalplasticity	0,049	0,163	0,151
	TemperamentalSpeed	-0,053	-0,239	-0,126
	TemperamentalEmotionality	-0,080	0,081	-0,333
* - correlations are significant at the level of 0.05; ** - correlations are significant at the level of 0.01				

1) Based on the data of the correlation analysis of the subgroup of subjects with low general intelligence (31 people), it follows that if the level of general intelligence is **low** (on average 105 points), then the overall success of solving tasks is associated with indicators of non-verbal and general intelligence, as well as "intellectual" temperamental emotionality. No interconnections of flexibility with level indicators of intelligence were found. Correlation between flexibility and temperamental emotionality was found.

2) The data of the correlation analysis of a subgroup of subjects with average general intelligence (38 subjects) indicate that, with an **average level of general intelligence** (115 points), there are significant relationships between the overall success of solving problems with indicators of verbal and general intelligence. No connection was found between success in solving tasks with indicators of the gradient of intelligence, flexibility of thinking, and "intellectual" temperamental properties. No interconnections of flexibility with level indicators of intelligence were found.

However, negative correlations between the Indicator of "Verbal" (obtained by the Stroop test) and the nonverbal intelligence index and the "intellectual" temperamental properties of plasticity and speed were found. A positive correlation of the Indicator of "Verbal" with temperamental emotionality was found.

3) A correlation analysis of a subgroup of subjects (23 subjects) with **high level of general intelligence** (124 points on average) also indicates that the overall success of solving tasks has no significant connections with indicators of intelligence, flexibility, and "intellectual" temperamental properties. No interconnections of flexibility with level indicators of intelligence were found.

II. At the level of the entire sample, a correlation between the indicator of the flexibility of thinking and the "intellectual" temperamental speed was revealed.

A connection between flexibility and temperamental emotionality is found with a low level of intelligence. The correlations of the Indicator of "Verbal" with temperamental plasticity, speed and emotionality were found with an average level of intelligence.

III. The interconnections of the flexibility of thinking, intelligence indicators, and "intellectual" temperamental properties for **3 types of general (total) success in solving heuristic tasks**: low (15-25 points), medium (25-35 points) and high (35-45 points) were identified.

19 subjects were in the subgroup with low overall success, 44 subjects were in the subgroup with medium overall success, and 29 subjects were in the subgroup with high overall success. Correlation analysis was carried out according to the Spearman method using the SPSS 11.5 program. The results of the analysis are shown in table 3.

Table 3 - Correlation analysis of the relationship of the flexibility of thinking, indicators of intelligence and "intellectual" temperamental properties with 3 types of overall success in solving heuristic tasks

	Lowoverallsuccess			Mediumoverallsuccess				Highoverallsuccess		
	Figurativetasks	Figurative-logicaltasks	Overallsuccessrate	Logicaltasks	Figurativetasks	Figurative-logicaltasks	Overallsuccessrate	Logicaltasks	Figurativetasks	Overallsuccessrate
Verbal IQ						,332	,362	,514	,405	,516
Nonverbal IQ					,389	,391	,427			
General IQ						,439	,454	,405	,392	,531
Flexibility								-,405		
Indicatorof "Verbal"				,365			,361			
Temperamental ergicity		-,540	-,507							
Temperamentalplasticity	,531									
Temperamentalemotionality		,602	,645							
All correlations are significant at the 0.05 and 0.01 levels										

1) From table 5 it follows that the low overall success in solving heuristic tasks is associated exclusively with indicators of the temperamental properties of ergicity and emotionality in the intellectual

sphere. Moreover, the connection between overall success and the indicator of temperamental "intellectual" ergicity is negative.

2) The medium overall success in solving heuristic tasks is associated with all indicators of intelligence and an Indicator of "Verbal" (high values of this indicator are evidence of the predominance of verbal (semantic-conceptual) methods of processing information).

3) The high overall success in solving heuristic tasks is associated with parameters of verbal and general intelligence. Undoubtedly, intellectual indicators are most important for achieving a high level of success in solving tasks. At the same time, a correlation was found between the success of solving logical tasks and the flexibility of cognitive control.

Discussion. The experimental study was aimed at solving the question of the interaction of the flexibility of thinking (diagnosed by the Stroop test) with the level characteristics of intelligence (D. Wechsler test), temperamental properties (QFDPI, designed by Rusalov V.M.) and the success of solving creative (heuristic) tasks.

We consider it necessary to briefly consider the whole variety of results obtained in this study in order to draw the main conclusions on their basis. In order to maintain the structure in the presentation of conclusions, we will move in accordance with the 3 hypotheses put forward.

I. Correlation analysis of the data of the entire sample made it possible to detect significant connections between the flexibility of thinking and level indicators of intelligence (verbal, non-verbal, and general intelligence). These data are consistent with psychological studies that show that age-adjusted scores for the Stroop Color-Word Test were found to be more strongly associated with Mayo age-adjusted WAIS-R Full Scale IQ scores[27]; executive functions (The Stroop Color and Word Test) are significantly related to intelligence [28]; IQ correlates with cognitive control abilities, such as interference suppression, as measured with experimental tasks like the Stroop task; people with higher IQs also resolve the interference Stroop tasks better [29].

To identify the links between the flexibility of thinking and level indicators of intelligence, a correlation analysis of 3 subgroups of subjects with low, medium and high levels of general intelligence was carried out.

1) With a low level of general intelligence, the success of the subject in solving heuristic tasks is ensured by non-verbal and general intelligence, as well as "strong emotional feelings about the discrepancy between the expected and actual result of mental work, strong anxiety about work related to mental stress" [21, p. 26] (characteristics of high values of temperamental emotionality in the intellectual sphere according to V. Rusalov).

2) With an average level of general intelligence, the success of the subject in solving heuristic tasks is ensured by verbal and general intelligence. The most interesting negative correlations we have obtained here are the Indicator of "Verbal" with nonverbal intelligence, temperamental plasticity, and speed; and a positive correlation of the Indicator of "Verbal" with temperamental emotionality.

According to Kholodnaya M.A., the lower the Indicator of "Verbal", the more coordinated (integrated) are the main "languages" of information processing (figurative and verbal) [7, p. 100]. Therefore, high values of nonverbal intelligence and the temperamental properties of plasticity and speed in the intellectual sphere are accompanied by greater integration of the main "languages" of information processing. A positive correlation between the Indicator of "Verbal" and the indicator of "intellectual" temperamental emotionality means that "strong emotional experience about the discrepancy between the expected and actual result of mental work, strong anxiety about work related to mental stress" [21, p. 26] (characteristics high values of emotionality according to V. Rusalov) is accompanied by the disintegration of the main "languages" of information processing. The regularity found is in good agreement with the Yerks-Dodson law. With an increase in the temperamental property of emotionality in the intellectual sphere (similar to an increase in motivation), the integration of "languages" of information processing decreases.

3) With a high level of general intelligence, the success of the subject in solving heuristic tasks does not have significant connections with indicators of intelligence, flexibility and "intellectual" temperamental properties. In this case, we can assume that in conditions of a high level of general intelligence, indicators of flexibility and "intellectual" temperamental properties lose their significance.

That is, the correlation analysis of subgroups of subjects with different levels of general intelligence (low, medium, high) did not reveal any definite correlations of the indicator of flexibility of thinking with the level characteristics of general intelligence. This means that the hypothesis that the flexibility of thinking is correlated with the level characteristics of intelligence does not find its experimental confirmation in these subgroups. However, when analyzing the data of the entire sample (table 1), connections between the flexibility of thinking and indicators of general intelligence were found. This can be explained by the fact that a decrease in the units of analysis in this case led to a masking of the existing relationships observed between the flexibility of thinking and level indicators of intelligence when analyzing the data of the entire sample. Also, this may indicate that the connections between the flexibility of thinking and the level characteristics of intelligence are not constant and unambiguous, but rather situational, manifesting themselves in certain conditions (for example, at the level of the entire sample and, as will be seen later, in conditions of a significant intelligence gradient).

II. Based on all the obtained experimental data, the following correlations between the indicators of temperament properties and the cognitive style "rigid-flexible cognitive control" were identified:

1) At the level of the entire sample, a correlation between the indicator of the flexibility of thinking and the "intellectual" temperamental speed was revealed.

2) A connection between flexibility and temperamental emotionality is found with a low level of intelligence. The correlations of the Indicator of "Verbal" with temperamental plasticity, speed and emotionality were found with an average level of intelligence.

III. In our study, it was confirmed that the overall success of solving problems is determined by a set of factors, including indicators of the flexibility of thinking, intelligence and temperamental properties. This is consistent with the data of other authors that divergent thinking is associated with higher attentional flexibility [14]; participants scoring high on test for creative thinking showed better indexes of cognitive control than participants with lower scores [15]; creativity was found to be correlated with inhibition defined either by performance in the Stroop task [30]; cognitive flexibility predicted academic achievement(reading, mathematical and writing skills) [31].

Analysis of the data in table 3 allows us to do the following analysis:

1) Low overall success in solving problems is associated with "a low level of intellectual capabilities, unwillingness of mental stress, low involvement in the process associated with mental activity" (characteristics of low values of ergicity properties in the intellectual sphere according to V. Rusalov [21, p.24]), on the one hand, and "strong emotional feelings about the discrepancy between the expected and actual result of mental work, strong anxiety about work related to mental stress" (characteristics of high values of the properties of emotionality in the intellectual sphere according to V. Rusalov [21, p.26]) on the other. Apparently, we can make the assumption that the low level of success in solving problems is provided mainly by "intellectual" temperamental properties.

2) The average level of success in solving heuristic problems is achieved by increasing indicators of verbal, non-verbal and general intelligence, on the one hand, and a greater bias in the Indicator of "Verbal" in the direction of verbal (semantic-conceptual) methods of processing information, on the other.

3) High rates of overall success in solving heuristic problems are associated exclusively with the parameters of verbal and general intelligence. Undoubtedly, intellectual indicators are most important for achieving a high level of success in solving problems.

The biases we are tracking are interesting: low success in solving problems is associated with "intellectual" temperamental properties; average success in solving problems is associated with indicators of intelligence and flexibility of thinking (Indicator of "Verbal"); and high success in solving problems is associated exclusively with indicators of intelligence. The fact found, apparently, indicates that different levels of success are provided by different structural elements of human personality, which is completely logical.

Conclusions and future research. Based on the analysis of the above results, we came to the following conclusions:

1. The flexibility of thinking is correlated with the level characteristics of intelligence in such a way that high levels of verbal, non-verbal and general intelligence correspond to the flexibility of cognitive control, low values of indicators of intelligence correspond to the pole of rigidity of this cognitive style. Consequently, intellectually developed subjects are more flexible.

2. The connections of the flexibility of cognitive control with indicators of the properties of temperament in the "intellectual" sphere are established.

3. The overall success of solving heuristic problems is determined by a set of factors, including indicators of the flexibility of thinking, intelligence and “intellectual” temperamental properties.

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«ТАНЫМДЫҚ БАҚЫЛАУДЫҢ РИГИДТІЛІГІ-ИКЕМДІЛІГІНІҢ» КОГНИТИВТІК СТИЛІ ЖӘНЕ ИНТЕЛЛЕКТІНІҢ ДЕҢГЕЙЛІК КӨРСЕТКІШТЕРІ

Аннотация. Зерттеу мақсаты. Зерттеудің бірінші мақсаты «танымдық бақылаудың ригидтілігі-икемділігінің» когнитивті стилі мен интеллектінің деңгейлік көрсеткіштерімен өзара байланысын анықтауға қатысты болып келеді.

Зерттеудің екінші мақсаты «танымдық бақылаудың ригидтілігі мен икемділігі» және темперамент қасиеттерінің арасындағы ықтимал өзара қатынастарды анықтау негізінде тұжырымдалды.

Әдістер. Зерттеу жұмысында авторлар ересектерге арналған Векслердің интеллект тестін (WAIS), Струптың «Сөздік-түстер интерференциясы» тестін, жеке адамның формальды-динамикалық қасиеттерін анықтауға арналған сауалнама (QFDPI, В.М. Русалов әзірлеген) және 15 эвристикалық тапсырма пайдаланды: қатысушыларға әрқайсысы 5 тапсырмадан тұратын бейнелік, логикалық және мәнерлілогикалық нысандағы тапсырма берілді (Кулюткин Ю.Н., Крутецкий В.А., Смаллиан Р.).

Нәтижелер. Эвристикалық мәселелерді шешудің жалпы жетістігі факторлар кешені негізінде анықталады, оған ойлау икемділігі, интеллект және «интеллектуалды» темпераменттік қасиеттер кіреді.

Ойлау икемділігі интеллектінің деңгейлік сипаттамаларына сәйкес келеді, яғни вербалды, бейвербальды және жалпы интеллектінің жоғары деңгейлері когнитивті бақылау икемділігіне, ал интеллектінің төменгі көрсеткіштері осы когнитивтік стильдің ригидтілік полюсіне сәйкес келеді, сондықтан интеллекті жақсы дамыған адамдар аса икемді болып келеді.

Қорытынды. Когнитивті стильдің «танымдық бақылаудың ригидтілігі-икемділігін» мета-қабілет ретінде қарастыруға болады. Бұл когнитивті стиль темперамент пен интеллект көрсеткіштеріне байланысты және белгілі бір деңгейде эвристикалық тапсырмаларды шешудің жетістігін анықтайды.

Түйін сөздер: танымдық бақылаудың ригидтілігі-икемділігі, когнитивтік стиль, интеллект, темперамент, эвристикалық тапсырмалар

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КОГНИТИВНЫЙ СТИЛЬ «РИГИДНОСТЬ-ГИБКОСТЬ ПОЗНАВАТЕЛЬНОГО КОНТРОЛЯ» И УРОВНЕВЫЕ ПОКАЗАТЕЛИ ИНТЕЛЛЕКТА

Аннотация. *Цель исследования.* Первая цель исследования заключается в определении взаимосвязей когнитивного стиля «ригидность-гибкость познавательного контроля» с уровневыми показателями интеллекта.

Вторая цель данного исследования заключается в выявлении возможных взаимоотношений между «ригидностью-гибкостью познавательного контроля» и свойствами темперамента.

Методы. В этой работе авторы использовали тест интеллекта Векслера для взрослых (WAIS), тест «Словесно-цветовой интерференции» Струпа, опросник формально-динамических свойств индивидуальности (QFDPI, разработанный Русаловым В.М.) и 15 эвристических заданий: по 5 заданий, предоставленных испытуемым в образной, логической и образно-логической форме (Кулюткин Ю.Н., Крутецкий В.А., Смаллиан Р.).

Результаты. Общая успешность решения эвристических задач определяется комплексом факторов, который включает показатели гибкости мышления, интеллекта и «интеллектуальных» темпераментных свойств.

Гибкость мышления соотносится с уровневыми характеристиками интеллекта таким образом, что высокие уровни вербального, невербального и общего интеллекта соответствуют гибкости когнитивного контроля, низкие значения показателей интеллекта соответствуют полюсу ригидности этого познавательного стиля; интеллектуально развитые люди более гибки.

Заключение. Когнитивный стиль «ригидность-гибкость познавательного контроля» можно рассматривать как мета-способность. Этот когнитивный стиль соотносится с показателями темперамента и интеллекта и в определенной степени определяет успешность решения эвристических задач.

Ключевые слова: ригидность-гибкость познавательного контроля, когнитивный стиль, интеллект, темперамент, эвристические задачи.

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CONTRIBUTION OF K.K. SAMRIN TO THE FORMATION OF THE KHAKASS WRITING SYSTEM (in 1920-1930-s)

Abstract. Russia, that was formed as a multi-ethnic and multilingual state, faced urgent question of the spiritual revival of the peoples, who were involved in the process of rapid assimilation at the beginning of the XXI century. National minorities and indigenous peoples have lost their main features of their ethnicity. Among them is disappearance of the native language. The national revival of any nation is inconceivable without the functioning of its mother language. Writing is the main means of fixing, preserving, development of the language and the most significant form of its social functioning. In this regard, it becomes relevant to address the origins of the Soviet writing of the peoples of Siberia. The article deals with the complex process of formation of writing system in Republic of Khakassia. The novelty of the research can be seen in attempts to realize the results of alphabetization through the prism of the biography of one of the participants in the creation of the Khakass script in the 1920s and 1930s. In this regard, K. K. Samrin's contribution to the development of the Khakass language, creation of the alphabet and national literature is revealed. The results of the research can be used in planning and forecasting of language development of minority languages.

Keywords: alphabet, romanization, language policy, language reform, national language.

In modern social and cultural conditions the Khakass language has become a minority language. According to UNESCO estimates, the Khakass language is regarded as endangered. Nowadays various measures are being taken by the government and the public to develop and preserve the language of the titular ethnic group in the Republic of Khakassia[2]. 2020 has declared as the year of the Khakass language to promote, support and develop it as an integral part of the cultural and spiritual heritage of the Khakass people. In this context, the problem of the history of Khakass writing becomes particularly relevant.

During the socio-political development of Khakassia [1] in the 1920s and 1930s, the question of written language became important, because “the language was the most important tool for forming the ethnoidentity of the peoples of the USSR, served as a marker for admission to the privileges of the titular ethnic group and securing its administrative and territorial status” [2]. At the same time, writing was “one of the types of political symbols as an independent element of the implementation of power, a strong means of psychological influence, an effective tool in the struggle for the establishment and strengthening of the power of the Bolsheviks” [3]. Representatives of the intelligentsia took an active part in the development of the Khakass written language, one of whom was Konstantin Samrin (1895-1938).

According to the established tradition in Soviet historiography, the position of the national intelligentsia was regarded as anti-Soviet, aimed at undermining and sabotaging the activities of the Soviet government. The romanization of alphabets, which was implemented in the 1920s and 1930s by representatives of a small national intelligentsia, also received a biased and distorted interpretation. Soviet scientists were denied the opportunity to make an objective analysis of the reform writing system of the Soviet peoples and summarize its experience. At present, it is considered in the neighboring countries, where the romanization of the alphabets is implemented [4].

The most recent publications note that the intelligentsia’s directions of activity have been well

[2]In 1923, Khakassia was separated from the Minusinsky and Achinsky uyezds of the Yenisei province into an independent uyezd, which was transformed into a district in 1925, and into an Autonomous region in 1930 (at first it was a part of the West Siberian region, and from 1934 it was a part of the Krasnoyarsk territory). In 1993, Khakassia was granted the status of a republic.

studied, but its life path is unexplored [5]. The above-mentioned facts apply to the personality of Samrin K.K. His name was mentioned in the works of all Soviet authors who were engaged in the history of the Khakass language and its alphabetization [6].

The emergence of a number of works based on new research approaches in the Khakass historiography gave the opportunity to representatives of the national intelligentsia to develop the problem of perception of revolutionary events in Russia. They provided a fresh look at the participation of the national intelligentsia in the transformation processes.

Formation of new approaches in modern historiography initiated new researching of significant aspects of the political activity of the national intelligentsia in that period. That fact allowed scientists to create complete reconstruction of the perception of the Khakass intelligentsia of new processes concerning the modernization in Russia.

The work of K. M. Patachakov, performed in the Khakass language, was the first issue dedicated to the life of Samrin K.K. and other public and political figures of Khakassia [7]. In the early 2000s the name of Konstantin Konstantinovich was included in the list of Orientalists-victims of political terror in the bibliographic dictionary [8]. Konstantin Konstantinovich Samrin was born on March 12, 1895 in the village of Askiz. The financial situation of the family allowed him to finish a 5-year school in Askiz village.

In the 1910-1916 he graduated from Krasnoyarsk Theological Seminary and took two-year teaching courses [9]. After his studies Samrin K.K. returned to his homeland. During 1916-1925 he worked as a teacher in Ust-Sosinskaya, and then in Ust-Tashtypskaya and Pokoyakov schools. During the election campaign (September 1923 – October 1924), he was elected to Pokoyakov village Council [10]. Along with teaching children and adults to read and write, he conducted educational work, delivered lectures and reports explaining the main concept of the national policy of the Soviet government. Konstantin Konstantinovich took an active part in the work of region and teacher's conferences.

In March 1925 K.K. Samrin was considered to be a competent person in education and national policy and appointed to the post of inspector of the Education Department of the Khakass Regional Executive Committee. During his work in a responsible position Konstantin Konstantinovich showed his deep knowledge, provided all possible support to teachers.

In may, 1925 Samrin K.K. was appointed to the position of Head of Education Department. In 1925-1926 he was one of the initiators of creating teachers courses at the Tashtyp school to solve personnel problems in the field of education. The problem was solved by sending young people to study in other towns and cities.

Filling in the Employment Application Form in 1926, Samrin K.K. noted that he could be useful “in the field of public education and Khakass writing” [11]. Before working in the Regional Education Public Department he was a member of the Commission for the creation of Khakass writing under the chairmanship of G. I. Itygin. The Commission was founded by the decision of the Yenisei provincial Department of public education through which the Khakass alphabet, based on the Russian graphics, was composed by the beginning of November 1924.

However, it was found out that the Khakass alphabet, created in 1924, was not perfect. A peculiarity of the alphabet was the lack of the letters to indicate specific sounds of the Khakass language. Further discussion of the alphabet took place in 1925 in Novosibirsk at a meeting of representatives from the oyrot, Khakass and Shor peoples. The representatives focused their attention on the unification of the alphabets of the three named peoples. The initiative came from the Altaians, who offered their own alphabet as a common one for the three peoples. The Khakass delegation called for improving its alphabet of 35 letters, and over the next three years, it was supplemented by three letters. In 1925, the Khakass alphabet based on Russian graphics was approved by the Commission in Moscow.

The appearance of the alphabet and written language initiated the producing of the first textbooks in the Khakass language that set new tasks for the Commission connected to the development of writing. Its functions were translation work, fix the literary language in literature and political publications. The expansion of functions of the Commission caused renaming it into Khakass Translation Commission.

In November 1925 the statement of the Khakass District Executive Committee reported the updated Commission including Samrin K.K., Kazanakov A.T., Katanov N.G. and others [12]. In 1925 the first manuscripts of the textbooks were submitted to the Central Book Publishing House of the USSR (CIZ). The next year, the abc-book “Khakastyn in pastap ugrener Pichi” (the First educational book of the

Khakass), created by K. S. Todyshev, the textbook for reading by A. T. Kazanakov "Khakastarnyn shkolazy", arithmetic book by K. K. Samrin were published [13].

The conditions for work of the Commission under the leadership of Samrin K.K. were extremely difficult. First, none of the members of the Commission had experience in research work, as well as none of them had created alphabets and textbooks before. Secondly, there was no educational and methodological basis for the development of the Commission's work. The Commission's statement reported that there were only “15 books in Khakass and Russian languages” and it included some information about creating Khakass-Russian dictionary contained “...more than 1,600 selected words” [14]. In 1927-1928 members of the translation Commission took an active part in publishing of new textbooks, collections of original poems and stories translated from Russian, the first insert to the local Minusinsk newspaper “Power of labor” in Khakass language [15].

Samarin K.K. became a member of Publishing Board established in the Department of agitation and propaganda headed by G.P. Bytotov. Its functions were checking the quality of the Translation Commission for ideological consistency [16]. The Bureau of the Regional Party Committee, that regularly discussed the work of the Board, made suggestions for improving the quality of its work.

In the second half of the 1920s, there was a tendency in the USSR to create a unified writing system that could fulfill ”the role of the basis, cementing fundamental principles of a new type of society.” National languages were to become the basis for “the creation and development of national, socialist cultures” [17].

There were a lot of variants, but preference was given to romanization of alphabets as a modernization of writing, that, according to the authorities, was “... a logical step on the path that Russia had already entered, having adopted a new calendar style and a metric system of weights and measures” [18]. In addition, romanization “corresponded to the nature of the political doctrine of the Soviet state and the Communist party, controlling all spheres of public life” [19]. The process of transition to the Latin graphics touched the languages that had at that time a well-thought and scientifically based the Arabic alphabet, in which various textbooks on the elimination of illiteracy were published [20]. For those peoples who had not written language, the process of romanization was acting like universal national development and the fight against illiteracy.

The transition to Latin in the Khakass district was started in 1928. In December 1928, the Bureau of Khakas regional Committee of the Party approved the information about the work of I All-Union Turkological Congress. Another issue considered by the Bureau was transition of Khakass writing system to the New Turkic Alphabet [21]. K. K. Samrin, as one of the experienced drafters previous alphabet, was included in the Regional Committee of the New Turkic Alphabet. The Commission for the creation of the Khakass writing system was transformed into the Publishing Board that was instructed to publish literary works in new romanized alphabet. In 1929, the first textbook in the romanized alphabet “Naa col” was published under the authorship of K. Samrin, A. Topanov, and T. Baltyzhakov.

However, the romanization of the Khakas alphabet did not bring desired results. In this regard the reasons for the failure of romanization began to find out. One of the most important reasons were great financial difficulties. According to the report, the funds from the local budget were sent for the salaries of employees, and “the task of restructuring work of the new alphabet could not advance without special expenses for these activities” [22]. Meanwhile, peer review required additional funds, as the published literature had to be checked “not only from the content side, but also in the spirit of the accepted principles of spelling and terminology”. In addition, the majority of Khakass interpreters and authors did not even have an education for seven years of high school. Such issues remained unresolved, since the party and state bodies of Khakassia have differently identified the main reason for the failure of romanization. In their opinion, the main reason was the penetration of nationalist elements in the Publishing Board and in the process of romanization.

Archival materials indicate that the persecution of people as class enemies was organized in the region. They were considered to be bourgeois counter-revolutionary nationalists, “belonged to the organization Union of Siberian Turks” and people who obstructed the process of romanization. In 1934 K. K. Samrin was strictly criticized as one of the authors of the “Alphabet of October”. This pamphlet was declared “clearly counter-revolutionary”, because the new government was allegedly depicted as an exploitative power in its poem “Kalinin”, where workers were pictured oppressed and wept by blood tears from oppression” [23].

K.K. Samrin's harassment was also supported in the media. The archive preserved the letter addressed to the newspaper “Soviet Siberia” dated July 1, 1934. The author of the letter made his signature illegible. The letter was accompanied by outright insults to Konstantin Konstantinovich: “One thing surprises me: there are knowledgeable people in Khakassia. There are people with brains, but textbooks are written by brainless and illiterate people, for example, Samrin....” [24]. The Department of Culture and Propaganda of Leninism of the Khakass Regional Committee of the CPSU (b) checked ideological and political consistency of published and translated literature in the Khakass language. The result of the Commission of the Department of Culture and Propaganda of Leninism of the CPSU (b) was the seizure of the literature published by the arrested authors.

Meanwhile, in 1934 the trial in the case of the “Union of Siberian Turks” Samrin K.K. and other defendants accused of anti-Soviet propaganda and illegal state activities, received an acquittal. The authors of the arrested textbooks returned to work on the implementation of the New Turkic Alphabet. However, the situation with romanization in Khakassia continued to deteriorate.

In 1935 the report of the Khakass regional Committee of the New Turkic Alphabet noted: “Russian-literate Khakas people still did not master the New Turkic Alphabet, and almost did not react to the newspaper “Khyzil Aal” and literature” [25]. Publishing of lesson plans on grammar and spelling of the Khakass language in the new alphabet by the Russian-language “Soviet Khakassia” did not improve the situation or increase literacy [26].

In 1935, the matter of the reverse transition of the languages of the peoples of the USSR to Cyrillic was raised at a meeting of the Presidium of the VTSIK. The process accelerated after criticism of the campaign of romanization of alphabets by the Central Committee of the CPSU (b) in 1936. Propaganda was actively launched: numerous appeals-letters appeared in newspapers from workers and collective farmers stated that the Latin alphabet did not suit them and expressed their desire to use the Cyrillic alphabet.

The search for those who were responsible for the failure of the language reform began in Khakassia. More and more accusations were made against the national intelligentsia of Khakassia in different documents. There were typical explanations for the failures of romanization in the Khakass region. According to the reports of the regional Committee of the NTA in 1936-1938, a group of interpreters was extremely clogged by the kulak-baysky elements, nationalists-counterrevolutionaries.

At the end of 1937, the participants of the national language reform were exposed as “active bourgeois nationalists and arrested by the NKVD for their counter-revolutionary activities” [27]. Among those participants sentenced to capital punishment by the military Board of the Supreme Court of the USSR in July 1938 was K. K. Samrin.

Reverse transition of the Khakas alphabet to Russian graphics was announced in 1938, when the Khakas regional Committee of the CPSU (b) adopted a resolution “to ask the CPSU (b) and expedite the decision of transition of Khakass writing into Russian alphabet”. The change in language policy caused great difficulties, especially in publishing. Additional difficulties were created by the necessity to edit and rewrite materials in the Russian alphabet, as many translations were made in the Latin alphabet. The transition to Cyrillic caused the correction of spelling and grammar of the Khakass language. All activities required funds, but they were sorely lacking even to pay for the work of interpreters.

However, the transition to Cyrillic was very rapid. The deadlines at that time were very strict: one or two years and no more. In addition, there was no single state body specifically dealed with that problem. The successful completion of cyrillization was announced in June 1941.

To sum up, it may be said that the transition of the Khakass writing system to the Cyrillic script was followed with the repressions of the 1930s. The participants of romanization, who sought to contribute to the development of national written culture, got into cruel and merciless conditions. The research allowed us to give a truthful, balanced assessment of K.K. Samrin's participation in the formation of Khakass writing system at its main stages. The role of K. K. Samrin is really significant. He made a considerable contribution to the formation of the Khakass alphabet based on the Cyrillic and Latin alphabets, the creation of the first textbooks and the works of fiction in the Khakass language.

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К.К. САМРИННІҢ ХАКАС ЖАЗУЫНЫҢ ҚАЛЫПТАСУЫНА ҚОСҚАН ҮЛЕСІ (1920-1930 жж.)

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ВКЛАД К. К.САМРИНА В СТАНОВЛЕНИЕ ХАКАССКОЙ ПИСЬМЕННОСТИ (1920-1930 гг.)

Аннотация. В России, сформировавшейся как многонациональное и многоязычное государство, сегодня остро стоит вопрос о духовном возрождении населяющих ее народов, вовлеченных в начале XXI в. в процесс быстрой ассимиляции. Национальные меньшинства и коренные народы утратили свои основные черты этничности. Среди них-исчезновение родного языка. Национальное возрождение любой нации немыслимо без функционирования ее родного языка. Письмо является основным средством закрепления, сохранения, развития языка и наиболее значимой формой его социального функционирования. В связи с этим становится актуальным обращение к истокам советской письменности народов Сибири. В статье рассматривается сложный процесс формирования письменности в Республике Хакасия. Новизна исследования видится в попытках реализовать результаты алфавитизации через призму биографии одного из участников создания хакасской письменности в 1920-1930-е годы. В этой связи раскрывается вклад К. К. Самрина в развитие хакасского языка, создание алфавита и национальной литературы. Результаты исследования могут быть использованы при планировании и прогнозировании языкового развития языков меньшинств.

Ключевые слова: алфавит, латинизация, языковая политика, языковая реформа, национальная письменность.

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ETHNOMUSIC, ETHNOPHORE, ETHNOGRAPHER

Abstract. The article presents issues related to the study of the triad of «ethno music, ethnophor, ethnographer» in the axiological aspect. Their research is updated in connection with the consideration of the trinity of «ethno music, ethnophor, ethnographer» in the global world from the point of view of the spiritual and cultural values of the Kazakh people aimed to increase their importance in modern society. The necessity of theoretical understanding of the problem «ethno ear» («auditory abilities of the ethnos») is revealed - which is a common «tool» in the trinity of the concepts of ethno music, ethnophor and ethnographer, which is the rationale for such important moments related to national identity as «intonation specificity», «culture of listening / listening», « memorizing skills», «ways of articulation», etc. It is emphasized that in the course of analyzing the genres that form the basis of ethno music, it is advisable to re-examine the contribution of outstanding personalities – those people who have managed to transmit them to the present day, and those who have been able to record them. Moreover, not considering the examples, methods of upbringing, lifestyle and worldview, customs and traditions of the ancestors only as a shady of images of the distant past or book values, but working to ensure their real «return» to everyday life through the firm fixation in the minds of the younger generations. Thanks to this, one can awaken the respect for the national cultural heritage in young people. In the course of the development of these issues by genre directions, the works of domestic researchers, scientists from foreign and CIS countries were taken into account. The main theses of the article can serve in the future as a guide and necessary support for students of traditional music, secondary specialized and higher educational institutions, Master, PhD students and teachers.

Keyword: ethnomusicology, ethnophor, ethnographer, spiritual values, global peace, cultural heritage.

Introduction. In the global world, especially in the last decade, the information exchange is becoming rapid, computer technologies and Internet sites are developing and are being actively introduced into society, including those which are duplicating the mainstream media – radio, television, newspapers and magazines. As a result of this, there is interaction and rapprochement of cultures and traditions of different peoples. In the process of such cultural exchange, the appearance of artificial works is noticeable in which the original nature of national music is lost. Of course, when we see the unacceptable essence of an alien, we begin to realize the need to evaluate the spiritual values of the own nation in their original form.

Over time, we become convinced that the works that truly reflect the artistic identity of a particular nation are of great interest in the world than those which have gained wide popularity and emerged in the process of exchange, in line with hybrid/ or multi-genre trends (ethno-rock, ethno-fusion, ethno-pop , neo-ethno-folk, ethno-electronics, modern-ethno-jazz duet). Although, there are also people who are fond of discovering the unfamiliar, mastering the instruments of other nations. In addition, the appearance of multi-genre, multi-style works, which arise as a result of various experiments which are linking the folklore heritage and traditional music of the nation with the culture of a foreign country, leads to the loss or even destruction of a rich national heritage. From this point of view, the question of the purity of the nature of the national heritage, the authenticity of its performance, and recording in its original form becomes the priority issue.

These problematic issues, leading to the theme “Ethno music, ethnophore, ethnographer: cultural and spiritual values of the Kazakh nation in the global world”, emphasize the relevance of the fundamental study of the still unstudied trinity in the chosen scientific and theoretical context.

The first President of the Republic of Kazakhstan, N.A.Nazarbayev, noted that the “national code”, which dates back to ancient times, has been preserved in the cultural heritage of the people: “Even largely modernized societies contain cultural codes, the origins of which are rooted back in the past. The first condition for the modernization of a new type is the preservation of their culture, their own national code” [1]. It is important to look at our ancient traditional music from the point of view of the national code and, at the same time, recall the names of those people who worked to preserve the originality of these values, recording them in their original, genuine form.

The main aim of the research is to study the Kazakh *ethnomusic* – the patterns of folklore heritage and the works of traditional art that form its basis; the works of *ethnophores* – who have mastered and absorbed the steppe culture of famous figures, unique personalities whose names are still unknown; *ethnographers* – who worked selflessly to record, compile and store information from the point of view of cultural and spiritual values in the global world.

Methods. Description of the main scientific issues and hypotheses of the research, the justification of the research strategy and approaches, the types of studies used in the research (descriptive, correlation and / or experimental), the sequence of studies;

Understanding the specifics of Kazakh traditional culture in the trinity of “ethno music, ethnophore, ethnographer”, which predetermines special attention to such a category as “ethno ear” can provide a qualitatively new level of comprehension of the nature of national music as an object of study, its genre, stylistic and regional diversity.

In accordance with the main goal of the research, the issues of “ethno music, ethnophore, ethno grapher” are considered in the context of historical, social, philosophical, psychological, pedagogical, philological, ethnographic and ethnological sciences.

In the study of the folklore heritage and the works of traditional art, which form the basis of the Kazakh ethno music, from the point of view of cultural and spiritual values in the global world, historical-theoretical, systematic methods of analysis are used;

When studying genre nature, regional features of the works, ways of forming and developing society, as well as the concepts of “kissa tunes”, “makams of epic traditions”, “sal-sere institute”, “individual kuyshi schools” formed according to the stages of development of traditional art, they are used comparative approaches to the development of these concepts;

Along with the study of the works of famous figures who have mastered and absorbed the steppe culture, who made an invaluable contribution to the design and storage of information recorded from ethnophores, as well as unique personalities whose names are still unknown, expert analytical and axiological research principles are applied.

Theoretical issues common to the trinity of “ethno music, ethnophore and ethnographer”, such as “intonation specificity”, “listening/ listening culture”, “memorization skills”, “articulation methods” and other system analysis methods developed in the field of musicology are used for interpretation of the important points.

The first President of the RK, N.Nazarbayev, in his article “Look into the Future: Modernization of Public Consciousness” noted: “Without reliance on national and cultural roots, modernization will hang in the air. History and national traditions must be taken into account. This platform connects the horizons nation past, present and future” [2]. History, worldview, customs, language, mentality, religion, culture, national art can be known through ethno music – the spiritual heritage of the people. In research we divided Kazakh ethnic music into two areas: folklore and traditional music. Both directions are based on oral creativity, roots back in antiquity and currently finds its continuation as a national treasure. Gilbert Rouget defined ethnomusicology as a science, noted that the oral tradition, which was spread before the formation of written culture, is the music of a particular ethnos, concludes: “Ethnomusicology is the musicology of unwritten music” [3, 677 p.].

The Kazakh folklore heritage has inhabited the Great Steppe since ancient times includes songs, kuy, epic, terme, kissa, dastans, aitys, tolgau. Musical folklore is the research subject of individual scholars works:A.Zataevich, G.Erzakovich, A.Baygaskina, A.Temirbekova, T.Bekhozhina, M.Akhmetova,

B.Karakulov, etc. This research includes folklore patterns transmitted by ancestors century by century, which are still relevant today education, upbringing, life activities, worldviews, which carry important information that bring this spiritual heritage to the minds of the independent country young generation. Among the works related to wedding ceremonial songs are studied “Toi bastar”,“Zhar-Zhar”,“Synsu”,“Betashar”, to mourning rituals “Estirtu”,“Zhoktau”,“Zhubatu”, children's folklore “Besik zhyry”,“Tusau kesu zhyry”,“Zhumbak”, belief songs “Badik”,“Arbau”, “Baksy saryndary”, calendar songs “Zhaz keledi, alakai!”,“Kim kalai dauystai biledi?”, holiday and nature renewal songs “Maldyn toldeui”,“Toigeleu”,“Shoreleu”, about Oraza ait “Zharamazan”,“Bata”, etc.

The second direction of ethnic music is associated with traditional art. The period of professional composer development creativity in traditional art was in the 19th century. The study of this period can be seen in the works of A.Zhubanov, Z.Kospakov, K.Zhuzbasov, A.Seidimbek, B.Amanov, A.Mukhambetova, S.Elemanova, A.Kunanbaeva, S.Utegalieva, R.Nesipbai. Outstanding creative personalities Birzhan-sal, Akhan-sere, Zhaiau Musa, Mukhit formed the “Sal-Sere Institute” and the unique kuyshi Abyl, Kurmangazy, Dauletkerei, Tattimbet, etc. founded “kuyshi schools”. In the works of zhyrau “tunes of kissa”, “makams of epic traditions”,“terme and tolgau texts” beautiful and elegant, melodic-intonational, exemplary-educational, spiritual, lyrical motifs are passed from generation to generation as an edification of the ancestors. With the revival of national culture the works of zhyrshy, sal-sere, singers and kuyshi transformed into masterpieces. The creations of traditional composers are analyzed in this research of spirituality and cultural value.

Centuries-old patterns of folk and traditional music in the cultural space became the basis for new directions and genres (traditional, academic/classical, mass/pop). This is noticeable in the work of professional composers of the 1920-30s of the XX century formed in the European written tradition. Based on S.Kuzembay, A.Ketegenova, U.Zhumakova, A.Omarova’s research, the works of composers within the framework of the topic are considered within the sides of creativity are revealed which were previously neglected.

P.Aravin, B.Erzakovich note Russian and foreign travelers M.Gotovitsky, R.Pfennig, N.Grodekov, A.Alekterov, S.Rybakova, A.Divaev, D.Lvovich, A.Eichhorn and others, who expressed their opinion on Kazakh musical heritage. The manuscripts of Alash figures, writers, scholars, ethnographers and ethnomusicologists about spiritual and cultural national values will be examined from a new perspective. For the first time, these materials will be published in the collection “Source of spiritual values”. In joint monograph as a result of basic research, recording methods, ear features, generalization and systematization methods of ethnographers and ethnomusicologists will be justified and reflected from the scientific aspects.

Study of the issue of ethnomusic in the foreign countries started earlier. It should be relayed on *the world's leading researches*. If among foreign scholars who conduct the research using anthropological methods in ethnomusicology, we can mention J.Rouget [3], D.McAllester [4], J.Ran [5], then in the field of Russian ethnomusic the basis for the formation of historical and theoretical justification was developed by B.Asafiev [6], K.Kvitka [7], I.Zemtsovsky [2], I.Matsievsky [8]. In heritage of different peoples, every day there appear more and more works in the field of musicology related to ethnomusic. For example, the works of T.Galtseva [9], N.Almeeva [10], etc. There are separate article “Globalization and ethnomusicology” [11] and appeared as the initiator within studies on ethnophores and ethnographers. Their conclusions can serve as a methodological basis.

Results. The foundations of ethnomusic, which are based on history, worldview, lifestyle, customs, language, mentality, religion, culture, the national art, in turn, clarify the folklore heritage and traditional music. Since any work can be considered as a “historical document” that provides information about a particular era and reflects the uniqueness of a particular nation. Such spiritual sources include religious makam, baksy saryn, songs, terme, tolgau, epic, dastans, kissa, covenants, kuy, etc. [12]. Therefore, it is planned in the frame of the research to study the nature of these genres, stylistic trends, regional features, ways of their formation and development of nomadic society. In addition, the traditional creativity of Kazakh folk composers, formed on the basis of folklore heritage, will be analyzed in the context of spiritual and cultural values. Among the considered are the theoretical interpretation of the “Makams of epic traditions”, “the institute of sal-sere”, “individual kuyshi schools”, “kissa tunes”, etc.

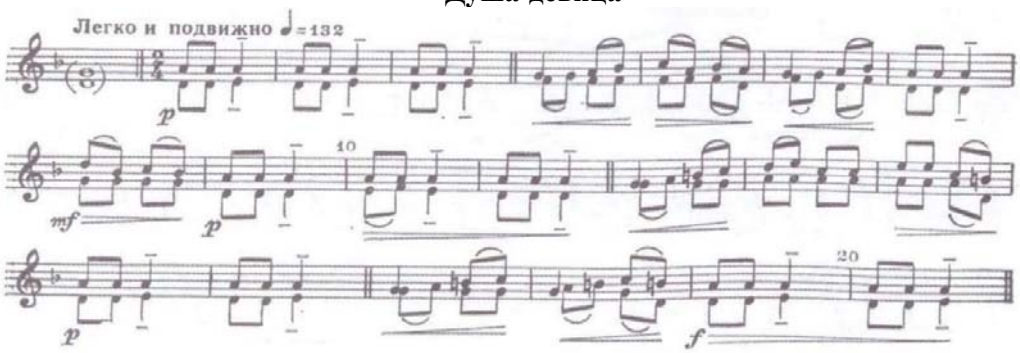
Today, the names of ethnophors - masters of art who have deeply mastered the subtleties of national music – are not often mentioned. Among them, along with celebrities, there are also persons who are unknown to date. Even if only famous people are taken into account, for many it remains unknown what kind of works they specifically promote. This issue has not been addressed in the history of music for various reasons. If in this regard, in Soviet times it was not customary to speak for political reasons, then from the moment of gaining independence the problem was mostly simply forgotten. Through analysis of the transferred works, the worldview, musical abilities, psychology and culture of performers will be shown. Through the study of their musical preferences and issues related to human musical anthropology, the secrets of the "creative laboratory" of ethnophores should be revealed. The necessary clarification of the problems of creating one's own work and the creative process will be proposed, in which national values are reproduced and improved, which are formed almost from birth, are divided at the level of the immune system into "own" and "alien", transmitted as a rich spiritual heritage from father to son.

The spiritual and cultural masterpieces of the Kazakh people began to be recorded in the late XIX and early XX centuries. The manuscripts of Russian and foreign travelers, figures of Alash, scientific writers, ethnographers and ethnomusicologists about Kazakh music, preserved in the collections of national archives, testify to this. These works contain information about the musical history and traditions of the ethnos, and the collections of ethnographers and ethnomusicologists along with musical notation patterns of national music contain information that has been preserved to date on ethnophors. Due to the fact that so far they have not been considered from a scientific point of view, documentary evidence will be selected on the methods of collection and systematization, methods of documentation, the peculiarities of auditory perception of ethnographers and ethnomusicologists, as well as biographical data of ethnophores.

To illustrate this we present two different transcripts of a single kuy:

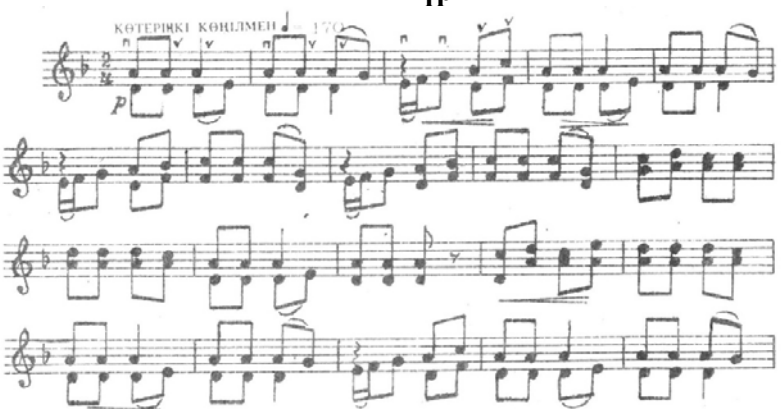
P. Aravin

ҚЫЗ-АҚЖЕЛЕҢ
Душа-девица



K. Akhmediyarov

ҚЫЗ АҚЖЕЛЕҢ
І-түрі



From a theoretical point of view in the study of orally spread works of "ethnomusic, ethnophore and ethnographer", the most important issue of the "auditory abilities of an ethnos," "ethnoear", which has turned into an invisible force in the world of music, will be revealed. Its research leads to the expansion of the range of issues related to other nationally distinctive realities – "intonation specificity", "listening/listening culture", "memorization skills", "methods of articulation", etc. The reason is that "ethnic hearing" as said I.I.Zemtsovsky, "is considered the first and main identifier of an ethnic group". It determines the musical worldview of the nation – the basis of the improvisational art of the entire ethnic group.

The field of ethnomusic requires interdisciplinary research. In this regard, these issues in the research are considered within the framework of historical, social, philosophical, psychological, pedagogical, philological, ethnographic and ethnological sciences using the time-tested principles of comparative and system analysis, historical-theoretical, practice-oriented, source study methods.

The research, associated with the humanitarian sphere also in demand in the modern society development, economy, technology. In the global world can be competitive only due to their spiritual and cultural values. The President K.K.Tokaev's proposal on the introduction of dombra lessons in the school curriculum is very relevant as a sign of the need to pay attention to the spiritual and cultural values that distinguish a nation. The First President's words are very convincing: "When people today talk about the impact of alien ideological influences, we mustn't forget that they are based on certain values, cultural symbols of other peoples. Only own national symbolism can resist it" [1]. The representation of the national brand on the world market should be based on the spiritual and cultural values of people. The publication of an archival materials collection and a collective monograph about trinity, for subjects of modern society may be of interest as a basis in practical activities, life guidelines, internal impulses. The historical and theoretical issues of the research, aimed at preserving, developing and recognizing the nation, can contribute to upbringing of national spirit through the formation the formation in the minds of present and future generations of a sense of respect and appreciation. The significance of the theme of the research at the national and international levels is evidenced by the development of issues of "ethnicity of hearing", "musical features", "listening culture", "memory skills", "articulation techniques", etc., that have not been studied in the trinity context.

The research theme, results achieved, new publications will affect the research work, the level of scientific and technical potential. It's necessary to know, see and remember the condition, prerequisite for scientific work in various fields is the national wisdom. "... ideally, the humanities are united by the study of "ethno" on their specific material, that is, ideally, everyone recognizes the universality of the ethnic category, regardless of the variety that cannot be taken into account, its specific manifestation and myriad of other ethnic displacements" [2, p.2]. Activities in scientific organizations and collectives working in the field of the humanities philosophy, cultural studies, religious studies, philology, linguistics, literary criticism, art criticism, history, psychology, anthropology, ethnography, cognitive science may foster a sense of patriotism. The results of this study can be used as a textbook in the education system. Scientific articles, conference reports, specific findings and archival data published in a monograph and collection will be a worthy contribution to the national science development

Conclusion. The main idea of research is considering the trinity of "ethnomusic, ethnophore, ethnographer" in the global world in spiritual-cultural values view of Kazakh nation, increasing their importance in modern society. During analysis of genres make up the ethnomusic basic in national identity system, explore outstanding personalities contribution, people managed to convey them to present time and recorded. Without considering examples, upbringing methods, lifestyle, worldview, traditions of ancestors as ghostly images of past or book values, it's necessary to ensure their real "return" to everyday life through a fixation in minds of younger generations and awaken respect for cultural heritage.

The immediate results of the research include, firstly, new methodological approaches to science, new factual materials that allow the use of various directions (in the research field and performing arts), and secondly, in the educational process in the taught disciplines – "History of Kazakh music", "Folk art", "Methods of designing notes", "Ethnosolpeggio", "Ethnoorganology and the history of instrumental music", etc., can be used in diploma, master and doctoral works (theoretically and practically, from the point of view of using information, musical materials) on the spiritual and cultural values of the Kazakh people. In addition, the results of the research can be very valuable when used in interdisciplinary fields, in television programs dedicated to the spiritual and cultural heritage. In the field of education and science,

the qualitative results of basic research aimed at improving the qualifications of students, Master and PhD students can be revealed quantitatively. Qualitative and quantitative characteristics of direct and indirect research results will be obvious over time.

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ЭТНОМУЗЫКА, ЭТНОФОР, ЭТНОГРАФ

Аннотация. Мақалада аксиологиялық аспектіде "этномусика, этнофор, этнограф" триадасын зерттеуге байланысты сұрақтар берілген. Олардың зерттеулері қазіргі қоғамдағы маңыздылығын арттыруға бағытталған қазақ халқының рухани-мәдени құндылықтары тұрғысынан жаһандық әлемдегі "этномусика, этнофор, этнограф" үштұғырлығының қарастырылуына байланысты өзекті болып отыр. "Интонациялық ерекшелік", "тыңдау / тыңдау мәдениеті", "есте сақтау дағдылары", "артикуляция тәсілдері" және т. б. сияқты ұлттық бірегейлікке байланысты маңызды сәттердің негіздемесі болып табылатын этномусика, этнофор және этнограф ұғымдарының үштұғырлығындағы "этно есту" ("этностың есту қабілеті") проблемасын теориялық тұрғыдан ұғыну қажеттігі анықталды. Этномусиканың негізін құрайтын жанрларды талдау барысында көрнекті тұлғалардың, оларды бүгінгі күнге дейін жеткізе білген адамдардың және оларды жаза алғандардың үлесін қайта қарастырған жөн. Сонымен қатар, ата-бабалардың мысалдарын, тәрбие әдістерін, өмір салты мен дүниетанымын, әдет-ғұрыптары мен дәстүрлерін алыс өткеннің немесе кітап құндылықтарының көлеңкелері ретінде қарастырмай, оларды жас ұрпақтың санасында берік бекіту арқылы күнделікті өмірге нақты "қайтаруды" қамтамасыз ету үшін жұмыс жасау. Осының арқасында жастардың ұлттық мәдени мұраға деген құрметін оятуға болады. Осы мәселелерді жанрлық бағыттар бойынша әзірлеу барысында отандық зерттеушілердің, шет елдер мен ТМД елдерінің ғалымдарының еңбектері ескерілді. Мақаланың негізгі тезистері дәстүрлі музыкалық университеттердің, орта арнаулы және жоғары оқу орындарының студенттеріне, магистранттарға, аспиранттар мен оқытушыларға басшылық және қажетті қолдау бола алады.

Түйін сөздер: этномузыка, этнофор, этнограф, рухани құндылықтар, жаһандық әлем, мәдени мұра.

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ЭТНОМУЗЫКА, ЭТНОФОР, ЭТНОГРАФ

Аннотация. В статье представлены вопросы, связанные с изучением триады «этномузыка, этнофор, этнограф» в аксиологическом аспекте. Их исследование актуализируется в связи с рассмотрением триединства «этномузыка, этнофор, этнограф» в глобальном мире с точки зрения духовно-культурных ценностей казахского народа, направленных на повышение их значимости в современном обществе. Выявлена необходимость теоретического осмысления проблемы «этно - слуха» («слуховых способностей этноса») - общего «инструмента» в триединстве понятий этномузыки, этнофора и этнографа, являющегося обоснованием таких важных моментов, связанных с национальной идентичностью, как «интонационная специфика», «культура слушания / слушания», « навыки запоминания», «способы артикуляции» и др. Подчеркивается, что в ходе анализа жанров, составляющих основу этномузыки, целесообразно заново рассмотреть вклад выдающихся личностей-тех людей, которые сумели передать их до наших дней, и тех, кто сумел их записать. Причем, не рассматривая примеры, методы воспитания, образ жизни и мировоззрение, обычаи и традиции предков лишь как тени образов далекого прошлого или книжных ценностей, а работая над обеспечением их реального «возвращения» в повседневную жизнь через твердую фиксацию в сознании подрастающих поколений. Благодаря этому можно пробудить в молодежи уважение к национальному культурному наследию. В ходе разработки этих вопросов по жанровым направлениям были учтены труды отечественных исследователей, ученых из зарубежных стран и стран СНГ. Основные тезисы статьи могут

служить в дальнейшем руководством и необходимой поддержкой для студентов традиционных музыкальных вузов, средних специальных и высших учебных заведений, магистрантов, аспирантов и преподавателей.

Ключевые слова: этномузыка, этнофор, этнограф, духовные ценности, глобальный мир, культурное наследие.

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Козин Леонид Фомич
22.08.1926–12.12.2020

Ушел из жизни Козин Леонид Фомич – доктор технических наук, профессор, заслуженный деятель науки КазССР, заслуженный изобретатель, лауреат Государственной премии Украины, академик Академии космонавтики им. К.Э. Циолковского.

Родился в Украине в 1926 г., высшее образование получил в Политехническом институте в г.Киеве, который окончил в 1953 г. по специальности инженер-технолог электрохимического производства. Создатель фундаментальных основ научного направления «Электрохимическое рафинирование металлов амальгамными методами». Это направление приобрело широкую известность и признание как в республиках СНГ, так и за рубежом. Важными достижениями в области прикладной электрохимии явились разработки технологий получения особочистых металлов многостадийным электролизом с жидкими биполярными электродами, а также металлов и металлоидов реакционным электролизом с введением депрессантов.

С 1961 по 1969 гг. Козин Л.Ф. возглавлял лабораторию «Амальгамной химии» Института химических наук АН КазССР. С коллективом сотрудников разрабатывал физико-химические основы амальгамной металлургии и технологии рафинирования металлов до высокой чистоты. Он стоял у истоков создания Института органического катализа и электрохимии АН КазССР в декабре 1969 года и организовал большую лабораторию «Сверхчистых металлов». В течение 20 лет Козин Л.Ф. проработал в Казахстане и создал основу для того, чтобы разработки Института были востребованы в настоящее время и в будущем. Одновременно с научной работой он проводил авторский надзор над проектированием и строительством нового цеха чистых металлов на Чимкентском свинцовом заводе (Южный Казахстан) и организовал работы по выпуску сверхчистых металлов на этом заводе. Освоение технологий получения свинца марки С-0000, висмута Ви-0000, Ви-00000, таллия –Тл-000, кадмия – Кд-0000, индия – Ин-0000 имели большое значение для развития в области среднего машиностроения СССР.

Разработки и внедрение технологии получения сверхчистой ртути на Никитовском ртутном комбинате заложили основы для развития этого направления в Украине. Начало работ по созданию технологий получения водорода с высокими скоростями также было положено в Казахстане. Защита докторской диссертации «Физико-химические исследования амальгамных методов получения металлов высокой чистоты» в 1966 г. в г. Алма-Ате на соискание степени доктора технических наук заложила глубокие теоретические основы для развития новых технологий. В 1971 г. решением ВАК СССР ему присвоено звание профессора по специальности «Теоретическая электрохимия» и в этом же году присвоено звание «Заслуженный деятель науки Республики Казахстан». Самый активный период становления Козина Л.Ф. как крупного ученого прошел в стенах Академии наук КазССР. Его имя заслуженно внесено в Золотую книгу Почета КазССР.

В Институте общей и неорганической химии Национальной академии наук Украины в Киеве он руководил отделом с 1981г. Удостоен медали Украины «За труд и доблесть» и знака отличия «За подготовку научной смены»

Козин Л.Ф. – автор 18 монографий, более 700 научных статей, 140 авторских свидетельств, 14 патентов и изобретений. Среди его учеников 3 доктора наук , 37 кандидатов наук.

Прирожденный талант исследователя в сочетании с неисчерпаемой творческой энергией и глубокой эрудицией определили его большой вклад в развитие химической науки.

Коллеги, ученики

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