ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

# Х А Б А Р Ш Ы С Ы

## ВЕСТНИК

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Типографияның мекенжайы: «Аруна» ЖК, Алматы қ., Муратбаева көш., 75.

# Information messages

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# FUNCTIONS OF ATOMS RADIAL DISTRIBUTION AND PAIR POTENTIAL OF SOME SEMICONDUCTORS MELTS

**Abstract.** The paper presents an estimate of the pair potential and the construction of the curves of the radial distribution of atoms in some melts of semiconductors such as germanium, silicon using the conducted studies in the framework of the density functional. The results of calculations of the potential for pair interaction in a germanium melt with the use of experimental data by V. M. Glazov and quantum potentials of pair interaction obtained by quantum chemical methods, respectively.

The temperature dependences of the radial distribution function of atoms in melts of selenium, tellurium, silicon, and germanium are studied theoretically. The results of the calculation of the radial distribution of atoms calculated by the molecular dynamics method are considered. If we assume that the position of the first maximum of the radial distribution curve of atoms in the melt corresponds to the shortest interatomic distance in atomic chains, then we must conclude that during the melting of a crystal this distance increases and a distorted crystal structure is obtained.

The potential of pair interplay in melts of germanium, silicon with usage of the conducted researches is estimated within the framework of a functional of density. The pair potentials are calculated under the electrostatic theorem of Gelman-Feynman, after finding of optimum electronic density conforming to equilibrium internuclear spacing interval.

**Keyswords:** pair potentials, radial distribution of atoms, semiconductor, structural factor atoms, molecular dynamics, density function, cluster structure.

**Introduction.** The structural difference of melts is conditioned by the difference of force fields, and consequently, by the difference of pair interaction potentials. It's obvious that the difference in two structures semiconductors with different types of chemical bond is to effect the size and form of the pair potential, and decreasing the share of microzones indicated is to lead to changes reflecting structural transformations in the melt.

**Methods.** In this connection in the work, there has been evaluated the pair interaction in germanium, silicon melts using the studies carried out in the frames of density functional (pair potential are calculated by Gelman-Feynman electrostatic theorem after determining an optimal electronic density corresponding to the balanced internuclear distance). Usually, to calculate pair potential in liquids there are used three integral equations connecting with experimentally obtained structural factors, i.e. Bogolyubov-Born-Green equation, Percus-Yewik equation and hyperchain equation [1, 2].

From the analysis of these equations it follows that for calculation it's necessary to know the dependence of the structural factor *S(q)* on the wave number. *S(q)* is obtained from the experimental data on scattering electrons and neutrons X-rays, the upper limit being the wave number equal to 8-12Å. However, X-ray structural analysis data do not give a possibility to evaluate reliably the structural factor in the long-wave limit. At the same time the uncertainty in X-ray data evaluation by the way of extrapolation introduces a significant error in determining pair interaction potential.

In principle, the structural factor of these melts can be calculated using experimental data on the sound speed, density and heat capacity at constant pressure which was for the first time indicated by Landau and Lifshits [7], and to compare them with theoretical values *S(q)*. In figure 1, a and b, there are presented the results of pair interaction potential calculation in germanium melt using experimental data of V. M. Glazov and quantum potentials of pair interaction obtained by quantum-chemical methods, respectively. (Here, due to the fact that curves a and b are given in Angstroms, our results are also given in Angstroms for excluding additional errors, on one hand, and for the fact that the primary data were not tabulated, on the other hand.
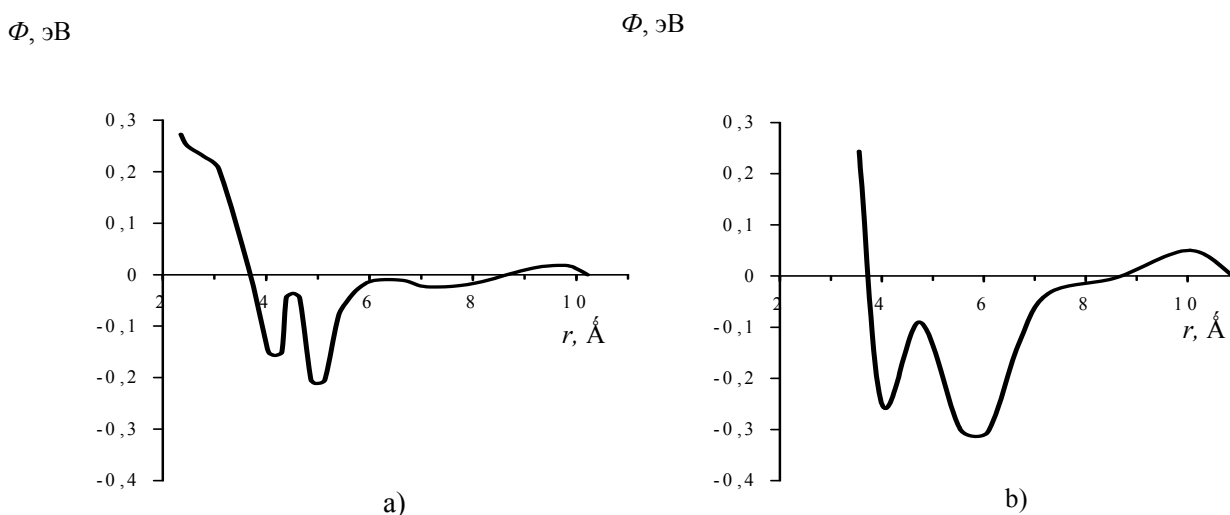


Figure 1 – Pair interaction potential in germanium melt:
a) – experiment; b) – calculation

As it is seen in the figure, at calculated values on $\Phi(r)$ dependence for germanium there is observed the potential minimum at $r=3{,}7$Å, which corresponds to the radius of the first coordination sphere. Besides, the potential abnormal behavior is observed at $r=4{,}75$Å, which corresponds to the radius of the second coordination sphere. It's worth noting that $\Phi(r)$ dependence in melted germanium is characterized by the presence of long-range oscillations.

Pair interaction potential calculation in melts using hyperchain equation lead to a similar result. It's worth noting that V. M. Glazov and his colleagues with the help of Percus-Yewik equations obtained $\Phi(r)$ dependences based on the data of the structural analysis. Based on the calculation results, the authors made a conclusion about a significant role of pair interaction potential dependence in liquid germanium on *r*. In figure 2 there is presented a pair interaction potential depending on inter-atom distance in silicon melt. It's obvious that this melt, as germanium, is characterized by pair interaction potential dependence near the point of melting and this dependence absence with large inter-atom distances [3, 5].

The results of the calculations carried out in germanium and silicon melts show that the structure reconstruction connected with breaking covalent bonds and their metallization don't' come to end completely at the melting temperature, but spreads to some temperature interval within the limits of which the processes comes to end. Structural differences observed in the process prove the process of post-melting.

Now let's consider the results of calculating the curves of atoms radial distribution computed by the method of molecular dynamics which algorithm is described in section 2.
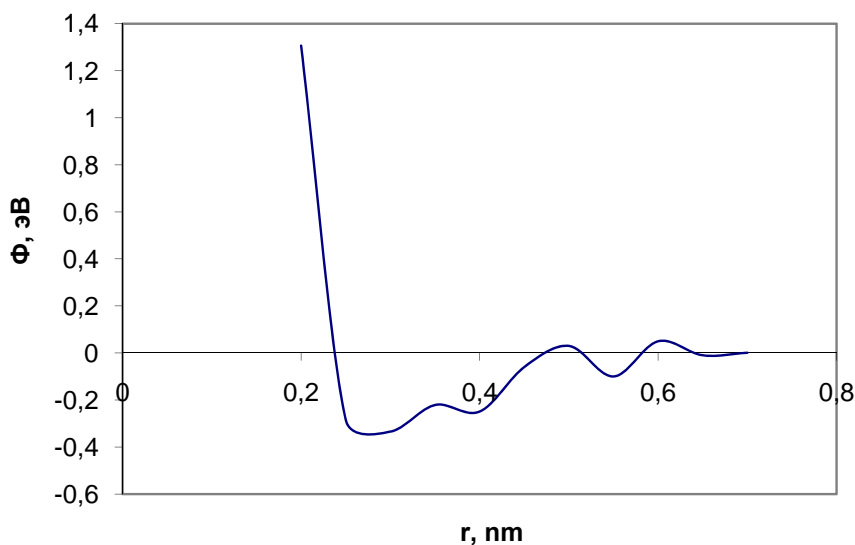
Figure 2 – Pair interaction potential in silicon melt at temperature 575 K

Near the melting temperature selenium is a viscous liquid, so in it there exist some structural elements of crystal modifications consisting of atomic chains or rings in a melt. This is proved by the position of the first two maxima of the atoms distribution curve in a melt shown in figure 3 at 500 K.
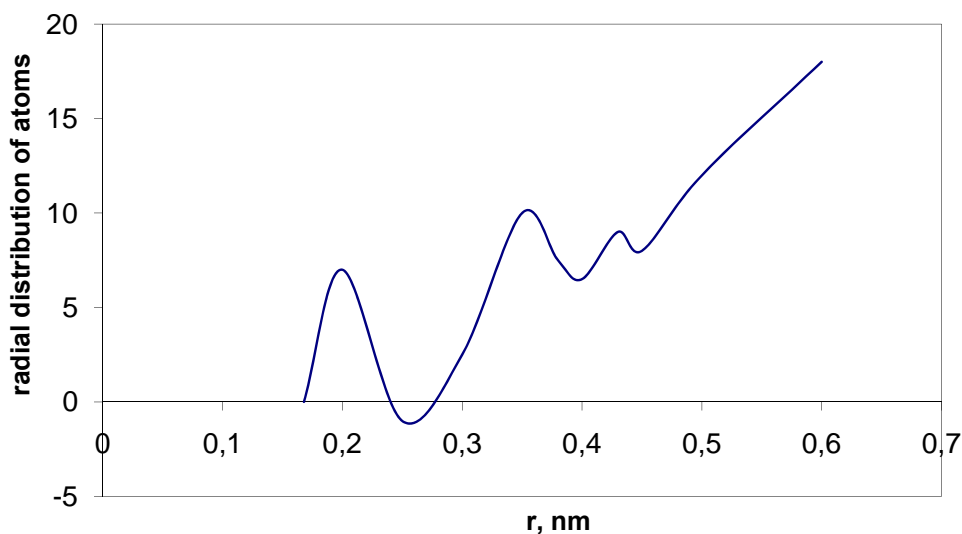


Figure 3 – Atoms radial distribution curve in selenium melt at temperature 500 K

This coincides with the value of inter-atom distances in screw chains typical for crystals. Molecular dynamics method using quantum potentials reproduces an experimental fact, and coordination numbers $Z_1$, $Z_2$ make 2,8 and 2,5, respectively. It's worth saying that the maximum at the distance 0,43 nm satisfies inter-atom distances in the screw chain, but, as shown in work [4], this can be referred to existing flat atomic chains. If in flat chains the shortest inter-atom distance is superseded about 0,2 nm and suppose their parallel location, then the following inter-atom distance is related to the zone of the second maximum of atoms radial distribution curve.

In figure 4 there is shown radial distribution curve at temperature 750 K, which has two clear maxima, and this may refer to $Se_3$ molecules that appear as a result of selenium chains atomic bonds breaking. The melt temperature increase to 740 K leads to increasing the shortest inter-atom distance, decreasing coordination number which in turn leads to disappearing an additional maximum at $r_2$=0,43 nm.
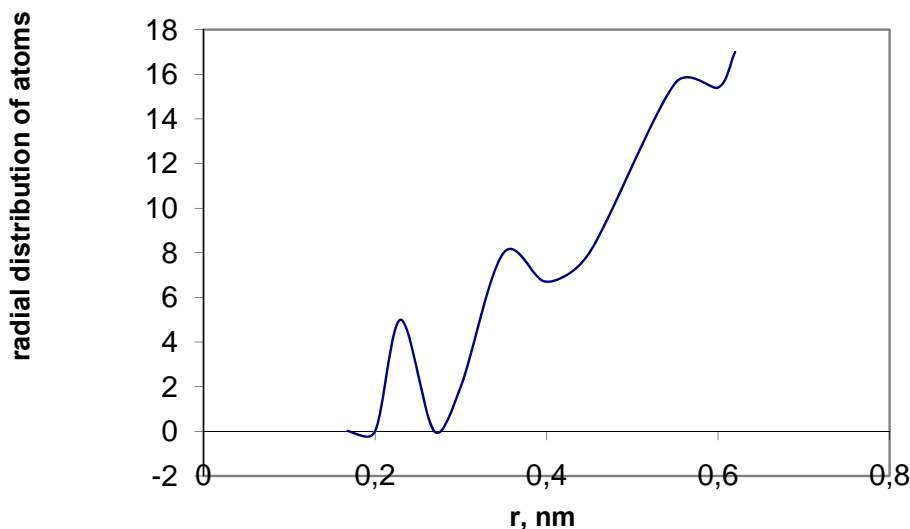
Figure 4 – Atoms radial distribution curve in selenium melt

A stable crystal modification of tellurium is a hexagonal modification which elementary cell is built of screw chains located along at the distances 0,2835; 0.4440 and 0,593 nm, where there are two atoms, and the shortest distance between four atoms of the neighboring chains is equal to 0.350 nm. Quantum calculations show that the bond between the atoms in the chain is covalent, conditioned by overlapping 5p-orbitals of impaired valent electrons, and between the chains there act Van der Walls forces, though in work [4, 6] there is expressed an opinion that the bond between atom chains is more complicated and to describe it we are to attract d-electrons.

In figure 5 there is presented atoms radial distribution curve calculated by molecular dynamics method at temperature 720 K.
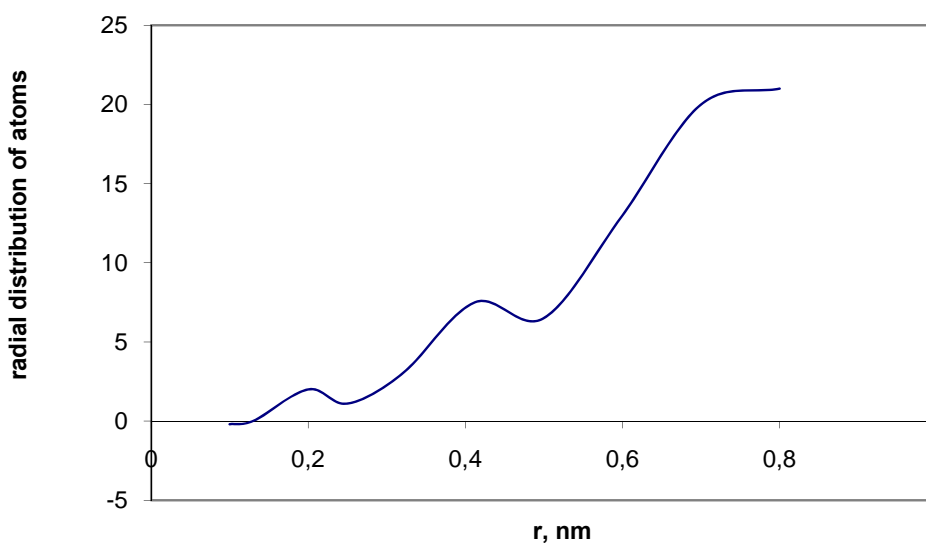
Figure 5 – Atoms radial distribution curve in tellurium meltat temperature 720 K

The calculations show that for this temperature the radial distribution curve has the following maxima: at 0,25; 0,413 and 0,78 nm, the coordination number being 2,3. This indicates that at melting tellurium there maintains its structure chain character.

The further heating of tellurium melt up to 880 K and higher seems not to lead to significant changes of its structure which is indicated by the flatness of atoms radial distribution curve.

Maxima positions of atoms radial distribution curve can be presented in such a way. Atoms distribution at temperatures 720 K and 780 K is close (figura 6). This can be explained by that in melt heating there take place rather minor changes of its short-order structure.

Maxima positions are close to the positions of the first and second maxima of atoms radial distribution curve at temperature 720ºC, however, the next maximum is very fuzzy.
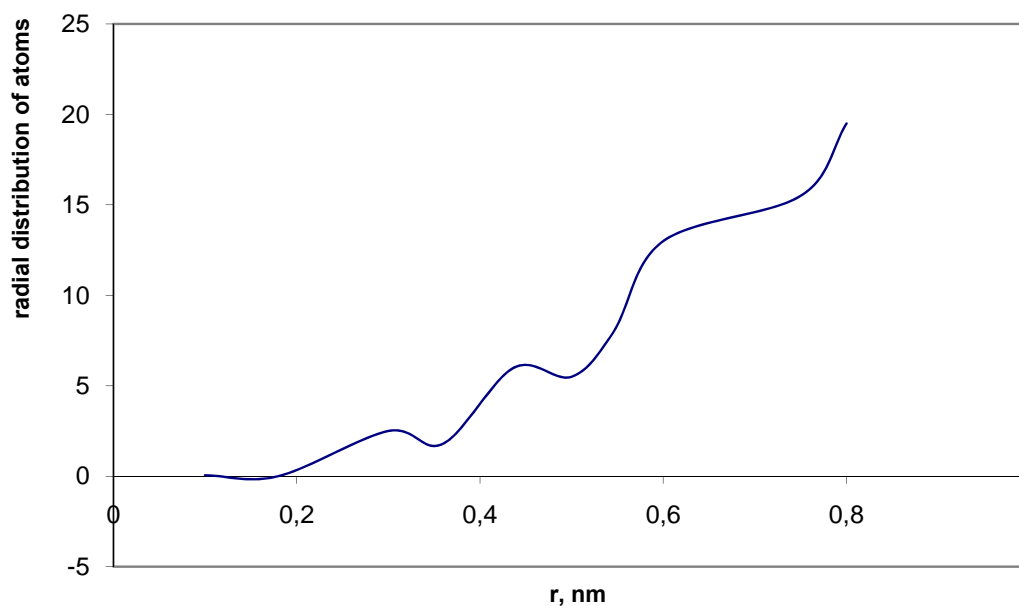


Figure 6 – Atoms radial distribution curve in tellurium melt at temperature 780 K

The value of the first coordination number of melted tellurium near the melting temperature permits to make a conclusion that its structural elements are rather atomic chains. if we suppose that the first maxima position of atoms radial distribution curve in the melt corresponds to the shortest inter-atom distance in atomic chains, then we can conclude that in crystal melting this distance increases and we obtain a distorted crystal structure.

If we suppose that in crystal melting inter-atom distances in atomic chains do not change, then atoms radial distribution in the melt can be presented as a sum of three Gauss curves which maxima are at 0,25; 0,413 and 0,78 nm, then the area under them will be equal to: $Z_1 = 1,9$, $Z_2 = 1,2$, $Z_3 = 7.2$ at temperature 720 K, and at temperature 780 K $Z_1 = 1,8$, $Z_2 = 1,6$ and $Z_3 = 8,1$.

This permits us to suggest a model of liquid tellurium structure presenting atomic chains differing in the value of the shortest distance. All the said permits to present the following picture of structural changes in tellurium. Tellurium melting leads to decaying bonds between atomic chains that build the crystal, but there maintains their existence in liquid state near the melting temperature. The melt heating to temperatures 780-850 K leads to partial decaying the chains and forming new structural elements.

Atoms radial distribution curve in liquid germanium is presented in figure 7, 8, there are also given the data of work [4, 10].

These data comparison with corresponding values for the distance $r_1$=0,294 nm, $Z$=4 shows that germanium melting is accompanied by significant changes in the short-order structure. Starting from the value of the first coordination number $Z_1$=8, V.K. Grigorovich suggested a model of liquid germanium based on the supposition that in melting there takes place its 4-valent electrons separation. Due to this,

there uncover $3d^1$ –electron atom shells, chemically active $3d^6$ – orbitals of which are directed ortho-gonally. As a result of the directed interaction between the neighboring $Ge^{4+}$ ions and collectivized valent electrons there forms a structure with the first coordination number $Z_1=8$. The first coordination sphere radius $r_1=0,28$ nm remains unchanged, and coordination number decreases from 7,62 to 7,25.

Atoms radial distribution curves behavior proves that in melts near $t_{пл}$ there exist statistically stable zones which atomic structure is close to that of the corresponding germanium crystals. The diffraction picture obtained experimentally proves the presence of such ordered zones which life duration ensures the possibility of coherent scattering of the incident X-ray radiation.
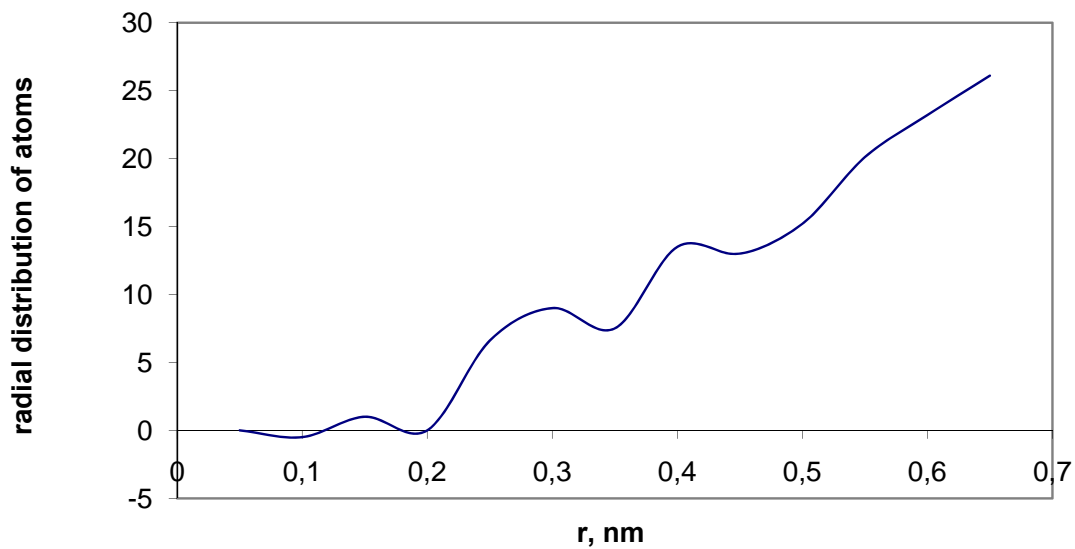


Figure 7 – Atoms radial distribution curve in germanium melt at temperature 1210 K
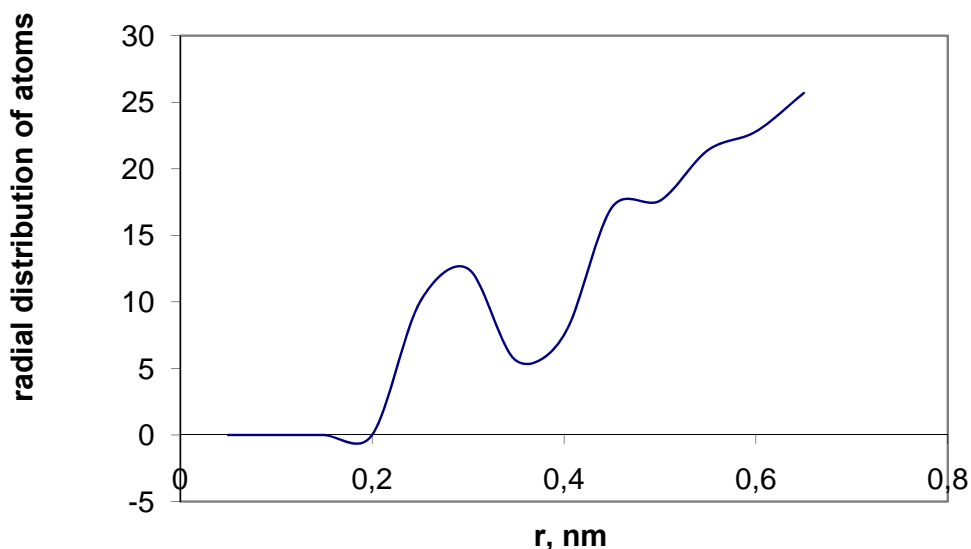


Figure 8 – Atoms radial distribution curve in germanium melt according to work [4] data

The first coordination sphere radius in the melt is 12.7 % more than in crystals, at the first maximum of atoms radial distribution curve in the melt with $Z_1=5.7$ there is the crystal first coordination sphere with $Z_1=4,0$. In the zone of the second coordination sphere in the melt with 10 atoms there are two crystal coordination spheres with 24 atoms. This proves changing the character of inter-atom bond in melting because it is the presence of mainly covalent bonds that defines low $Z_1$ value in crystals.

From comparison between $r_i$ and $Z_i$ for a melt and for a crystal presented in work [9] it follows that the latter is conditioned by prevailing structure consolidation due to $Z_1$ over its loosening due to increasing the shortest inter-atom distance. That's why we can make a conclusion about the similarity of the nearest neighbors in liquid germanium at 1210 K. It's worth noting that this conclusion is based on comparing four parameters of both structures, while supposition of neighbors' similarity in germanium melt follows only from that $Z_1$ in the melt determined by the method of asymmetric solving the first maximum of the radial distribution curve is equal to 8.

The short-order structure of the first type group corresponds well to the model of the fuzzy lattice, the second type group structure is somewhat more "loose" and seems to be conditioned by partial maintaining covalent bonds in a liquid melt. The melt heating leads to the gradual decaying the latter and consequently to the short-range order structure consolidation

The calculated curve of atoms radial distribution for silicon melt at the melting temperature is presented in figure 9, and the results of work [4, 8] in figure 10. Comparing the radial distribution curves in crystal and melted silicon are somewhat different.
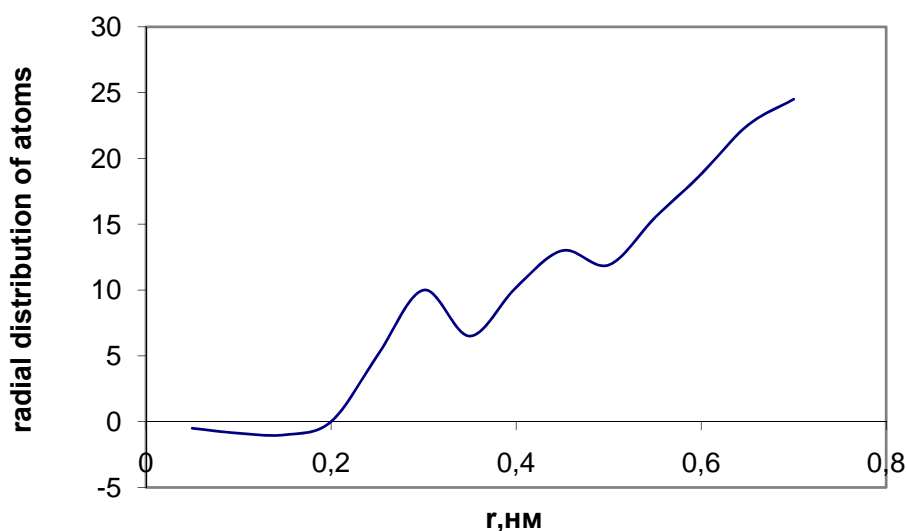


Figure 9 – Atoms radial distribution in silicon melt

In the distance range from 0,3 to 0,48 nm at the radial distribution in the crystal there are two maxima corresponding to the second and the third coordination spheres. In liquid silicon this range corresponds to the second fuzzy maximum, and these distances correspond to coordination numbers $Z_1=6,8$ and $Z_2=12,8$.

**Results.** The difference of radial distributions in crystal and melted silicon may prove that in crystal-melt transition there break covalent inter-atom bonds conditioning tetrahedral location of the nearest neighbors. "Loose" atom packing characterized on the atom radial distribution curve in the crystal by existing distances with a zero or close to zero radial density of atoms, gives place to their more dense packing in the melt.

Crystallographic and chemical similarity of germanium and silicon and the parameter value for the melt and the lattice $r_1=0,52$ make bases to try to describe liquid silicon structure, as well as germanium, by the model of the fuzzy s.c. lattice.
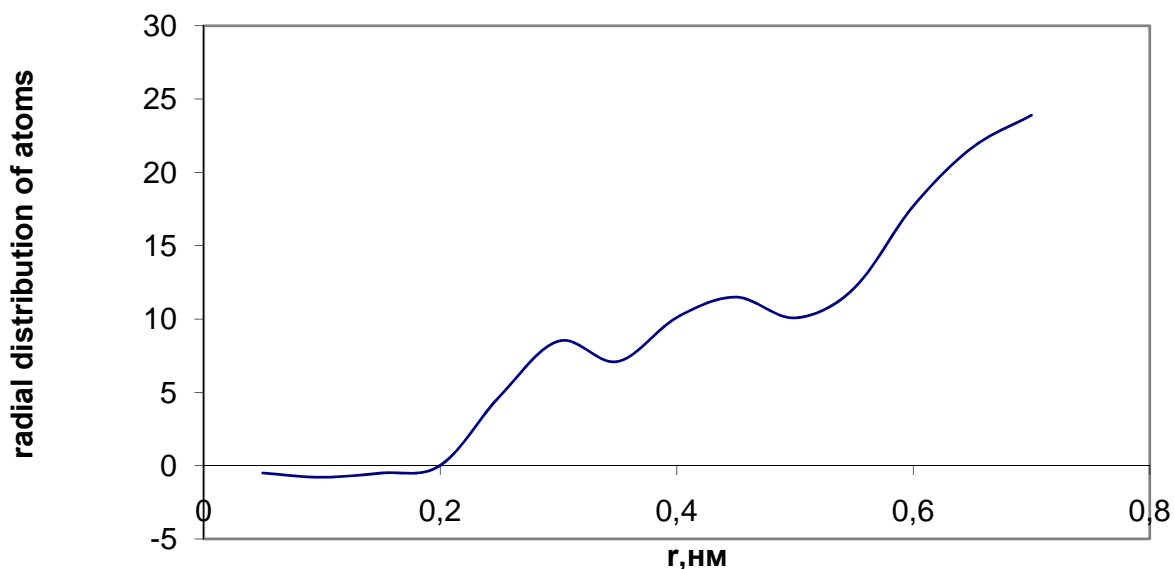
Figure 10 – Atoms radial distribution in silicon melt according to work [4] data

**Discussion.** The theoretical results obtained for the radial distribution of atoms in melts of selenium, tellurium, silicon, and germanium indicate that the semimetals and semiconductors are microheterogeneous. The results of calculations of the potential of pair interaction in germanium and silicon melts indicate that the structural rearrangement associated with the destruction of covalent bonds and their metallization does not end entirely at the melting temperature, but extends over a certain temperature interval within which the process ends.

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## КЕЙБІР ЖАРТЫЛАЙ ӨТКІЗГІШ БАЛҚЫМАЛАРДЫҢ ЖҰПТЫҚ ПОТЕНЦИАЛЫ МЕН АТОМДАРДЫҢ РАДИАЛДЫ ҮЛЕСТІРІМ ФУНКЦИЯЛАРЫ

**Анноатция.** Жұмыста жұптық потенциал бағаланған және тығыздылық функционалы шеңберінде жүргізілген зерттеулердіпайдаланып, германий, кремний сияқты жартылай өткізгіштердің кейбір балқымаларында атомдардың радиал үлестірімінің қисықтарысалынған. В. М. Глазовтың эксперименттік деректерін қатыстыру арқылы германий балқымасындағы жұптық өзара әрекеттесу потенциалын есептеудің нәтижелері және сәйкесінше кванттық-химиялық әдістермен алынған, жұптық өзара әрекеттесудің кванттық потенциалдары келтірілген.

Теориялық түрде селен, теллури, кремний және герман балқымаларындағы атомдардың радиалды үлестіру функциясының температуралық тәуелділігі зерттеледі.Молекулярлық динамика әдісімен есептелген атомдардың радиалды қисықтарын есептеу нәтижелері қарастырылған. Егер балқымадағы атомдардың радиал үлестірімі қисығының бірінші максимумының орны атомдық тізбектердегі атом аралық ең қысқа қашықтыққа сәйкес келетінін болжасақ, онда кристалл балқыған кезде бұл ара қашықтық ұлғаяды және бұрмаланған кристалдық құрылымы алынады деген қорытынды жасау керек..

Тығыздық функционалының шеңберінде германий және кремний балқымаларының атомдардың жұптық әсерлесу потенциалдары есептелген. Жұптық потенциалдар тепе-теңдік аралықтарды тапқан соң Гельман–Фейманның электростатистикалық теоремасы арқылы табылады.

**Түйін сөздер:** жұптық потенциалдар, атомдардың үлестірім функциясы, жартылай өткізгіштік, функционал тығыздығы, атомдар, молекулалық динамика, кластерлік құрылым.

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## ФУНКЦИИ РАДИАЛЬНОГО РАСПРЕДЕЛЕНИЯ АТОМОВ И ПАРНОГО ПОТЕНЦИАЛА НЕКОТОРЫХ РАСПЛАВОВ ПОЛУПРОВОДНИКОВ

**Аннотация.** В работе приведена оценка парного потенциала и построение кривых радиального распределения атомов в некоторых расплавах полупроводников, таких как германий, кремний с использованием проведенных исследований в рамках функционала плотности. Приведены результаты расчетов потенциала парного взаимодействия в расплаве германия с привлечением экспериментальных данных В. М. Глазова и квантовые потенциалы парного взаимодействия, полученные квантовохимическими методами, соответственно.

Теоретически исследованы температурные зависимости радиальной функции распределения атомов в расплавах селена, теллура, кремния и германия. Рассмотрены результаты расчета кривых радиального распределения атомов, рассчитанные методом молекулярной динамики. Если предположить, что положение первого максимума кривой радиального распределения атомов в расплаве соответствует кратчайшему межатомному расстоянию в атомных цепях, то следует сделать заключение, что при плавлении кристалла это расстояние увеличивается и получается искаженная кристаллическая структура.

Потенциал парного взаимодействия в расплавах германия, кремния с использованием проведенных исследований оценивается в рамках функционала плотности. Парные потенциалы вычисляются по электростатической теореме Гельмана–Фейнмана, после нахождения оптимальной электронной плотности, соответствующей равновесный межъядерный интервал.

**Ключевые слова:** парные потенциалы, радиальные распределения атомов, полупроводник, функционал плотности,структурный фактор, атомы, молекулярная динамика, кластерная структура.

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# POLYMORPHISMS OF SOME GENES,
# ASSOCIATED WITH HYPERTENSION:
# A REVIEW OF RELEVANT PUBLICATIONS

**Abstract.** Purpose of the review: To review relevant publications on the study results of gene polymorphisms in hypertension.

Methodology: A search of relevant publications was conducted in electronic databases including Embase, PubMed/Medline, Science Direct, Ebscohost, Springer Link, The Cochrane Library, Web of Knowledge (Thomson Reuters), and eLibrary. The depth of search for publications was 16 years (2002-2018). More than 30 publications were selected and reviewed as analytical material for this article. The inclusion criteria were meta-analyzes, systematic reviews, full-text articles published earlier in 2002, the results of randomized studies, research reports with evidence base.

Results and conclusion. An analysis of relevant publications indicated that despite the many ongoing studies on the polymorphisms of genes involved in the renin-angiotensin-aldosterone system in hypertension, the results of these studies are contradictory. Sample size, the specific population and other external factors influence study results. Each population has its own characteristics that affect the result of the study. When assessing the association between gene polymorphisms and the risk of hypertension, it is necessary to take into account changes in the genes with the geographical features of the studied population. In addition, an example of such a study would be the Kazakh population.

**Keywords:** hypertension, gene polymorphisms, single nucleotide polymorphism, renin-angiotensin-aldosterone system.

**Introduction.** Hypertension is a widespread chronically occurring multifactorial disease that is associated with the interaction between the genetic background and environmental factors [1]. The prevalence of hypertension throughout the world is constantly growing, and medical costs associated with treating its complications are increasing exponentially in all countries. According to the World Health Organization, hypertension is globally one of the risk factors for a number of non-communicable diseases.

One of the proven risk factors for the development of hypertension is a genetic predisposition in which the signs of this disease are transmitted to offspring. Identification of genetic factors to predict the formation and progression of hypertension and its complications is an important task for the Republic of Kazakhstan due to the high prevalence and epidemiological, medico-social and economic significance of hypertension for society and the health system [2, 3].

Genetic factors largely determine the risk of developing hypertension and target organ damage, are constant throughout the life of the individual and can be diagnosed at any time, including well before the onset of the clinical symptoms of the disease. However, most of the identified genetic factors were obtained in studies of people of European descent, whereas there are significant differences in the association of polymorphisms in genes with diseases between representatives of the Asian and European populations.

To date, there are many studies that are devoted to the study of gene polymorphisms in various diseases including hypertension.

**The purpose** of this article is to review relevant publications on the study results of gene polymorphisms in hypertension.

**Materials and methods.** A search of relevant publications was conducted in electronic databases including Embase, PubMed/Medline, Science Direct, Ebscohost, Springer Link, The Cocrane Library, Web of Knowledge (Thomson Reuters), and eLibrary. The depth of search for publications was 16 years (2002-2018). The following search terms were used for the search: "hypertension" OR "essential hypertension" OR "high blood pressure", "gene polymorphisms" OR "single nucleotide polymorphisms" OR "polymorphism", "genetic association" OR "genetic variant" OR "genetic association study". More than 30 publications were selected and reviewed as analytical material for this article. The inclusion criteria were meta-analyzes, systematic reviews, full-text articles published earlier in 2002, the results of randomized studies, research reports with evidence base. All selected publications were in English and Russian, and included studies in individuals with hypertension and metabolic syndrome.

**Results and discussion.** To date, there have been identified a polymorphism of dozens of genes claiming to be hereditary markers of hypertension and other cardiovascular diseases.

In large-scale studies (GWAS), international consortia (Global Blood pressure gen Consortium, CHARGE, International Consortium for Blood Pressure, Asian genetic epidemiological network) evaluated associations between genomic variants and phenotypic traits in different ethnic groups and identified 147 single-nucleotide polymorphisms associated with hypertension and the risks of target organ damage [4-8].

The search for candidate genes in hypertension should be based on existing ideas about the mechanisms of their development. Therefore, special attention was paid to the study of genes involved in the renin-angiotensin-aldosterone system (RAAS), since the RAAS affects the homeostasis of the vascular volume and vascular tone [9, 10]. We analyzed various genes - candidates for hypertension to determine their association with each other.

*Angiotensin-converting enzyme (ACE).* Among numerous studies, considerable attention was paid to the study of the polymorphisms of the angiotensin-converting enzyme gene, which catalyzes the splitting of inactive angiotensin I to active angiotensin II. There are a number of polymorphisms in the ACE gene. One of them is associated with the insertion (I) or deletion (D) of the Alu element with a size of 287 base pairs in the 16th intron and 3 genotypes are distinguished: I/I homozygotes, D/D deletion homozygotes, I/D heterozygotes [11]. Genotype II carriers have the lowest enzyme level, while in people with DD genotype, it is maximal. Therefore, the presence of allelic variant D leads to an increased content of angiotensin II, a decrease in the level of bradykinin and may be a risk factor for cardiovascular disease.

Currently, there are many studies on insertion-deletion (ID) polymorphism of the ACE gene in patients with hypertension. In the world as we know the ethnic origin affects the gene polymorphism of ACE I/D [12]. Some studies conducted in the African, Australian, Mongolian, and Pakistani populations revealed a link between the polymorphism of the ACE DD gene and the development of hypertension.

Tchelougou D. et al. (2015) investigated the association between the three polymorphisms of the renin-angiotensin system and hypertension in the African population. The study results showed a strong link between the polymorphism of the ACE I/D genes and the development of hypertension. Therefore, they indicate that the DD genotype is a predictor of the risk of hypertension, regardless of other environmental factors [13].

In addition, other studies have demonstrated a link between allele I and hypertension [14]. The limited number of individuals studied and the presence of high levels of inbreeding [15] explained the association between allele I and hypertension in the Pakistani population.

However, some studies conducted in the Belgian, Dutch, Indian and Bangladeshi populations did not reveal any connection between the polymorphisms of the ACE gene and hypertension [16].

Sumeet G. et al. (2009) in their study have seen that the polymorphism of the ACE I/D genes is not a risk factor for the development of hypertension in the study of rural population from India.

The inability to find a link between the polymorphism of the ACE I/D genes and hypertension in this study strongly suggests that the ACE gene does not play a dominant role in the pathophysiology of hypertension in the Indian population and it is not a good predictor of hypertension [17].

Thus, ethnic and geographical differences may affect the ACE I/D polymorphisms, but their association with the development of hypertension remains controversial.

***Type I angiotensin II receptor (AGTR1).*** The gene encoding angiotensin II receptor type I (AGTR1) is located on chromosome 3 (3q24). Activation of the renin-angiotensin-aldosterone system and the subsequent generation of angiotensin II play an important role in normal physiology and in the progression of heart and kidney diseases. According to G. Nickenig and D. Harrison (2002) study, type I angiotensin II receptor is regulated by different mechanisms.

Glucocorticoids, aldosterone, insulin, LDL, estrogen, progesterone, sodium influence the expression of the angiotensin II receptor of type I. Increased serum LDL levels play a fundamental role in the pathogenesis of hypertension. An increased level of LDL enhances angiotensin II type I receptor mRNA and protein expression, thereby increasing angiotensin II sensitivity [18].

Fung M. and a group of researchers (2011) in their work showed that polymorphisms of the AGTR1 gene can contribute to the development of hypertension in patients with highly normal blood pressure indicators [19]. In this study, insulin resistance was observed in patients with highly normal blood pressure, and this was associated with the metabolic syndrome. Moreover, the less studied A/G polymorphism was associated with HDL and apolipoprotein A1.

Palatini P. et al. (2009) investigated the effects of A1166C gene polymorphism for AGTR1 and -1332G/A for AGTR2 on the incidence of stable hypertension and metabolic syndrome in a cohort of young patients who had screening test for stage I hypertension. They showed that SS genotype carriers increased the risk of developing metabolic syndrome, which was due to an increased tendency to gain weight and the presence of hypertension. According to the results of this study, the polymorphism of the AGTR1 gene is a significant predictor of the development of hypertension and metabolic syndrome [20].

Sean O. Henderson et al. (2004) showed that the T allele (-535) of the AGTR1 gene and the T allele (-344) of the CYP11B2 gene may increase the risk of hypertension among African Americans, but not among Hispanics [21].

S. Mehri et al. (2011) studied the association between the genes AGTR1 and ACE with the risk of developing cardiovascular diseases. The study indicated that the A1166C polymorphisms of the AGTR1 gene are genetic risk factors for the development of cardiovascular disease [22].

According to Behravan J. et al. (2006), the frequency of the C allele of the AGTR1 gene was higher in women with hypertension than in women without hypertension, and in men, this frequency was not observed [23]. The authors explain that the A/CC genotype is associated with higher blood pressure numbers than the AA genotype in women. In addition, the results of the study showed that some components of the RAAS in women are regulated by estrogen.

Abdollahi M. and a group of researchers conducted a new approach to quantifying the haplotypes of the AGTR1 gene transcript [24]. The authors studied the association of homozygous and heterozygous haplotypes with the metabolic syndrome and, as a result, the metabolic syndrome was associated with the C allele rs5186 of the AGTR1 gene.

Shatskaya E. et al. (2011) conducted a study to identify the association between the genes - candidates of the RAAS, lipid metabolism, hemostasis factors responsible for the function of the endothelium and hypertension [25]. The results of the study showed that the A1166C polymorphism of the AGTR1 gene was more common in patients with hypertension and was associated with parameters of hemodynamics and metabolic status, determining the risk of developing cardiovascular complications in patients with hypertension.

***Aldosterone synthase (CYP11B2).*** The CYP11B2 gene encodes a second cytochrome P450 polypeptide of family 11, subfamily B (cytochrome P450, subfamily XIB, polypeptide 2; CYP11B2), catalyses the last step in the synthesis of the hormone aldosterone from deoxycorticosterone. Several single nucleotide polymorphisms are known in the CYP11B2 gene. The most fully studied polymorphism, which is manifested in the replacement of cytosine by thymine in the -344th position of the nucleotide sequence, in the regulatory region of the gene. This site is the binding site of steroidogenic transcription factor SF-1, an expression regulator for aldosterone synthase gene. According to research, the allele T leads to increased production of aldosterone, which in turn is associated with hypertension.

Many researchers have studied and analyzed single nucleotide polymorphisms of the gene that affect the function of aldosterone synthase activity. As a result, they created a database on the polymorphisms of this gene [26].

Y.R. Kim et al. (2014) examined the association of the polymorphisms -344C/T, K173R and IC of the CYP11B2 gene with hypertension in Korean patients. The study authors found that the genotype RR polymorphism K173R was associated with the development of hypertension [27].

Chandra et al. (2015) in their study determined the correlation between increased expression of the CYP11B2 gene and hypertension [28]. They consider these results as a factor in the progression of increased blood pressure in patients with hypertension.

E. Androulakis (2012) and other scientists studied the effect of aldosterone synthase gene polymorphism on vascular dysfunction and inflammation in hypertension. As a result, they concluded that the homogeneous T allele of the polymorphism –344C/T of the CYP11B2 gene is a marker of the risk of developing hypertension, but it was not associated with vascular changes in hypertension [29].

Many scientists use large-scale studies of the association of genomic diseases (GWAS) and candidate genes to study the genetic basis of hypertension and among these scientists were K. Miyaki (2012) et al. who studied 12 independent gene variants [30].

Sh. Niu et al. (2016) studied the effect of polymorphisms of RAAS genes on hypertension in the Kazakh population living in northwestern China [31]. As a result, the authors found that a strong synergistic effect between polymorphisms of ACE I/D and CY11B2 T-344C genes and a moderate effect between polymorphisms of ACE I/D and CY11B2 T-344C genes increases the risk of developing hypertension among Kazakhs.

F. Takeuchi et al. (2012) in their large study on the Japanese population evaluated the association of blood pressure with seven candidate genes [32]. The researchers found a link between the rs1799998 polymorphism of the CYP11B2 gene and the rs699 of the AGT gene with hypertension.

However, there have been some studies, the results of which did not reveal the association of CYP11B2 gene polymorphisms with the development of cardiovascular diseases [33-37].

**Conclusion.** An analysis of relevant publications indicated that despite the many ongoing studies on polymorphisms of genes involved in the RAAS in hypertension, the results of these studies are contradictory. Sample size, the specific population and other external factors influence study results. Each population has its own characteristics that affect the result of the study.

Thus, to assess the association between gene polymorphisms and the risk of hypertension, it is necessary to take into account changes in the genes with the geographical features of the studied population. The Kazakh population study of polymorphisms associated with hypertension could significantly complement global studies and accelerate the acquisition of specific data for the development of personalized approaches in the prevention and treatment of hypertension.

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### АРТЕРИЯЛЫҚ ГИПЕРТЕНЗИЯМЕН АССОЦИАЦИЯЛАНҒАН КЕЙБІР ГЕНДЕРДІҢ ПОЛИМОРФИЗМДЕРІ: БЕЙІНДІ ЖАРИЯЛАНЫМДАРҒА ШОЛУ

**Аннотация.** Мақсаты: Артериялық гипертензия кезінде гендер полиморфизмдерін зерттеу нәтижелері бойынша бейінді жарияланымдарға шолу жасау.

Әдістеме: Embase, PubMed/Medline, Science Direct, Ebscohost, Springer Link, Кокран кітапханасы, Web of Knowledge (Thomson Reuters), eLibrary кіретін электрондық дереккорларында бейінді жарияланымдарға іздеу жүргізілді. Жарияланымдарды іздеу тереңдігі 16 жыл (2002-2018 жж.) болды. Осы мақаланың талдамалық материалы ретінде 30-дан астам жарияланымдар қарастырылып іріктелді. Жарияланымдарды қосу критерийлері болып 2002 жылдан бастап жарияланған толық мәтінді мақалалар, мета-анализдер, жүйелі шолулар, рандомизацияланған зерттеулердің нәтижелері, дәлелденген негізі бар зерттеу есептері табылды.

Нәтижелер мен қорытындылар: бейінді жарияланымдарды талдау артериялық гипертензиядағы ренин-ангиотензин-альдостерон жүйесінде қатысатын гендердің полиморфизмдеріне қатысты көптеген зерттеу-

лерге қарамастан осы зерттеулердің нәтижелері қарама-қайшылықты көрсетті. Зерттеу нәтижелеріне іріктеу өлшемі, нақты популяция және сыртқы факторлар әсер етеді. Гендердің полиморфизмдері мен артериялық гипертензияның даму қаупінің өзара байланысын бағалау кезінде әртүрлі географиялық ерекшеліктерге әсер ететін халықтың гендеріндегі өзгерістерді ескеру қажет. Осындай зерттеудің мысалы ретінде қазақ популяциясы бола алады.

**Түйін сөздер:** артериялық гипертензия, гендер полиморфизмдері, бір нуклеотидті полиморфизм, ренин-ангиотензин-альдостерон жүйесі.

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## ПОЛИМОРФИЗМЫ НЕКОТОРЫХ ГЕНОВ, АССОЦИИРОВАННЫЕ С АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИЕЙ: ОБЗОР ПРОФИЛЬНЫХ ПУБЛИКАЦИЙ

**Аннотация.** Цель: провести обзор профильных публикаций по результатам изучения полиморфизмов генов при артериальной гипертензии.

Методология: проведен поиск профильных публикаций в электронных базах данных, вошедших в Embase, PubMed/Medline, Science Direct, Ebscohost, Springer Link, The Cochrane Library, Web of Knowledge (Thomson Reuters), eLibrary. Глубина поиска публикаций составляла 16 лет (2002-2018 гг.). Были рассмотрены и отобраны более 30 публикаций в качестве аналитического материала для данной статьи. Критериями включения являлись мета-анализы, систематические обзоры, полнотекстовые статьи, опубликованные не ранее 2002 года, результаты рандомизированных исследований, отчеты исследований, имеющие доказательную базу.

Результаты и заключение. Анализ профильных публикаций показал, что несмотря на множество проводимых исследований по полиморфизмам генов, участвующих в ренин-ангиотензин-альдостероновой системе при артериальной гипертензии, результаты этих исследований очень противоречивы. На результаты исследования влияет размер выборки, конкретная популяция и внешние факторы. При оценке взаимосвязи полиморфизмов генов и риска развития артериальной гипертензии необходимо учитывать изменения в генах популяции, испытывающей влияние различающихся географических особенностей. И примером такого исследования могла бы стать казахстанская популяция.

**Ключевые слова:** артериальная гипертензия, полиморфизмы генов, однонуклеотидный полиморфизм, ренин-ангиотензин-альдостероновая система.

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# SPECIFIC FEATURES
# OF CHRONIC TONSILLITIS DURING PREGNANCY

**Abstract.** The effect of chronic tonsillitis during pregnancy on the course and outcome of pregnancy, the effect on the fetus is considered. Against the background of chronic tonsillitis, pregnant women develop not only various pregnancy complications, but also a negative impact on the development of the fetus and newborn, therefore timely treatment and prevention of this pathology during pregnancy is necessary.

**Key words:** chronic tonsillitis, pregnancy, microbial flora.

Maternal and child health protection is reflected in the Strategic development plan of the Ministry of health of the Republic of Kazakhstan until 2021, the National concept of social development of the Republic of Kazakhstan until 2030, the Strategy "Kazakhstan – 2050: a new political course of the established state».

In the Republic of Kazakhstan, "The national model of social support for families with children" is represented by a system of measures aimed at stimulating the birth rate, increasing the prestige and authority of mothers with many children, supporting families with disabled children, supporting low-income families [1-3].

The comprehensive measures currently being taken in the country have had a positive impact on the demographic situation. Such measures include measures to improve the reproductive health of women, early detection of diseases, dispensary monitoring and their recovery; consultations on family planning and choice of contraceptive method, as well as measures to prepare for pregnancy.

The need for in-depth research and development of preventive measures aimed at minimizing the negative impact of chronic tonsillitis on the course and outcome of pregnancy is one of the indicators of the implementation of the provisions of the "National model of social support for families with children».

Chronic tonsillitis (CT) – a widespread pathology, occurs up to 44% of the adult population. The problem of chronic tonsillitis occupies a leading position in the structure of ENT-diseases. According to the world health organization, more than 100 somatic diseases of immunopathological profile with a leading infectious-dependent toxic-allergic mechanism are associated with chronic tonsillitis [5-7].

CT, as an extragenital chronic infection, affects not only the course and outcome of pregnancy, but also the development of the fetus, there is a direct pathogenetic relationship between the frequency of various complications of pregnancy and childbirth [4, 5]. In the literature when describing infection of the oropharynx may encounter the terms "pharyngitis", "tonsillitis" and "tonsillopharyngitis", with the first often refers to the defeat of the mucous membrane of the pharynx and tonsils. Currently, in foreign literature, both of these diseases are combined into one and widely use the term "tonsillopharyngitis", because of the close anatomical location and the similarity of the histological structure, inflammation of the tonsils rarely does without inflammation of the mucous membrane of the pharynx and vice versa [6].

**Based on the above**, the identification of the role of chronic inflammatory diseases of the oropharynx in the course and outcome of pregnancy is an urgent problem of modern medicine. Most researchers believe that the occurrence of CT is associated with a violation of immunobiological processes in the tonsils of the palatine, which affects the protective and adaptive mechanisms of lymphadenoid tissue and

reduces its resistance to infection. Palatine tonsils are a reflexogenic zone, which has numerous connections with the central nervous system and various internal organs. The structure of the nervous apparatus of the palatine tonsils includes almost all known types of extra-and interoreceptors that perceive mechanical, thermal, chemical, osmo-and barometric, as well as pain stimuli. Receptors in the Palatine tonsils are represented by V and IX pair of cranial nerves, which are mixed, that is, contain both afferent and efferent fibers. Nerve endings occur in the parenchyma of the tonsils, and in the epithelium, and it is very important to note the presence of nerve plexus and chemoreceptors, located submucosally near the lacunas, from which pathological impulses can originate in inflammatory processes in the latter. In CT, the pathological process involves primarily the afferent link of the nervous apparatus of the tonsils, so with angina and exacerbations of tonsillitis, the palatine tonsils become not only the "gate" of infection, but also the foci of pathological impulses [9].

Studies of single nucleotide polymorphisms (single nucleotide polymorphism, SNP) for their association with a high probability of the development of a particular pathology are becoming increasingly popular. The association of C-allele polymorphism (T280M) *CX3CR1* with the possibility of CT is found. The above data suggest the possibility of multifactorial nature of the disease [7-9].

As shown by the research of scientists in the analysis of endotoxicosis in 444 patients of which 116 with chronic tonsillitis, the dependence of the nature of endotoxemia on the nosological form of pathology was established. This is reflected in the compensatory-protective reactions of the body depending on the level of damage to its tissues by toxic agents, which is associated with violations of the processes of lipo-peroxidation on cell membranes and insufficient functional activity of antioxidant enzymes. Analysis of these studies showed that in pregnant women with HT were observed following mechanisms of damage of the biomembrane as a result of perincioli POL: first - polymerization, and aggregation of biomolecules; second, the oxidation of amino acid residues of membrane proteins, loss of enzyme activity, which leads to a decrease of catalase activity of blood; third, the violation of hydrophobicity with the increase of the permeability of phospholipid bioloy. Having studied the causes of process disorders, scientists have come to the important conclusion that modern therapy of chronic pathological processes should use natural and synthetic antioxidants [10]. Scientists have found that one of the causes of miscarriage and miscarriage are chronic diseases of ENT organs, among which a significant role is played by chronic tonsillitis. Monitoring of the course and outcome of pregnancy in 217 women with preterm birth, it was found that most of them had a high incidence of ENT diseases, namely, often encountered acute 21.7% and chronic tonsillitis 17.4%. In 47.8% cases of preterm births, 33-37 weeks of gestation were observed. This indicates that in the terms of 37-38 weeks of gestation there is a low titer of antistreptococcal antibodies in the serum of the mother and the late transplacental transmission of matein immunoglobulins observed in these terms explains the high incidence of septic diseases of newborns [11].

According to the study of N. V. Volchok and O. G. Drazhina, CT is often combined with genital and extragenital inflammatory processes, which requires careful preparation for pregnancy. Microbial spectrum according to the results of sowing from the pharynx were as follows: alpha-hemolytic Streptococcus viridans – 20 pregnant women (67%), Candida albicans – 4 women (13%), Neisseria species – 3 women (10%), Streptococcus pneumonia – 3 women (10%), Staphylococcus aureus – 2 women (7%), Enterobacter cloacae – 2 women (7%), Klebsiella pneumoniae – 1 woman (3%), Staphylococcus epidermidis – 1 woman(3%).

According to the results of sowing from the throat, in pregnant women with CT, alpha-hemolytic Streptococcus viridans is more common (in 67% of cases). According to the sensitivity of the identified microflora to AB drugs, the authors recommended to start treatment of chronic tonsillitis with cephalosporins empirically, when receiving the results of sowing, correction of AB therapy is possible [12].

Currently, in the Republic of Kazakhstan there is no certain tactics of management of pregnant women with CT, as not all therapeutic measures can be carried out to a pregnant woman because of the risk of toxic effects on the fetus. In studies of the I. V. Dolina, it was found that in pregnant women with CT in the gaps was most prevalent pathogens (a total of 81.25% - 26 patients) and opportunistic (18.75 per cent in 6 patients) microflora. This indicates a strict selection of antibacterial drugs, taking into account the sensitivity of the isolated microbial flora. Also of great importance is the local aseptic therapy and timely sanitation of the oral cavity [13].

Distribution of sensitivity of the revealed microorganisms to antibacterial preparations

| Group of antibiotics | Str. viridans n = 20 | Str. pneumonia n = 3 | Staph. epidermidis n = 1 | Staph. aureus n = 2 | Ent. Cloacae n = 2 | Kleb. pneumonia n = 1 |
|---|---|---|---|---|---|---|
| B-lactam: **penicillins appointment in pregnant women – allowed** | 6 | 1 | 1 | 1 | – | – |
| Cephalosporins **appointment in pregnant women – allowed** | 7 | 2 | 1 | 2 | 2 | 1 |
| Aminoglycosides **appointment in pregnant women – not allowed** | 1 | 1 | 1 | 1 | 2 | 1 |
| Macrolides **appointment in pregnant women – allowed** | 7 | 3 | 1 | 2 | – | – |
| Lincosamides **appointment in pregnant women – not allowed** | 4 | 1 | 1 | 1 | – | – |
| Tetracyclines **appointment in pregnant women – not allowed** | 4 | 1 | 1 | – | 2 | 1 |
| Glycopeptides **appointment in pregnant women – allowed in II, III trimesters** | 3 | 1 | 1 | – | – | – |
| Quinolones/f**to**rquinolones **appointment in pregnant women – not allowed** | 8 | 1 | – | 2 | 2 | 1 |
| Oxazolidinones (linezolid**) application is possible if the expected benefit to the mother exceeds the potential risk to the fetus** | – | – | – | 2 | – | – |

In recent years, the most interesting is the study of the features of human microbiota. Studies indicate the relationship of microecological intestinal, vaginal, and nasopharyngeal biocenosis in the composition of the microbiome of humans. According to research, more than 10 thousand species of various microorganisms cohabit in the human body. 95% of microbiome bacteria belong to the species inhabiting the oral cavity. Thus, in women with vaginal microbiota disorders, intestinal dysbiosis and chronic diseases of the nasopharyngeal biotope are more often detected, which in turn contributes to the chronization of the inflammatory process in the pelvic organs, treatment inefficiency, an increase in the risk of an adverse pregnancy outcome and a decrease in the quality of life [14].

The results of American studies show that the placenta carries a microbe, which mainly consists of non-pathogenic flora: Firmicutes, Tenericutes, Proteobacteria, Bacteroidetes and Fusobacteria phyla. This composition of the placental microbiome is most similar to the composition of the oral microbiota of non-pregnant women. In the placenta, several types of microorganisms of the oral cavity were found, including *Prevotella tannerae* (it occurs on the crevices of the gums) and non-pathogenic species *Neisseria* (on the surface of the oral mucosa). Special similarity of the microbiota of the placenta detected composition of the microbiota is taken from the tongue, tonsils and magdesieva of the splits obtained from the oral cavity of non-pregnant women. Most of the taxa detected in the placenta using DNA technology are not found in the genitourinary tract, and are part of the microbiota of the oral cavity. Some of these oral microbes such as *Fusobacterium nucleatum* (gram-negative oral anaerobic), can hematogenously penetrate into the vascular endothelium during placentation as a result of changing the permeability, and thus act as "activator" pathological influence of other microorganisms, such as *Escherichia coli*. The available data indicate that placental microbiome probably occurs due to hematogenous spread of microorganisms of oral microbiota during early vascularization and placentation in the first trimester of pregnancy [15-19].

Canadian scientists have recently suggested that the maternal microbiota contributes to a smooth pregnancy and that microbiota dysbiosis can lead to premature birth. The vaginal microbiome and its Lactobacillus species participate in the function of the "vaginal filter", preventing the spread of pathogens ascending into the uterine cavity. It is assumed hematogenous spread of oral bacteria in the uterus. Thus, the maternal microbiome can play both a protective and causal role in the occurrence of spontaneous premature birth [20].

Scientists from Canada argue that recent advances in sequencing and metagenomic analysis have shown that the composition of the microbiome in various niches: oral, vaginal, intestinal and even the placenta, affect the course and outcome of pregnancy [21].

In the study of the relationship of oral microbiota and adverse pregnancy outcome, scientists confirm the spread of pathogenic bacteria, such as: *fu. Nucleatum* , *po. Gingivalis* , *fi. Alocis*, *c. Rectus* etc., who are potential participants in adverse pregnancy outcomes. The validity of the association between oral disease and adverse pregnancy outcomes is likely to include several pathways: 1) hematogenous spread (bacteremia) of pathogenic periodontal microorganisms; 2) hematogenous spread of multiple inflammatory mediators that are generated by the host and / or fetus immune response to pathogenic bacteria; and 3) possible oral transmission of the microbial pathogen followed by colonization in the vaginal microbiome as a result of sexual practices. American scientists came to such conclusion [22-25].

**Conclusion.** Thus, summing up, all of the above leads to the conclusion that pregnant women with chronic tonsillitis form a risk group during pregnancy and many somatic disorders and require increased attention from both otolaryngologists and doctors of other specialties. It is necessary to comprehensively consider the pathology of chronic tonsillopharyngitis in pregnant women, to conduct a thorough diagnosis and targeted therapeutic measures to eliminate exacerbations and complications of this pathology, as well as it is important to carry out prevention during pregnancy. Only such a comprehensive approach can reduce the number of complications in pregnant women with chronic tonsillitis.

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## ЖҮКТІЛІК КЕЗІНДЕГІ
## СОЗЫЛМАЛЫ ТОНЗИЛЛИТ АҒЫМЫНЫҢ ЕРЕКШЕЛІГІ

**Аннотация.** Жүктілік кезеңінде созылмалы тонзиллиттың жүктілік кезінде және нәтижесіне әсер етуі ұрыққа әсер етеді. Созылмалы тонзиллит аясында, жүкті әйелдер әртүрлі жүктілік асқынуларын ғана емес, сонымен қатар ұрық пен нәрестенің дамуына теріс әсерін тигізеді, сондықтан жүктілікті уақытында емдеу және осы патологияның алдын-алу қажет.

**Түйін сөздер:** созылмалы тонзиллит, жүктілік, микробтық флора.

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## ОСОБЕННОСТИ ТЕЧЕНИЯ ХРОНИЧЕСКОГО ТОНЗИЛЛИТА
## ПРИ БЕРЕМЕННОСТИ

**Аннотация.** Рассмотрено влияние хронического тонзиллита при беременности на течение и исход беременности, воздействие на плод. На фоне хронического тонзиллита у беременных женщин развиваются не только различные осложнения беременности, но и отрицательное влияние на развитие плода и новорожденного, поэтому необходимо своевременное лечение и профилактика данной патологии во время беременности.

**Ключевые слова:** хронический тонзиллит, беременность, микробная флора.

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# BASULIFOR PROBIOTIC SUPPLEMENT, ITS IMPACT ON BODY AND PRODUCTIVITY OF YOUNG QUAILS

**Abstract.** For the first time, on the basis of comprehensive research, the feasibility of using Basulifor domestic probiotic supplement in the growing technology of quail was scientifically grounded and experimentally proved. The feed additive contributed to an increase in the number of erythrocytes in the blood of birds by 5.20-5.69% (P<0.05), hemoglobin concentration - by 3.80-4.48 (P<0.05), the amount of total protein in serum blood - by 3.89-6.66% (P<0.05), gamma globulins - by 7.29-8.03% (P<0.01), class A immunoglobulins - by 11.50-15.30% (P<0.01), IgM - by 7.14-10.70% (P<0.01), IgG - by 6.54-6.80% (P<0.01), birds' preservation - 93.0 to 97.34% (P<0.01). It was established that the 1st and 2nd experimental groups quails surpassed their peers in control in live weight by 5.30 and 10.50 g (P<0.05), the average daily gain was 0.08 and 0.17 g. Killing yield of quails against the background of the use of feed supplement was higher by 1.97% and 3.76% (P<0.05) rather than in the control group. Quail meat samples of the 1st experimental group treated with ozone-air mixture at a dose of 5 mg/m$^3$, without losing their quality indicators, remained for 18.00±0.36 days, and in the 2nd experimental group when processing meat samples with ozone in a dose of 10 mg/m$^3$ - for 24.00±0.53 days. Compared with the control batch of meat, these indicators in the experimental groups were higher by 12.0 and 18.0 days (P<0.01). The novelty of the obtained data is confirmed by the fact that for the first time the feasibility of correcting the morphological, biochemical, and immune status of the body, increasing the preservation, productivity and quality of meat products of young quails by using Basulifor probiotic feed additive has been proved.

**Keywords:** quail, Basulifor feed supplement; immunoglobulins; growth; productivity; meat quality.

**Introduction.** In recent years, in Russia quail farming has been widely distributed, because the products are valued not only in quality, but also in a short period of reproduction. Being one of the important branches of the poultry industry, quail farming was created as a complex system, providing processes from poultry reproduction to the production of finished products, and sale. Quails, unlike other birds, have several distinctive advantages: they have a high temperature, an intense metabolism, a small size, a high precocity, and egg production capacity. In Germany, France, Great Britain, Italy, Canada, quail products are valued so highly that special farms are organized for the production of their products [1-8].

The development and implementation of efficient technologies for keeping, feeding and servicing birds into the production process, although it allows to increase productivity, improve the quality of the products and profitability of the industry as a whole, however, it often violates the relationship of the bird organism with the environment and traditional conditions of keeping and feeding established during the phylogeny. Processing methods of modern poultry complexes, irrational use of antibacterial drugs cause a violation of metabolism, reduce the resistance of the quail body, which ultimately leads to high morbidity and low productivity. In such conditions, the nature of the bird and the physiological features of the organism are not able to vary as quickly as the conditions of keeping, feeding and the poultry technology as a whole. Often the bird cannot avoid the action of stress factors, adapt to changing environmental conditions, which leads to various functional disorders and diseases [9-14].

In the light of the above, the development and introduction of new domestic probiotic feed supplement to the manufacturing technology of dietary meat of young quails to enhance the body's protective and adaptive mechanisms to the environmental conditions and realize the bioresource potential of the meat qualities of young quails is a topical issue.

**The aim of this work** is a scientific substantiation of the use of the Basulifor supplement to activate nonspecific resistance and productive potential of young quails.

**Material and methods.** Experimental studies were conducted in the poultry farm of Tsivilsky district of the Chuvash Republic in accordance with the research plan of the Chuvash State Agricultural Academy, and the material processing was carried out in the Chuvash Republican Veterinary Laboratory of the State Veterinary Service of the Chuvash Republic and in the laboratory of the Department of Morphology, Obstetrics and Therapy of the Chuvash State Agricultural Academy in the period from 2014 to 2017.

The objects of research were quails of the Japanese breed of the egg direction from 1-day to 60-day-old age and quail meat. In the scientific and economic experience, three groups were formed based on the principle of pairs-analogues taking into account the clinical and physiological state, age and live weight of 300 birds (150 females and 150 males) in each group.In order to improve the reproductive qualities of the Japanese quail breed and the productive potential of birds the Basulifor probiotic feed supplement was used. Quails of the 1st experimental group were fed with Basulifor at a dose of 0.2 g/kg of feed from 1 to 60 days of age; of the 2nd experimental group - with Basulifor at a dose of 0.3 g/kg in the same terms, in the control group the feed additive was not introduced.

Basulifor is a probiotic feed supplement containing the microbial mass of living natural strains of Bacillus subtilis and Bacillus licheniformis microorganisms in an optimal ratio, producing digestive enzymes, amino acids and B vitamins. The number of microbial cells in the feed additive is 1x109 CFU. In appearance, the drug is a powder of gray color, a sweetish taste, with a weak fermented milk smell, easily soluble in water.

Probiotic feed preparations and additives are used to improve the digestibility of feed, increase the natural resistance of farm animals, birds, fish and fur animals. Basulifor is available in dry and liquid forms, is a high-tech product, convenient to use. The drug does not lose its beneficial qualities when expanding and pelletizing the forage. It has no adverse effect on the organism of animals and birds. Contraindications to the use of feed additives were not found [15-17].

The study of the clinical and physiological state, growth and development, the morphological, biochemical and immunological compositions of the quail blood was performed on the 1st, 15th, 30th, 45th, and 60th days of their life according to modern generally accepted methods in veterinary medicine. After killing birds of the control and experimental groups at the age of 60 days, we conducted a veterinary and sanitary examination of meat.

**Results.** It has been established that the microclimate parameters in premises for growing quails corresponded to zoohygienic norms. In the cages where the quails of the control and experimental groups were kept, at a floor housing, the air temperature in the premises was $27.10\pm0.18$ °C, at the cage housing - $24.00\pm0.15$ °C. The relative humidity of the air in the room was $61.40\pm0.16\%$ at floor housing, and $68.70\pm0.24\%$ with cage housing. The air velocity at the floor housing was $0.13\pm0.01$ m/s, at the cage housing - $0.17\pm0.05$ m/s. The concentration of carbon dioxide in the air of the premises for quails with the floor housing was $0.07\pm0.01\%$, the content of ammonia - $2.78\pm0.02$ mg/m$^3$, hydrogen sulfide - $1.87\pm0.04$ mg/m$^3$.

The applied Basulifor probiotic feed supplement influenced the morphological profile of birds. At the age of 15 days, the number of erythrocytes in the blood of quails of the 1st experimental group was significantly higher by 2.65% (P<0.05) compared to the control analogues, of the 2nd experimental group - by 3.07% (P<0.05). At 30-, 45-, and 60-day-old age, the number of erythrocytes was also higher in the blood of birds of the 1st experimental group by 2.23%, 3.32 and 5.20% (P<0.05)than the control indicator, of the 2nd experimental - by 3.71%, 5.53, 6.59% (P<0.05), respectively.

The hemoglobin concentration in the quail blood of the 1st experimental group at 15-, 30-, 45-day-old age was higher than the control indicator by 2.19, 2.14 and 3.05% (P<0.05), respectively, and in the quail blood of the 2nd experimental group –higher by 1.46, 3.38 and 3.85% (P<0.05). At the age of 60 days, the concentration of hemoglobin in the blood of the 1st and 2nd experimental groups quails also turned out to be higher than the control indicator by 3.84 and 4.48% (P<0.5), but this excess did not have

statistical validity. The number of leukocytes in the blood of birds in the experimental groups was lower by 2.65-2.91%compared with the control analogues, however the value of this indicator did not go beyond the limits of physiological norms.

Against the background of introduction to the basicdiet of the tested feed additive in the initial period of postnatal ontogenesis, a significant increase in the serum level of total protein is observed due to strengthening of the concentration of albumin and globulin fractions (table 1).

Table 1 – Total protein and its fractions in the blood serum of young quails

| Bird groups | Age, days | Indicator, g/l | | | | |
|---|---|---|---|---|---|---|
| | | Total protein | Albumins | Alpha-globulins | Beta-globulins | Gamma-globulins |
| Control | 1 | 28.54±0.48 | 10.96±0.13 | 2.18±0.05 | 2.15±0.05 | 8.46±0.07 |
| | 15 | 32.44±0.12 | 12.18±0.27 | 2.39±0.10 | 3.99±0.04 | 10.96±0.34 |
| | 30 | 36.18±0.67 | 12.10±0.15 | 3.85±0.14 | 4.10±0.11 | 11.15±0.33 |
| | 45 | 38.24±0.45 | 12.13±0.25 | 4.11±0.15 | 4.56±0.16 | 11.85±0.08* |
| | 60 | 40.18±0.24 | 14.15±0.08 | 5.13±0.19 | 5.11±0.17 | 13.01±0.09 |
| 1st experimental | 1 | 30.27±0.51 | 11.85±0.16 | 2.45±0.12 | 2.86±0.13 | 10.18±0.14 |
| | 15 | 33.31±0.20* | 12.46±0.10 | 2.48±0.17 | 4.03±0.07 | 11.18±0.17* |
| | 30 | 37.25±0.40** | 12.48±0.14 | 3.97±0.14 | 4.17±0.17 | 11.76±0.38 |
| | 45 | 39.32±0.32** | 12.49±0.12** | 4.28±0.21** | 5.85±0.22 | 12.48±0.19 |
| | 60 | 41.86±0.25** | 14.48±0.11** | 5.43±0.23** | 6.19±0.23 | 14.15±0.17 |
| 2nd experimental | 1 | 30.72±0.54 | 11.93±0.18 | 2.44±0.13 | 3.11±0.13 | 10.24±0.15 |
| | 15 | 33.30±0.20* | 12.67±0.11 | 2.50±0.13 | 4.05±0.06 | 11.92±0.42* |
| | 30 | 37.71±0.42** | 12.74±0.17 | 3.99±0.14 | 4.96±0.21 | 11.84±0.18 |
| | 45 | 39.73±0.37** | 13.25±0.13** | 4.35±0.22** | 5.28±0.20 | 13.13±0.18 |
| | 60 | 41.15±0.28** | 16.18±0.14** | 5.53±0.23** | 7.41±0.25 | 14.79±0.19 |
| * P < 0.05; **P < 0.01. | | | | | | |

The increase in the albumin fraction of the protein was observed from the age of 45 days, although it has a significant value, but at the level of the first threshold of reliability (P<0.05). An advance in the globulin fraction of the protein has been observed since the age of 15 days and with a more pronounced value. The growth of this indicator was mainly due to the gamma-globulin fraction, a significant increase in which amounted to 8.76-13.68% (P<0.01) on the 60th day in the experimental groups of birds, compared to the control group.

The results of the immunological study of quail blood indicate that the introduction into the main ration of birds in the initial period of postnatal ontogenesis of Basulifor probiotic promotes the activation of humoral factors of nonspecific resistance of the organism. Thus, in the experimental group of quails (table 2), compared with the control analogues, there is a significant increase in the level of immunoglobulins of the "IgA" classes by 11.53-12.23% (P<0.01), Ig "M" - by 7.14-10.71% (P<0.01), Ig "G" - by 6.54-6.80% (P<0.01), which indicates an enhancement in the resistance of their organism to adverse environmental factors and, as a result, the genetically established productive potential is more fully realized.

Table 2 – Dynamics of immunoglobulins and quail blood serum intracellular enzymes

| Indicator | Bird group | | |
|---|---|---|---|
| Ig «A» immunoglobulins | 0.26±0.01 | 0.29±0.01* | 0.31±0.02* |
| Ig «M» immunoglobulins | 0.28±0.02 | 0.30±0.03 | 0.31±0.02 |
| Ig «G» immunoglobulins | 3.82±0.12 | 4.07±0.11 | 4.08±0.14 |
| Alanine aminotransferase (ALAT), u/l | 93.40±1.01 | 81.00±1.16** | 76.50±1.02** |
| Alanine aminotransferase (ASAT), u/l | 355.80±4.65 | 338.48±3.36* | 320.48±3.09* |
| *P < 0.05,**P < 0.01. | | | |

Studies have shown that the probiotic feed supplement had a definite influence on the activity of the intracellular enzymes of the blood serum of birds - alanine aminotransferase (ALAT) and aspartate transaminase (ASAT), mainly in the direction of lowering them.

As a result of the use of Basulifor, the ALAT concentration in blood serum of the 1st experimental group of birds decreased by an average of 12.40 units/l by the 45 day of the experiment compared to the analogues in the control; of the 2nd group - by 16 units/l, the ASAT index of quails in the 1st experimental group, in relation to the control, was also lower on average by 17.32 units/l (P<0.05), and in the 2nd experimental group - by 15.32 units/l (P<0.05). At the same time, the content of these enzymes in the blood serum of the experimental quails, compared with the intact birds, did not go beyond the limits of physiological fluctuations.

Application in the technology for growing quails of Basulifor probiotic feed supplement stimulates their growth and development. The live weight of the quails of all three groups naturally grew during the whole experimental period (table 3).

Table 3 – Growth and Development Dynamics of young quails

| Age, days | Bird group | | |
|---|---|---|---|
| | Control | 1st experimental | 2ndexperimental |
| Live weight, g | | | |
| 1 | 8.34±0.12 | 8.31±0.10 | 8.33±0.11 |
| 15 | 74.00±0.68 | 75.51±0.12* | 78.16±0.72* |
| 30 | 118.13±0.11 | 123.32±0.12* | 125.18±0.15* |
| 45 | 127.41±0.13 | 135.18±0.19** | 140.14±0.17** |
| 60 | 138.56±0.25 | 148.53±0.27** | 149.15±0.27** |
| Average daily gain, g | | | |
| 1 | – | – | – |
| 15 | 4.37±0.04 | 4.51±0.06* | 4.57±0.07* |
| 30 | 3.66±0.03 | 3.83±0.04* | 3.89±0.05* |
| 45 | 2.64±0.02 | 2.81±0.02** | 2.83±0.03** |
| 60 | 2.17±0.01 | 2.31±0.01** | 2.34±0.02** |
| *P < 0.05, **P < 0.01. | | | |

Thus, with equal live weight at birth, in quails of the control group at the age of 30 days it averaged of 118.13±0.11 g, at 60-day-old age it was 138.56±0.25 g. The live weight of quails of the 1st and the 2nd experimental groups were significantly more than the same indicator in the control group at the age of 30 days by 4.39% and 5.96% (P<0.05), at the age of 60 days - by 6.83% and 7.64% (P<0.01). The average daily weight gain of quails in the control group at 15, 30, 45, and 60 days of life were equal to 4.37±0.04 g, 3.66±0.03 g, 2.64±0.02 g, 2.17±0.01 g, in the 1st experimental group quails these indicators exceeded the control analogues by 3.20, 4.64, 6.43, 6.45% (P<0.05), in the 2nd experimental group –excess by 4.57, 6.28, 7.19, 7.83% (P<0.05, 0.01).

Consequently, the revealed tendency to increase in live weight and average daily gains in quail of the experimental groups, compared with control analogues, indicates a growth-promoting effect on the organism of birds by new Basulifor probiotic feed additive.

In quails-layers of the experimental groups, in which the tested feed additive was added to the basicdiet, unlike with the control analogues, egg-laying started a few days earlier (table 4).

The beginning of egg-laying in quails of the control group was observed at 48-day-old age, in the first experimental group - at 44-day-old age, and in the second experimental group - at 43-day-old age. Against the background of the use of the feed additive in the experimental groups of birds, comparing with the control, the age of onset of egg laying was significantly reduced by 4 and 5 days. The egg production capacity per the average quail in the experimental groups was higher on average by 3.84 and 4.80% (P<0.05). There was also an increase in the number of standardized eggs in the experimental groups of

Table 4 – Dynamics of egg production capacity in quails using Basulifor probiotic feed additive

| Indicators | Bird group | | |
|---|---|---|---|
| | control | 1st experimental | 2nd experimental |
| Number of quails-layers, heads | 50 | 50 | 50 |
| Start of egg laying, age, days | 48±1.24 | 44.00±1.29* | 43.00±1.2* |
| Egg production capacity per average quail-layer, pieces | 38 | 42 | 44 |
| Number of eggs, %<br>standardized<br>large<br>small<br>cracked<br>shell-less<br>average weight of 1 egg | 68.56±0.90<br>8.10±0.04<br>17.96±0.20<br>2.82±0.04<br>2.56±0.03<br>13.39±0.04 | 73.57±0.75*<br>17.02±0.12*<br>6.88±0.05*<br>1.12±0.01<br>0.94±0.04<br>14.16±0.02 | 74.04±0.81*<br>16.04±0.21*<br>6.82±0.11*<br>0.96±0.03<br>0.83±0.01<br>14.28±0.02 |
| *P < 0.05. | | | |

birds compared to the control by 7.31 and 8.00% (P<0.01), large eggs almost doubled. In addition, the use of this feed supplement promoted to an increase in high-quality products. Reject (cracked and shell-less eggs) in the experimental groups of birds composed 1.02–0.96% (P<0.05) and 0.94–0.83% (P<0.05), while in the control group of birds, this indicator was at the level of 2.82-2.56%. The weight of eggs in quails of the first and second experimental groups, comparing with the control, was higher on average by 5.75% and 6.64% (P<0.05).

The studies have shown that the fertilizartion rate of eggs in quails-layers of the control group was 75.0% (table 5), and in the first and second experimental groups, with the use of the Basulifor probiotic feed supplement in the bird diet, this figure was 77.00% and 77.52% respectively (P<0.05). In the first experimental group, as a result of using Basulifor, 87 heads of young quails were obtained or 5.93% (P<0.05) and 7.36% (P<0.05) more. The hatchability of quails in the experimental groups exceeded that of the intact group by average of 3.12% and 3.52% (P<0.05).

Table 5 – Quail egg incubation rate

| Indicators | Bird group | | |
|---|---|---|---|
| | control | 1st experimental | 2nd experimental |
| Put egg carriers,pieces | 5 | 5 | 5 |
| Number of eggs in the carrier, pieces | 420 | 420 | 420 |
| Laideggs, total, pieces | 2100 | 2100 | 2100 |
| of whichfertilized, pieces | 1575 | 1617 | 1628 |
| Gothealthyquails, heads | 1466 | 1553 | 1574 |
| Hatchabilityofyoungquails, % | 93.06 | 96.18* | 96.58* |
| Preservation of quails up to 30-day-old age:<br>heads<br>inpercents | 1379<br>94.06 | 1508*<br>97.10* | 1543*<br>98.03* |
| *P < 0.05. | | | |

At the age of 60 days, a control killing of 10 quails from each group was conducted (table 6). Poultry killing was carried out in the killing room of the poultry enterprise in accordance with the rules of veterinary inspection of killed birds and veterinary and sanitary examination of meat and meat products [19].

As can be seen from the table, the killing yield in control quails was 65.35%. In addition to the absolute increase in the weight of the eviscerated quail carcass with the use of a probiotic feed additive, the killing yieldwas also increased. Thus, this indicator in quails of the 1st and 2nd experimental groups had a value of 66.64% and 67.81%, which is 1.29% and 2.46% more than the control indicator.

Table 6 – The morphological composition of the carcasses of young quails

| Indicators | Bird group | | |
|---|---|---|---|
| | control | 1st experimental | 2nd experimental |
| Pre-killing weight, g | 138.56±0.25 | 143.89±0.27** | 149.15±0.27** |
| Weight of the eviscerated carcass, g | 90.56±0.11 | 95.89±0.12* | 101.15±0.14* |
| Killing yield, % | 65.35±0.08 | 66.64±0.09* | 67.81±0.10* |
| Muscletissue, % | 34.65±0.41 | 36.71±0.55* | 36.98±0.59* |
| Fattissue, % | 10.28±0.20 | 9.32±0.18* | 9.48±0.20* |
| Bonetissue, % | 13.44±0.16 | 14.12±0.18* | 14.15±0.20* |
| *P < 0.05; **P < 0.01. | | | |

The content of muscle tissue in the carcasses of birds of the first and second experimental groups was higher by 2.06-2.33% (P<0.05) than in the control group. In the carcasses of young quails of the tested groups, the fat tissue content, on the contrary, was lower by 0.96-0.80% (P<0.05), the amount of bone tissue was higher by 0.68-0.71% (P<0.05), respectively.

The chemical composition of the meat of young quails in the experienced groups differed slightly from those of the control group. The moisture content in the poultry meat of the experimental groups, compared with the control analogues, was lower by 1.62-1.46% (P<0.05), the protein content - higher by 1.41-1.63% (P<0, 05), the dry matter - higher by 1.42-1.54% (P<0.05). The quantitative content of crude fat in the meat of experimental and control birds was almost the same and did not have a significant difference.

In the course of the test survey, two series of experiments on the ozonation of quail carcasses were conducted. Each series of experiments have lasted for 30 days. Experienced carcasses of young quails were treated with the ozone-air mixture in non-frozen form. For this, a domestic ozonizer of the "Pozi-tron-3 Air 1" brand was used.

Samples of meat from control and experimental carcasses were kept chilled for 5 minutes, then tested batches of carcasses were placed in a glass dish, where they were subjected to ozone treatment. In view of the fact that ozone is 2.5 times heavier than air, the ozonizer was placed above meat samples at a distance of 50 cm. In the first series of experiments, carcasses of quail meat were treated with an ozone-air mixture at a dose of 5 mg/m$^3$ with an exposure of 4 hours for 3 days, and in the second series of experiments - at a dose of 10 mg/m$^3$ for 4 hours for 4 days. After treatment with an ozone-air mixture, the meat samples were stored in a refrigerating chamber on slatted floors at a temperature of + 4 °C and a relative humidity of 80-85%.

The studies have shown that quail meat samples of the first group treated with ozone-air mixture at a dose of 5.0 mg/m$^3$, without losing their quality indicators, was reliably preserved for 18.00±36 days (P<0.05), and in the second experimental group when treating samples of meat with ozone at a dose of 10 mg/m$^3$–for 24.00±0.53 days (P<0.01).Comparing with the control batch of meat, these indicators in the experimental groups were higher on average by 12 and 18 days. Treatment of young quail meat samples with ozone-air mixture had a positive impact on its preservation and shelf life. So, after ozonation, the preservation of chilled meat (+ 4ºC) increased by 3-4 times. The maximum shelf life of samples from the control carcasses was 6.00±0.48 days, the carcasses were yellow, which is not characteristic of fresh meat, and there was also a musty putrefactive smell.

**Discussion.** The research results showed that the Basulifor probiotic feed additive contributed to the intensification of the growth rate of young quails. Thus, the average daily weight gain in quails of the control group at 7 days of age was 4.66±0.04 g. In the experimental groups of birds, unlike with the con-trol analogues, this indicator in the specified age cycle was significantly higher on average by 2.57% (P<0.05) and 3.00% (P<0.05). At an older age i.e. at 14 and 28 days of age, the average daily weight gain in birds of the tested groups exceeded that of the intact group by an average of 4.02–4.66% and 4.20–4.62% (P<0.05).The most intensive raise in this indicator, both in the control and experimental quails, occurred at the age of 42 and 56 days. Thus, in the indicated age cycles, this index in the control group of birds was characterized by 4.85±0.05 and 4.88±0.06 grams. At the same time, against the background of

using the probiotic feed additive in the ration, in birds of the experimental groups compared with the analogues in the control, the average daily weight gain was higher by 4.53 - 4.94% (P<0.01) and 5.32 - 6.14% (P<0.01).

Some researchers explain the increase in live weight of experimental birds under the influence of probiotic preparations by the fact that young quails acquire higher coefficients of nutrient digestibility, absorption, and their accessibility [18, 19].

The Basulifor feed additive promoted the increase in the pre-killing weight in experimental birds. So, this indicator in young quails of the 1st experimental group, compared with the control analogues, was higher by 5.62% (P<0.01), in the second experimental group - by 6.12% (P<0.01), carcass weight indicator –higher by 7.18% (P<0.01) and 7.51% (P<0.01), killing yield - by 0.60 - 1.02% (P<0.05).

The content of muscle tissue in the carcasses of birds of the first and second experimental groups was 2.06 - 2.33% higher (P<0.05) than in the control. On the contrary, in the young quail carcasses of the experimental groups, the fat tissue content was lower by 0.80–0.90% than in the control group (P<0.05), the amount of bone tissue was higher by 0.68-0.71% (P<0.05) respectively. The chemical parameters of meat in birds of the experimental groups differed slightly from the control group.

The moisture content in the poultry meat of the experimental groups was lower by 1.62-1.46% (P<0.05) than in the control group, the protein content was more by 1.46-1.63% (P<0.05), the dry matter - more by 1.42-1.54% (P<0.05), respectively. The quantitative content of crude fat in the meat of experimental and control birds was almost the same and did not have a significant difference.

Studies have shown that after ozonation sessions, samples of experimental meat differed in quality indicators from those of control ones. Samples from experimental groups had a weak-dry crust and a light-white color, the consistency was soft, weakly elastic, at finger pressing on the meat surface, a dimple appeared, which quickly leveled. The muscles in the cut were slightly moisty and did not leave a wet spot on the filter paper. The broths cooked from experimental meat samples were light, fragrant, and an accumulation of fat drops was observed on the surface. The pH of the meat of young quails was 5.66±0.01 and 5.74±0.03, the reaction to ammonia with Nessler's reagent was negative, to peroxidase - positive, and to sulfuric acid copper - negative.

The furtherin vestigations showed that the quailmeat samples from the 1$^{st}$group treated with ozone-air mixture at a dose of 5 mg/m$^3$,withoutlosingits qualitative indicators, were truly preserved for18±0.36 days (P<0.01), and the meat samples from the 2$^{nd}$ group with a ozone treatment at a dose of 10 mg/m$^3$ were preserved for 24±0.53 days (P<0.01). In comparison with control meat, the specified indicators in the tested groups turned out to be higher on 12 and 18 days (table 1). The treated meat samples with ozone-airmixturehada positive impact on their preservation and shelf life. So, after ozonation, the preservation of chilled meat (+4$^0$C) increased by 3-4 times. The maximum shelf life of samples from control carcasses was 6±0.48 days, the carcasses were yellow, which is not characteristic of fresh meat, and there was alsoa musty putrefactive smell.

The egg production capacity of birds, including quails, is an important indicator of poultry farming. The beginning of egg laying in quails of the control group was observed at the age of 48.00±1.24 days, in quails of the first experimental group - at the age of 44.00±1.29 days, of the second experimental group - at the age of 43.00±1.22 days. Against the background of the use of the feed supplement in the tested groups of birds, compared with the control group, the age of onset of egg laying was significantly reduced by 4 and 5 days. The egg production capacity per the average quail-layer of the experimental groups, in relation to the control quails, was higher on average by 3.84 and 4.80% (P<0.05). As can be seen from the presented analysis, in the second tested group, when using the additive at a dose of 0.2 g/kg of feed, the specified indicator was slightly higher by an average of 2.81% (P <0.05) in contrast to the birds of the first tested group, which received the feed additive at a dose of 0.1 g/kg.

There has been observed an increase in the number of standardized eggs in the experimental groups of birds by 7.31% and 8.00% (P<0.05), compared to the control, the number of large eggs almost doubled. In addition, the use of this feed supplement contributed to an improvement of high-quality products. The percentage of reject (cracked and shell-less eggs) in the tested groups was 1.02-0 96% (P<0.05) and 0.94-0.83% (P<0.05), while in the control group of birds, this indicator was characterized by 2.82-2.56%. The weight of quail eggs of the first and second experimental groups, compared with the control, was higher on average by 5.75% and 6.64% (P<0.05), respectively. When using probiotic preparations, similar results were obtained by other researchers [20-23].

According to some scholars, resistance is one of the most important functional characteristics of the organism and is an indicator of its resistance to diverse effects [23]. It is based on the mechanisms that have been formed in the process of evolution, fixed by natural selection and they determine the adaptive form of the reaction of one or another individual or species as a whole. The problem of the study of the effect of probiotic preparations based on spore-forming bacteria on thebody nonspecific resistance of bird in recent years has received adequate consideration. Scientific and economic interest in them is due to the ability of these bacteria in the gastrointestinal tract of birds to synthesize the digestive enzymes, hormones, and other biologically active substances, which contribute to the activation of the body's defense mechanisms[21].

The use of the Basulifor feed additive contributed to growth in the level of class "A" immunoglobulins in the blood serum of birds. So, with the application of the specified feed additive, in the serum of the first tested quail group, compared to the control analogues, by the 45th day of the experiment the level of class A immunoglobulins significantly raised by 20% and 29% (P<0.05).Also while using the feed additive the growth of class Ig "M" immunoglobulins in the blood serum of the experienced quails, compared with the controlanalogues, ranged from 0.28±0.02 to 0.31±0.04 g/l (P<0.05), and the growth of class Ig "G" immunoglobulins - from 3.82±0.12 to 4.08±0.14 g/l (P<0.05).

**Summary:**

1. The use of the ozonizerpromotes the optimization of the basic parameters of the microclimate in the premises for growing quails. This significantly reduces the concentration of water vapor and harmful gases.

2. Basulifor probiotic feed additive activates morphological, biochemical, and immunological parameters of blood and serum, which leads to the growth of egg and meat productivity and preservation of young quails.

3. The ozone-air mixture allows extending the shelf life of the quail meat without a significant reduction in its quality indicators. According to some researchers, ozone has a high bactericidal activity and extends the shelf life of meat and meat food [22].

**Conclusions.**

1. Under the influence of the Basulifor probiotic feed supplement, the growth and development of young quails were activated. On the 14th and 28th day, the average daily gain in live weight in birds of the experimental groups exceeded the same indicator of the intact group by an average of 4.02–4.66% (P<0.05) and 4.20–4.62% (P<0.05). The highest productivity in quails was recorded in the second experimental group, where the tested feed additive was used at a dose of 0.3 g/kg. Thus, the live weight of the quail of this group, in the phase of completion of the production experience, in relation to the control analogues, was significantly higher by 12.94 g (P<0.01) or by 4.67%.

2. Quail meat samples of the first group, treated with ozone-air mixture at a dose of 5 mg/m$^3$, without losing their quality indicators, were truly preserved for 18±0.36 days (P<0.01), and in the second experimental group, at treatment of meat samples with ozone at a dose of 10 mg/m3 - for 24±0.53 days (P<0.01). Compared with the control meat, these indicators in the tested groups were higher on average by 12 and 18 days. After ozonation, the preservation of chilled meat (+4$^o$C) increased by 3-4 times. Introduction to the basic diet of quail-layer of the Basulifor probiotic feed additive stimulates egg productivity in quails by 3.84-4.80% (P<0.05).

3. When using the probiotic feed additive, the concentration of alanine aminotransferase in the blood serum of birds of the first experimental group significantly decreased by an average of 12.40 units/l (P<0.05) by the 45 day of experience, compared with the control analogs, in birds of the second experimental group - by 16.9 units/l (P<0.05), the level of aspartate aminotransferase in quails of the first tested group was also lower on average by 17.32 units/l (P<0.05), and in the second experimental group - by 15.32 units/l (P<0.05).

4. When using the Basulifor probiotic feed additive, there was an increase in the tested groups by the 45 day of the experiment of the level of the class "A" immunoglobulin by 20% and 29% (P<0.05). The growth of the class Ig "M" immunoglobulins in the serum of the experienced quails ranged from 0.28±0.02 to 0.31±0.04 g/l (P<0.05), and the class Ig "G" immunoglobulins - from 3.82±0 to 4.08±0.14 g/l (P<0.05).

5. Studies and obtained results showed that under the influence of probiotic feed additive in the blood of quails at the level of physiological norms, the concentration of erythrocytes, hemoglobin increases, the level of leukocytes decreases, and the content of total protein and its fractions increases, which testifies that there are no negative effects on the quail body from the probiotic feed supplement.

**Recommendations.** In order to realize the bio-resource potential of the body, in industrial quailing for the purpose of activation of nonspecific resistance, increasing the intensity of weight gain, preserving the young quail and increasing the egg productivity of quails, as well as improving the quality indicators of meat and egg productivity, it is recommended to introduce Basulifor in the basic diet at a dose of 0.3 g/kg of feed containing the microbial mass of living natural strains of Bacillus subtilis and Bacillus licheniformis microorganisms in the optimal ratio, producing digestive enzymes, amino acids and B vitamins.

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## ПРОБИОТИКАЛЫҚ БАСУЛИФОР АЗЫҚ ҚОСПАСЫНЫҢ БӨДЕНЕ ӨНІМДІЛІГІ МЕН ОНЫҢ ОРГАНИЗІМІНЕ ӘСЕРІ

**Аннотация.** Алғаш рет кешенді зерттеулер негізінде Басулифор өсіру технологиясында отандық пробиотикалық азық қоспасын пайдалану мүмкіндігі ғылыми негізделген және эксперименталды түрде дәлелденді. Азық қоспасы эритроцити санының көбеюіне әкелді 5,20-5,69% (Р <0,05), гемоглобиннің концентрациясы 3,80-4,48 (Р <0,05), қан сарысуындағы ақуыздардың жалпы саны қан - 3,89-6,66% (Р <0,05), гамма-глобулиндер - 7,29-8,03% (Р <0,01), А классындағы иммуноглобулиндер - 11,50-15, Ig M - 7,14-10,70% (Р <0,01), Ig G - 6,54-6,80% (Р <0,01) , құстардың қауіпсіздігі 93,0% -дан 97,34%-ға дейін (Р <0,01). 1-ші және 2-ші эксперименталдық топтардың тірі салмақта 5,30 және 10,50 г (Р <0,05) тірі салмақта өздерінің құрдастарынан асып түсетіндігі анықталды, орташа күндік өсу 0,08 және 0,17 г болды. Азық қоспасын қолдану аясында бөдене етінің таза салмағы, 1,97% -ға және 3,76% -ға (Р <0,05) жоғары болды. 5 мг / м3 дозада озон мен ауа қоспасын араластырып өңдейтін экспериментальды топтың бөдене етінің үлгілері олардың сапалық көрсеткіштерін жоғалтпай 18.00 ± 0.36 күн қалды, ал екінші сынақ тобында ет сынамаларын өңдеу кезінде 10 мг/м$^3$ дозада озон - 24,00 ± 0,53 күн. Ет бақылау партиясымен салыстырғанда эксперименталды топтардағы бұл көрсеткіштер 12,0 және 18,0 күнде жоғары болды (Р <0,01). Алынған мәліметтердің жаңалығы алғаш рет организмнің морфологиялық, биохимиялық және иммундық жай-күйін түзету, жас бөденелердің ет өнімдерінің қауіпсіздігін, өнімділігі мен сапасын жоғарылатуды Басулифор пробиотикалық қоспаларын қолдану арқылы дәлелденді.

**Түйін сөздер:** бөдене; азық қоспасы Басулифор; иммуноглобулиндер; өсуі; өнімділік; ет сапасы.

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## ПРОБИОТИЧЕСКАЯ КОРМОВАЯ ДОБАВКА БАСУЛИФОР, ЕЕ ВЛИЯНИЕ НА ОРГАНИЗМ И ПРОДУКТИВНОСТЬ ПЕРЕПЕЛЯТ

**Аннотация.** Впервые на основе комплексных исследований научно обоснована и экспериментально доказана целесообразность использования отечественной пробиотической кормовой добавки Басулифор в

технологии выращивания перепелят. Кормовая добавка способствовала повышению количества эритроцитов в крови птиц на 5,20-5,69% (P<0,05), концентрации гемоглобина – на 3,80-4,48 (P<0,05), количества общего белка в сыворотке крови – на 3,89-6,66% (P<0,05), гамма-глобулинов – на 7,29-8,03% (P<0,01), иммуноглобулинов классов A– на 11,50-15,30% (P<0,01), Ig M – на 7,14-10,70% (P<0,01), IgG – на 6,54-6,80% (P<0,01), сохранности птиц от 93,0 до 97,34% (P<0,01). Установлено, что перепелята 1-й и 2-й опытных групп превосходили сверстников в контроле по живой массе на 5,30 и 10,50 г (P<0,05), среднесуточному приросту – на 0,08 и 0,17 г. Убойный выход перепелят на фоне применения кормовой добавки оказался выше на 1,97% и 3,76% (P<0,05), нежели в контроле. Мясо перепелят опытных образцов 1-й опытной группы, обработанных озоно-воздушной смесью в дозе 5 мг/м$^3$, не теряя своих качественных показателей, сохранялось в течение 18,00±0,36 дней, а во 2-й опытной группе при обработке проб мяса озоном – в дозе 10 мг/м$^3$ – 24,00±0,53 дней. По сравнению с контрольной партией мяса, указанные показатели в опытных группах были выше на 12,0 и 18,0 дней (P<0,01). Новизна полученных данных подтверждается тем, что впервые доказана целесообразность коррекции морфологического, биохимического и иммунного статуса организма, повышения сохранности, продуктивности и качества мясной продукции молодняка перепелов путем применения пробиотической кормовой добавки Басулифор.

**Ключевые слова:** перепелята; кормовая добавка Басулифор; иммуноглобулины; рост; продуктивность; качество мяса.

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# DEVICES FOR MULTIPLYING MODULO NUMBERS
# WITH ANALYSIS OF THE LOWER BITS
# OF THE MULTIPLIER

**Abstract.** Various approaches of modulo multiplying multi-bit (large) numbers in modulus are considered. An algorithm for multiplying numbers is given, where the modular multiplication process is divided into steps, and in each step, by combining the multiplication operations of the previous partial remainder by two with the operation of reducing the multiplication results modulo, partial remainders is formed. The circuit diagrams of multipliers of numbers modulo with the analysis of the lower bits of the multiplier with the sequential and matrix formation of remainders are considered. The proposed modulo multipliers do not require pre-calculations and all calculations do not go beyond the bit grid of the module.

**Keywords:** public-key cryptosystem, hardware encryption, modular multiplication, remainder former.

**Introduction.** In asymmetric cryptosystems, data encryption and decryption procedures are performed by modular exponentiation of the number $a$ to the power $x$ modulo P ($a^x \, modP$), which can be implemented in hardware and/or software [1, 2]. Hardware encryption has several significant advantages over software encryption, one of which is higher speed [3]. Hardware implementation ensures its integrity. At the same time, the generation and storage of keys, as well as encryption, are carried out in the encoder board itself, and not in the computer's RAM. Thus, the security of the implementation of the algorithm itself is ensured, which is also an important advantage. Therefore, the development of high-speed operating units of hardware cryptoprocessors for asymmetric encryption, despite their high cost, is an urgent task.

**Approaches to the multiplication modulo.** Modular multiplication of numbers can be done in three ways. In the first method, the operation is divided into two stages. At the first stage, n-bit numbers A and B are multiplied and a 2n-bit number C is formed. At the second stage, the product C = A*B is reduced by the module P.

Nowadays, a great deal of experience has been gained in the development of high-speed integer multipliers and devices for squaring. These include Brown, Wallace multipliers, Dadda multipliers, systolic and vedic multipliers and quadrants, where the computational complexity is O ($n^2$) bit operations. But these multipliers are very effective in calculating "low-bit" numbers, which are widely used in the construction of operating units of computers of various classes [4].

In cryptography for multiplication of multi-bit numbers, which allow to calculate the required product faster than O ($n^2$) steps (bit operations), the Karatsuba method [5], whose complexity is $O(n^{\log_2 3})$, the Toom -Cook algorithm [6] with complexity of order $O(n2^{\sqrt{2\log_2 n}})$ bit operations. And the Shengghe-Strassen algorithm [7] allows to multiply two n-bit numbers for O(nlog$n$ log$n$) bit operations.

The modular reduction operation, which is performed in the second stage, is the receipt of the remainder of dividing the product C = A*B by the module P. In [8], various ways of modular reduction of the numbers were analyzed. It is shown that the most effective construction tool is a modular device based on a dividing device. Part of such a dividing device includes a partial remainder former. Based on partial remainder formers, high-performance matrix and pipeline devices of modular reduction are easily implemented [9-13].

In the second modular multiplication method, using the Barrett or Montgomery algorithms [14-16], the process of multiplying large numbers by the module is accelerated. However, these algorithms require preliminary calculations associated with the need to use the algorithm for dividing large numbers, therefore representing the greatest complexity:

– Barrett algorithm requires constant predictions

$$\mu = \left\lfloor \frac{d^{2m}}{N} \right\rfloor$$

where $d = 2^k$, k-size of a word in bits, m-number of words in module. The effectiveness of the Barrett algorithm depends entirely on how effectively the preliminary calculations will be performed, which are performed by dividing large numbers.

– for the Montgomery algorithm, prediction of the constant "$r^2(mod N)$", is required, using division with remainder.

In the third method, the process of multiplying modulo numbers is performed in sets of steps, where its number is determined by the number of bits of the multiplier.

Depending on which bit of the multiplier multiplication begins, two types of the multiplier structure can be distinguished:

- modulo multiplier, where multiplication begins with the analysis of the lower bits;

- modulo multiplier, where multiplication begins with the analysis of the higher order bits of the multiplier.

The paper deals with the first type of multiplier. In such a multiplier, the following actions are performed at each multiplication step:

– the partial remainder former $PRF_i$ calculates the partial remainder $r_i$. For what the previous partial remainder $r_{i-1}$, shifted by one bit towards the higher order bits, is reduced modulo P, i.e. $r_i = 2r_{i-1} mod P$. When forming the first partial remainder $r_1$, the previous partial remainder is $r_0 = A$ (multiplicand), then the value of remainder $r_i$ is determined by the formula $r_1 = 2r_0 mod P$.

– the partial remainder $r_i$ is logically multiplied by the i-bit of the multiplier B by the block $And_i$. The input of the block $And_0$ is $r_0 = A$ and the value of the bit $b_0$ of the multiplier.

– the partial remainder $r_i$ from the outputs of the block $And_i$ and the intermediate remainder $R_{i-1}$ from the previous modulo adder $MAdd_{i-1}$ is fed to the inputs of the modulo adder $MAdd_i$, where the operation on the formation of the intermediate remainder $R_i = (r_i + R_{i-1}) mod P$ and the result of operations is fed to the inputs of $AddM_{i+1}$.

After performing N at the outputs of the modulo adder the result is generated $R = R_{N-1} = r_{N-1} + R_{N-2} mod P$.

In turn, a modulo multiplier with the analysis of the lower bits of the multiplier can be constructed in two ways.

In the first method, all partial and intermediate remainders are formed sequentially as the next lower bits of the multiplier are analyzed on the same partial remainder former and modulo adder.

In the second method, a separate driver is allocated for the formation of each partial residue, and each intermediate residue is formed on its modulo adder, where the drivers and adders in the multiplier are arranged in a matrix.

**The modulo multiplier of numbers sequential action, where multiplication begins with the analysis of the lower bits of the multiplier.** The functional diagram of the multiplier of numbers modulo a sequence of actions is shown in figure 1. The multiplier includes the shift register RegB, where before the start of operations the number B (multiplier) is stored, the register RegP where the module P is stored, cumulative partial remainder former (CPRF) and the cumulative modulo adder (CMAdd), flip-flop T, counter of clock pulses (CCP), delay lines DL.1, DL.2, DL.3, blocks of logic circuits $And_1 \div And_{10}$ and OR.
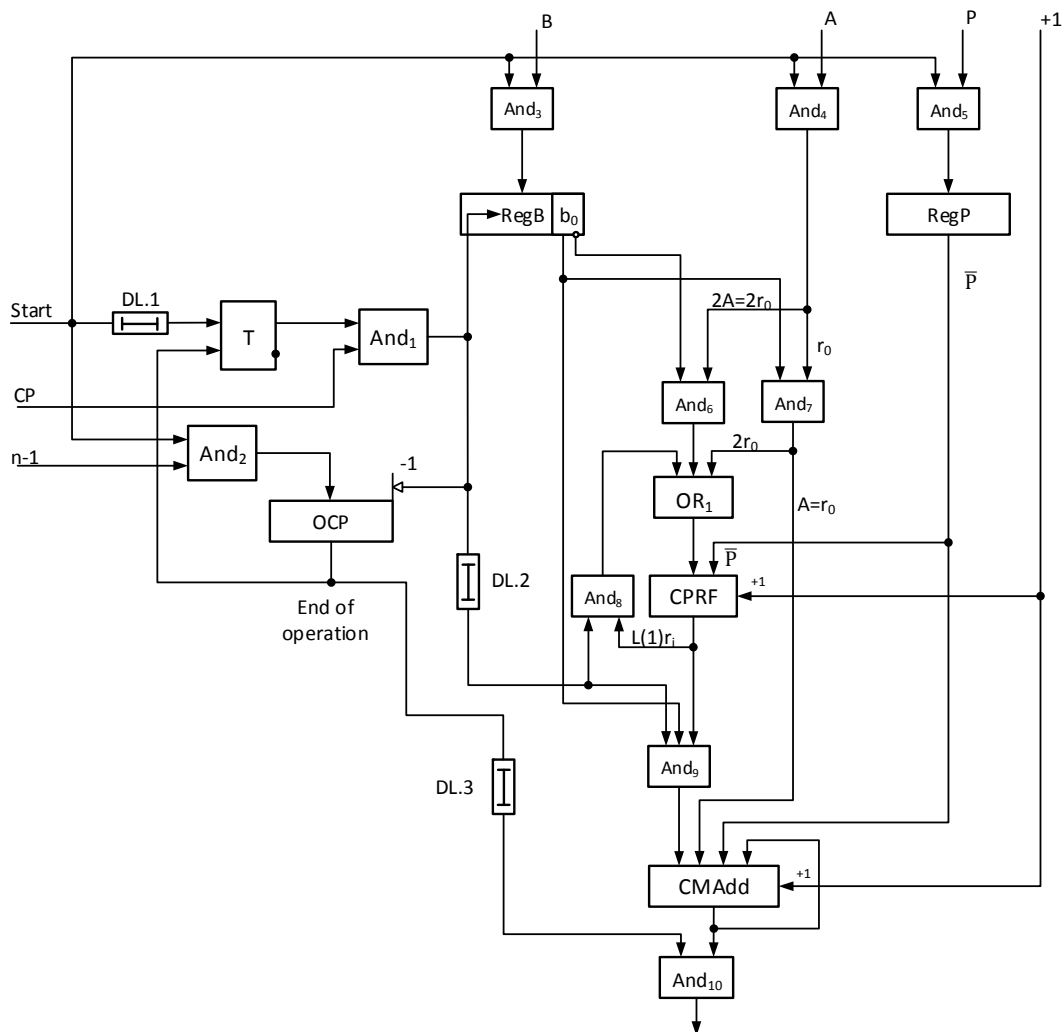
Figure 1 – Functional diagram of the multiplier of numbers modulo sequential action

Figure 2 shows the structure of the CPRF, which consists of the binary adder CM, the multiplexer MS, and the register of partial remainders RegPR.

The previous partial remainders $(r_{i-1})$ is fed to the left inputs of the adder with a shift by one bit in the direction of the higher order bits $(2 * r_{i-1})$. The second inputs of the adder Add are supplied with the bits of the return code of the module $\overline{P}$, and the low signal of the adder receives a single signal +1, which translates the return one complement code of the module into a two complement. In the process of adding $2 * r_{i-1}$ with P in the two complement, if $2 * r_{i-1} > P$, then the carry C = 1 occurs from the high-order bit of the adder, which controls the transfer to MS multiplexer output difference $r_i = 2r_{i-1} - P$. If $2r_{i-1} < P$, then we get the difference $2r_{i-1} - P$ with a negative sign (Sn = 1), which controls the transfer of the input code $2r_{i-1}$ and the result of the operation is stored in the register RegPR.

The structure of the cumulative modulo adder (CMAdd) is shown in figure 3. The CMAdd differs from the CPRF only by the adder Add, where the current partial remainder $r_i$ is summed with the previous intermediate remainder $(R_{i-1})$. Then this sum is reduced modulo P, i.e. $R_i = (r_i + R_{i-1}) mod P$ and the value $R_i$ is stored in the intermediate remainder register - RegR.

Consider the operation of the multiplier. On the "Start" signal, the operands B and P are received by the blocks of logic circuits And$_3$ and And$_5$, respectively, in the registers RegB and RegP. At the same time, the low-order bit of the multiplier B-b$_0$ is fixed in the low-order bit of the register RegB. The bits of the multiplicand A from the outputs of the block of circuit And$_4$ are fed to the inputs of the block of circuits And7 and shifted by one bit in the direction of the higher bits to the inputs of the block of circuits
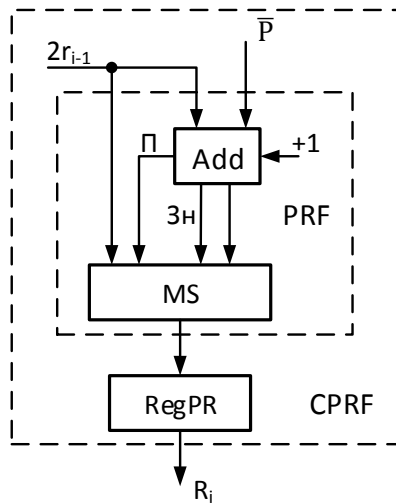
Figure 2 – CPRF structure                                      Figure 3 – CMAdd structure
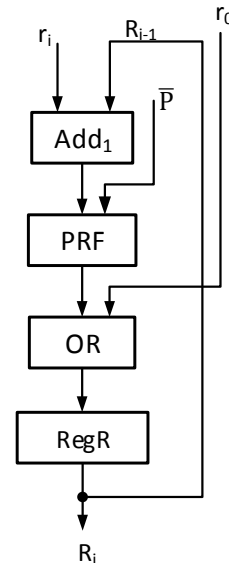
And6. The input of the block of circuits And$_7$ also supplies the value of the bit b$_0$, and its inverse value $\overline{b_0}$ is fed to the input of the block of circuits And$_6$. The "Start" signal also records the number of shifts - N-1 (where N is the bits number of the multiplier) in the counter of clock pulses of the CCP.

After receiving the multiplier B in the register RegB, if $b_0 = 1$, then the bits of the multiplicand A=$r_0$ through the circuit of the block And$_7$ is fed to the input of the register of the intermediate remainder RegR of the CMAdd. In addition, the value A=$r_0$ with a shift by one bit in the direction of the higher order through the circuits And$_7$ and OR1 is fed to the inputs of the CPRF where $r_1 = 2r_0 mod\ P = 2r_0 + \overline{P} + 1$. is formed. $r_1$ is stored in the register RegPR of the CPRF.

When values $b_0 = 0$ from the outputs of the block of the circuits And$_4$, the value of A is shifted to the high-order side through the circuits And6 and OR$_1$ is fed to the inputs of the CPRF, where $r_1 = 2r_0 mod\ P$ is formed, which is also stored in the registers of the RegPR of the CPRF. The low bit level $b_0 = 0$ prohibits the output $r_0 = A$ to the output of the block of circuits And$_7$. By the time of formation and storage of the first partial remainder $r_1$ from the output of the delay lines DL.1, the "Start" signal is fed to the flip-flop T input, which translates the flip-flop T to the single state, and allows the passage of the 1st clock pulse CP1 to the multiplier circuit. CP1 reduces the readings of the counter CCP by one and shifts the contents of the RegB register to the right by one bit. At the time of the shift of the register RegB, CP1 delaying on the delay lines DL.2 arrives at the control inputs of the block of circuits And$_8$ and And$_9$. If, after the shift in the low order PrB, $b_1 = 1$ is fixed, then the contents of RegPR of the CPRF are transmitted through the block of circuits And$_8$ to the input of the CMAdd, where the intermediate remainder $R_1 = (R_0 + r_1)mod\ P$ is formed, which is stored by RegR. At the same time, the pulse CP1from the output of the RegPR of the CPRF through the block of the And$_8$ and OR$_1$ circuit doubles the value $2r_1$ to the inputs of the CPRF, $r_2 = 2r_1 mod\ P$ and $r_2$ are stored in the RegPR of the CPRF. By the end of the formation of $r_2$ in the register RegPR o and $R_1$, in the register RegR, the clock pulse CP2 arrives at the input of the multiplier, by which the contents of the register RegB are shifted by one bit to the left, reduces the readings of the counter CCP by one, forms a partial remainder $r_3$ in RegPR and the intermediate remainder $r_3$ in RegR, etc. After the filing of the n-1-th clock pulse, the counter CCP generates the "End of Operations" signal, which delays on DL.3 for the duration of the $R_{n-1}$ result generation and is fed to the control input of the circuit block And$_{10}$ and the result of the operations is output. The "End of Operations" signal transfers the flip-flop T to the initial zero state and prevents the next clock signal from passing through the circuit And1 to the device. The parameters of the clock signals are determined by the delay signals on the CMAdd.

Consider the example of the multiplication of numbers by module.

Let A = 25; B = 2210 = 101102

P = 26. For convenience, all calculations are performed in decimal notation, which are shown in table 1.

Table 1 – The order of multiplication of A by B modulo R

| Clock pulses | $b_i$ | CPRF | CMAdd |
|---|---|---|---|
| Start | $b_0 = 0$ $b_1 = 1$ | $r_1 = 2r_0 mod P$= 50- 26=24 | $R_0 = 0$ $R_1 = (R_0 + r_1)mod26$=24 |
| CP1 | $b_2 = 1$ | $r_2 = 2r_1 mod P$=48-26=22 | $R_2 = (R_1 + r_2)$ mod P =24+22=46 mod 26 = 20 |
| CP2 | $b_3 = 0$ | $r_3 = 2r_2 mod P$=44-26-18 | $R_3 = (R_2 + 0)$ mod P = 20 |
| CP3 | $b_4 = 1$ | $r_4 = 2R_3 mod P$=36-26=10 | $R_4 = (R_3 + r_4)$ mod P = (20+10)mod 26 = 4 |
| Checking: $R = (A \cdot B)mod P = (25 \cdot 22)mod\ 26 = 550\ mod\ 26 = 4$. | | | |

**Matrix scheme of the device for modular multiplication with the analysis of the lower bits of the multiplier.** Figure 4 shows the block diagram of the matrix multiplier of numbers, where multiplication begins with the lower order bits of the multiplier. The multiplier consists of the register of the multiplier RegB, the register of the module RegP, partial remainders former $PRF_1 \div PRF_{N-1}$, blocks of logic circuits $And_0 \div And_{N-1}$,, modulo adders $MAdd_1 \div MAdd_{N-1}$, delay line DL.3. The bits of the multiplier register in $в_{N-1}$, $в_{N-2}$, ..., $в_1$, are connected to the inputs of the block of circuits $And_{N-1}$, $And_{N-2}$, ..., $And_1$,, respectively. The inverse value of the module P$\overline{P}$ of the register of RegP is connected with the inputs $PRF_1 \div PRF_{N-2}$ and $MAdd_1 \div MAdd_{N-2}$. The outputs of the $PRF_i$ are connected with the inputs $And_i$ and with the inputs of the next $PRF_{i+1}$. The outputs $And_i$ are connected to the inputs of the $MAdd_i$. The $MAdd_i$ inputs are connected to the $MAdd_{i-1}$ outputs. The outputs $MAdd_i$ are connected to the inputs $MAdd_{i+1}$. Signal "+1" is fed to the inputs of $PRF_1 \div PRF_{N-2}$ and $MAdd_1 \div MAdd_{N-2}$.

Consider the operation of the matrix multiplier. The signal "Start", which is fed into the circuit through input 1, from input 2 is taken the bits of the module P in the register RegP, through input 3, the multiplicand A is taken to the input of the block $And_0$ and with a shift by one bit in the direction of the higher order bits is taken to input PRF.1, through input 4 the multiplier B is taken to the register RegB. In
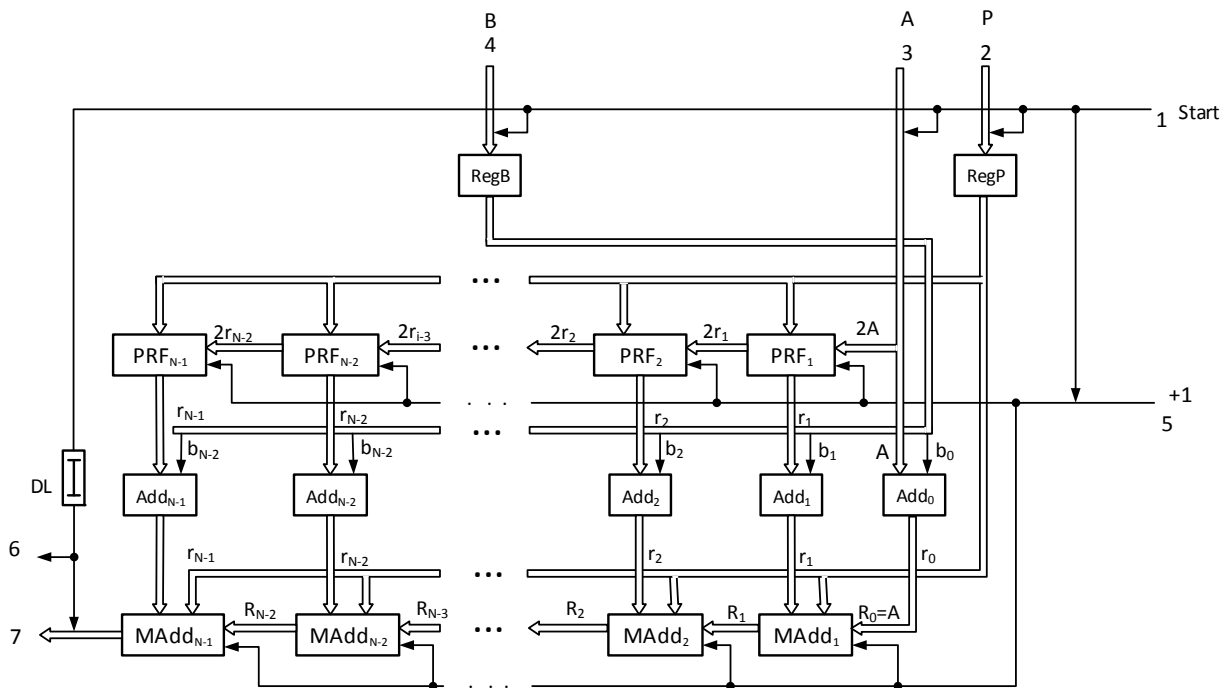


Figure 4 – Block diagram of the matrix multiplier of the numbers modulo
(multiplication begins with the analysis of the lower order)

addition, the "Start" signal is fed to the input of the delay lines DL and receives from input 5 the signal "+ 1". After receiving the multiplier B in the register RegB, module P in the register RegP and multiplicand A to the inputs PRF.1 and $AND_0$ and the signal "+ 1" is fed to the inputs $PRF_1 \div PRF_{N-1}$ and $MAdd_1 \div MAdd_{N-1}$. At the output of PRF.1, a partial remainder $r_1 = 2A mod P$ is formed, which is supplied with a shift by one bit towards the high order bits to the input of $PRF_2$ and without a shift of $r_1$ is transmitted to the information inputs of the block of circuits $And_1$, to the control input of which the value of bit $b_1$ from register RegB. When $b_1 = 1$, the value of $r_1$ from output $And_1$ is transmitted to the inputs of the modulo adder $MAdd_1$, and the second information inputs of which are fed the value $r_0 = R_0 = A$ at the output of $MAdd_1$, the intermediate remainder $R_1 = (r_1 + R_0) \, mod P$ which is transmitted to the input of $MAdd_2$.

Similarly, partial remainder $r_3, \dots, r_{N-2}, r_{N-1}$ are formed at the outputs $PRF_3, \dots, PRF_{N-2}, PRF_{N-1}$ and intermediate remainder $R_3, \dots, R_{N-2}, R_{N-1}$.

At that time, at the $PRF_2$ outputs, a partial remainder $r_2 = 2r_1 mod P$ is formed, which, with a shift of one bit to the left towards the higher order bits, is transmitted to the input of the $PRF_3$. Partial remainder $r_2$ is simultaneously transmitted to the information inputs of the block of circuits $And_2$, and the control input of which is transferred to the value of bit $b_2$ from the register RegB. When $b_2 = 1$, the value of $r_2$ is transmitted to the input of the adder $MAdd_2$, to the second input of which the value $R_1$ is supplied from the output of $MAdd_1$. An intermediate remainder $R_1 = (r_1 + R_0) \, mod P$ is formed at the output of $MAdd_2$.

Similarly, at the outputs $PRF_3, \dots, PRF_{N-2}, PRF_{N-1}$, partial remainders $r_3, \dots, r_{N-2}, r_{N-1}$ are sequentially formed. In parallel, partial remainders at the outputs of the $MAdd_3, \dots, MAdd_{N-2}, MAdd_{N-1}$ adders form intermediate remainders $R_3, \dots, R_{N-2}, R_{N-1}$. The remainder $R_{N-1}$ is the result of multiplying the numbers A and B modulo P.

Figure 5 shows the structure of the adder modulo MAdd, which consists of a binary adder, where the partial remainder $r_i$ is summed with the intermediate remainder $R_{i-1}$ and this sum is reduced modulo using the PRF.
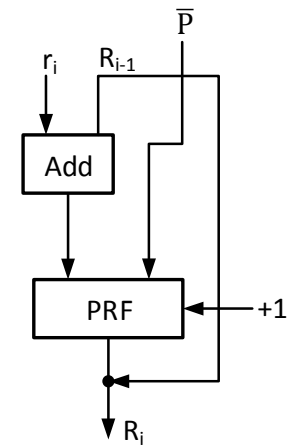


Figure 5 – Structure of MADD

Table 2 shows the order of execution of multiplication operations modulo the matrix multiplier, where $A=27_{10}$; $B=23_{10}=10111_2$; $P=35_{10}$. For convenience, all arithmetic operations are performed in the decimal number system.

Table 2 – Calculation order of the R = (27*23)$mod$35

| $PRF_4$ | $PRF_3$ | $PRF_2$ | $PRF_1$ | $PRF_0$ |
|---|---|---|---|---|
| $r_4 = 2r_3 mod35=12$ | $r_3 = 2r_2 mod35=6$ | $r_2 = 2r_1 mod35=38-35=3$ | $r_1 = 2A mod35=54-35=19$ | – |
| $And_4$ | $And_3$ | $And_2$ | $And_1$ | $And_0$ |
| $b_4 = 1$ <br> $r_4 = 12$ | $b_3 = 0$ <br> $r_3 = 0$ | $b_2 = 1$ <br> $r_2 = 3$ | $b_1 = 1$ <br> $r_1 = 19$ | $b_0 = 1$ <br> $R_0 = A = 27$ |
| $MAdd_4$ | $MAdd_3$ | $MAdd_2$ | $MAdd_1$ | |
| $R = R_4 = (R_2 + r_4)$ <br> $mod P = (12+14)=26$ | $R_2 = (R_2 + r_3) \, mod P = 14$ | $R_2 = (R_1 + r_2) \, mod P = 14$ | $R_1 = (R_0 + r_1) \, mod P = 11$ | – |
| Checking R = (27*23) = 621$mod$35 = 26. | | | | |

The magnitude of the delay on the DL determine the longest chain necessary for the formation of the result $R = R_{N-1}$: $PRF_1 - And_1 - MAdd_1 \div MAdd_{N-1}$. Then

$$\tau_{DL} = \tau_{PRF} + \tau_{And} + N - 1(\tau_{MAdd})$$

where $\tau_{PRF}$ is the delay time on the PRF; $\tau_{H}$ is the delay time of the AND circuit; $\tau_{MAdd}$ is the delay time on MADD.

**Conclusion.** In the proposed modulo multipliers, no precalculations is required; at each stage of the formation of the intermediate remainder, the multiplication and reduction operations are combined; All calculations do not go beyond the bit grid of the module.

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### КӨБЕЙТКІШТІҢ ТӨМЕНГІ РАЗРЯДТАРЫН ТАЛДАУ АРҚЫЛЫ САНДАРДЫ МОДУЛЬ БОЙЫНША КӨБЕЙТУ ҚҰРЫЛҒЫСЫ

**Аннотация.** Көп таңбалы (үлкен) сандарды модуль бойынша көбейту жолдары қарастырылады. Сандарды көбейту алгоритмі берілген, онда модуль бойынша көбейту үрдісі қадамдарға бөлінеді және әр кезеңде, бұрынғы ішінара қалдықтың көбейту әрекеттерін модуль бойынша көбейту нәтижелерін моульге келтіру операциясы көмегімен біріктіру арқылы ішінара қалдықтар пайда болады. Көбейткіштің төменгі разрядтарын талдаумен сандардың көбейту құрылғысы мен қалдықтардың матрицалық қалыптасуы бар схемалық шешімдер қарастырылады. Ұсынылған модуль бойынша көбейту құрылғылары алдын-ала есептеулерді талап етпейді және барлық есептеулер модульдің разряд торынан тыс жүрмейді.

**Түйін сөздер:** ашық кілттік криптожүйе, аппараттық шифрлау, модульдік көбейту, қалдық құрастырушы.

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### УСТРОЙСТВА УМНОЖЕНИЯ ЧИСЕЛ ПО МОДУЛЮ, НАЧИНАЯ С АНАЛИЗА МЛАДШИХ РАЗРЯДОВ МНОЖИТЕЛЯ

**Аннотация.** Рассматриваются различные способы умножения многоразрядных (больших) чисел по модулю. Приводится алгоритм умножения чисел, где процесс умножения по модулю разбиваются на шаги и в каждом шаге путем совмещения операций умножения предыдущего частичного остатка на два с операцией приведения результатов умножения по модулю формируются частичные остатки. Рассмотрены схемные решения умножителей чисел по модулю с анализом младших разрядов множителя с последовательным и матричным формированием остатков. В предложенных умножителях по модулю не требуются выполнять предвычисления и все вычисления не выходят за разрядной сетки модуля.

**Ключевые слова:** криптосистема с открытым ключом, аппаратное шифрование, умножение чисел по модулю, формирователь остатков.

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# ADJUSTMENT OF THE FEEDING LEVEL OF MEAT-TYPE COWS WITH DIFFERENT LIVE WEIGHT AND FATNESS

**Abstract.** For the first time, on the basis of comprehensive research, it was scientifically substantiated and experimentally proved the feasibility of changing the feeding level of cows of specialized meat-type breeds that have a different score of fatness when using the regression coefficient between fatness and live weight.

For efficient production of high-quality beef, it is not enough to have specialized beef breeds with high genetic potential and high-quality feed. Of great importance is the management of technology for feeding, rational use of forage and animals. Currently, standards for feeding meat-type cows are recommended, calculated depending on their live weight. This is an insufficiently substantiated approach, as in a group, animals can have the same live weight, different fatness, and energy need. The rates of cow feeding should be adjusted not only taking into account their live weight, but also the fatness of animals. In this case, the formation of groups, depending on the fatness, becomes an obligatory technique in the technological chain of beef production that will save feed, since in the cost structure of beef a large proportion of the costs fall on feed (60% or more), as well as increase the profitability of the industry.

**Keywords:** beef cattle; fatness; live weight; scoring of fatness; correlation; regression; feeding level.

**Introduction.** Food security is in the focus of attention of international organizations and intergovernmental bodies where Russia is a member state. The work of the UN FAO is aimed at reducing the problem of poverty and hunger in the world by promoting the development of agriculture, improving nutrition and solving the problem of food security.

In accordance with the Doctrine, the strategic goal of food security in Russia is to provide the population of the country with safe agricultural products, fish and other products from aquatic biological resources and food. That is, food security - according to the Doctrine - exists when the population of the country is provided with safe agricultural products and other food.

In 2015 Russia exceeded the threshold indicators of the food security doctrine. The "meat safety" indicator in 2015 reached the recommended level. In fact, the pre-reform level of consumption has been reached, which corresponds to the rational norms recommended by the Ministry of Health of the Russian Federation. Full satisfaction of the need for meat and meat products is provided at maintaining a significant imbalance in certain types of meat.

At first sight, beef production technology is simple. As it were, it is enough to have animals with high genetic potential of meat productivity, to receive from the cow every year the offspring, to create the necessary feeding conditions, satisfying their nutrient needs, and comfortable housing conditions. However, for the successful production, it is not enough.An element is needed that combines the main technological processes and stages that form the production foundation, i.e. herd management, determining the sequence of individual stages and procedures, ensuring the cohesiveness of the entire technology, determining the economic efficiency and profitability of beef production [1-4].

Shortcomings and mistakes in the herd management lead to underperformance of the activities and profits. To take competent management actions, we need a tool that allows us to quickly and accurately determine the energy reserves in the body of animals and the need for nutrients since, in this case, it is necessary to form livestock groups timely and make positive adjustments to the feeding.It is known that an indicator of the availability of energy resources in the body and their quantity, as well as the general condition of animals, can be shown by the live weight and fatness of beef cattle, which, in turn, is strongly affected by the level of animal feeding [5-7].

Cows in a herd with the same live weight may have different fatness and, vice versa, cows with the same fatness may have different live weight indicators since the live weight varies within sufficient broad limits depending on the contents of the gastrointestinal tract, as well as on the stage of pregnancy. In this regard, the live weight of animals cannot serve as the main indicator for determining the organism's energy reserves. Studies by many scientists have established that the energy reserves indicator of the body is the fatness of animals [8-10].

The fatness of animals is the amount of energy reserves in the body, deposited in the muscle fibers in the form of fat and partially protein.

For a numerical expression of energy reserves, a score of cattle fatness was adopted. In zootechnic science and experience, various scoring systems for fatness of livestock are used, for example, Canada and Europe have adopted a score for fatness on 1-5 points scale, in the USA - on 1-9 scale, in Russia staff of Federal Science Center for Animal Husbandry have proposed a 1-9 points scale system for assessing fatness of beef cattle [11-14].

A calf is the only product derived from a meat-type cow, so you need to pay great attention to reproduction issues. It is known that a cow should bring a calf every year, for this it should be fertilized within 80-90 days after calving, provided that the duration of pregnancy of cows is 272-280 days (depending on the breed and foetal gender).Our studies conducted earlier on meat-type cows have shown that the pregnancy duration of the early-ripening Angus breed was 272-273 days, and of the Limousin one, as more long-growing, the period of intrauterine development was 278-280 days [15].

The duration of a period between calvings also depends on the length of the service period. According to the research of many scholars, the duration of the service period stands on the state of cow fatness. For example, according to Dan E. Eversoul and others, only 46% of cows with a less than 3 points fatness are bulling within 60 days after calving, while 61% of cows with 4 points fatness and 91% of cows with 5 points fatness are bulling within 2 months after calving [16].

In this regard, many of the most essential reproductive qualities depend on the state of fatness of meat-type cows: the fertilization after the first insemination, the duration of the service period, the duration of estrus and the estrous cycle, the interval between calvings and the milking capacity of the cows. When cows have low fatness (below 4 points), their immunity decreases, which, in turn, leads to a depression of reproductive functions [17, 18].

In farms throughout the year, on average, the fatness score of most healthy cows is within 3-7 points. Before calving, it is desirable that the state of fatness of cows be 5-7 points. Depending on the physiological state, a cow during a breeding season or after calving can lose fatness since a part of the energy reserves in the form of fat deposits is spent on the formation of milk. Subsequently, with a balanced feeding, it is able to recover its live weight, by the end of pregnancy comes in good condition, and sufficient fatness ensures normal growth and development of the fetus [19, 20].

Many livestock breeders, estimating the level of feeding, make a mistake, focusing only on the live weight of animals. Live weight of meat-type cows should not be the only indicator of the level of feeding. In a herd, cows differ in age, in linear dimensions, in terms of pregnancy, in health, in quantity and quality of consumed feed (in terms of the fullness of the gastrointestinal tract).Determining the level and balance

of feeding only by live weight could lead to a distortion of the results of assessing the quality of animals feeding. Definition of the fatness is a more reliable and accurate tool for determining the level of feeding of animals.

In attenuate animals, there is a lack of the estrous cycle or inadequate cycles, which makes it difficult to identify the periods of estrus, reduces the results of fertilization of dams after the first insemination.

In cows with 8–9 points of fatness, a depression in reproductive functions is also observed, a decrease in motor activity leads to a multiplication of severe calving cases. Overnutrition of cows leads to an increase in feed cost, which is reflected in the underperformance of production since the feed cost is the main article of the production cost. In beef cattle breeding, feed costs reach up to 60-65% of the total production costs. In addition, well-fed cows locating near the feed cribs always crowd out the weaker cows and often leave them hungry.

Thus, the study of the relationship of the state of fatness with live weight of cows, in order to adjust feeding programs, is of great economic value. Some researchers recommend how many kilograms it is necessary to increase the live weight of cows in order to increase fatness by 1 point without indicating changes in the feeding level [10, 20, 21]. Our studies are valid by the determination and application of the correlation and regression coefficients between live weight and the state of fatness in points, they allow to accurately determine the necessary changes in the feeding programs of cows in EFU (energetic feed unit), depending not only on the live weight, but also on the state of fatness. Using this technique, each researcher or producer engaged in beef production can calculate the regression value between live weight and fatness, with a scoring system of fatness, to make adjustments to the program for cows feeding, as well as of an individual herd.

**The aim of this work** is to identify the parameters that make it possible to adjust the level of feeding depending on the live weight and the scoring of the fatness of cows 90-100 days before calving, to save feed and ensure the profitability of the enterprise in the beef production.

**Materials and methods of research** – the objects of the research were cows of specialized meat-type breeds, Hereford and Kazakh white-headed, 100 heads in each group. Studies were conducted in Polyanskoe and Volgar farms in 2016 commissioned by the Ministry of Agriculture of the Russian Federation from the federal budget.In the course of the work, there were used scoring method for fatness of animals, methods of correlation-regression and statistical analyses. The correlation coefficients between live weight and fatness of cows were determined as the phenotypic correlation coefficient for large samples, and the regression coefficients - according to the formula:

$$R_{x\backslash y} = r \cdot \cdot (\delta_x : \delta_y),$$

where r – correlation coefficient between live weight and fatness, $\delta_x$ and $\delta_y$ – mean-square deviation from the arithmetic mean of both traits.

The feeding level of cows was determined according to the rates of feeding of meat-type cows developed by a team of authors under the leadership of A. P. Kalashnikov [22].

The digital material obtained in the course of research was processed by the method of variation statistics with the calculation of basic biometric constants.

**Research results.** Live weight of an animal is the main trait indicating its development, state of nutrition. The determination of the correlation coefficient between live weight and the fatness of animals is an essential element for determining the energy reserves of animal's organism. In the course of our research, the arithmetic mean value and its error of the attribute taken into account (live weight) were defined, the correlation and regression coefficients, the coefficient of variation were calculated (table 1).

Table 1 – Live weight of cows of different breeds and its variability

| Indicator | Breed | |
|---|---|---|
| | Hereford | Kazakh white-headed |
| Live weight (M+m), kg | 458.2+5.88 | 465.0+5.13 |
| $C_V$, % | 12.75 | 13.20 |
| δ | 58.3 | 61.4 |
| *(P<0.95). | | |

As can be seen from table 1, in live weight, the Kazakh breed cows slightly exceed the Hereford breed cows. The difference is 6.8 kg (P<0.95). The coefficients of variation testify to the heterogeneity of cows of herds in both groups in terms of live weight, which indicates the need for a differentiated approach in the management ofcow feeding, to form groups ranked according to live weight and fatness.

The average fatness of animals in both groups is the same, does not exceed 6 points (table 2).

Table 2 – Fatness of cows of different breeds and its variability

| Indicator | Breed | |
|---|---|---|
| | Hereford | Kazakh white-headed |
| Fatness point (M±m), | 5.62±0.10 | 5.79±0.11 |
| $C_V$, % | 19.6 | 20.0 |
| δ | 1.02 | 1.16 |

The data in table 2 indicate that the fatness of the Hereford breed is only 0.17 points (3.02%) less than that of the Kazakh white-headed breed, the difference is not significant (P<0.95). However, the representatives of both breeds differed in greater variability of fatness, and the mean-square deviation of the trait in the Kazakh white-headed breed was higher than the similar indicator of Herefords by 0.14, and the coefficient of variability - by 0.4%, which should be considered when forming technological groups.

Currently, the study of correlated variability becomes more relevant due to the need to breed animals suitable for breeding and exploitation in industrial technology. In such animals, high productivity should be combined with the ability for normal development and reproduction in conditions that were not usual for their parents and remote ancestors.

Regression is a biometric parameter that shows a measure of a change in one trait depending on a change in a correlating another trait.

In the case of a straight-line relation, uniform changes in one trait correspond to uniform changes in the second trait with minor deviations. Determination of correlation and regression coefficients showed a high level of correlation between these traits (table 3).

Table 3 – Correlation and regression coefficients between fatness and live weight of cows

| Indicator | Breed | |
|---|---|---|
| | Hereford | Kazakh white-headed |
| r | 0.93* | 0.95* |
| R | 40.42*** | 48.13*** |
| *P>0.95; ***P>0.999. | | |

The correlation coefficients in both groups were positive and high from 0.93 to 0.95, which indicates a large dependence of live weight of cattle on fatness. The study of regression coefficients showed that a change in fatness in one point changes the live weight of the Hereford breed on 40.42 kg, and a change in fatness in one point of the Kazakh white-headed breed changes the live weight by 48.13 kg. These data are the foundation for making changes in the feeding level of cows, if necessary, and make adjustments to the feeding program. In all cases, the correlation and regression coefficients were reliable (P>0.95... 0.999).

Changes in live weight and fatness of cows that occur during the production cycle throughout the year should be considered as regular and, virtually, inevitable. This is due to the different physiological condition of the cows. Since the reproductive functions of cows depend on the state of fatness, and the fatness, in turn, depends on the level of feeding, an important first step to improve the state of nutrition and reproductive functions is the management of feeding, taking into account the season of calving. Ensuring 5 points fatness and above, maintaining it throughout the entire production cycle is a prerequisite for efficient beef production. Many enterprises, farms lose part of their profits by feeding additional forage to cows, which are in a normal state of nutrition at the time when only part of the cows need additional energy and feed additives and will respond adequately to an increase in the feeding level.

Keeping the cows in an optimal state of fatness (5-7 points) allows to achieve maximum results in the reproduction of the herd and reduce the feed cost for keeping the breeding stock.

For a farm with good fatness of cows, before winter, less forage will be needed for winter, or the forage may be of poor quality and, as a result, cheaper, which has a positive effect on the economy of the farm. Herewith, the cows will undoubtedly lose in live weight. For herbivorous animals, it is natural to lose weight in the most difficult time of the year. A good state of fatness before the winter period and during lactation is the basis for a successful wintering of livestock and the preservation of high repro- ductive qualities.

According to some authors, the assessment of the fatness of cows should be conducted three times a year: after weaning calves or in time for the annual livestock bonitation, just before calving, and 30 days before the start of the breeding season.

It is important to make adjustments to the feeding of cows 90-100 days before calving to achieve the optimal level of fatness. In many cases, this period will coincide with the terms of weaning calves. Therefore, it is necessary to regulate the fatness of animals, adjusting feeding, both attenuate cows and animals with an excessively high condition of fatness status. In this regard, it is necessary to form groups of animals depending on the category of fatness [21, 23].

By means of forming technological groups, organizing the feeding and keeping of cows on the basis of the fatness scoring, it is possible to achieve an improvement in the economic performance of an enterprise. Grouping animals according to live weight and state of fatness is a good tool for extracting additional profits and a good management decision.

Depending on health and linear dimensions, each cow gains or loses in live weight by 40.4-48.1 kg when changing the fatness state in 1 point. For example, if a live weight of a cow is 450 kg with fatness of 6 points, then with a decrease in fatness to 5 points it will weigh 410-402 kg. In other words, with a de- crease in fatness in 2 points, it will lose 80-96 kg. Therefore, it is necessary to organize the feeding in such a way that an animal can gain 80-96 kg in live weight. It needs more energy and nutrients for 45-48 kg increase in the last three months of pregnancy on the growth of the fetus and placenta.

Recommendations on the change in live weight of cows 90-100 days before to achieve by calving the desired fatness of 5-7 points are given in table 4.

Table 4 – Proposed changes in live weight 90-100 days before calving to achieve optimal 5-7 points of fatness

| Fatness point | Desirable fatness point by the calving period | Increase (+), decrease (–) in live weight, kg |
|---|---|---|
| 1 | 5 | + 160-192 |
| 2 | 5 | + 135-160 |
| 3 | 5 | + 90-135 |
| 4 | 5 | + 70-90 |
| 5 | 5 | + 45-48* |
| 6 | 5-7 | + 45-48* |
| 7 | 5-7 | – |
| 8 | 5-7 | – 25-45 |
| 9 | 5-7 | – 45-90 |
| *For the growth of fetus and placenta. | | |

Limited feeding of cows of specialized meat-type breeds, taking into account the period of pregnancy and lactation, live weight and other important factors make it possible to satisfy the body's need for nutrition elements and to rationally use fodder resources.

Dry cows with a live weight of 450-500 kg, while maintaining good nutrition and birth of a healthy calf, 1.73-1.82 EFU, 17-18 MJ of metabolic energy and 1.90-2.20 kg of dry matter are required per 100 kg of live weight. 85–90 kg of digestible protein should fall on 1 EFU of the diet [2].

In our opinion, from there, it is possible to calculate the change in the rates of feeding the cows depending on the live weight, taking into account the state of fatness, and to make changes in the diets of (table 5, 6).

Table 5 – Nutritional value of diets depending on the fatness of cows (live weight – 450 kg)

| Fatness point | Desirable fatness point by the calving period | Increase (decrease) of the rates of feeding (RF)*, EFU |
|---|---|---|
| 1 | 5 | + 3.02 |
| 2 | 5 | + 2.55-3.02 |
| 3 | 5 | + 1.70-2.55 |
| 4 | 5 | + 1.32-1.70 |
| 5 | 5-7 | + 0.85-0.91 |
| 6 | 5-7 | +0.85-0.91 |
| 7 | 5-7 | HK* |
| 8 | 5-7 | −0.47-0.85 |
| 9 | 5-7 | − 0.85-1.70 |

Table 6 – Nutritional value of rations depending on the fatness of cows with different live weight

| Fatnesspoint | Desirable fatness point | Changes in rates of feeding (RF), EFU | | | |
|---|---|---|---|---|---|
| | | Live weight | | | |
| | | 400 | 450 | 550 | 600 |
| 1 | 5 | + 3.16 | + 3.02 | + 2.82 | + 2.77 |
| 2 | 5 | +2.67-3.16 | +2.55-3.02 | + 2.46-2.82 | +2.34-2.77 |
| 3 | 5 | +1.76-2.67 | +1.70-2.55 | +1.64-2.46 | +1.56-2.34 |
| 4 | 5 | +1.38-1.76 | +1.32-1.70 | +1.27-1.64 | +1.21-1.56 |
| 5 | 5-7 | + 0.89-0.95 | + 0.85-0.91 | + 0.82-0.87 | + 0.78-0.84 |
| 6 | 5-7 | + 0.89-0.95 | + 0.85-0.91 | + 0.82-0.87 | + 0.78-0.84 |
| 7 | 5-7 | HK | HK | HK | HK |
| 8 | 5-7 | − 0.50-0.89 | − 0.47-0.85 | − 0.46-0.82 | − 0.43-0.78 |
| 9 | 5-7 | − 0.88-1.78 | − 0.85-1.70 | − 0.82-1.64 | − 0.78-1.56 |
| *RF (rate of feeding). | | | | | |

According to our calculations, to bring the fatness from 2 to 5 points, the cow will additionally need from 2.5 to 2.9 EFU and 212.5-261.0 g of digestible protein. Accordingly, in order to reduce the fatness of cows from 9 points to the desirable 5-7 points, it is necessary to reduce the nutritional value of the diets by 0.8-1.6 EFU and 68-144 g of digestible protein per day.

**Conclusion.** As a brief review of available literary sources shows, there are many studies proving the impact of cattle fatness on the live weight and reproductive qualities of cows. Criteria for changing the live weight of animals are given to increase their fatness by 1 point. For example, according to Parsons, in order to increase the fatness of cows from 3 to 5 points, cows should put on weight from 90.7 to 136 kg, and from 1 to 5 points - more than 158.8 kg [21]. According to other authors, to change the fatness in 1 point for small and medium-sized cows, the weight should be increased by 27-36 kg, and for large cows by 45-68 kg [10, 20].But no one researcher gives criteria for increasing the level of feeding. In our studies, to increase the fatness by one point, the cows of the Hereford breed should add 40.4 kg in weight, and the Kazakh white-headed cows - 48.1 kg. Apparently, these values depend on the initial live weight of the cows. Knowing the energy needs of cows, we calculated how much it is necessary to increase the level of feeding of animals. For example, to bring up fatness from 2 to 5 points, cows will additionally need from 2.5 to 2.9 EFU and 212.5-261.0 g of digestible protein, respectively, for Hereford and Kazakh white-headed breed.

The level of cows feeding depends on the state of fatness and a certain period of time is required to change the fatness.

From an economic point of view, the fatness of cows should be increased in the summer pasture period, when the forage is cheap and complete. Much attention should be paid to the use of natural forage lands, which are very important for reducing the cost of animals maintenance. Pastures should have good herbage, sufficient to meet the nutritional needs of animals.

In a herd, animals always have a different state of nutrition. Excessive feeding of cows with high fatness leads to a reduction of profits, at a time when only part of the cows needs additional feeding. Formation of groups of cows based on the state of nutrition and management of feeding, depending on the scoring of fatness, are required techniques for improving the economy of beef production. In terms of the organization of seasonal calving, the best way to make adjustments to the feeding program is 90-100 days before calving.

Our research shows the presence of a high positive correlation between live weight and the fatness state of cows, which allows calculating the regression coefficient between live weight and fatness. Knowing the quantitative change in live weight of animals with a change in fatness at 1 point,it is possible to reduce the cost of cows feeding. This will allow to save on expensive forage, to improve the reproductive quality of the breeding stock and the efficiency of beef production.

Analysis of the obtained data in the course of research indicates that high positive relation has been established between live weight and fatness of cows (r = 0.93 for Hereford and r = 0.95 for Kazakh white-headed breed). This made it possible to calculate the regression coefficients between the considered traits. It has been established that an increase in fatness by 1 point contributes to an increase in live weight of cows of Hereford and Kazakh white-headed breeds by 40.4 and 48.1 kg, respectively that gives reason to adjust the level of feeding 90-100 days before calving upwards: for cows with 1 point of fatness by 3.02 EFU; with 2 points fatness - by 2.67-3.02; 3 points - 1.70-2.55; 4 points - 1.32-1.70; 5-6 points - 0.85-0.91 EFU. For cows with fatness of 8 points, it is necessary to reduce the level of feeding by 0.47-0.85 EFU; with fatness of 9 points - by 0.85-1.70 EFU.

Thus, the timely formation of technological groups, taking into account live weight and fatness, the obligatory adjustment of the feeding level of animals in the "cow-calf" system, are important factors of saving forage, increasing the profitability of the beef productionenterprise.

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## ҚОНДЫЛЫҒЫ МЕН ТІРІ САЛМАҒЫТҮРЛІ ЕТТІ ІРІ ҚАРАНЫ АЗЫҚТАНДЫРУ ДЕҢГЕЙІН ТЕҢЕСТІРУ

**Аннотация.** Кешенді зерттеулер негізінде алғаш рет қондылығымен тірі салмағы арасындағы регрессиялық коэффициентті пайдаланған кезде әртүрлі қондылықбаллдары бар арнайы етті ірі қараның азықтандыру деңгейін өзгертудің ғылыми-негізділігі және эксперименталды түрде дәлелденді.

Жоғары сапалы сиыр етін тиімді өндіру үшін жоғары генетикалық әлеуеті бар ірі қара тұқымдарының және жоғары сапалы азықтың болуы жеткіліксіз.Азықты және жануарларды ұтымды пайдалану технологиясын ұйымдастыру аса маңызды. Қазіргі уақытта ірі қараныазықтандыруға ұсынылған стандарттар, олардың тірі салмағына байланысты есептеледі. Бұл жеткіліксіз дәлелденген әдіс, өйткені топта жануарлардың тірі салмағы, түрлі қондылығымен энергияға деген қажеттілігі болуы мүмкін. Ірі қараның азықтандыру нормалары олардың тірі салмағын ескеріп қана қоймай, сонымен қатар жануарлардың қондылығын да бірге

есептелу қажет. Бұл жағдайда ірі қараның қондылығына байланысты топтардың қалыптасуы ірі қара етін өндірудің технологиялық тізбегіне міндетті түрде қабылданады, бұл жемшөпті үнемдеуге мүмкіндік береді, өйткені ірі қара еті құнының құрылымында азыққа (60% және одан да көп) шығын кетеді, демек саланың кірісін жоғарылату қажет.

**Түйін сөздер:** ірі қара мал; қондылық; тірі салмақ; қондылық ұпайлары; корреляция; регрессия; азық-тандыру деңгейі.

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### КОРРЕКЦИЯ УРОВНЯ КОРМЛЕНИЯ МЯСНЫХ КОРОВ РАЗНОЙ ЖИВОЙ МАССЫ И УПИТАННОСТИ

**Аннотация.** Впервые на основе комплексных исследований научно обоснована и экспериментально доказана целесообразность изменения уровня кормления коров специализированных мясных пород, имеющих различную балльную оценку упитанности при использовании коэффициента регрессии между упитанностью и живой массой.

Для эффективного производства высококачественной говядины недостаточно иметь специализированные мясные породы скота с высоким генетическим потенциалом и качественные корма. Большое значение имеет организация технологии кормления, рационального использования кормов и животных. В настоящее время рекомендованы нормы кормления мясных коров, рассчитанные в зависимости от их живой массы. Это недостаточно обоснованный подход, так как в группе животные могут иметь одинаковую живую массу, различную упитанность и потребность в энергии. Нормы кормления коров должны корректироваться не только с учётом их живой массы, но и упитанности животных. В этом случае формирование групп, в зависимости от упитанности коров, становится обязательным приёмом в технологической цепи производства говядины, что позволит сэкономить корма, так как в структуре себестоимости говядины большая доля затрат приходится на корма (60 % и более), повысить доходность отрасли.

**Ключевые слова:** мясной скот; упитанность; живая масса; балльная оценка упитанности; корреляция; регрессия; уровень кормления.

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# OPTIMAL MOISTURE OF SOIL SAMPLES FOR SEED GERMINATION AND GROWTH OF SEEDLINGS IN CLOSED CONTAINERS

**Abstract.** The purpose of the research is to determine optimum moisture content of soil samples in closed, transparent containers for seed germination and seedling growth of wild-growing wormwood – artemisia effusus (*Artemisia diffusa*), wild-growing type of cereal – comb-shaped wheat grass (*Agropyron pectiniforme*), cultured cereal – soft wheat (*Tríticum aestivum*), variety Saratovskaya-29. Tested soil samples with humidity of 20%, 40% and 60%.

It is established that in a closed container (5 liters) soil moisture in the range of 40% - 60% provides the best seed germination and the growth of seedlings of the used plant species.

In tested closed containers, soil moisture of 40% should be used, with relatively short period of plants research (30 days). With a longer period of research, it is possible to use soil with moisture content of up to 60%, because with time, the excess water is absorbed by growing plants.

The method of closed containers find use for studies of influence of toxic, volatile, gaseous substances on the growth and development of plants in laboratory conditions. The results of this work will be used in modeling the ecosystem of Central Kazakhstan in connection with environmental pollution of volatile, highly toxic components of rocket-engine propellant, resulting from activities of Baikonur space-launch complex.

**Key words:** closed containers, soil moisture, seed germination, growth of seedlings.

**Introduction.** The issues of influence volatile, toxic substances on the growth and development of plants and accumulation of volatile toxic substances by wild and cultivated plant species are of high concern. For example, plants of Central Kazakhstan are under the polluting influence of unspent rocket-engine propellant - unsymmetrical dimethyl hydrazine (UDMH) and its transformation products. UDMH and its transformation products enters the plants and then into the body of animals and humans from soil and through aerogenic way [1]. Volatile derivatives of UDH have been identified in various types of soil [2]. As is known, UDH and a number of its derivatives belong to the first class of hazard (extremely dangerous organic compound) [3].

Volatile toxic substances are chemicals that could be available in the air in a gaseous state. In this regard, to estimate phytotoxicity of UDMH and its derivatives under laboratory conditions should be used methods, similar to those for study of gas resistance of the plants.

It is known that (closed containers, 'gas chambers') are used to study gas resistance of the plants in laboratory conditions. Plant or its parts are placed in container, gases are dispensed (for example, sulfur dioxide, hydrogen fluoride and hydrogen chloride) and then changes in plant reactions are monitored. As diagnostic features utilized the following parameters: change in germination and seed germination energy, growth rate and formation of individual organs, change in the timing and duration of the developmental and organogenesis phases, and others. In the event of activity of sublethal and lethal gas concentrations, plant resistance can be determined by degree of leaf damage necrosis or by changes in the water regime and photosynthesis [4-7].

One of the first task in development of technology for evaluating the effect of volatile toxic substances on plants in closed containers is to establish optimum soil moisture, which provides the best seed germination and development of plant seedlings.

**Purpose of the article** – establish the optimum moisture content of soil samples in closed container for seed germination and growth of seedlings of wormwood and cereals.

**Methods.** The targets of research were wild-growing wormwood: artemisia effusus (*Artemisia diffusa*), wild-growing type of cereal - comb-shaped wheat grass (*Agropyron pectiniforme*), cultivated type of cereal - soft wheat (*Tríticum aestivum*), variety Saratovskaya-29.

In work process being used ready-made soil universal, for all types of vegetable, green, flower crops and seedlings, environmentally friendly product 'Himself agronomist'. Production Russia, LLC 'AgroSnabRetail'. Composition: drug turf (lime carbonate, chalk, dolomite powder) and structuring materials, mineral fertilizers.

Content of nutrients, mg/ml:

| | | |
|---|---|---|
| Nitrogen ($NH_4$+$NO_3$) | 240-350 |
| Phosphorus ($P_2O_5$) | 290-410 |
| Potassium ($K_2O$) | 330-470 |
| Acidity pH | 5,4-6,6 |

Complete set of required of minor elements.

Ready-made universal soil was dried at room temperature for two weeks; sand was thoroughly washed and dried. Prepared a mixture of soil and sand with weight ratio of 70% soil and 30% sand. Sand was added to better aerate the soil. Then prepared soil samples with different humidity: 20%, 40% and 60%.

Transparent plastic bottles (commercial, household, used for drinking water) of 5.25 liters were cut horizontally centrally, 0.5 kg prepared soil samples placed in containers. The seeds were sown, then containers sealed with scotch tape and tightly closed with cap on top (figure).



Seed germination and seedling growth of comb-shaped wheat grass (*Agropyron pectiniforme*) in closed containers

Seed germination was carried out at temperature of + 20 + 23 °C.

Used known methods of seed germination [8]. Each batch of each series was carried out in three replications, followed by statistical processing [9].

**Results and discussion.** Being studied seed germination of wild-growing wormwood – artemisia effusus (*Artemisia diffusa*) in closed containers with soil samples of different moisture. The seeds of wormwood are small (2x0.8 mm), lightweight (weight of 1,000 seeds is 0.2-0.3 grams). 0.5 grams of wormwood seeds were sown, or about 1,500 seeds in each container. The observation period was 30 days. After 30 days, containers were opened, the best condition of seedlings was found at soil sample with 40% of moisture, soil sample with 60% moisture was waterlogged.

Seed germination of wormwood was 1%, 1.6% and 1.7% on soil samples with moisture content of 20%, 40% and 60% respectively. Seed germination of wormwood is 1,6-1,7 times higher on soil samples of 40% and 60% compared to soil samples with moisture content of 20% (table 1).

Table 1 – Seed germination of artemisia effusus (*Artemisia diffusa*) in closed containers within one month.
0.5 grams of seeds or about 1,500 seeds were sown in each container. Represented data collected on 30th day of research

| Soil moisture, % | Germination, % | Seedling height, cm |
|---|---|---|
| 20 | 1,0±0,02 | 1,2 ±0,3 |
| 40 | 1,6±0,03 | 3,2±0,9 |
| 60 | 1,7±0,03 | 3,1±1,0 |

Seeds of wormwood were collected in November 2018, the period of post-harvest ripening was 3,5 months. Such a short period of post-harvest ripening explains the low germination of wormwood seeds.

Part of containers were opened later, only after 3 months. It has been established that condition of container with 60% soil moisture is significantly improved. As far as water is used to increase biomass of growing plants and its content in soil and air is reduced.

The results of research cereal seeds are presented in tables 2 and 3, respectively.

Table 2 – Seed germination and seedling growth of comb-shaped wheat grass (*Agropyron pectiniforme*) in closed containers.
300 seeds are sown in each container. Represented data collected on 30th day of research

| Soil moisture, % | Germination, % | Seedling height, cm |
|---|---|---|
| 20 | 3,6±0,03 | 15 ±3 |
| 40 | 42±1,2 | 17±4 |
| 60 | 41±1,3 | 18±4 |

Table 3 – Growth and development of soft wheat seedlings (*Tríticum aestivum*), variety Saratovskaya-29 in closed containers
within one month. In each container, 100 seeds are sown. Represented data collected on 30th day of research

| Soil moisture, % | Germination, % | Seedling height, cm |
|---|---|---|
| 20 | 19±0,8 | 27 ±4 |
| 40 | 78±2,2 | 37±5 |
| 60 | 79±2,3 | 37±6 |

Research of cereal seeds germination was carried out during a month; it was established that soil moisture of 40% is optimal for seed germination and seedling growth in closed containers. Soil samples with moisture content of 20% had significantly lower seed germination compared to seed germination of soil samples with moisture content of 40% and 60%. The germination of cereal seeds and seedling development was about the same of soil samples with moisture content of 40% and 60%. (tables 2 and 3).

In closed containers, both for wormwood and for cereals, soil moisture in range of 40-60% provides the best seed germination. Seeds of wild plant species are heterogenic and do not germinate simulta-neously. Then, cultivated cereal, soft wheat (*Tríticum aestivum*) variety Saratovskaya-29 is able to com-plete seed germination on 14th day of research. Quite opposite seeds of wild-growing species of comb-shaped wheat grass (*Agropyron pectiniforme*) and artemisia effusus (*Artemisia diffusa*) begin to germinate on 3-4 days or later on the 14th day.

Regarding the optimal moisture content of soil samples in closed containers, for comparison, we quote data of Pryanishnikov D. N. (1900) about optimum moisture content of open ground (soil) for seed germination, plant growth and development. In open ground, the lower limit of optimum moisture content is approximately estimated depending on the type of soil and plants by the following values: for grasses - 50–60%, for cereals - 45–50%, for vegetable and technical crops - 40–45% [10].

That is, there is an approximate coincidence of the optimum soil moisture for plant development both in open ground and in closed container.

However, the results of our research have shown waterlogged general condition of closed container with soil sample of 60% humidity. Waterlogging often leads to mold and contamination comparing with soil samples having less moisture. It is known that the development of bacteria stops at about 25% of environment moisture and about 15% for mold [11].

**Conclusions.** In closed, transparent container (5 liters) soil moisture (soil mixed with peat and sand) in the range of 40–60% compared to humidity of 20% provides the best seed germination of wild species: wormwood (*Artemisia diffusa*), comb-shaped wheat grass (*Agropyron pectiniforme*), cultivated cereal soft wheat (*Tríticum aestivum*) variety Saratovskaya-29.

In tested closed containers, soil moisture of 40% should be used, with relatively short research period of plants (30 days). With a longer period of research, it is possible to use soil with moisture content of up to 60%, because with time, the excess water is absorbed by growing plants.

The method of closed containers find use for studies of influence of toxic, volatile, gaseous substances on the growth and development of plants in laboratory conditions. The results of this work will be used in modeling the ecosystem of Central Kazakhstan in connection with environmental pollution of volatile, highly toxic components of rocket-engine propellant, resulting from activities of Baikonur space-launch complex.

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### ТҰҚЫМДАРДЫҢ ЖӘНЕ ТҰҚЫМ ӨСКІНДЕРІНІҢ ЖАБЫҚ ЫДЫСТАРДА ӨСУІ ҮШІН ТОПЫРАҚТАР ҮЛГІСІНІҢ ОҢТАЙЛЫ ЫЛҒАЛДЫЛЫҒЫ

**Аннотация.** Зерттеу мақсаты жусанның жабайы өсетін түрінің тұқымдарының және екпе көшеттердің өсуі үшін топырақ үлгісінің жабық, мөлдір ыдыстардағы оңтайлы ылғалдылығын белгілеу болды - тармақты жусан (*Artemisia diffusa*), дақылдың жабайы өсетін түрі - еркек бидайық (*Agropyron pectiniforme*), мәдени-ленген дақыл - жұмсақ бидай (*Tríticum aestivum*), Саратов сұрыбы-29. 20, 40 және 60 % ылғалдылықтағы топырақ үлгілері сыналды. Жабық ыдыста (5 литрлік) топырақтың ылғалдылығы 40-60 % интервалда тұқым-дардың және екпе көшеттердің пайдаланылған өсімдік түрлерінде жақсы өсуін қамтамасыз ететіні анық-талған. Сыналған жабық ыдыстарда өсімдіктердің қатыстық қысқа кезеңінде 40 % тең топырақ үлгісінің ыл-ғалдылығын пайдалану қажет (30 тәулік). Пайдаланудың неғұрлым ұзақ кезеңінде 60 % дейінгі ылғалдылық-пен топырақты пайдалану мүмкіндігі бар, себебі уақыт өте келе судың артығы өсіп келе жатқан өсімдікпен игеріледі. Жабық ыдыстар әдісі зертханалық жағдайда өсімдіктердің өсуіне және дамуына улы, ұшатын, газ тәрізді заттардың әсер етуін зертеуде қолданылады. Осы жұмыстардың нәтижелері Орталық Қазақстанның экожүйесін Байқоңыр космодромының қызметіне байланысты қоршаған ортаның ұшқыш, жоғары токсинді ракеталық жанармаймен ластануына байланысты үлгілеуде пайдаланылатын болады.

**Түйін сөздер:** жабық ыдыстар, топырақтың ылғалдылығы, тұқымдардың өсуі, екпе көшеттердің өскіні.

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### ОПТИМАЛЬНАЯ ВЛАЖНОСТЬ ПОЧВЫ ДЛЯ ПРОРАСТАНИЯ СЕМЯН И РОСТА СЕЯНЦЕВ В ЗАМКНУТЫХ ЕМКОСТЯХ

**Аннотация.** Целью исследований служило установление в замкнутых, прозрачных емкостях оптималь-ной влажности образцов почвы для всхожести семян и роста сеянцев дикорастущего вида полыни – полынь развесистая (*Artemisia diffusa*), дикорастущего вида злака - пырея гребневидного (*Agropyron pectiniforme*), окультуренного злака - мягкая пшеница (*Tríticum aestivum*), сорт Саратовская-29. Использован универсаль-ный, коммерческий торфогрунт.

Установлено, что в замкнутой, прозрачной емкости (на 5 литров) влажность почвы в интервале 40-60 % в сравнении с влажностью почвы 20 %, обеспечивает лучшую всхожесть семян и рост сеянцев *Artemisia diffusa*, *Agropyron pectiniforme* и *Tríticum aestivum*, сорт Саратовская-29.

В испытанных замкнутых емкостях следует использовать влажность образцов почвы, равную 40 %, при относительно коротком периоде исследований растений (30 суток). При более длительном периоде исследований возможно использование почвы с влажностью до 60 %, по сколько со временем излишек воды усваивается растущими растениями.

Замкнутая, прозрачная емкость может служить моделью замкнутой экосистемы, то есть системы, не предполагающей какого-либо обмена веществом с внешней средой замкнутых емкостей. Такие системы представляют научный интерес и могут быть использованы для исследования влияния летучих (газообразных) соединений на растения.

Область применения: метод замкнутых емкостей находит применение в исследовании влияния летучих, газообразных веществ на рост и развитие растений в лабораторных условиях. Результаты этой работы будут использованы при моделировании экосистемы Центрального Казахстана в связи с загрязнением окружающей среды летучими, высокотоксичными компонентами ракетного топлива, возникающими в результате деятельности космодрома Байконур.

**Ключевые слова:** замкнутые емкости, проростание семян, влажность почвы.

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# MODERN PROBLEMS AND RATIONAL
# USE METHODS OF ARID SOILS IN AZERBAIJAN
# (AS AN EXAMPLE OF JEYRANCHOL)

**Abstract.** The problems in dynamical changes assessment occurring as a result of mutual impact of the available state, natural and antropoghenic factors in Azerbaijan arid soils have been paid attention, but the scientific groundings have been based on our perennial soil investigations in Jeyranchol at the global desertification problems context in the article.

**Key words:** degradation, arid, semiarid, deflation, erosion, semihumid, exodynamic, salinization.

**Introduction.** Beginning before 70th years of the XX century the salinization process occurring in the world is discussed at a standart of the General Assembly sessions UNO and the fight measures against it are analyred on the basis of special researches at a global scale. As it is known that desertification happens as a result of two mutual influences – natural and antropoghenic factors. This effect is appeared to different degrees in al the regions and natural districts of the earth. A comparison changes depending on the geographical zone. So, the natural factors prevail over an antropoghenic factor in some zones, but the antropoghenic factor prevails over a natural factor in the other zones. According to the calculations the world agriculture loses 16 milliard dollars as a result of the soil productivity loss in a year [3].

The problems of swamping, salinization, loss of the pasture areas and unirrigated soils productivity include the desertification process in soil. We come to such a conclusion that desertification process intensively occurs in the arid, semiarid and semihumid climatical areas on the basis of the perennial soil researches and visual observations. So, the ecological situation of these zones indicate itself in biological productivity decrease and this happens under an influence of the natural factors and human's farming activity. G. Dregne (1976) evaluates desertification as a joint effect process source of the aridity and human's farming activity in arid, semiarid and sometimes semihumid ecosystem [6]. This process like a landscape degradation shows itself in plants optimalization disorder, productivity reduction, change of biomass, macro and microfauna, flora difference an soil cover disorder. These cases change man's life mode and create dangers in a future work [5].

The antropoghenic factor possesses an effect force to some or other degree besides natural factors in a desertification process of the environment.

The followings enter the principal factors causing desertification process in arid soils of Azerbaijan:

- degradation of plant cover and soil cover eroding as a result of the human's incorrect farming activity;

- acceleration of the deflation process as a result of unrational use from agriculture under the unirrigated condition. Not considering natural characters of soil cover;

- not keeping a comparison between cattle-breeding and plant-growing;

- forests cutting as a result of not meeting the population's need for heat;

- perishment of soil and plant cover in the various technogen landscapes;

- disorder of the plant and soil cover as a result of the incorrect arrangement of the water sources in the winter pastures;

- not keeping an irrigation norm during the soils irrigation and conseguently;

- happening of secondary salinization and alkalinity process;

- cultivation of soils possessing thin layer because of the soil resources shortage;

- lately carrying the fertile soils of the semiarid and semihumid zones to the large cities.

**Research object and method.** The research object stretches from north-west to south-east involving a zone more than 200 000 hectares in the north-west part of Azerbaijan. The geographical coordinates are 45°45'14.1" east length and 41°20'52.1" north width, 45°39'28,8" east length in the south, 47°7'48" north width in south, 45°6'3,6" east length in the west and 41°20'24" north width in the west, 46°31'58,8" east length in the east, 41°57'46,8" north width in the east. Two observation and example grounds have been selected in the research object. The first observation and example grounds are in the zone of the Girzan dwelling station on the left bank of the Kur. The geographical coordinates of this station are 45°40'37,7" east length and 41°7'40,35" north width in the south, 45°40'52" east length and 41°7'44,07" north width in the east, 45°41'51,9" east length and 41°8'30,6" north width in the north, 45°41'18,8" east length and 41°8'10,4" north width in the west.

An absolute height from the sea level of the first observation and example grounds varies by 220 m and 370 m. A problem of the influence of the modern geomorphological processes and antropoghenic activity an soil cover from the coordinates towards north direction to the low upland was paid attention (figure 1).



Figure 1 –
Characteristic soil cuts place
of the first observation and example gorund



Figure 2 –
Characteristic soil cuts place
of the 2nd observation and sample ground

The second observation and example ground is taken as a continuation of the first one. The geographical coordinages of the station are 45°40'30,3" east length and north width in the south, 45°42'10,8" east length and 41°8'54,81" north width in the east, 45°40'32,8" east length and 41°9'32" north width in the north, but 45°40'98,18" east length and 41°9'98,7" north width in the west. The zone consists of weak inclined plain at 370-380 metres from sea level (figure 2).

But both exodynamic and soil processes occur in different directions in these stations.

The eight-element model on surface profile was constructed on the left bank of the Kur river considering the modern geomorphological state, soil and exodynamic processes (figure 3).

The soil sections characteristic for the soil processes analysis have been applied, the thorough morphological discriptions have been performed in these sections and the soil parameters have been studied by the following method and ways in the soil samples taken on genetic layers: absorbed bases (Ca$^{++}$ - Mg$^{++}$) by Ivanov's method; calcareous calsimeter – by Scheibler method; pH (in water solution) by potensiometer; granulometric composition by Kachinsky's method.
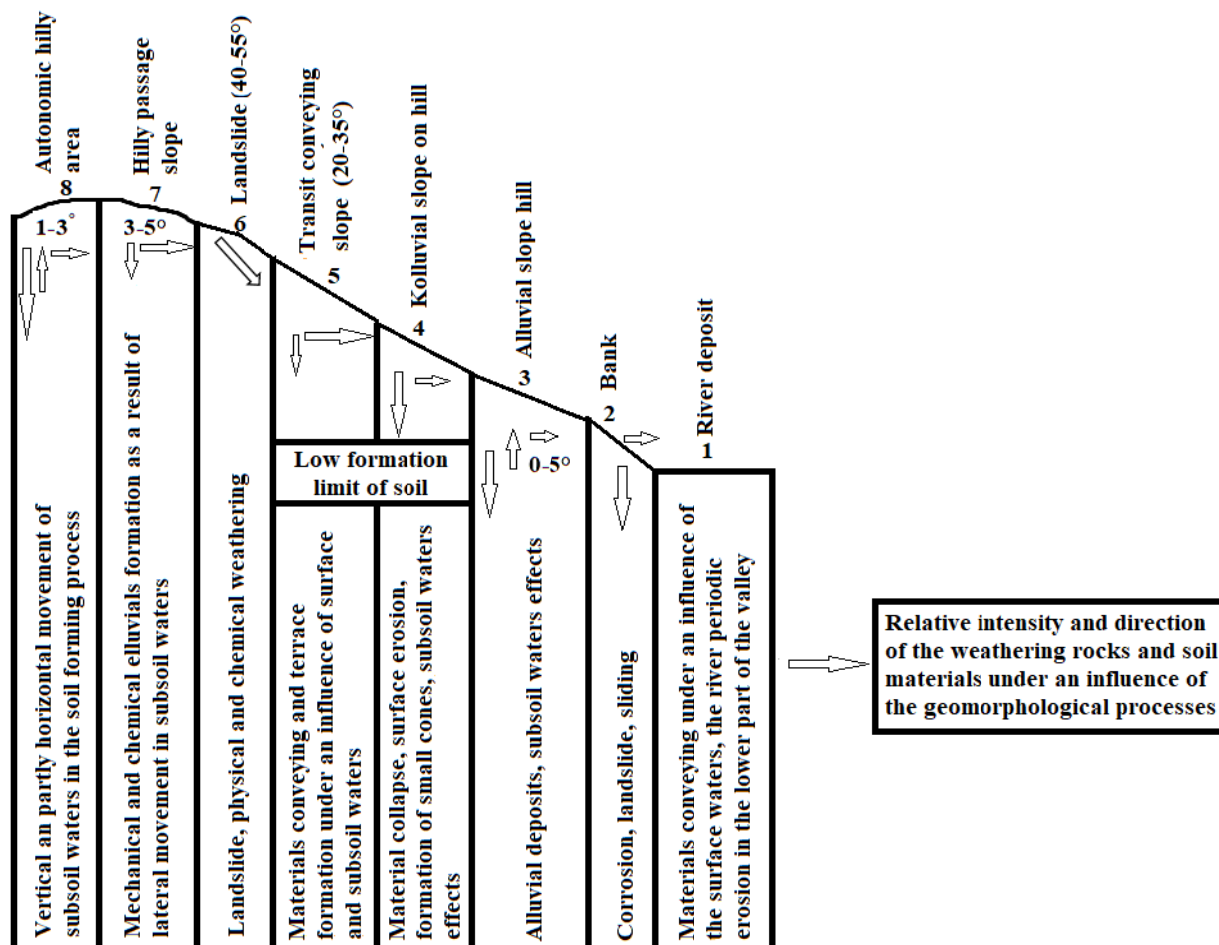
Figure 3 – Eight-element model on Jeyranchol massive of the left surface in the Kur valley

**Results and discussions.** The research object is geomorphologically complex, possesses unlike relief characters. Here the soil cover exsposes to different exodynamic processes depending on relief. These processess accelerate aridity rate in the zone. So, the intermountain plains mostly expose to wind erosion, while landslide and erosion process intensively go on the slope. The destructive-winnowing activity of the strong winds in the spring and summer months causes disappearing of the surface fertile layer of soil [4].

The soil processes possess a great effect force in ravine-gorge erosion development of Jeyranchol. So, the atmospheric sediments solve gypsum combinations in soil structure, wash them out in the vertical and horisontal directions, complicate the relief, accelerate soil degradation and intensify aridity [2].

The exodynamic processes change some indications of soil cover and agricultural importance of soil reduces.

Provision of the fodder plants with nutrients deteriorates because the surface fertile layer of the soil is covered by the materials which are brought with the wind erosion.

A direction and intensity of the soil-formation process changes depending on modern geomorpho-logical state in the first observation and example ground. Though the human's farming activity is weaker than the second station in the first research zone an effect of the natural processes in superior. The Kur river effect is very stronger in the first, second elements of the given model. These soils have been formed on the basisi of alluvial deposits and under an influence of the local factors. The soil layer covered at 80-1.150 cm depth on profile of the soil cut is met. The third element of the model is on the alluvial slope hill and inclination varies by 0-5°. A flow of the subsoil waters towards the river deposit happens in a hori-zontal direction, besides vertical infiltration and evaporation of the atmospheric precipitations. These soils expose to surface erosion as a result of the elementar irrigation. Humus is 2,0-2,5 %, total nitrogen is 0,18-0,20 % on the surface accumulative horison of the soil. A guantity of physical clay is 50,4 %, but silt

fraction is 27,6 % on the upper horison. Totality of salts and dry residue towards depth rises according to the results of the total water weight analysis. This index is more higher in plaxes (plains).

The fertility parameters vary towards decrease in comparison with the soil monitoring conseguences performed for a half century before us.

While moving away from the Kur river-bed, the subsoil waters level reduces and colluvial slopes start. Here the soil formation processes goes weakly. The soil processes are disordered under an influence of the transit floats. The floating materials create liitle cones. The floating and settling materials are very poor from a food supply standpoit, they are mainly clayey rocks. The gypsum guantity is more than 20-25 % in these rocks structure.

The fifth element is a transit conveying slope of the materials. Here the exodynamic process goes rather intensively. The landslide material expands around under the gravity and weathering influence. The exodynamic processsses intensify the desertification process under the arid climatic condition in the zone. Collection of the landslide materials and more inclination create small displacement areas in the zone. Here the relief inclination changes by 20-35°. The soil processes direction often changes because of exogenic processes dynamism elevation.

The sixth element is a zone where an exodynamic process goes intensively. This zone plays a border role between the transit area with an autonomic area. The inclination changes by 40-55°. All the transit areas are nourished from this element. The conveying products are mainly calcareous, gypsic and clayey rocks. The transit products conveyed as a result of the geomorphological processes affect till the first element. This effect is negative, covers relatively fertile accumulative layer and so the covered soils are founded, and an initial soil formation process starts. This process goes very slowly under the arid climate condition.

The seventh-eight element passes to the 2nd observation and example ground. These elements are the zones which will be able to lose their natural balance soon under the modern geomorphological processes influence. The zone surface is somewhat vivid, it possesses 1-3° and 3-5° inclination. Here are soil formation process occurs normally, and normal genetic layers are formed. The soil formation process occurs under an influence of the vertical and horizontal movement of waters in the autonomic vivid area. During the soil research the hygroscopic water increases from 2,27 % to 17,5 % while rising depth according to the results of the taken samples analysis. $CaCO_3$ and $CaSO_4 \cdot 2H_2O$ is washed out as a result of the atmospheric rainfalls. A mechanical structure of soil is heavy loamy on the upper genetic stratum and turns into mean loamy towards low layers.

The natural effect is higher than the antropoghenic influence in the first observation and sample ground as it is seen from our field and laboratorial research result. The weathering and landslide phenomena happening towards the Kur river valley causes reduction of the plain soils in the Jeyranchol massive year after year. These processes disturb the soil ecological balance and accelerate desertification process in the zone.

The second observation and sample ground possesses ordinary grey-brown (chestnut) soils under the autonomic condition and at 370 m height from the sea level. The inclination varies by 1-5°. For a long time these soils have been used as a winter pasture area.

These zones used for extensive cattle-breeding was available as an unprofitable farming in the economic life of the Republic. The second observation and sample ground was selected and the scientific observations were performed, the characteristic soil cuts were applied and the main parameters were analyred in the taken soil samples under the laboratorial condition during the soil researches in Jeyranchol in 2015-2016.

As a result we come to such a scientific conclusion that the farming direction can be changed towards agriculture by rationally using from the water resources of the Kur river.

While changing a farming direction in Jeyranchol, the exodynamic processes characteristic for the zone, especially the deflation and ravine erosion shouldn't be forgotten. While fulfilling the tillage works, there is a necessary need for building of the field guarding forest zones consisting of the tree and bushes characteristic for the zozne by taking umpire winds into account. A guantity of humus and total nitrogen gets reduced in comparison with the previous researches as it is seen from the analysis results of the soil sections applied in the zone. This index accordingty varies by 2,17-0,83 % and 0,18-0,070 %. Decrease of the nutrient for the last century is connected with the exodynamic process and mineralization intensity

under the arid climatic condition, moreover increase of the antropoghenic effect for last 100 years. As it is seen from the statistic information a guantity of the cattle falling per hectare was 2025 times more than a normal limit in accordance with the aridity index [1].

An amount of physical clay (<0,01 mm) rose on the upper layer in comparison with the previous years, it changes from mean and heavy loamy to mean and heavy clayey soils in the analysis indices of more soil cuts. There is a great influence of the exodynamic processes, especially wind and rain erosion on this change.

It is known from the observation on soil sections that the observing depth of carbonate reproductions reduced along the profile. The gypsum combinations and nets consisting of gypsum are found at 20-25 cm. Whereas these indices were noted at 30-50 cm depth in the previous researches. The change on $Cl^-$ anion is weakly striking in comparison with the previous results of the total water weight analysis. But this difference is comparatively higher on $SO_4^{2-}$ anion and $Ca^{2+}$ cation. This is also connected with the increase of calcareous and gypsum number as a result of the desertification process intensity.

It is known during our research in the ordinary grey-brown (chestnut) soils under the irrigative and unirrigative condition in Jeyranchol in 2015, that the soil formation process was going more normally under the irrigative condition in comparison with the unirrigative condition. We can come to such a conclusion that the soil cover can be improved and the farming can be made more profitable by broadening agriculture under the irrigative condition.

**Conclusions.**

1. As it is seen from the field and laboratorial research result in the first observation and sample ground that a natural effect is very greater than the antropoghenic influence. The weathering and landslide phenomena occuring towards the Kur river valley cause decrease of the plain soils in the Jeyranchol massive year after year. These processes disturb an ecological balance of soil and accelerate a desertification process in the zone.

2. The change of nutrient and other parameters in the negative direction is observed in the soils in comparison with the soil monitoring results in which the soil research conseguences have been performed in the gray-brown (chestnut) soils of the 2nd observation and example ground. The soil formation process can be accelerated and the farming can be made profitable by applying irrigative agriculture in these soils.

**И. А. Кулиев, М. Ю. Халилов, И. И. Марданов**

**СОВРЕМЕННЫЕ ПРОБЛЕМЫ И РАЦИОНАЛЬНОЕ ИСПОЛЬЗОВАНИЕ АРИДНЫХ ПОЧВ В АЗЕРБАЙДЖАНЕ (НА ПРИМЕРЕ ДЖЕЙРАНЧЕЛЯ)**

**Аннотация.** В статье уделено внимание вопросам современного состояния и оценке динамических изменений аридных почв в Азербайджане под влиянием совместных естественных и антропогенных факторов в контексте проблемах глобального остепнения, научное обоснование дается на основании многолетних почвенных исследований, проведенных на территории Азербайджана.

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# EFFICIENT METHODS IN BREEDING DAIRY CATTLE
# OF THE REPUBLIC OF KAZAKHSTAN

**Abstract.** 10077 heads of cows, daughters of 117 bulls belonging to 38 lines of 4 dairy breeds: Alatau, Holstein Black-and-white, Black-and-white,and Red Steppe were monitored. In terms of breeds, mothers of daughters of the selected Alatau bulls have had average productivity of 5515±170 kg, the Holstein black-and-white - 7871±182 kg, Black-and-white - 5741±149 kg, and the Red Steppe - 3917±104 kg. It was established that the average productivity of dairy cows in the republic of all types of farms was 5039±31 kg. The highest productivity of Holstein cows is 5280±67 kg, the smallest - of Red Steppe breed cows - 3518±38 kg. The difference between the productivity of Holstein and Alatau was 436 kg, with Black-and-white - 344 kg, with the Red Steppe - 1762 kg (P>0.999). In terms of fat and protein, cows of the Red Steppe breed have the highest rates (3.96±0.02% and 3.30±0.03%, respectively). In terms of fat content, cows of the Red Steppe breed prevail over the Alatau breed by 0.22% (P>0.999), over the Holstein - by 0.23% (P>0.999), over the Black-and-white - by 0.31% (P>0.999), the excess in protein content was: over Alatau by 0.11% (P>0.99), over Holstein - by 0.12% (P>0.99), over Black-and-white - by 0.25% (P>0.999).

In the age aspect, it was established that dairy productivity is characterized by growth (4844...5679...5458 kg) by the second or third lactation and a gradual decrease (4716...4017 kg) by the fifth lactation, i.e. this breed is characterized by a constant milk yield level. On average, for all lactations, cows of this breed gave 5123±275.4 kg of milk. The nature of the dairy productivity flow of cows of the Black-and-white breed has a peculiar specificity. So, starting from the first lactation, when there was a maximum milk yield (4936±231 kg), then there was a gradual decrease by the fifth lactation, where the lowest productivity was noted. Nevertheless, the average milk yield for all lactations was 4671±190 kg, i.e. the potential of this breed is seen, as evidenced by the variability of this selection trait (32.0...50.7%). The productivity of Red Steppe breed cows of different genotypes averaged - 3904 kg of milk, fat content - 3.77%, and live weight - 487 kg. The yield of crossbred cows is higher than those of purebred Red Steppe by - 280-365 kg. The coefficient of full value of lactation in the Red Steppe of different genotypes is within 63.77-69.83%, in the Black-and-white - 69.17%, the index of the full value of lactation is within 83.7-93.6% and 94.97%.

**Keywords:** selection,breeding, assortment, breeding value of cows, linear assessment of the exterior, milk yield, milk composition.

**Introduction.** In the modern dairy cattle breeding of our country, the main task of zootechnic science and practice is the further intensification of the industry, aimed at increasing the genetic potential of the productive qualities of domestic animals and the degree of its realization. The development of molecular biology, population genetics, biotechnology, the development and implementation of large-scale selection, the use of computer programs for analyzing selective information have enriched the arsenal of tools for studying biological patterns and managing animal heredity, breed-formation processes [1].

However, it does not mean that the methods of individual selection, which are key for creating new highly productive herds, lines, families, and obtaining animals with record numbers, have lost their value. A detailed study of intrabreed structures, in particular, breeding herds on selective and genetic parameters in dynamics, on a certain ecological background, will allow to assess the gene pool of the breed and to give a theoretical justification for its qualitative improvement, avoiding the "selection plateau", to maintain the necessary level of variability of herds, while simultaneously increasing the productivity of herds [2].

F.F. Eisner [3] considered individual selection in breeding herds to be the most important element in breeding work. Recognizing the role of modern programs based on population genetics methods, he repeatedly stressed that the greatest effect in improving the hereditary qualities of dairy cattle can be achieved with a reasonable combination of large-scale and in-depth individual selection.

A similar opinion is shared by L.K. Ernst et al. [4]. They considered it necessary to persistently search for ways to accelerate the selection process in accordance with the requirements of scientific and technological progress, to develop new efficient technologies that would contribute to the greatest realization of the genetic potential of animals. The search should go both in the direction of improving the efficiency of individual ways and methods of selection, and along the lines of developing more advanced organizational forms of breeding. Breeding work is a work for the future, and it should be carried out on the basis of clear scientific developments and long-term forecasts.

Genetic progress of the population is provided by the best animals - the prepotent bulls - leaders, the cows - champions. Researchers point out the lack of data on methods for breeding cows-champions, their use, heritability and repeatability of the most important breeding traits. The study and generalization of the methods of creating outstanding animals will justify the recommendations for their planned obtaining [5].

The essence of agrarian reform consists in a set of socio-economic and organizational measures aimed at transforming production relations, ensuring the growth of efficiency of agriculture and agro-industrial production as a whole, which should be reflected in creating conditions for the expanded reproduction of agricultural raw materials and food and improving the level and quality of life of rural residents.

Dairy cattle breeding cannot develop without solving problems of forming the effective herd, taking into account the genetic potential of dairy productivity and reproductive qualities, equipping with modern technologies of dairy cattle breeding and strong forage base. Sequential intensification and enhancement of the efficiency of dairy cattle breeding are impossible without an increase in the productivity of cows. In turn, the increase in productivity is impossible without special elaborations of a recommendatory nature in order to improve the economic efficiency of breeding dairy cattle [6].

The economic efficiency of cattle breeding reflects the ratio of production results (production and income) with the number of resources used (labor, fodder and other means of production and services) and costs. Under the conditions of the market economy, indicators of cost recovery, profit,and profitability are essential as a basis for the guarantee of simple and expanded reproduction. In assessing the effectiveness of cattle breeding in Russia, it is important to take into account the peculiarities of the formation of a multi-pattern agriculture during the period of transformations and management, and the analysis should be carried out not only as a whole, but also in the context of farm categories that have different conditions and economic management mechanisms. The development of animal husbandry is essential not only for balanced nutrition of the population, but also for ensuring the food security of our country. Modernization of selective and technical potential in dairy cattle breeding is a priority condition for the improvement of the economic efficiency of domestic and foreign cattle breeding [7].

Growing calves and increasing business output is an important factor in the reproduction of dairy cattle livestock, affecting the profitability of milk production. Despite this, calf losses on dairy complexes are quite high [8, 9].

The calves management approach depends not only on the size of the enterprise, but also on the selected technology of their feeding. The ways of calves maintenance are planned in such a manner as to create comfortable conditions during all periods of growth and development, taking into account the natural and climatic features of the environment, as well as the capabilities of the equipment for ventilation of the premises and reduction of microbial dissemination [10, 11].

Crossing the animals of the Swiss breed with local cattle and further "inter se" breeding the crossbreeds led to the creation of large areas of brown cattle in various zones of the country, differing in productivity and body build. This was the basis for the isolation of several zonal breeds originating from Swiss cattle from the common brown cattle array. Thus, 5 breeds were emphasized: Kostroma, Alatau, Lebedin, Caucasian brown, and Brown Carpathian cattle [12].

Alatau brown cattle breed was obtained by crossing local animal breeds with Swiss breed. Therefore, the use of Swiss on cattle of Alatau breed contributed to the improvement of the morphological and physiological properties of the udder of cows. The crossbreeds needed to improve the uniform develop-

ment of udder fractions, the size of the nipples and milk flow rate. Alatau brown breed is less suitable for direct economic use in industrial complexes, but it serves as excellent breeding material for obtaining animals (at the industrial crossing with Swiss) [8].

The theoretical basis of modern breeding is population genetics, based on the combinational variability of characters and knowledge of the patterns of their inheritance. Over the past decades, considerable potential has been accumulated in this area, the use of which makes it possible to work in the right direction, to predict the effect of breeding programs, modeling them with an accurate calculation of the average for cows of the same age totally in the breed [5, 6].

Due to the significant variability of environmental conditions and nonadditive inheritance of milk production, according to some researchers, the productivity of ancestors is not a reliable criterion for the value of their offspring. One of the ways to improve the accuracy of cows estimation is to take into account the greatest possible number of environmental factors, fluctuations in dairy productivity by lactation, heritability, standard deviations, repeatability.

Therefore, the search for rational use of the gene pool of breed capable of improving the Alatau, Black-and-white and Red Steppe breed is currently relevant.

**The aim of the research.** Formation of the information base of initial data on dairy cattle populations from various regions of Kazakhstan with the determination of the population in each breed and productivity, analysis of the used bulls of the Swiss, Holstein, Danish Red and Angler breeds while improving the productive qualities of the Alatau, Black-and-white, and Red Steppe breeds.

**Research methods.** The objects of the research were breeding stocks, as well as servicing bulls of experimental farms in different regions of Kazakhstan. Materials for research were documents of primary zootechnic and breeding accounting (from the IAS system), as well as the results of experimental studies, visual assessment, measurements, and control milkings of animals. For the analysis of dairy productivity, live weight and genealogy, the data of breeding and zootechnic accounting of the farm were used. All cows were in the same feeding and maintenance conditions. Cows were fed with adopted in the farm fodder.

When breeding, it is important to know the general phenotypic variability of productive traits. It consists of genotypic and paratypic variability. From genotypic factors, we investigated the variability of productive indicators of the ancestors of the studied cows.

We have studied the following:

- dairy productivity - according to breeding records and control milkings;

- the nature of lactation curves was estimated by the coefficient of lactation constancy (CLC) - which is defined as the percentage ratio of the yield sum of 4–6 months to the amount of 1–3 months.

Digital material was processed by the methods of variation statistics proposed by G.F. Lakin [13] and D.A. Baimukanov et al. [14].

**Research results.** One of the reasons for the low efficiency of selection work with dairy cattle in Kazakhstan is the use of low-quality breeding material. Indeed, the absence of breeding material is a brake on the development of dairy cattle breeding. Farmers rarely use quality breeding material from leading manufacturers. The regulations adopted in Kazakhstan in recent years in the field of animal husbandry created real prerequisites for the preservation and increase of the livestock gene pool.

*Monitoring of domestic and imported dairy cattle.* Monitoring of dairy cattle of the Alatau breed was carried out in experimental farms of various regions of Kazakhstan.

The problem of domestic dairy cattle breeding is an outdated system of integrated assessment of animal breeding qualities. So far, in Kazakhstan, the methodology of integrated assessment is based on the obsolete principles of grade scaling of the phenotypic values of individual economic traits. As a result, it is not possible to objectively rank the animals for the main complex of economic traits, which, ultimately, violates the optimality of the formation of breeding animal groups and reduces the rate of genetic improvement of populations in general.

We have analyzed the genealogical affiliation of the studied animals (table 1) using the downloaded data from the IAS program.

As can be seen from the data of table 1, 10077 cows, daughters of 117 bulls belonging to 38 lines of 4 dairy breeds were monitored: Alatau, Holstein black-and-white, Black-and-white and Red Steppe. In terms of breeds, mothers of daughters of the Alatau breed selected bulls have had average productivity of

Table 1 – Productive indicators of experimental animals in the context of lines and breeds

| Breed | Lines | Number of bulls-fathers | Number of their daughters | Milk yield of the fathers' mothers | Milk yield of the daughters' mothers |
|---|---|---|---|---|---|
| Holstein black-and-white | Adema 197 | 3 | 241 | 11596 | 19759±158 |
| | Annas-Adema 30587 | 2 | 193 | 13327 | 5925±201 |
| | Wis Ideal 933122 | 4 | 306 | 14811 | 7261±144 |
| | Wis Back Ideal 1013415 | 5 | 320 | 12014 | 6999±99 |
| Holstein black-and-white | Montvik Chieftain | 5 | 334 | 12411 | 7201±185 |
| | Master family group 106902 | 2 | 135 | 10168 | 6233±102 |
| | | | | | |
| | Meridian f.g. | 1 | 28 | 11785 | 5920±121 |
| | | | | | |
| | West Lawn | 2 | 428 | 12433 | 6935±155 |
| | Reflection Sovereign 198998 | 5 | 398 | 12928 | 7299±117 |
| | Sealing Trigun Rokit | 2 | 211 | 11603 | 6457±112 |
| | Wis ideal 933122 | 2 | 178 | 12841 | 8400±88 |
| | HiltyesAdema | 2 | 217 | 12173 | 6055±99 |
| Total for the Holstein Black-and-white breed | | 35 | 2989 | 12341 | 7871±182 |
| Alatau | Concentrate group | 8 | 553 | 11109 | 5369±124 |
| | Kylian 181455 | 2 | 56 | 10245 | 6016±89 |
| | Course line 197970 | 2 | 150 | 11261 | 4811±158 |
| | Meridian | 8 | 361 | 10868 | 5283±142 |
| | Oregon 86356 | 1 | 46 | 11192 | 5550±177 |
| | Master group 106902 | 9 | 373 | 11318 | 6029±82 |
| | Taddy 76BS9013 | 4 | 452 | 10147 | 5802±201 |
| | West Lawn | 11 | 646 | 11497 | 5757±141 |
| | Hiltyes Adema | 2 | 76 | 11217 | 5021±122 |
| Total for the Alatau breed | | 47 | 2713 | 10984 | 5515±170 |
| Black-and-white | Adema197 | 5 | 480 | 12583 | 5765±99 |
| | Annas-Adema 30587 | 5 | 683 | 12242 | 5359±102 |
| | Ansturm 53 | 1 | 79 | 9720 | 3720±158 |
| | Wis Ideal 933122 | 4 | 747 | 11004 | 5493±144 |
| | Wis Back Ideal 1013415 | 3 | 152 | 10355 | 6392±122 |
| | Montvik Chieftain | 2 | 93 | 8270 | 5095±98 |
| | West Lawn group | 2 | 270 | 11125 | 4815±102 |
| | Reflection Sovereign 198998 | 2 | 177 | 10668 | 7785±148 |
| | Sealing Trigun Rokit | 2 | 333 | 9685 | 5350±162 |
| | Wis ideal 933122 | 1 | 67 | 12412 | 6915±158 |
| | Hiltyes Adema | 4 | 292 | 12807 | 6478±112 |
| Total for the Black-and-white breed | | 26 | 3373 | 10828 | 5741±149 |
| Red Steppe | 115 (by Angler) | 1 | 52 | 6200 | 4005±111 |
| | 29 (Danish Red) | 1 | 42 | 6575 | 3750±88 |
| | 98 (by SPE) | 1 | 165 | 6780 | 3922±102 |
| | Vala 4930 | 1 | 64 | 6450 | 3890±112 |
| | Ogestida group | 3 | 513 | 7220 | 3769±99 |
| | Cavalier group 160273 | 2 | 166 | 7670 | 4170±101 |
| Total for the Red Steppe | | 9 | 1002 | 6816 | 3917±104 |
| For all breeds | | 117 | 10077 | 10706 | 6043±92 |

5515±170 kg, of the Holstein black-and-white - 7871±182 kg, of the Black-and-white - 5741±149 kg and of the Red Steppe - 3917±104 kg.

During the monitoring of dairy breeds, we studied the productive indicators of cows of the basic farms breeding the Alatau breed.

In Adal AIC JSC, it is established that cows of the nuclear stock produce 7983.7±76.4 kg of milk, the selection group is 6847.1±84.5 kg (table 2).

Table 2 – Productivity of the Alatau breed cows in JSC Adal AIC

| No | Group | Heads | Milk yield, kg |
|----|-------|-------|----------------|
| 1 | Nuclear stock | 42 | 7983.7±76.4 |
| 2 | Selective group | 175 | 6847.1±84.5 |

On the average, in the herd, Alatau cows produced milk in the amount of 7457.9±75.9 kg, with a fat content of 3.83±0.07%.

Scientists [15, 16] found that the average dairy productivity of cows for all lactations correlates well with the milk yield for the highest lactation.

When estimating cows for productivity, they took into account the influence of environmental factors. This is due to the fact that heifers grown in unsatisfactory conditions will never become highly productive cows, even if they come from high-priced parents [19, 20].

Because of the lack of forage and its low quality, the genetic potential of animals is often realized in farms only by 40–80%. [17].

The number of livestock projects provides for the zero grazing of calves up to 3 months of age in individual narrow-sized cages. This method of keeping calves can significantly increase the density of animals [18].

Studies of cows in Tauelsizdik LLP and Adal AIC JSC were conducted in a herd, where the level of dairy productivity by the first lactation exceeded the I class standard on average on 1213 kg, or 47.6%, by the full age lactation - by 787 kg, or 23.3% (table 3).

Table 3 – Dairy productivity of cows in the experimental farms

| Lactation by the order | Farms | Indicators | | | | | |
|---|---|---|---|---|---|---|---|
| | | Milk yield, kg | | | Fat content, % | | |
| | | n | $X \pm m_x$ | $C_v$ | $X \pm m_x$ | $C_v$ | |
| First | Tauelsizdik LLP | 72 | 4430±60 | 9.5 | 3.99±0.01 | 5.9 | |
| | Adal APC LLP | 82 | 4734±97 | 15.4 | 3.78±0.01 | 2.3 | |
| Third and older | Tauelsizdik LLP | 83 | 4666±94 | 13.1 | 3.95±0.01 | 4.7 | |
| | Adal APC LLP | 349 | 4996±81 | 21.7 | 3.79±0.03 | 1.9 | |

In terms of dairy productivity, cows of all ages in the Adal AIC JSC (n=431) comply with the standard of the Alatau breed in the Republic of Kazakhstan. As for lactations: the first exceeds the breed standard on 534.4 kg, the second - on 246 kg and by the third lactation - at the level of the first-class standard. As for the fat content - 0.19% and the yield of milk fat - in the first lactation - on 28.75 kg, in the second - on 17.22 kg and in the third - on 8.67 kg. The average productivity of the herd of 431 cows was 4915 kg of milk and 3.79% of fat. When converting to the breed standard from 3.6% milk fat content, the dairy productivity of the herd of Adal LLP is 5175 kg of milk per cow. The same trend is observed in cows of Tauelsizdik LLP (n=155).

A comparative analysis of dairy productivity showed that the cows of Adal LLP significantly (P>0.95) exceeded the productivity of the cows of Tauelsizdik LLP in first-calf cows on 304 kg, and in full-aged - on 330 kg.

Lactation is a function of the entire organism. In ensuring the process of milk formation, systems (nervous, endocrine, digestive, circulatory, respiratory, and others) work. Their cooperation is based on

the principles of dynamic organization and is aimed at ensuring the full functioning of the breast (milk gland). Under normal conditions of feeding and maintenance of cows, as a rule, daily milk yield in the first time after calving tend to increase and reach a maximum by the middle of the second, at the end of the first month. For high-yielding cows, the period of time required to achieve maximum productivity is usually longer than for low-yielding ones.

We investigated the nature of lactation of cows in experimental farms in terms of the coefficient of lactation full value (table 4).

Table 4 – Lactation activity of first-calf cows

| Indicator | Farms | |
|---|---|---|
| | Adal APC LLP | Tauelsizdik LLP |
| Number of heads | 100 | 100 |
| Milk yield for the first 100 days, kg | 2525±102 | 2190±91 |
| Milk yield for thefurther 100 days, kg | 2020±89 | 1752±111 |
| Milk yield for 305 days, kg | 4734±97 | 4430±60 |

As established by the data in table 4, with a significant difference (P>0.95) of dairy productivity in the lactation segments, the CLC did not differ.

At the present stage of work, the realization of the high genetic potential of dairy cattle is crucial. To successfully accomplish this task, along with improving the feeding and maintenance conditions, it is necessary to provide a scientific justification for the degree of influence of genetic and phenotypic factors on the formation and realization of productive qualities. The leading place in selective programs is occupied by dairy productivity.

The level of dairy productivity depends on the hereditary traits and conditions under which the animals are. In cows with approximately the same heredity, under the influence of various environmental conditions, the formation of traits proceeds unequally, and vice versa, under the same external factors, animals with different genotypes differ in productive qualities.

We analyzed the yield and milk composition of domestic and imported dairy cattle breeds of the country based on the uploaded data on the productivity of cows who completed lactation in 2017 (table 5).

Table 5 – Indicators of dairy productivity of the first-calf cows (uploaded from the IAS)

| Breeds | Heads | Milk yield, kg | | Fat, % | | Protein, % | | Somatic cells, thousand | |
|---|---|---|---|---|---|---|---|---|---|
| | | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv |
| Alatau | 2713 | 4844±62 | 66.7 | 3.74±0.04 | 8.6 | 3.19±0.03 | 8.6 | 542.2±57.2 | 83.1 |
| Holsteinblack-and-white | 2989 | 5280±67 | 69.4 | 3.73±0.02 | 14.9 | 3.18±0.02 | 13.5 | 302.2±7.3 | 65.2 |
| Black-and-white | 3373 | 4936±31 | 36.5 | 3.65±0.05 | 15.3 | 3.05±0.05 | 19.5 | 444.1±101.7 | 247.8 |
| Red steppe | 1002 | 3518±38 | 34.2 | 3.96±0.02 | 5.4 | 3.30±0.03 | 9.9 | 387.9±17.1 | 50.9 |
| Total/at average | 10077 | 5039±31 | 61.8 | 3.75±0.03 | 13.4 | 3.18±0.02 | 13.4 | 343.7±22.2 | 85.0 |

According to table 5 data, it can be seen that the average productivity of dairy cattle of the republic of all types of farms was 5039±31 kg. It has been established that the highest productivity in Holstein cows is 5280±67 kg, the lowest in cows of the Red Steppe breed - 3518±38 kg. The variability trait of the milk yield for lactation is rather high, especially in cows of the Holstein black-and-white and Alatau breeds (66.7–69.4). Apparently, this is due to the high intralinear variability of this trait.

The difference between the productivity of Holstein and Alatau was 436 kg, with Black-and-white - 344 kg, with Red Steppe - 1762 kg (P>0.999). In terms of fat and protein, cows of the Red Steppe breed had the highest rates (3.96±0.02% and 3.30±0.03%, respectively).

In terms of fat content, cows of the Red Steppe breed prevail over the Alatau by 0.22% (P>0.999), over the Holstein - by 0.23% (P>0.999), over the Black-and-white - by 0.31% (P>0.999), the excess in protein content was: over the Alatau by 0.11% (P>0.99), over the Holstein - by 0.12% (P>0.99), over the

Black-and-white - by 0.25% (P>0.999). In terms of the number of somatic cells, the milk of all cows is within the norm.

The duration of the economic use of cows is one of the important indicators in the system of herd reproduction - a comprehensive production process, including a complex of organizational, economic, veterinarian, technological measures. Productivity and reproductive abilities of animals are primary components of economically useful traits, according to which the selection should be conducted. This issue is covered by the works of the scientists [19, 20].

We analyzed the data of dairy productivity of cows of the studied breeds depending on age.

Indicators of the dairy productivity of theAlatau breed are presented in table 6.

Table 6 – Indicators of the dairy productivity and milk composition of the Alatau breed

| Age, in lactation | Number of heads | Milk yield, kg | | Fat, % | | Protein, % | | Somatic cells, thous./cm³ | |
|---|---|---|---|---|---|---|---|---|---|
| | | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv |
| 1 lactation | 833 | 4844±61 | 36.3 | 3.74±0.04 | 8.6 | 3.19±0.03 | 8.6 | 542.2 ± 57 | 83.1 |
| 2 lactation | 779 | 5679±59 | 29.0 | 3.77±0.04 | 8.5 | 3.22±0.03 | 8.1 | 490.6 ± 57 | 89.3 |
| 3 lactation | 483 | 5458±67 | 27.0 | 3.76±0.04 | 6.8 | 3.22±0.04 | 7.3 | 802.0±155 | 116.2 |
| 4 lactation | 457 | 4716±69 | 31.3 | 3.79±0.05 | 8.3 | 3.23±0.05 | 8.6 | 785.3±89 | 66.2 |
| 5 lactation | 161 | 4017±120 | 37.9 | 3.93±0.11 | 10.0 | 3.29±0.10 | 10.3 | 673.6±181 | 93.2 |
| On average | 2713 | 5123±42 | 42.7 | 3.77±0.05 | 8.5 | 3.22±0.05 | 8.6 | 622.4±95 | 87.6 |

As can be seen from the data of table 6, the dairy productivityis characterized by growth (4844...5679...5458 kg) by the second or third lactation and a gradual decrease (4716...4017 kg) by the fifth one, i.e. this breed is characterized by a constant yield level, which confirms its high resistance to stress. On average, for all lactations, cows of this breed have given 5123±275.4 kg of milk.

Dairy cattle are distinguished by a sufficiently long duration of biologically possible longevity, but the biological potential of dairy cows is not always used. Therefore, the important assessment of the animals is the amount of products obtained during the period of their use. High lifetime productivity of cows is a consequence of the proper development and functioning of all organs and systems of the vital activity of the animal during the entire period of its use.

Somewhat different picture is observed in the study of dairy productivity in the context of lactation in Holstein cows (table 7).

Table 7 – Indicators of the dairy productivity and milk composition of the Holstein breed

| Age, in lactation | Number of heads | Milk yield, kg | | Fat, % | | Protein, % | | Somatic cells, thous./cm³ | |
|---|---|---|---|---|---|---|---|---|---|
| | | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv | $X \pm m_x$ | Cv |
| 1 lactation | 1130 | 5280±67.6 | 34.4 | 3.73±0.02 | 14.9 | 3.18±0.02 | 13.5 | 302.2±7.3 | 65.2 |
| 2 lactation | 912 | 5502±85.4 | 37.5 | 3.78±0.02 | 11.6 | 3.22±0.02 | 12.5 | 274.2±5.3 | 47.0 |
| 3 lactation | 557 | 5598±98.1 | 33.1 | 3.76±0.02 | 9.2 | 3.21±0.01 | 8.7 | 313.4±14.9 | 89.6 |
| 4 lactation | 247 | 5650±159.3 | 35.4 | 3.74±0.04 | 12.6 | 3.21±0.03 | 11.7 | 297.2±16.4 | 69.3 |
| 5 lactation | 143 | 6139±213.1 | 33.1 | 3.79±0.03 | 8.8 | 3.25±0.03 | 7.9 | 256.7±15.4 | 57.3 |
| On average | 2989 | 5479±93.3 | 35.1 | 3.75±0.02 | 12.3 | 3.20±0.02 | 11.8 | 293.0±9.5 | 63.7 |

As can be seen from the data of table 7, the dairy productivity of Holstein cows increases by the fifth lactation, without recessions, that is typical for this, the most milking, breed.

The nature of the dairy productivity of the Black-and-white cows (table 8) has a peculiar specificity.

So, starting from the first lactation, when there was a maximum milk yield (4936±231 kg), then there was a gradual decrease by the fifth lactation, where the lowest productivity was established, which confirms the increased reaction of this breed to stressful environmental factors. Nevertheless, the average milk yield for all lactations was 4671±190 kg, i.e. the potential of this breed could be seen, as evidenced by the variability of this selection trait (32.0–50.7%). When working with this breed, it is necessary to strengthen the selection according to the dairy production and milk composition.

Table 8 – Indicators of the dairy productivity and milk composition of the Red Steppe breed

| Age, in lactation | Number of heads | Milk yield, kg | | Fat, % | | Protein, % | | Somatic cells, thous./cm$^3$ | |
|---|---|---|---|---|---|---|---|---|---|
| | | X ± m$_x$ | Cv | X ± m$_x$ | Cv | X ± m$_x$ | Cv | X ± m$_x$ | Cv |
| 1 lactation | 843 | 4936±231 | 50.7 | 3.65±0.05 | 15.3 | 3.05 ± 0.05 | 19.5 | 444.1 ± 101.7 | 247.8 |
| 2 lactation | 872 | 4692±191 | 44.9 | 3.77 ±0.03 | 9.5 | 2.97 ± 0.06 | 23.3 | 293.5 ± 26.6 | 99.9 |
| 3 lactation | 778 | 4811±157 | 34.1 | 3.75 ±0.04 | 10.1 | 3.14 ± 0.05 | 18.0 | 408.1 ± 64.5 | 164.3 |
| 4 lactation | 490 | 4493±174 | 32.0 | 3.81 ±0.03 | 6.4 | 2.97 ± 0.10 | 26.5 | 289.1 ± 27.2 | 77.7 |
| 5 lactation | 390 | 3989±180 | 33.3 | 3.85 ±0.03 | 5.2 | 3.23 ± 0.04 | 8.8 | 241.7 ± 8.9 | 26.9 |
| On average | 3373 | 4671±190 | 40.6 | 3.75 ±0.04 | 10.1 | 3.06 ± 0.06 | 19.3 | 367.7 ± 62.1 | 141.7 |

We investigated the productive qualities and exterior indicators of cows of different genotypes of the Red Steppe breed in the experimental farm of Ulguli LLP (table 8).

The productivity of the Red Steppe cows of different genotypes averaged - 3904 kg of milk yield, fat content - 3.77%, and live weight - 487 kg.

The yield of crossbred cows is higher than that of purebred Red Steppe by - 280-365 kg (table 9).

Table 9 – Ethological indicators of the first-calf cows of different genotypes, (M±m)

| Indicator, min. | Purebred Red Steppe | | Red Steppe X Angler | | Red Steppe X Danish Red | | Red Steppe X Holstein Red-and-white | |
|---|---|---|---|---|---|---|---|---|
| | day | night | day | night | day | night | day | night |
| Number of heads | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Standing, total: | 486.3±0.6 | 260.2±0.5 | 470.2±1.5 | 240.3±1.7 | 468.8±7.8 | 251.4± | 457.2±2.4 | 247.2±0.7 |
| Including without action | 88.4 ±0.5 | 70.2±0.6 | 80.1±1.6 | 69.2±0.9 | 89.0±0.25 | 69.0±0.4 | 88.6±0.6 | 66.7±0.5 |
| Feed intake | 238.6±0.5 | 75.1±0.2 | 240.4±0.3 | 75.8±0.7 | 242.6±0.3 | 86.1±0.3 | 245.7±0.4 | 89.6±0.5 |
| Water intake | 11.4±3.4 | 4.6±2.9 | 11.9±1.5 | 4.8±3.5 | 12.0±4.3 | 5.0±1.7 | 13.4±2.3 | 6.8±2.6 |
| Merycisin, total | 147.9±0.6 | 270.6±0.3 | 148.8±0.5 | 272.4±0.4 | 148.6±0.2 | 281.6±0.6 | 150.1±0.4 | 296.0±1.0 |
| Including lying | 84.3±0.8 | 72.1±0.8 | 85.1±0.7 | 73.1±1.5 | 94.2±0.74 | 73.9±0.8 | 98.1±2.9 | 75.1±0.42 |
| standing | 60.7±0.6 | 11.6±9.8 | 204.2±1.51 | 6.91±2.3 | 61.3±1.7 | 206.2±1.2 | 62.4±0.4 | 215.6± |
| Comfortable standing movements | 10.6±4.1 | 6.07±4.4 | 11.4±3.83 | 7.2±3.64 | 11.2±15.2 | 7.0±5.1 | 12.7±2.8 | 14.2±1.6 |
| Lying, total: | 114.8±0.74 | 300.1±0.3 | 115.4±0.2 | 306.3±0.1 | 116.4±1.2 | 310.4±0.1 | 131.4±0.9 | 430.1±0.2 |
| Including without action | 40.2±0.06 | 102.4±0.08 | 42.4±0.21 | 102.8±0.24 | 45.8±0.31 | 104.6±0.4 | 47.6±0.24 | 108.8±0.4 |
| Sleep | 7.8±3.4 | 80.7±0.7 | 6.7±0.74 | 88.6±0.31 | 6.0±1.7 | 96.4±0.5 | 6.9±0.92 | 99.7±0.4 |
| Comfortable lying movements | 3.2±3.1 | 6.4±3.4 | 4.6±1.1 | 6.9±2.6 | 4.8±2.81 | 6.0±4.3 | 4.6±3.4 | 5.0±5.3 |
| Milking | 7.8±3.4 | | 8.0±0.7 | | 9.1±1.03 | | 8.2±0.7 | |
| Walking | 86.1±0.6 | 24.0±1.6 | 84.2±1.0 | 25.1±11.2 | 82.7±1.1 | 16.0±0.6 | 68.0±0.7 | 16.8±4.3 |
| Defecation | 6.0±1.7 | 7.6±2.4 | 6.2±0.8 | 7.8±2.3 | 6.6±0.7 | 7.8±2.3 | 7.1±0.1 | 8.0±0.03 |
| Urination | 7.4±0.7 | 6.9±0.2 | 7.2±0.5 | 7.6±2.9 | 7.0±1.2 | 7.8±2.3 | 7.2±3.1 | 7.6±4.3 |

For the study of the dairy productivity after calving, the analysis of the lactation activity of heifers of the Red Steppe and Black-and-white breeds of different genotypes was carried out, the lactation activity was studied (table 10).

Table 10 – Lactation activity of first-calf cows in Ulguli LLP

| Indicators | Purebred Red Steppe | Crossbred Red | Crossbred withHolstein Red-and-white |
|---|---|---|---|
| Number of heads | 20 | 20 | 20 |
| Milk yield for the first 100 days, kg | 1338 | 1378 | 1372 |
| Milk yield for thefurther 100 days, kg | 1336 | 1313 | 1161 |
| Milk yield for 305 days, kg | 3669 | 4049 | 4173 |

CFL in the Red Steppe cows of different genotypes is in the range of 63.77-69.83%, in the Black-and-white cows - 69.17%, IFL - in the range of 83.7-93.6% and 94.97%. The animals had a steady curve by the months of lactation.

Ethological studies were conducted on cows of different genotypes of the Red Steppe and Black-and-white breeds (table 11). During the ethological studies, it was established that experimental animals differed in certain regularities of the daily regime. During the daytime, the crossbred first-calf cows with the blood of the Red-and-white Holsteins, spent 30% more time to feed intake, 17.5% more time to water intake and they had a significant superiority over mates of the Red Steppe breed.

Table 11 – Udder measurements of the experimental first-calf cows

| Indicator, cm | Ulguli LLP | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Purebred Red Steppe | | Crossbred Red | | Crossbred with Holstein Red-and-white | |
| | before milking | after milking | before milking | after milking | before milking | after milking |
| Length | 34.4±0.06 | 32.5±0.08 | 36.3±0.02 | 32.6±0.09 | 37.4±0.03 | 31.6±0.04 |
| Width | 24.9±0.1 | 21.7±0.07 | 33.1±0.06 | 29.3±0.04 | 34.3±0.06 | 30.7±0.07 |
| Girth | 109.8±0.03 | 104.3±0.15 | 117.6±0.11 | 109.9±0.12 | 119.3±0.04 | 108.3±0.06 |
| Depth | 30.0±0.08 | 28.7±0.09 | 41.2±0.17 | 44.6±0.08 | 43.1±0.06 | 44.8±0.12 |
| Nipples length | 6.6±0.23 | – | 6.2±0.16 | – | 6.4±0.07 | – |
| Nipples diameter | 2.7±0.07 | – | 2.9±0.21 | – | 3.0±0.07 | – |
| Distance between the front nipples | 12.9±0.05 | – | 13.1±0.05 | – | 13.9±0.03 | – |
| Distance between the rear nipples | 8.6±0.02 | – | 12.6±0.08 | – | 11.8±0.02 | – |
| Distance between the front and rear nipples | 13.1±0.07 | – | 12.6±0.08 | – | 12.2±0.09 | – |
| Uddercapacity, $dm^3$ | 34.7±0.09 | – | 35.8±0.11 | – | 36.4±0.11 | – |
| milk flow rate, kg/min | 1.64±0.36 | | 1.78±0.21 | | 1.89±0.07 | |
| Udderindex, % | 48.6 | | 49.2 | | 50.4 | |

The first-calf Danish Red cows spent more time on merycisin by 4.1%, the Holstein Red-and-white breeds - by 9.4%, including lying - 11.7% and 16.4%, respectively. On the rest, crossbred first-calf cows of Holstein red-and-white breed spent more time by 14.6-43.3%. Danish Red crossbred first-calf cows spent more time on sleeping by 19.4%, the Holstein red-and-white cows - by 23.5%, respectively, with a significant difference.

Especially important is the assessment of cows for the quality of the udder and suitability for machine milking [9, 10].

It is necessary to scrutinize more deeply the morphological and functional properties of the udder [11].

The morphological and functional properties of the udder of the Red Steppe breed cows of different genotypes were studied (table 12).

Table 12 – Distribution of the first-calf cows in Ulguli LLP by the shape of the udder, %

| Udder shape | Purebred Red Steppe | | Angler | | Danish Red | | Holstein red-and-white | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | heads | % | heads | % | heads | % | heads | % |
| Number of heads | 20 | | 20 | | 20 | | 20 | |
| Bath-shaped | – | – | 3 | 15.0 | 3 | 15.0 | 2 | 10.0 |
| Cup-shaped | 5 | 25 | 12 | 60.0 | 10 | 50.0 | 13 | 65.0 |
| Koundshape | 12 | 60 | 5 | 25.0 | 7 | 35.0 | 5 | 25.0 |
| Goat-shaped | 3 | 15 | – | – | – | – | – | – |

As can be seen from the data of table 12, the largest number of cows with a bath-shaped udder was for 15% of the Angler cows and 15% of the Danish Red and 30% for the crossbred Holstein red-and-white breed. With the cup-shaped udder, the crossbred Holstein red-and-white cows were 65%, the Angler - 60%, and the Danish Red - 50%. The smallest number of cows with the cup-shaped form was in the Red Steppe purebred - 25%.

Studies have been conducted on the incidence of cows with mastitis depending on the season of the year (table 13). The greatest number of sick cows was in winter, which coincided with calving. Highly productive crossbred cows of the Red Steppe breed of different genotypes are most susceptible to diseases of mastitis, including its clinical form. The crossbred cows in Holstein Red-and-white breed in the winter period had more udder diseases with the clinical form of mastitis by 9.5%.

Table 13 – Incidence of cows with mastitis, depending on the season

| Group | Survey edheads | Survey season | Revealed diseases | | | |
| | | | Total | | Clinical for mofmastitis | |
| | | | heads | % | heads | % |
| Ulguli LLP | | | | | | |
| I (purebred Red Steppe) | 57 | winter spring | 126 | 21.0 10.5 | 84 | 66.7 7.1 |
| II (Red) | 145 | winter spring | 4418 | 30.3 12.4 | 197 | 43.2 38.8 |
| III (Holstein Red-and-white) | 35 | winter spring | 2114 | 60.0 40.0 | 169 | 76.2 64.3 |

The difficulties of breeding both for milk yield and the main component of milk are related to the fact that these traits, as a rule, have a negative relationship. At present, not only a quantitative increase in dairy productivity but also an improvement in its quality is of great importance [27, 28].

The chemical composition of milk and the yield of its main components for 305 days of lactation were studied (tables 14, 15).

Table 14 – Output and the ratio of the main components of milk for the lactation

| Indicator | Ulguli LLP | |
| | Purebred Red Steppe | Crossbred |
| Milk yield, kg | 3260 | 3896 |
| Fat | 124.2 | 151.2 |
| Protein | 99.8 | 129.7 |
| Casein | 88.7 | 114.2 |
| Wheyproteins | 12.7 | 17.9 |
| Lactose | 159.7 | 189.7 |
| Dry matter | 418.3 | 513.5 |
| Mineralsubstanceы | 23.8 | 29.6 |
| Nonfatmilksolids | 282.6 | 353.4 |
| Fat-Protein | 1.24 | 1.17 |
| Fat-Nonfatmilksolids | 0.44 | 0.43 |
| Protein-Nonfatmilksolids | 0.35 | 0.37 |

Table 15 – The chemical composition of milk of cows of different genotypes

| Indicators, % | Ulguli LLP | |
|---|---|---|
| | Purebred Red Steppe | Crossbred |
| Numberofsamples | 20 | 20 |
| Milk yield, kg | 3641 | 4027 |
| Fat | 3.86 | 3.90 |
| Protein | 3.22 | 3.35 |
| Casein | 2.68 | 2.83 |
| Wheyproteins | 0.39 | 0.45 |
| Lactose | 4.88 | 4.85 |
| Dry matter | 12.76 | 13.02 |
| Ash | 0.74 | 0.78 |
| Nonfatmilksolids | 8.72 | 9.04 |
| Energy nutritional value of 1 kg of milk, J | 2857.2 | 2952.4 |
| Of the Total milk yield, KJ | 10938.3 | 11921.5 |

The milk chemical composition of cows of different genotypes had certain diversities. So in the milk of crossbred animals of the Red Steppe breed, the fat content was higher by 0.09%, protein - by 0.96%, casein - by 0.94%, dry matter - by 0.01%, nonfat milk solids - by 0.3%, respectively. The lactose content in purebred Red Steppe cows milk in comparison with crossbred animals was higher by 0.01%.

The exterior assessment allows to characterize the existing body type of the animals and to identify trends in its changes [21, 22].

When conducting a linear assessment of cows of different genotypes, the harmony in body build established in crossbred animals of different genotypes was higher. The height at the withers in the Red Steppe crossbred cows was 4.6–5.3% higher than their mates, 2.0–6.3% greater in the chest measurements, 3.3% greater in the oblique body length, and 1.7-3.2% greater in the pelvis measurements. Crossbred cows are distinguished by a strong constitution and skeleton, they are more wide-bodied and stretched, with better development of the breast and pelvis (table 16).

Table 16 – Exterior features of experimental full-aged cows

| Indicator, cm | Purebred Red Steppe | Crossbred | |
|---|---|---|---|
| | | Red | Holstein Red-and-white |
| Ulguli LLP | | | |
| Number of heads | 20 | 20 | 20 |
| Height at the withers | 127.4±0.03 | 133.0±0.06 | 134.2±0.03 |
| Chestdepth | 69.8±0.06 | 72.2±0.06 | 72.6±0.06 |
| Chestcircumference | 71.8±0.11 | 73.2±0.07 | 76.3±0.01 |
| Chestbreadth | 39.2±0.09 | 40.3±0.16 | 42.0±0.06 |
| Oblique body length | 152.9±0.08 | 158.0±0.03 | 159.1±0.02 |
| Widthintuberishiis | 46.4±0.59 | 47.2±0.32 | 47.9±0.11 |
| Widthinhookbones | 52.1±0.06 | 52.9±0.12 | 53.1±0.09 |
| Width at the hip joints | 46.0±0.04 | 47.2±0.04 | 46.7±0.08 |
| Metacarpusgirth | 18.5±0.14 | 18.8±0.13 | 18.1±0.11 |
| Highfoot | 46.9 | 45.7 | 45.9 |
| Extension | 116.4 | 118.7 | 118.5 |
| Pelvicthoracic | 75.2 | 76.2 | 79.1 |
| Thoracic | 56.2 | 55.8 | 57.8 |
| Blockiness | 46.9 | 46.3 | 47.9 |
| Massiveness | 54.6 | 55.0 | 56.8 |
| Narrowquarters | 89.1 | 89.2 | 90.2 |
| Boniness | 14.1 | 14.1 | 13.5 |

There was made the estimation of the influence of servicing bulls on the economic traits of daughters at Ulguli LLP (table 17).

Table 17 – Estimation of bulls on the quality of the offspring

| Individual No, nickname | Breed | n | Daughters productivity | | |
|---|---|---|---|---|---|
| | | | milk yield, kg | fat, % | live weight |
| Obryv 1569 | Estonian Red | 7 | 3331.1±94.7 | 3.8±0.1 | 451.2±7.8 |
| Iman 314 | Purebred Red Steppe | 8 | 3453.4±80.8 | 3.7±0.1 | 440.5±4.7 |
| Graf 56733 | Holstein Red-and-white | 10 | 3683.6±53.0 | 3.8±0.3 | 448.0±8.4 |
| Grozny 38056 | Holstein Red-and-white | 19 | 3811.3±144.0 | 3.8±0.1 | 443.7±8.3 |
| Erlauhts6103 | Angler | 99 | 4008.8±33.0 | 3.7±0.2 | 443.8±7.5 |
| Wetzel 8804 | Holstein Red-and-white | 16 | 4254.8±200.0 | 3.7±0.2 | 476.0±8.8 |
| Maket 9214 | Holstein Red-and-white | 25 | 4023.0±207.5 | 3.7±0.1 | 442.3±7.8 |
| Evnuh 7024 | Purebred Red Steppe | 27 | 4064.0±177.0 | 3.7±0.1 | 485.0±9.6 |
| Rytsar 234 | Danish Red | 14 | 4091.1±276.0 | 3.7±0.2 | 484.6±9.8 |

Table 18 – Dynamics of live weight of experimental cows (n=120) of different genotypes, kg

| Age, months | Ulguli LLP | | | |
|---|---|---|---|---|
| | Groups | | | |
| | I purebred Red Steppe | Crossbred | | |
| | | II of Angler breed | III of Danish Red | IV of Holstein Red-and-white |
| At birth | 29.1±0.12 | 30.4±0.11 | 30.9±0.26 | 32.0±0.18 |
| 3 | 85.2±0.07 | 86.6±0.06 | 85.4±0.06 | 90.6±0.08 |
| 6 | 137.2±0.20 | 139.8±0.05 | 140.1±0.05 | 144.2±0.04 |
| 9 | 189.4±0.05 | 190.2±0.06 | 191.3±0.05 | 195.8±0.06 |
| 12 | 229.3±0.08 | 230.3±0.05 | 231.4±0.05 | 234.2±0.06 |
| 15 | 264.2±0.05 | 268.6±0.06 | 271.3±0.05 | 277.6±0.10 |
| 18 | 298.3±0.08 | 302.4±0.05 | 307.1±0.10 | 336.1±0.06 |
| ± to the breed standard, kg, % | -1.7- | +2.4; 100.8 | +7.1; 102.4 | +36.1; 112.3 |

The estimation of bulls showed that they are prepotenton the basis of milking capacity (table 18).

Also, there was conducted the evaluation of the breeding value of cows of different genotypes in Ulguli LLP (table 19).

To the breeding core of the herd of Ulguli LLP, 320 heads were selected with the average productivity of 4503 kg of milk with the fat content of 3.7%. The foundation cows of families in the number of 11 heads of each were selected, with the average productivity of the Red Steppe cows of different genotypes - 5682 kg, with the fat content of 3.7%.

There was determined the growth rate of replacement heifers of different genotypes in Ulguli LLP at different periods of growth from birth to 3 months, 3-6 months, 6-9 months, 9-12 months, 12-15 months, 15-18 months, 0-12 months., 0-18 months.

The comparative description of average daily gains of heifers (replacement) of different genotypes in Ulguli LLP was carried out (table 20).

In the period from birth to 3 months the greatest average daily gain - 676.9 g was obtained from the crossbred of the Holstein Red-and-white animals, later (with the exception of the 3 to 6 months of age period) - this advantage was preserved up to 18 months of age.

For the period from birth to 12 months and up to 18 months of age, the superiority was for crossbred Holstein Red-and-white replacement heaifers. For the period from birth to 18 months of age, the average

Table 19 – Breeding value of cows in Ulguli LLP

| Statements | Indicators | |
|---|---|---|
| Number of cows, heads | 320 | |
| By exterior, points | | |
| Forbody type | 83.8 | |
| Forudder | 58.1 | |
| Forlimbs | 72.5 | |
| Overall score for the exterior | 71.4 | |
| Class of cows on the exterior, heads | | |
| Excellent | 1 | |
| Good with a plus | 4 | |
| Good | 29 | |
| Satisfactory | 69 | |
| Bad | 17 | |
| Exterior Index, % | 95.9 | |
| Byproductivity | | |
| Population difference | heads | Milk yield, kg ($\pm$) |
| | 55 | +762.6 |
| | 65 | −646.2 |
| Index for milk yield, % | 99.6 | |

Table 20 – Growth rate of replacement heifers of different genotypes, $(X \pm m_x)$

| Growth rate for the period, months | Ulguli LLP | | | |
|---|---|---|---|---|
| | Group | | | |
| | I | II | III | IV |
| Averagedailygain, g | | | | |
| 0-3 | 616.5 | 617.6 | 599.0 | 676.9 |
| 3-6 | 568.3 | 581.4 | 597.8 | 586.0 |
| 6-9 | 580.0 | 560.0 | 568.9 | 573.3 |
| 9-12 | 448.3 | 450.6 | 450.6 | 431.5 |
| 12-15 | 387.7 | 425.5 | 443.3 | 482.2 |
| 15-18 | 374.7 | 371.4 | 642.9 | 423.1 |
| 0-12 | 548.5 | 547.7 | 549.3 | 554.0 |
| 0-18 | 491.5 | 496.8 | 504.5 | 555.4 |
| Relativegain, % | | | | |
| 0-3 | 98.2 | 96.1 | 93.7 | 95.6 |
| 3-6 | 46.8 | 47.0 | 48.5 | 43.1 |
| 6-9 | 32.0 | 30.5 | 30.9 | 30.3 |
| 9-12 | 19.1 | 19.1 | 19.0 | 17.9 |
| 12-15 | 14.1 | 15.4 | 15.9 | 17.0 |
| 15-18 | 12.1 | 11.8 | 12.4 | 19.1 |
| 0-12 | 154.9 | 153.4 | 152.9 | 151.9 |
| 0-18 | 164.4 | 166.1 | 163.4 | 165.2 |

daily gain in Holsteinized Red-Steppe cows was higher on 64 g. The relative gain in crossbred of the Red Steppe breed was higher by - 0.8% than in purebred mates (0-18 months period).

Therefore, the analysis of data on the live weight of experimental animals of all breed groups throughout the entire period of breeding shows that crossbred heifers grew and developed better, especially the Red-and-white holsteinized ones. The growth rate of experimental heifers by growing periods can also be judged by the change in average daily gain. The relative growth rate from birth to 18 months of age was high in Holstein crossbreds. Crossbred offspring consumed summer pasture feed better, because their gains during this period were higher than those of purebred Red-Steppe mates.

To characterize the physical features of the experimental heifers, we calculated the indices expressing the ratio of anatomically related items (table 21).

Table 21 – Body build indices of replacement heifers of different genotypes

| Body build indices, % | Age, 18 months | | | |
|---|---|---|---|---|
| | Group | | | |
| | I | II | III | IV |
| Extension | 119.9 | 120.4 | 119.3 | 119.7 |
| Blockiness | 118.1 | 116.1 | 117.9 | 116.3 |
| Highfoot | 50.8 | 48.7 | 49.4 | 49.6 |
| Thoracic | 68.1 | 56.8 | 59.3 | 59.7 |
| Massiveness | 118.1 | 139.7 | 140.7 | 140.8 |
| Pelvicthoracic | 81.8 | 83.3 | 81.7 | 80.4 |
| Narrow quarters | 37.1 | 37.4 | 35.1 | 34.6 |
| Boniness | 15.2 | 15.0 | 14.7 | 14.7 |

Slightly higher body build indices were in crossbred replacement heifers. Further, it is apparent that all the heifers are quite proportionally developed. Body indices characterize them as animals of the dairy direction of productivity. Crossbred heifers, obtained from crossing Red Steppe cows with bulls of related Red breeds and Holstein Red-and-white in the same feeding and maintenance conditions, had a greater growth rate, exceeded in live weight. They are leggy, extended, having higher pelvic-thoracic and thoracic indices.

Currently, in countries with developed dairy cattle breeding, livestock assessment is carried out by identifying breeding values by genetic characteristics, eliminating the influence of paratypical factors using mathematical calculations with the best linear unbiased prediction (BLUP), based on the construction and solution of the mixed model equations developed by C.R. Henderson [23].

In Europe and North America, one of the main elements of the breeding work in improving dairy and dairy-meat breeds of livestock is the assessment of servicing bulls by the quality of offspring using various mathematical methods of genetic evaluation (BLUP, Animal model, Sire model, ssBLUP, G BLUP). The principle of evaluating bulls for the quality of offspring is to compare the breeding value of the daughters of the estimated bulls and mates, originating from other producers grown in different feeding, maintenance and care conditions.

Such a way of assessing the breeding value of bulls allows to obtain comparable results, i.e. to identify exactly the genotypic, hereditary capabilities of related animals and to use in further work to improve the animals of dairy, dairy and meat breed, true improvers. The advantage of this method lies in the fact that it allows to use to the full all available information about the animal being assessed, where the breeding value is calculated from the average value of the population.

Taking into account the aforementioned and modern approaches to assessing the breeding value of dairy cattle, studies have been conducted to assess the breeding value of dairy, dairy and meat breeds of the Republic of Kazakhstan on the dairy productivity of daughters, using information from the IAS database in the republican system.

At the initial stage of the research, the data of pedigree and zootechnic registration was downloaded from the IAS database of the Republic of Kazakhstan on 4 dairy and dairy and meat breeds of productivity

for 2804 first-calf cows, daughters of 478 servicing bulls. The experimental stock of first-calf cows is presented as follows: Holstein black-and-white and Black-and-white - 2437 heads from 390 servicing bulls, Alatau - 262 heads from 20 servicing bulls, Red Steppe - 105 heads from 10 servicing bulls. The obtained data were corrected and prepared for further calculation of the index estimate of the breeding value of the experimental population (table 22).

Table 22 – Information about the daughters of the estimated servicing bulls of dairy, dairy and meat breeds

| Breed | Number of bulls | Number of daughters | Number of farms |
|---|---|---|---|
| Holstein b/wand r/w | 374 | 2365 | 21 |
| Black-and-white | | | 14 |
| Alatau | 21 | 246 | 6 |
| Red Steppe | 9 | 75 | 4 |
| Total | 404 | 2686 | 45 |

From the data of Table 22, it can be seen that after processing and correction of the IAS data, of 3,686 selected heifers to further calculate their breeding value, 3,514 heads remained, originating from 482 dairy and dairy-meat breed servicing bulls. Of the entire array of selected heifers, 172 heads were not included in the assessment of breeding value.

**Conclusions:**

1) 10077 heads of cows, daughters of 117 bulls belonging to 38 lines of 4 dairy breeds: Alatau, Holstein Black-and-white, Black-and-white and Red Steppe were monitored. In terms of breeds, mothers of daughters of the selected Alatau bulls have had an average productivity of 5515±170 kg, the Holstein black-and-white - 7871±182 kg, Black-and-white - 5741±149 kg and the Red Steppe - 3917±104 kg.

2) In terms of dairy productivity, cows of all ages in JSC Adal AIC (n = 431) comply with the Alatau breed standard in the Republic of Kazakhstan. By lactation: the first lactation exceeds the breed standard by 534.4 kg, the second one - by 246 kg, and the third lactation - at the level of the first class standard. According to the fat content - by 0.19% and milk fat yield - in the first lactation - by 28.75 kg, in the second - by 17.22 kg, and in the third - by 8.67 kg. The average productivity of the herd of 431 cows was 4915 kg of milk and 3.79% of fatness. The same trend is observed in the cows of Tauelsizdik LLP (n=155).

3) It was established that the average productivity of dairy cows of the republic of all types of farms was 5039±31 kg. The highest productivity is for the Holstein cows - 5280±67 kg, the lowest — for the Red Steppe breed cows - 3518±38 kg. The variability of the milk yield for lactation is rather high, especially in cows of the Holstein black-and-white and Alatau breeds (66.7... 69.4). The difference between the productivity of Holstein and Alatau was 436 kg, with Black-and-white - 344 kg, with the Red Steppe - 1762 kg (P>0.999). The fat and protein content is the highest in cows of the Red Steppe breed (3.96±0.02% and 3.30±0.03%, respectively).In terms of the fat content, cows of the Red Steppe breed prevail over the Alatau breed by 0.22% (P>0.999), over the Holstein - by 0.23% (P>0.999), over the Black-and-white - by 0.31% (P>0.999), the excess in protein content was: over Alatau breed - by 0.11% (P>0.99), over Holstein - by 0.12% (P>0.99), over Black-and-white - by 0.25% (P>0.999). By the number of somatic cells, the milk of all cows is within the norm.

4) In the age aspect, it was found that dairy productivity is characterized by growth (4844...5679...5458 kg) by the second or third lactations and a gradual decrease (4716...4017 kg) by the fifth, i.e. this breed is characterized by a constant yield level, which confirms its high resistance to stress. On average, for all the lactations, cows of this breed produced 5123±275.4 kg of milk. The dairy productivity of Holstein cows increases to the sixth lactation, without recessions, which is typical for this, the most dairy breed. The nature of the dairy productivity flow of the Black-and-white cows has a peculiar specificity. So, starting from the first lactation, when there was a maximum milk yield (4936±231 kg), then there was a gradual decrease by the fifth lactation, where the lowest productivity was established. Nevertheless, the average milk yield for all lactations was 4671±190 kg, i.e. the potential of this breed is available, as evidenced by the variability of this breeding trait (32.0–50.7%).

5) The productivity of the Red Steppe breed cows of different genotypes averaged - 3904 kg of milk, 3.77% of fatness, and 487 kg of live weight. The milk yield of crossbred cows is higher by - 280-365 kg than that of purebred Red Steppe. CFL in the Red Steppe cows of different genotypes is in the range of 63.77-69.83%, in the Black-and-white cows - 69.17%, IFL - in the range of 83.7-93.6% and 94.97%. The animals had a steady curve by the months of lactation. The greatest number of cows with a bath-shaped udder was in 15% of the Angler type and 15% of the Danish Red crossbreds and 30% of the Holstein red-and-white breed. With the cup-shaped udder, there were 65% of the crossbred Holstein red-and-white cows, 60% of the Angler cows, 50% - the Danish Red cows. The smallest share of cows with the cup-shaped form was in the Red Steppe purebred - 25%.All the indicators characterizing the harmony of body build in the crossbred animals of different genotypes were higher. The height at the withers in the Red Steppe crossbred cows was 4.6–5.3% higher than their mates, 2.0–6.3% greater in the chest measurements, 3.3% greater in the oblique body length, and 1.7-3.2% greater in the pelvis measurements. Crossbred cows are distinguished by a strong constitution and skeleton, they are more wide-bodied and stretched, with better development of the breast and pelvis

6) The information database of used bulls of the Swiss, Holstein, Danish Red and Angler breeds in selection work with the improvement of the productive qualities of the Alatau, Black-and-White, and Red Steppe breeds was created. After processing and correcting the IAS data, of 3,686 selected heifers to further calculate their breeding value, 3,514 heads remained, originating from 482 dairy and dairy-meat breed servicing bulls. Of the entire array of selected heifers, 172 heads were not included in the assessment of breeding value.

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## ҚАЗАҚСТАН РЕСПУБЛИКСЫНДАҒЫ АСЫЛ ТҰҚЫМДЫ СҮТТІ ІРІ ҚАРА МАЛ САЛАСЫНДАҒЫ АСЫЛДАНДЫРУДЫҢ ТИІМДІ ӘДІСТЕРІ

**Аннотация.** 10077 сиыр тұқымдарының 38 сортына жататын 117 бұканың қыздары бақыланды: алатау, голштен қара-ала, қара-ала және қырдың қызыл сиыры. Ана тұқымдары бойынша таңдап алынған Алатау бұ-қалары орташа өнімділігі 5 515 ± 170 кг, голштен қара және сұр - 7871 ± 182 кг, қара және сұр - 5741 ± 149 кг және қызыл дала - 3917 ± 104 кг болды. Республиканың сүт сиырларының барлық түрлерінің орташа өнім-ділігі 5039 ± 31 кг құрады. Голштен сиырларының ең жоғары өнімділігі - 5280 ± 67 кг, ең кіші - қызыл дала тәрізді сиырлар - 3518 ± 38 кг. Голштин мен алатаудың өнімділігі арасындағы айырмашылық 436 кг құрады, қара және сұр - 344 кг, қызыл дала - 1762 кг (P> 0.999). Майдың және ақуыздың құрамы қызыл дала тұқым-дарының сиыр арасында ең жоғары болып табылады (тиісінше 3,96 ± 0,02% және 3,30 ± 0,03%). Майлы құрғақшылық жағдайында алатау тұқымында 0,2% -ға (P> 0,999), голштен - 0,23% -ға (P> 0,999), қара-ақ түсті - 0,31% -ға (P> 0,999) басым, ақуыздың артық құрамы: Алатау бойынша 0,11% (P> 0,99), голштен - 0,12% (P> 0,99), қара-ақ түсті - 0,25% (P> 0,999) құрады.

Жас ерекшелігі бойынша, сүт өнімділігінің өсуі (4844 ... 5679 ... 5458 кг) екіншісіне немесе үшінші лак-тациясына және біртіндеп төмендеуге (4716 ... 4017 кг) бесінші, яғни біртіндеп сипатталады. Бұл тұқым тұ-рақты сүт өнімділігі деңгейімен сипатталады. Орташа алғанда, барлық лактациялар үшін осы тұқымның сиырлары 5123 ± 275,4 кг-ға дейін жеткізілді. Ақ-қара түсті сиыр сиырларының сүт өнімділігінің сипаты ерекше ерекшелікке ие. Осылайша, алғашқы сауын мерзімі бастап, ең көп сүт өнімділігі (4936 ± 231 кг) болған кезде, ең төменгі өнімділік орнатылған бесінші лактацияға біртіндеп төмендеу байқалды. Дегенмен, орташа алғанда барлық лактация үшін сүт өнімі 4671 ± 190 кг құрады, яғни, осы тұқымның әлеуеті бар, бұл өсімдік ерекшелігінің өзгермелілігі (32.0...50.7%).Қызыл түсті дала тәрізді сиырлардың өнімділігі орта есеп-пен 3904 кг, майы - 3,77%, ал тірі салмағы - 487 кг. Аралас сиырлардың өнімділігі - 280-365 кг-нан асты таза сары түсті даладан жоғары. Қызыл даладағы КПЛ әр түрлі генотиптерде 6377-69,83%, қара-ақ 69,17%, 83,7-93,6% және 94,97% ауқымында IPL шегінде орналасқан.

**Түйін сөздер:** селекция, сұрыптау, жұп таңдау, тұқымдық сиыр құндылығы, экстерьерді сызықтық ба-ғалау, сауын, сүт құрамы.

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## ЭФФЕКТИВНЫЕ МЕТОДЫ СЕЛЕКЦИИ
## В ПЛЕМЕННОМ МОЛОЧНОМ СКОТОВОДСТВЕ РЕСПУБЛИКИ КАЗАХСТАН

**Аннотация.** Проведен мониторинг 10 077 голов коров, дочерей 117 быков, относящихся к 38 линиям 4 молочных пород: алатауской, голштинской черно-пестрой, черно-пестрой и красной степной. В разрезе пород матери дочерей отобранных быков алатауской породы имели продуктивность в среднем 5515±170 кг, голштинской черно-пестрой - 7871±182 кг, черно-пестрой - 5741±149 кг и красной степной - 3917±104 кг. Установлено, что средняя продуктивность молочных коров республики всех типов хозяйств составила 5039±31 кг. Наивысшая продуктивность у коров голштинской породы - 5280±67 кг, наименьшая – у коров красной степной породы - 3518±38 кг. Разница между продуктивностью голштинской и алатауской составила 436 кг, с черно-пестрой – 344 кг, с красной степной – 1762 кг (Р>0,999). По содержанию жира и белка самые высокие показатели у коров красной степной породы (3,96±0,02% и 3,30±0,03%, соответственно). По содержанию жира коровы красной степной породы превалируют над алатауской на 0,22% (Р>0,999), голштинской – на 0,23% (Р>0,999), черно-пестрой – на 0,31% (Р>0,999), по содержанию белка превышение составило: над алатауской на 0,11% (Р>0,99), голштинской – на 0,12% (Р>0,99), черно-пестрой – на 0,25% (Р>0,999).

В возрастном аспекте установлено, что молочная продуктивность характеризуется ростом (4844…5679…5458 кг) до второй-третьей лактациям и постепенным снижением (4716…4017 кг) к пятой, т.е. для данной породы характерно постоянство уровня удоев. В среднем за все лактации коровы этой породы надоили 5123±275,4 кг. Характер течения молочной продуктивности коров черно-пестрой породы имеет своеобразную специфику. Так, начиная с первой лактации, когда был максимум удоев (4936±231 кг), затем идет постепенное снижение к пятой лактации, где установлена самая низкая продуктивность. Но тем не менее, в среднем за все лактации удой составил 4671±190 кг, т.е. потенциал данной породы имеется, о чем свидетельствует вариабельность данного селекционного признака (32,0…50,7%). Продуктивность коров красной степной породы разных генотипов в среднем составила – 3904 кг молока, жирностью – 3,77 %, живой массой – 487 кг. Удой помесных коров выше, чем у чистопородных красных степных на – 280-365 кг. Коэффициент полноценности лактации у красных степных разных генотипов находится в пределах 63,77-69,83 %, черно-пестрых 69,17 %, индекс полноценности лактации в пределах 83,7-93,6 % и 94,97 %.

**Ключевые слова:** селекция, отбор, подбор, племенная ценность коров, линейная оценка экстерьера, удой, состав молока.

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# COENOFLORA *PULSATILLA PATENS* (L.) MILL. s.l. IN NORTHERN KAZAKHSTAN

**Abstract.** The current article presents the results of the study made on *Pulsatilla patens* (L.) Mill. s.l. coenoflora of Northern Kazakhstan. The materials have been obtained in the course of field research considering the literary data. The list of pulsatilla flora discovered in Northern Kazakhstan is based on detailed route studies. The coenoflora of *Pulsatilla patens* (L.) Mill. s.l. in Northern Kazakhstan includes 168 species belonging to 42 families and 141 genera. The leading families are *Asteraceae, Poaceae, Rosaceae, Fabaceae, Caryophyllaceae, Ranunculaceae.* The largest number of species refers to perennial species (150), annuals and biennials make up 15 species, ephemera - 3 species. Among the life forms, there are mainly long-rooted (70) and stem-rooted (36) species. The coenoflora has a steppe character with a small number of forest floristic elements correlating with ecological conditions of the rocky (and partly sparsely forest) habitats where the populations are formed. The eco-biological analysis confirmed a meadow-steppe character of coenoflora. Anthropogenic breach of coenoflora is expressed in a rather large number of weed species (18 species - 11%).

**Key words**: *Pulsatilla patens* s.l., coenopopulation, Northern Kazakhstan, systematic structure, ecological and coenotic groups.

**Introduction.** *Pulsatilla patens* s. str. is a forest-steppe species widespread in Eastern Europe, Western Siberia, Central and Northern Kazakhstan, Altai and Tarbagatai [1, 2]. The species is included into the Red Book of Kazakhstan (2014) [3].

Systematic position of *Pulsatilla patens* s.l. is extremely complicated. This species is not mentioned in Siberian flora, instead, there is *Pulsatilla flavescens* (Zuss.) Juz. [4]. According to the current studies, that name is a later ononym, and therefore a denotation of Kazakhstan and Siberian species as "*Pulsatilla flavescens*" is illegal [2, 5]. *Pulsatilla uralensis* (Zamels)Tzvel (= *Pulsatilla flavescens* (Zuss.) Juz.) is employed to denote yellow flowered pulsatilla. According to our observations, there are no "pure" populations of *Pulsatilla patens* in Northern Kazakhstan. Instead, in the area, we most likely have complex hybrid races between the European *Pulsatilla patens*, the Ural-Kazakhstan *Pulsatilla uralensis*, and the East European-Asian *P. multifida* (G. Pritz.) Juz. In this research we are investigating the diversity of the *Pulsatilla* races in Northern Kazakhstan within the framework of a polytypic species *Pulsatilla patens* s.l.

In the absence of clear morphological species, especially for rare and endangered species, coenotic environment is very important, on the one hand, it can indicate an ecological difference between individual populations and, on the other, can identify any threats to the existence of a species. There were conducted no special works on the study of *Pulsatilla patens* s.l. in northern Kazakhstan.

**Material and research methods.** The research was carried out on the territory of Pavlodar and Akmola regions. For the floristic description were chosen the areas with a high density of *Pulsatilla patens* s.l. All in all were examined 13 population loci: Akmola region, the vicinity of Yereymentau, Mount Yereymentau, a hillside, 29 IV 2018; Akmola region, the territory of "Burabay" State National Natural Park (SNNP), the vicinity of Catharkol, gravel hillsides 03 V 2018; the vicinity of Akylbay, a feather-grass steppe, 04 V 2018; Akylbay forestry, a pine-birch forest, near Svetly lake, 15 V 2013;

Borovsky forestry, quarter 96, in bushes, a rocky slope, 04 V 2012; Zolotoborsky forestry, quarter 26, a pitch-dark pine forest, 3 VI 2011; Katarkol forestry, quarter 11, a forest edge, 03 VI 2011; Mirny forestry, quarter 74, pine-birch forest, 05 VI 2011; quarter 73, a pine forest 05 VI 2011; quarter 14, a hillside 05 VI 2011; Barmashinsky forestry, quarter 134, a forest edge, 08 VI 2011; Pavlodar region, the vicinity of Bayanaul, a meadow between the rocks 28 IV 2018; the Bayanaul Mountains, Mount Auliet, a slope, 26.V.2007.

The habitats of *Pulsatilla patens* s.l. are confined to the steep hill slopes, as well as to the pitch-dark and stony pine forests [6, 7].

For analysis of the coenoflora life forms, we employed the approaches of Serebryakov I.G. (1962) [8]. Evaluation of species in their relation to moisture was carried out according to the ecological scale of Shennikov A.P. (1950) [9]. To process floristic descriptions we used an IBIS program developed by Zverev A.A. (1998, 2007) [10, 11].

The volume of families is given according to Cherepanov S.K. (1995) considering modern data [12]. The families of flowering plants are arranged according to the system of Takhtajyan A.L. [13]. The species in genera and the genera in families are arranged in an alphabetical order.

**Results and discussion.** The coenoflora of *Pulsatilla patens* s.l. includes 168 species belonging to 42 families and 141 genera (table 1).

Table 1 – Composition of *Pulsatilla patens* s.l. coenoflora

| Plant species | 1* | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| The **Pinaceae** Spreng. ex Rudolphi family | | | | |
| *Pinus sylvestris* L. | P | T | Xm | Forest |
| The **Ephedraceae** Dumert. family | | | | |
| *Ephedra distachya* L. | P | B | Xph | Steppe |
| The **Ranunculaceae** Juss. family | | | | |
| *Adonis wolgensis* Steven | P | Sh-R | M | Steppe |
| *Anemone sylvestris* L. | P | L-R | M | Meadow |
| *Pulsatilla patens* (L.) Mill. | P | Sh-R | M | Steppe |
| *Ranunculus polyanthemos* L. | P | B-R | M | Meadow |
| *Ranunculus polyrhizos* Steph. | P | B-R | M | Steppe |
| *Ranunculus repens* L. | P | B-R | H | Meadow |
| *Thalictrum minus* L. | P | B-R | M | Meadow |
| *Thalictrum simplex* L. | P | B-R | M | Meadow |
| The **Betulaceae** S.F. Gray family | | | | |
| *Betula pendula* Roth. | P | T | M | Forest |
| The **Caryophyllaceae** Juss. family | | | | |
| *Cerastium arvense* L. | P | L-R | Xm | Meadow |
| *Eremogone koriniana* (Fisch. ex Fenzl) | P | S-R | Xph | Steppe |
| *Eremogone longifolia* (M.Bieb.) Fenzl | P | L-R | Xm | Meadow |
| *Gypsophila altissima* L. | P | S-R | Xm | Meadow |
| *Gypsophila paniculata* L. | P | S-R | Xm | Steppe |
| *Otites wolgensis* (Hornem.) Grossh. | A-B | S-R | Xm | Steppe |
| *Silene nutans* L. | P | L-R | M | Meadow |
| *Stellaria graminea* L. | P | L-R | M | Meadow |

*Continuation of table 1*

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| The **Chenopodiaceae** Vent family | | | | |
| *Axyris amaranthoides* L. | A-B | S-R | Xph | Weed |
| *Chenopodium album* L. | A-B | S-R | Xm | Weed |
| The **Polygonaceae** Juss. family | | | | |
| *Fallopia convolvulus* (L.) A.Love | A-B | S-R | M | Weed |
| The **Limoniaceae** Ser. family | | | | |
| *Limonium gmelinii* (Willd.) Kuntze | P | Sh-R | Xm | Steppe |
| The **Vacciniaceae** S.F. Gray family | | | | |
| *Vaccinium vitis-idaea* L. | P | Sh | Xm | Forest |
| The **Pyrolaceae** Dumort family | | | | |
| *Chimaphila umbellata* (L.) W.P.C.B | P | Sh | Xm | Forest |
| *Orthilia secunda* (L.) House | P | Sh | Xm | Forest |
| *Pyrola minor* L. | P | Sh | Xm | Forest |
| The **Primulaceae** Batsch ex Borkh. family | | | | |
| *Androsace septentrionalis* L. | E | S-R | M | Forest |
| *Primula longiscapa* Ledeb. | P | B-R | M | Meadow |
| The **Limoniaceae** Ser. family | | | | |
| *Limonium gmelinii* (Willd.) Kuntze | P | Sh-R | Xm | Steppe |
| The **Brassicaeae** Burnett family | | | | |
| *Descurainia sophia* (L.) Webb ex | A-B | S-R | M | Weed |
| *Draba nemorosa* L. | E | S-R | M | Steppe |
| *Clausia aprica* (Stephan) Ko | P | L-R | Xph | Steppe |
| *Odontarrhena tortuosa* (Waldst. et Kit. ex Willd.) C.A. Mey. | P | Sh | Xph | Steppe |
| *Turritis glabra* L. | A-B | S-R | M | Meadow |
| The **Violaceae** Batsch family | | | | |
| *Viola rupestris* F.W.Schmidt | P | Sh-R | M | Forest |
| The **Crassulaceae** J. St.-Hil. family | | | | |
| *Sedum hybridum* L. | P | L-R | M | Steppe |
| *Sedum telephium* L. | P | L-R | M | Meadow |
| The **Urticaceae** Juss. family | | | | |
| *Urtica dioica* L. | P | L-R | M | Weed |
| The **Euphorbiaceae** Juss. family | | | | |
| *Euphorbia subcordata* C.A.Mey. | P | L-R | Xm | Meadow |
| The **Rosaceae** Juss. family | | | | |
| *Cerasus fruticosa* Pall. | P | B | Xm | Steppe |
| *Cotoneaster melanocarpus* Fisch. ex Bl | P | B | Xm | Steppe |
| *Filipendula ulmaria (L.)* Maxim. | P | Tub | M | Meadow |
| *Filipendula vulgaris* Moench | P | Tub | Xm | Steppe |
| *Fragaria vesca* L. | P | L-R | M | Forest |
| *Fragaria viridis* (Duchesne) Weston | P | L-R | Xm | Meadow |

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Pentophylloides parvifolia* (Fischer ex Lehm.) Sójak | P | B | Xm | Steppe |
| *Potentilla argentea* L. | P | S-R | Xph | Steppe |
| *Potentilla bifurca* L. | P | L-R | Xm | Steppe |
| *Potentilla canescens* Besser | P | Sh-R | Xm | Steppe |
| *Potentilla humifusa* Willd. ex Schltdl. | P | Sh-R | Xm | Steppe |
| *Rosa acicularis* Lindl. | P | B | Xm | Steppe |
| *Rosa majalis* Herrm. | P | B | Xm | Forest |
| *Rubus saxatilis* L. | P | L-R | M | Forest |
| *Spiraea hypericifolia* L. | P | B | Xm | Steppe |
| The **Onagraceae** Juss. family | | | | |
| *Chamaenerion angustifolium* (L.) Scop. | P | L-R | M | Forest |
| The **Fabaceae** Lindl. family | | | | |
| *Astragalus danicus* Retz. | P | L-R | M | Meadow |
| *Caragana frutex* (L.) K.Koch | P | B | Xm | Steppe |
| *Glycyrrhiza uralensis* Fisch. | P | L-R | M | Steppe |
| *Lathyrus pisiformis* L. | P | S-R | M | Forest |
| *Lathyrus pratensis* L. | P | L-R | M | Meadow |
| *Lupinaster pentaphyllus* Moench | P | L-R | Xm | Forest |
| *Medicago falcata* L. | P | S-R | Xm | Steppe |
| *Melilotus officinalis* (L.) Pall. | A-B | S-R | Xm | Weed |
| *Vicia cracca* L. | P | L-R | M | Weed |
| The **Polygalaceae** Hoffmanns. et Link family | | | | |
| *Polygala comosa* Schkuhr | P | S-R | M | Meadow |
| The **Geraniaceae** Juss. family | | | | |
| Geranium albiflorum Ledeb. | P | Sh-R | M | Forest |
| Geranium pratense L. | P | Sh-R | M | Meadow |
| The **Valerianaceae** Batsch family | | | | |
| *Valeriana tuberosa* L. | P | Tub | M | Steppe |
| The **Dipsacaceae** Juss. family | | | | |
| *Scabiosa isetensis* L. | P | L-R | Xm | Steppe |
| The **Fabaceae** Lindl. family | | | | |
| *Cenolophium denudatum* (Fisch. ex Hornem.) Tutin | P | S-R | M | Meadow |
| *Conioselinum tataricum* Hoffm. | P | S-R | M | Meadow |
| *Heracleum sibiricum* L. | P | S-R | M | Forest |
| *Kadenia dubia* (Schkuhr) Lavrova & V.N.Tikhom. | P | S-R | M | Forest |
| *Seseli ledebourii* G.Don | P | Sh-R | Xm | Steppe |
| *Seseli libanotis* (L.) W.D.J.Koch | P | S-R | M | Meadow |
| *Xanthoselinum alsaticum* (L.) Schur | P | Sh-R | M | Meadow |

*Continuation of table 1*

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| The **Plantaginaceae** Juss. family | | | | |
| *Plantago media* L. | P | Br-R | Xm | Meadow |
| *Plantago urvillei* Opiz | P | Br-R | M | Meadow |
| The **Campanulaceae** Juss. family | | | | |
| *Campanula wolgensis* P.A.Smirn. | P | S-R | M | Forest |
| The **Asteraceae** Bercht. et J. Presl family | | | | |
| *Achillea asiatica* Serg. | P | L-R | Xm | Meadow |
| *Achillea millefolium* L. | P | L-R | M | Meadow |
| *Achillea nobilis* L. | A-B | Br-R | Xm | Steppe |
| *Achillea setacea* Waldst. & Kit. | P | L-R | Xm | Steppe |
| *Antennaria dioica* (L.) Gaertn. | P | L-R | Xph | Forest |
| *Aster alpinus* L. | P | L-R | Xm | Steppe |
| *Artemisia absinthium* L. | P | Sh-R | Xm | Weed |
| *Artemisia armeniaca* Lam. | P | L-R | Xm | Meadow |
| *Artemisia austriaca* Jacq. | P | L-R | Xm | Steppe |
| *Artemisia campestris* L. | P | S-R | Xm | Steppe |
| *Artemisia frigida* Willd. | P | Sh | Xm | Steppe |
| *Artemisia glauca* Pall. ex Wil | P | L-R | Xm | Meadow |
| *Artemisia latifolia* Ledeb. | P | L-R | M | Meadow |
| *Artemisia macrantha* Ledeb. | P | L-R | M | Forest |
| *Artemisia marschalliana* Spreng. | P | S-R | Xph | Steppe |
| *Artemisia pontica* L. | P | L-R | Xph | Steppe |
| *Artemisia rupestris* L. | P | L-R | M | Meadow |
| *Artemisia scoparia* Waldst. et Kit. | A-B | S-R | Xph | Weed |
| *Artemisia sericea* Weber ex Ste | P | L-R | Xm | Steppe |
| *Carduus crispus* L. | A-B | S-R | Xm | Weed |
| *Carduus nutans* L. | A-B | S-R | Xm | Weed |
| *Cirsium incanum* (S.G.Gmel.) | P | L-R | Xm | Weed |
| *Cirsium setosum* (Willd.) Bes | P | L-R | Xm | Weed |
| *Cirsium vulgare* (Savi) Ten. | A-B | S-R | Xph | Weed |
| *Conyza canadensis* (L.) Cronqis | A-B | S-R | Xm | Weed |
| *Echinops ritro* L. | P | S-R | Xph | Steppe |
| *Galatella angustissima* (Tausch) Novopokr. | P | L-R | Xm | Steppe |
| *Crinitaria tatarica* (Less.) Czer. | P | L-R | Xm | Steppe |
| *Helichrysum arenarium* (L.) Moench | P | L-R | Xph | Steppe |
| *Hieracium umbellatum* L. | P | Br-R | Xm | Forest |
| *Hieracium virosum* Pall. | P | Br-R | Xm | Steppe |
| *Inula salicina* L. | P | L-R | M | Meadow |
| *Jacobaea vulgaris* Gaertn. | A-B | S-R | Xm | Weed |
| *Pilosella echioides* (Lumn.) F.Sc | P | Br-R | Xph | Steppe |

*Continuation of table 1*

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Scorzonera purpurea* L. | P | S-R | Xm | Steppe |
| *Serratula coronata* L. | P | L-R | M | Meadow |
| *Solidago virgaurea* L. | P | Sh-R | M | Forest |
| *Tanacetum vulgare* L. | P | L-R | M | Meadow |
| *Taraxacum officinale* F.H.Wigg. | A-B | S-R | M | Weed |
| *Trommsdorffia maculata* (L.) Bernh. | P | S-R | Xm | Meadow |
| The **Rosaceae** Juss. family | | | | |
| *Galium boreale* L. | P | L-R | M | Forest |
| *Galium verum* L. | P | Sh-R | Xm | Steppe |
| The **Gentianaceae** Juss. family | | | | |
| *Gentiana fetisovii* Regel. et Winkl. | P | L-R | M | Meadow |
| The **Boraginaceae** Juss. family | | | | |
| *Onosma simplicissima* L. | P | L-R | Xm | Steppe |
| *Onosma transrhymnensis* Klok. ex M. Pop. | P | S-R | Xph | Steppe |
| The **Scrophulariaceae** Juss. family | | | | |
| *Linaria vulgaris* Mill. | P | L-R | M | Weed |
| *Odontites vulgaris* Moench | A-B | S-R | Xm | Meadow |
| *Pedicularis dasystachys* Schrenk | P | Br-R | Xm | Steppe |
| *Veronica incana* L. | P | L-R | Xph | Steppe |
| *Veronica krylovii* Schischk. | P | S-R | M | Meadow |
| *Veronica longifolia* L. | P | L-R | M | Meadow |
| *Veronica spicata* L. | P | L-R | Xm | Steppe |
| *Veronica spuria* L. | P | L-R | Xm | Steppe |
| The **Orobanchaceae** Vent. family | | | | |
| *Orobanche caesia* Reichenb. | P | P | M | Steppe |
| *Orostachys spinosa* (L.) Sweet | P | P | M | Steppe |
| The **Lamiaceae** Martinov family | | | | |
| *Dracocephalum ruyschiana* L. | P | L-R | Xm | Meadow |
| *Phlomoides tuberosa* (L.) Moench | P | Tub | Xm | Steppe |
| *Thymus marschallianus* Willd. | P | L-R | Xm | Steppe |
| *Thymus serpyllum* L. | P | L-R | Xm | Steppe |
| The **Rosaceae** Juss. family | | | | |
| *Gagea granulosa* Turcz. | P | Tub-B | M | Steppe |
| *Tulipa patens* C.Agardh ex Schult. & Schult. f. | P | Tub-B | M | Steppe |
| The **Alliaceae** Borkh. family | | | | |
| *Allium hymenorhizum* Ledeb | P | Tub-B | M | Meadow |
| *Allium globosum* M.Bieb. ex Redoute | P | Tub-B | Xm | Steppe |
| *Allium rubens* Schrad. ex Willd. | P | Tub-B | Xm | Steppe |
| The **Asparagaceae** Juss. family | | | | |
| *Asparagus officinalis* L. | P | L-R | M | Meadow |

*End of table 1*

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| The **Orchidaceae** Juss. family | | | | |
| *Dactylorhiza fuchsii* (Druce) Soa | P | Tub-B | M | Forest |
| The **Convallariaceae** Horan. family | | | | |
| *Polygonatum odoratum* (Mill.) Druc | P | L-R | M | Forest |
| The **Iridaceae** Juss. family | | | | |
| *Iris halophila* Pall. | P | Sh-R | M | Meadow |
| The **Cyperaceae** Juss family | | | | |
| *Carex supina* Willd. ex Wahlenb. | P | L-R | Xph | Steppe |
| The **Poaceae** Barnhart family | | | | |
| *Brachypodium pinnatum* (L.) Beauv. | P | L-R | M | Forest |
| *Bromopsis inermis* (Leyss.) Holub | P | L-R | M | Meadow |
| *Calamagrostis obtusata* Trin. | P | L-R | M | Forest |
| *Calamagrostis epigeios* (L.) Roth | P | L-R | Xm | Meadow |
| *Cleistogenes squarrosa* (Trin.) Keng. | E | Br-R | Xm | Steppe |
| *Elytrigia repens* (L.) Nevski | P | L-R | M | Weed |
| *Festuca valesiaca* Gaudin | P | Sh-R | Xph | Steppe |
| *Helictotrichon desertorum* (Less.) Nevs | P | Sh-R | Xph | Steppe |
| *Hordeum brevisubulatum* (Trin.) Link | P | L-R | Xm | Meadow |
| *Koeleria cri*stata (L.) Pers. | P | L-R | Xph | Steppe |
| *Leymus angustus* (Trin.) Pilg | P | L-R | Xph | Steppe |
| *Leymus paboanus* (Claus) Pilg | P | L-R | Xph | Steppe |
| *Melica nutans* L. | P | L-R | M | Forest |
| *Phleum phleoides* (L.) H.Karst. | P | L-R | Xm | Steppe |
| *Poa angu*stifolia L. | P | L-R | Xm | Steppe |
| *Poa palustris* L. | P | L-R | M | Meadow |
| *Poa pratensi*s L. | P | L-R | M | Meadow |
| *Stipa capillata* L. | P | Sh-R | Xph | Steppe |
| *Stipa lessingiana* Trin. et Rupr. | P | Sh-R | Xph | Steppe |
| *Stipa pennata* L. | P | Sh-R | Xph | Steppe |
| *Stipa zalesskii* Wilensky | P | Sh-R | Xph | Steppe |

*Column 1 shows the longevity of species (P - Perennials, A-B - Long-vegetating annual-biennial plants, E - Ephemera).

Column 2 shows life forms (T - Trees, B - Bushes, Sh - Shrubs, L-R - Long-rooted grasses, Sh-R - Short-rooted grasses, Tub - Tuberous grasses, Tub-B - Tuber-bulbous grasses, S-R - Stem-rooted grasses, Br-R - Brush-rooted grasses; Parasites).

Column 3 shows ecological groups in relation to moisture supply of the habitats (Xph - Xerophytes, Xm - Xeromesophytes, M - Mesophytes, H - Hygromosophytes).

Column 4 shows ecological and coenotic groups.

The share of 10 leading families comprises 117 species, which makes 70% of the total coenoflora composition. The *Asteraceae*, *Poaceae,* and *Rosaceae* families are the richest in species composition (Table 2). The leading genera are *Artemisia* (13), *Veronica* (5), *Achillea*, *Potentilla*, and *Stipa* (4 species each).

Table 2 – Leading families of *Pulsatilla patens* s.l. coenoflora according to the number of species

| Family | *Pulsatilla patens* s.l. coenoflora | | | Flora of the Kazakh Uplands (KU) (Kupriyanov, 2017) | |
|---|---|---|---|---|---|
| | place according to the number of species | number of genera / % of the total | number of species / % of the total | place according to the number of species | number of species / % of the total |
| *Asteraceae* Bercht. et J. Presl | I | 21/15 | 40/24 | I | 306/15 |
| *Poaceae* Barnhart | II | 14/10 | 21/12,5 | III | 132/7 |
| *Rosaceae* Juss. | III | 8/6 | 8/5 | VIII | 73/4 |
| *Fabaceae* Lindl. | IV | 8/6 | 8/5 | II | 145/7 |
| *Caryophyllaceae* Juss. | V | 6/4 | 6/3,5 | VI | 84/4 |
| *Ranunculaceae* Juss. | VI | 5/3,5 | 5/3 | XII | 59/3 |
| *Scrophulariaceae* Juss. | VII | 4/3 | 4/2 | IX | 69//3 |
| *Apiaceae* Lindl. | VIII | 6/6 | 6/3,5 | VII | 79/4 |
| *Brassicaceae* Burnett | IX | 5/5 | 5/3 | IV | 130/6 |
| *Lamiaceae* Martinov | X | 3/3 | 4/2 | XI | 65/3 |
| **Total** | | 80/57 | 107/64 | | 1142/57 |

Compared to the Kazakh Upland's flora [14], the third place in terms of the number of species is occupied by *Rosaceae*, which takes 8th place in the KU flora. The ten leading families are *Ranunculaceae* and *Lamiaceae*, which are beyond the top ten leading families in the KU territory. The *Brassicaceae* family has dropped from place IV to IX. The floras of Eastern Europe have a tendency for lowering the status of *Fabaceae* and raising the status of *Rosaceae* [15]. These peculiarities of the coenoflora correlate well with the ecological conditions of stony (and partly sparse forest) habitats in which populations of *Pulsatillla patens* s.l. are formed with greater resistance to unfavorable growing conditions.

In the *Asteraceae* family there were found 13 species of the *Artemisia* genus. Among them, a major part of the species belongs to the steppe and meadow ones, which indicates a meadow-steppe character of the *Pulsatilla patens* s.l. coenoflora. The presence of *Pyrolaceae* species (*Chimaphila umbellata, Orthilia secunda, Pyrola minor*), which are part of a relict complex of the pine forests, indicates a forest character of the coenoflora [6].

The largest amount of species refers to perennial species (150), annuals and biennials make up 15 species, ephemera 3 species. Among the life forms, there are mainly long-rooted (70) and stem-rooted (36) species. A meadow-steppe character of the coenoflora emphasizes almost the same number of mesophytes and xeromesophytes (71 and 70 species respectively) as well as the presence of xerophytes (26 species) and the almost complete absence of more hygrophilous species. Among coenotic groups, there dominate steppe species (73 species, or 43%), then meadow ones (49 species, or 29%), forest ones (28 species, or 17%), and weedy (18 species, or 11%). The presence of a relatively large proportion of weed species indicates a significant anthropogenic breach in the habitats due to cattle pastures, recreation, partly steppe and forest fires.

**Conclusion.** Coenoflora of *Pulsatillla patens* s.l. includes 168 species belonging to 42 families and 141 genera. The leading families are *Asteraceae, Poaceae, Rosaceae, Fabaceae, Caryophyllaceae, Ranunculaceae.* The characteristics of coenoflora correlate well with the ecological conditions of rocky (and partly sparse forest) habitats where the populations of *Pulsatilla patens* s.l are formed. Eco-biological analysis confirmed a meadow-steppe character of the coenoflora with a little presence of forest species. Anthropogenic breach of coenoflora is expressed in a rather large amount of weed species (18 species, or 11%).

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## СОЛТҮСТІК ҚАЗАҚСТАНДАҒЫ *PULSATILLA PATENS* (L.) MILL. s.l. ЦЕНОФЛОРАСЫ

**Аннотация.** Мақалада Солтүстік Қазақстандағы *Pulsatilla patens* (L.) Mill. s.l.)ценофлорасын зерттеу нәтижелері келтірілген. Материалдар далалық зерттеулер нәтижесінде алынды, әдеби мәліметтер ескерілді. Нақтылы-маршрутты зерттеулер негізінде Солтүстік Қазақстандағы ашық құндызшөп флорасының тізімі келтіріледі.

Солтүстік Қазақстанның *Pulsatilla patens (L.) Mill. s.l.* ценофлорасында 42 тұқымдасқа және 141 туысқа жататын 168 түрі бар. Негізгі тұқымдастары: *Asteraceae, Poaceae, Rosaceae, Fabaceae, Caryophyllaceae, Ranunculaceae*.

Түрлердің ең көп саны көпжылдық түрлерге жатады (150), бір-екі жылдықтар 15 түрді, эфемерлер 3 түрді құрайды. Өмірлік формалар арасында ең көбі ұзын тамырлы (70) және тамыр сабақты (36) түрлері бар. Ценофлора орман флористикалық элементтердің аз мөлшері бар далалық сипаттағы және популяциялар қалыптасатын тасты (ал ішінара кесілген орман) мекендейтін жерлердің экологиялық жағдайларымен үйлеседі. Экобиологиялық талдау нәтижесінде ценофлораның шалғындық-дала сипаты расталды. Ценофлораның антропогендік бұзылуы арамшөптердің (18 түрі немесе 11%) өте көптігінен көрінеді.

**Түйін сөздер:** *Pulsatilla patens* (L.) Mill., ценопопуляция, Солтүстік Қазақстан, систематикалық құрылым, экология-ценотикалық топтар.

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## ЦЕНОФЛОРА *PULSATILA PATENS* (L.) MILL. s.l. В СЕВЕРНОМ КАЗАХСТАНЕ

**Аннотация.** В статье приведены результаты изучения ценофлоры *Pulsatilla patens* (L.) Mill. s.l. в Северном Казахстане. Материалы получены в результате полевых исследований, учтены литературные данные. На основании детально-маршрутных исследований приводится список флоры прострела раскрытого в Северном Казахстане. Ценофлора *Pulsatilla patens* (L.) Mill. s.l. в Северном Казахстане насчитывает 168 видов, принадлежащих к 42 семействам и 141 родам. Ведущими семействами являются: *Asteraceae, Poaceae, Rosaceae, Fabaceae, Caryophyllaceae, Ranunculaceae*. Наибольшее количество видов относится к многолетним видам (150), одно-двулетники составляют 15 видов, эфемеры – 3 вида. Среди жизненных форм более всего длиннокорневищных (70) и стержнекорневых (36) видов. Ценофлора имеет степной характер с небольшим количеством лесных флористических элементов и коррелируют с экологическими условиями каменистых (а отчасти разреженно лесных) местообитаний, в которых формируются популяции. Экобиологический анализ подтвердил лугово-степной характер ценофлоры. Антропогенная нарушенность ценофлоры выражается в довольно большом количестве сорных видов (18 видов или 11%).

**Ключевые слова:** *Pulsatila patens* s.l., ценопопуляция, Северный Казахстан, систематическая структура, эколого-ценотические группы.

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# FORESIGHT AND THE ROLE OF INNOVATION
# IN THE DEVELOPMENT OF EDUCATION

**Abstract.** Foresight is a system of methods for transforming priorities in education and science, economics and production, social and cultural development. In modern Russia, the foresight of education acts as a means of its collapse: theorists and methodologists of educational foresight, working on behalf of comprador corporations, consistently build a system of priority tasks that not only ignore the domestic experience of education and upbringing, but also destroy it and its ideals. The development and self-realization of the person was replace by the values of selling the person and using it in the most convenient ways for corporations. The purpose of the study is to analyze the problems and prospects of modern education as a theory and practice, which combines the experience of training and educating a person throughout his life in various (subject/professional) fields and situations gained by many generations, communities, cultures, humanity as a whole. The basis of the research is the theoretical analysis and integration of data on various theoretical and practical pedagogical, psychological, sociological and other models of education and the development of education in order to identify problems of the foresight of modern education. The main line of transformations during the transition to a new way of life is no more sophisticated exploitation of man and society as "capital", but the priority of these types of "capital" is in itself.

**Keywords:** education, dynamic capability, foresight, self-realization, integrative model of education.

**Introduction.** Globalization as a phenomenon of culture involves the spread of modern economic, legal, sociological and other theories, including in the sphere of their application to development, and, more precisely, to destruction, science and education, from countries considered to be carriers of universal "culture," civilization " (Europe and the USA) to the barbarian countries of the "second" and "third" worlds (Evzrezov, Mayer, 2013; Kryukov, 2010). Neither science nor education is necessary for the globalized world: the unification of power, cephalization and digitalization of management (mondialization) are opposed to development. And, if the foresight of education is really interesting to us, we should look at the myths about modern education and its history critically.

**Problem statement.** According to the supporters of globalization and mondialization (which "separatist" and other movements of national revival are quite successfully opposing in the modern world), large-scale innovations in education occur infrequently: supposedly, there were only four in the last thousand years. In the West, the practice and theorists of education often mark out the following as the main ages of world education: 1) appearance in X-XII centuries in Europe, universities focused on the translation of the universe of knowledge (Bologna, Paris); 2) class-lesson system proposed by Y.A. Comenius in the XVII century, which has now become the pedagogical norm for mass education; 3) the emergence in the XIX century of research-type universities according to the model of V. von Humboldt, intended for the generation of scientific knowledge and the training of researchers; 4) the idea of pragmatic education and experimental teaching method proposed by J. Dewey at the turn of the XIX-XX centuries, which became the basis for the development of project training and "active methods" of preparation

(SEDeC, 2013b: 4). This list does not practically represent the ideas of theorists and practitioners of the national school, including the ideas of forming the skills of learning and teaching, theories of the gradual formation of mental actions and other learning models (L.S. Vygotskiy, V.V. Davydov, P.Y. Halperin, etc.), made the Soviet education in the XX century, the best in the world. Modern researchers, it seems, have not even heard of them, comparing educational "brownfields" and "greenfields" of western education and building a foresight on the basis of Western models that have repeatedly manifested their inferiority of Western models: "Traditional educational institutions, the fate of which is most often discussed in the expert community, can be called "Brownfield" - the historically established "zone of educational practice." "Greenfield" will be new educational projects (educational start-ups) created on the basis of new techno-logical grounds. Such projects are in reference (Evzrezov, Mayer, 2013: 3). The educational foresight must take into account not only "strong trends" of targeted destruction of national education and destruc-tive pseudo-innovations (such as Erasmus +, unintelligible and constantly rewritten "federal state stan-dards" and other ways of creating maximum difficulties for creating a country), but also "jokers" of real and truly unique achievements of domestic teachers and psychologists: not only "alien", but also "own" resources and experience. And the latter are huge. Different technologies and methods, procedures of "acceleration" of education are not new at all and often have as their basis the theory and technology of modern intensive teaching methods, for example, G. Lozanov's intensive suggestopedic teaching method and G.A. Kitaygorodskaya. In these models, it is assumed that a person's abilities are not limited and depend on the environment. Therefore, you can create the conditions and find those areas that are usually not involved. The state of a reduced level of consciousness is also used in hypnopia (A. M. Svyadosch, V. V. Vakhmistrov, V. P. Zukhar, V. P. Bliznichenko).The model of activating the capabilities of the indivi-dual and the collective of A. Kitaygorodskaya is in many ways similar to this model, but at a different level of understanding. The main postulates and methods of the system G.A. Kitaygorodskaya related to the concepts of the Soviet psychological school: theories (speech) activities of A.N. Leontiev and A.A. Leontiev, the theory of personality and team A.V. Petrovskiy and V.A. Petrovskiy. G.A. Kitaygorod-skaya and many other Soviet and Russian pedagogics and scholars correlate intensive and high-quality education not with minimization, but with maximization of individual and joint efforts, of the teacher and the students. Activation of training is the activation of the activity of the teacher and students. However, minimization or maximization itself is formal, it is necessary to create new or use old technologies that allow "expanding" a person's abilities, his faith in himself and the world, freedom and activity, etc. In general, the pedagogy of modernity contains a huge amount hikes, we list only the most famous and pro-ductive of them (not including the actual traditional teaching methods): methods of "learning optimi-zation"; methods of problem-developmental education (Makhmutov M.I.); business games and contextual learning (Verbitsky A. A.); programmed learning (Talyzina N.F., Bespalko V.P.); intensive training (G. Lozanov, G. A. Kitaygorodskaya, I. Yu. Shekhter, L. Sh. Gegechkori); methods of stimulating creati-vity (scientific, technical, artistic creativity); methods of enhancing general educational skills; mental state self-regulation (Romain A.S.); learning methods of accelerated perception of information (F. Lezer, A. Churilo); drafting reference notes and rational work with texts (Shatalov V.F., Fedorova A.A.); activation of the educational process (Danilov M. A., Esipov B. P., Ogorodnikov I. T. Makhmutov M. I.); development of theoretical thinking (V. Davydov, D. B. Elkonin); the formation of spiritual needs (Yu. V. Sharov); education needs (Ilyin V. S.); development of cognitive interests (Shchukin G. I., Bozhovich L. I.); ability to learn and learn (N.P. Nichiporenko, M.R. Arpentieva); motivation in learning activities (Markova A.K.); the phased formation of mental actions (P. Halperin); problem-based learning (A. M. Matyushkin, T. V. Kudryavtsev, I. Ya. Lerner); immersion techniques (A. Plesnevich, G.V. Dya-konov, etc.). Of the foreign methods, it should be noted theories and methods of in-depth training, heu-tagogy, metacognitive learning (much more interesting and complete than "neuropedagogics", etc.), as well as the (contextual) concept of learning types of G. Bateson. To some achievements of dubious sense can be attributed, as noted in the theory and methodology of "metasubject", "competence," as well as "inclusive" and many other educational trends of pedagogy. These trends aimed at reducing both intensity and productivity. "At the same time, as we see, lack of culture is exalted due to the uncontrolled pene-tration of digital technologies into the life of modern people: the dangers of "digital dependence" do not bother the supporters of "greenfield", it seems that they are glad that modern students and students either lag behind in development, or so they are "ahead" that their brains and bodies as a whole become the

brains and bodies of a seriously ill, old person in 11-13 years, that their relationships with themselves and the world are not formed and remain primitive and dependent, and their soul and does not "wake up", since moral criteria are excluded from the interaction of res ipsadeclarat, par excellence, that Russia is actively striving to turn into an exclusively "raw material base", first of all, turning its population into a "raw material".

The educational foresight must take into account not only the "strong tendencies" of purposeful destruction of national education and destructive pseudo-innovations (such as Erasmus +, etc.), but also the "jokers" of domestic achievements. These achievements are used all over the world in the most advanced models of education, including in Japan, Norway and other post-capitalist fears. Education within the framework of the model of J. Dewey and his followers, even especially in the Global Education Futures (GEF) models, not only never was an innovation in education, but acted and acts as a way to return education to the pre-university way of learning: the informative breakdown of education in its improvement is the goal of modern capitalism (Zhukova, 2016). In Russia, there has always been a system of universities (higher educational institutions -"HEI") and secondary vocational schools (secondary special educational institutions - "SSEI"): no one protested against the choice of a person. Everyone had a choice. Now there is no choice: the foresight invites us to begin trading in our abilities, knowledge and skills already at school. However, if we build a foresight, based on the fact that on Earth the power of the comprador bourgeoisie will be eternal, we are mistaken. We need to choose other points of reference, indicated by our, domestic researchers, as well as the world's leading achievements in this field. And these are not unfounded and useless statements that education becomes media education, etc. This argument about who a person becomes, what form of relationship with the world, with life, with God he chooses, how to make the mass education that has lost the imperative of "quality" still be able to return to it, and, if possible, rise a new stage / climb a new step. Transformation of education into a mass process and mediatization of education, the transformation of educational institutions and scientific centers into "educational enterprises", under the slogans of "monetization" and obtaining benefits, is not a subject for delight, on the contrary, Modern education, thanks to the business, went in the opposite development. The bourgeoisie pushes society from selling money to selling knowledge and skills, and then to selling themselves. As far as this situation and enthusiastic foresight forecasts are out-of-moral, non-viable, as far as they are anti-educational, almost none of those who are actively engaged in this notice (Burov, 2016; SEDeC, 2013a). However, a foresight is a development, even if it exists in spite of attempts by the comprador bourgeoisie to destroy education and science in general. "Human capital", which seems to be designed to provide education for the future, is understood as other, financial and material capital: it can and should be distributed to banks (industrial zones - concentration camps), depriving a person of not only independence, but also self-awareness. It is a natural goal of those who do not have this very self-consciousness (Burov, 2016; SEDeC, 2013a; SEDeC, 2013b). In fact, there is nothing new in many "foresight reports"; there are no insights about what will actually advance the development of education: digital technologies are just technologies, they are either "greenfield" or "brownfield". At the same time, hopes that absolutely new methods and approaches will appear in the next century are quite understandable, especially when the past is forgotten. However, as you know, "new is a well forgotten old".

**Research questions.** The issue of our research is related to the fact that modern science and practice of education is undergoing a systemic crisis. It is associated with attempts at "renewal for the sake of renewal": innovations are declared, which, however, either do not materialize or lead to deformations and destruction of educational relations. The theme of "crisis" and "end" of the university, the problem of university interaction and power (business) and the university's loss of the spirit of freedom, changing the essence of the "university idea" as a multiple phenomenon, as well as the problem of mass education as a manifestation of "mass uprising" and the need to form specialists, that is, individuals capable of withstanding the onslaught of the masses, are popular throughout the 20th century and earlier (the works of F. Nietzsche, H. Ortega-i-Gasset, M. Weber, E. Durkheim, K. Jaspers, A.N. Whitehead, V. Humboldt, J. Newman, J.-F. Lyotar, B. Readings, etc.). The modern foresight of education practically rejects the entire history of pedagogy and pedagogical psychology, cultural and sociological research, focusing on educational models created for the purpose of its maximum simplification and short-term effectiveness. These models of "express education" can be productive for some period of time and in some situations, however, in general, the predominance of the "short perspective" is alien to education in general and

productive and effective educational practices and technologies. Education is essentially a long-term process that requires not a consumer, narrowly functional, but a spiritual, moral, sacral attitude and understanding. If a community loses its powerful education system, it essentially loses itself. If the community focuses on education only in the applied aspect (as well illustrated by the TOP-50 professions in Russia, which includes only professions of the "service" type, which do not require either high competence or development of a person as an individual, partner and professional), then the country's development prospective sharply collapses. Such a country has no future. On the contrary, respect for education, its practices, teachers and other researchers and developers of pedagogical approaches and technologies, speaks of the importance of taking into account the diversity of research experience and achievements throughout human history, in all regions and communities. Neither the Soviet nor the Scandinavian, nor, moreover, American, education and its "idols", like J. Dewey, cannot be the only building pillars and criteria for evaluating the constructed systems and educational infrastructures (Barber, Donnelly, Rizvi, 2013).

**Purpose of the study and research method.** The purpose of the study is to analyze the problems and prospects of modern education as a theory and practice, which combines the experience of training and educating a person throughout his life in various (subject/professional) fields and situations gained by many generations, communities, cultures, humanity as a whole.

The basis of the research is the theoretical analysis and integration of data on various theoretical and practical pedagogical, psychological, sociological and other models of education and the development of education in order to identify problems of the foresight of modern education.

**Findings.** As for the foresight itself, it should be noted that this theory is closely related to the development of an incompletely formulated concept of technological structures, which is currently trying to understand the moral and social implications of changing technologies, as well as an interesting concept of dynamic abilities, which is trying to solve the old problem of "personality in history / organization"("inconvenient" realization that an uneducated and ill-mannered manager in an educational organization, interested only in ensuring its profitability leads both its organization and all education to decay). It is also associated with the fictions of the theories of "sustainable development", as well as with traditional developments in the field of strategic management with its understanding of the importance of the mission and the moral foundations of the organization's theory and intersubjective management (evergetics of the V. Vittich, second democracy of the A. Adler, deep democracy of the A. Mindell, etc.. (Adler, 1993; Arpentieva, Duvalina, Gorelova, 2017, Mindell, 1998; Vittich, 2014). Among these trends, the theory and practice of foresight and enhancing the dynamic abilities of enterprises are among the leading ones, since they directly address the question we have about who is going to cultivate the "2030/2035 foresight model of education": an obedient and deprived individual, convenient to use member a social herd or an individual with their own understanding of their lifetimes and priorities? In our opinion, the answer is obvious, so we will try to consider the capabilities of the dynamic ability model as one of the least "hostile" education, and, in many ways, supplementing the strategic management model with an awareness of the need for dialogue between educational and scientific institutions with society and the state. Dialogue of equal, full, developed and deep. Dialogue in which education and science affect the community, and are not a means of rationed violence of the state and the community in relation to the individual, in relation to the human soul. Theories and practices of foresight and enhancing the dynamic abilities of enterprises act as important tools for regulating the national and world economy, and, in the field of education and science, the development of education and science in the country. The problems of effectively forecasting the development of the economy and production, including the functioning and development of certain sectoral markets in a crisis period for society, its economy and politics, are closely related to the so-called dynamic abilities of enterprises, their abilities to restructure and diversify due to sectoral market trends , highlight both strong, obvious, and weak, subtle, but important trends, including threats and development prospects, challenges of time and challenges of regional markets Arpentieva, 2017; Arpentieva, 2018; Kulesh, 2015; Tis, Pisano, Shuen, 2003). An important role in the development of education is also played by "breakthrough" and "subversive" technologies. In their development and application, however, it is important to remember that these are special technologies. They do not undermine and do not break through the "educational services markets", but serve to enrich education, including changing the ratio of routine and creative forms of activity, directive and intersubjective education management. Disruptive and breakthrough technologies are fraught with great risks and insufficient amount of retrospective

information about their use. That is why in their advancement it is necessary to carefully assess the potential of the technologies used and include them into an integrative foresight model (Kostenko, 2013). Breakthrough and disruptive technologies are changing the situation in education and other areas of social life (DaSilva, Trkman, Desouza, &Lindič, 2013; Sharon, 2016; Van Esler, 2016; Von der Gracht, Vennemann, Darkow, 2010). They contribute to the success and integration of traditional and innovative business and cultural projects. However, they often destroy existing markets (market conditions) by introducing innovative business models with many new dynamic capabilities. Breakthrough and disruptive technologies use strategic approaches at different levels and components of organizations, firms and markets. They are effective where they are embedded in the mission of the institution and in traditional technologies and strategies for its development and functioning. In the intensively and steadily developing institutions of education, culture, etc. advanced digital, psychological, biological, control, and other technologies are often used together (Sharon, 2016; Van Esler, 2016: Dudley, Banister, &Schwanen, 2017).

Thanks to dynamic abilities, more or less large organizations, their subversive and breakthrough technologies leave the start-up stage, and become dominant. In addition, breakthrough or disruptive technologies change the view of the future and how to achieve it. Breakthrough and disruptive technologies are the main components of an enterprise's dynamic capabilities. On the one hand, from a tactical point of view, they destabilize education, and on the other hand, on the strategic side, they allow education, the community as a whole, to develop steadily and harmoniously. A true foresight is distinguished by the involvement in the process of studying and creating the future of those who are most interested in it, by systematic, complex modeling and research of the main factors and forces that influence and transform this future. In Russia, lobbyists of comprador corporations and comprador structures of the state are often engaged in foresight: university programs in Russia are increasingly approaching primary school programs that form an ignorant personality, easily manipulated, ready and forced to survive in order to survive, not only with their truncated knowledge and skills, but and yourself. Modern strategic management in the system of education and science is focused on a systematic account of old and new sources of development and threats, constraints and production prospects in accordance with the challenges of specific time and space - analysis of regional requests, prevention and correction of organizational crises and collapses, reduction of bureaucratization and corruption in organizations, reducing "personnel leakage", including "brain drain", downshifting and deprofessionalization. Such management relies on the understanding that everything in the world is interconnected, and thus even the most destructive, dangerous events and phenomena can be identified, prevented or corrected in one way or another. Similarly, phenomena and events that create conditions for the development of production and the economy, as well as society as a whole, including education, science, and culture, can be identified, enhanced, and, in some cases, specially created. In this connection, the role of such dynamic abilities of institutions of science and education arises and strengthens, which allow to identify and predict the development of the education system and its institutions, to carry out long-term strategic planning, taking into account these forecasts, their conclusions about future more or less important and obvious changes, to manage these changes. In this context, the theory of dynamic abilities is closely intertwined with the theory of foresight, as well as a number of other theories based on the concept of complex systems, their fractal, and synergistic, self-developing and self-regulating nature. The theory of dynamic abilities is also built on the idea of educational organizations as complex, heterogeneous, changing and supporting the internal and external balance of systems. Therefore, the foresight should become an organic part of the theory of dynamic abilities, expanding it and deepening the understanding of the essence, activation. A true foresight is distinguished by the involvement in the process of studying and creating the future of those who are most interested in it, by systematic, complex modeling and research of the main factors and forces that influence and transform this future (Zhukova, 2016; Kulesh, 2015). In Russia, lobbyists of comprador corporations and comprador structures of the state are often engaged in foresight: university programs in Russia are increasingly approaching primary school programs that form an ignorant personality, easily manipulated, ready and forced to survive in order to survive, not only with their truncated knowledge and skills, but and itself.

Alternative foresight education in Russia, of course, includes "resuscitation", the recollection and restoration of the moral foundations of education and its orientation not to optimize sales of students' abilities, knowledge and skills, not to form a consumer that is convenient for consumption, whose only purpose in life is comfort and survival, and both self-realization and development as individuals and as

members of a community striving for transcendence, self-realization in the process of serving people. This, of course, requires the involvement of new and old practices and concepts, their innovative reintegration for the development of man and mankind. This requires the restoration of all the fullness and wealth of methods and knowledge of the national school, Russian education, which have shown their productivity of foreign old and new concepts and technologies, as well as the complete exclusion from education of financial interests and coercions ("paid education" and "monetization" of scientific research - already caused irreparable harm to Russia, and not only to its scientists and educators). It includes their theoretical rethinking and integration of methods and technologies, and not just "gamification", "mediation" and other "–tion" (Arpentieva, 2017; Barber, Donnelly, Rizvi, 2013; Kryukov, 2010). Without serious scientific research and the support of real researchers, and not just "fictionalists," composers of pseudo-forwards websites, further education will not move.

**Conclusion.** Post hominum memoriam, man is a measure of things: primumvivere. It is not a subject of sale, at any age, with any talents, on which modern foresight projects and ministries so enthusiastically insist on almost totally paid education and science today (Peskov, 2016). Careless substitution of achievements of modern education and replacement of genius P.Ya. Halperin on the usual J. Dewey, does not save the Russian education. And it's time to save him. Therefore, the result is periculum in mora. Otherwise, there will simply be no one to work: one can scoff at people, destroy both dignity and life carefully and for a long time, but paraphrasing M. Bulgakov, a person is mortal and mortal suddenly. You can't try to undo the changes and go back: the main line of transformations during the transition to a new way of life is no more sophisticated exploitation of man and society as "capital", but the priority of these types of "capital" is in itself. Not education should serve the interests of corporations, as it is believed by the citizens biased by the latter: pars pro toto. Rercipit quasi notissimum, corporate interests are the interests of people, humanity. This is the answer to the question of how to protect Russia, which has been dying out from the pia desiderata of "developed democracy" in the past three decades, from further, destroying its steps on the "road maps" of the genocidal foresight, from the noble dedication of foreign sponsors implanting in Russia and other post-soviet countries are alien, and, most importantly, inefficient and unproductive technologies and ideologies of learning and education, from others, pactumisillicitum. Prius vitiislaboravimus, nuns legibus, but from the fact that defects turn into laws, the burden does not decrease. Obviously, this situation can not last long. For example, at present one of the theoretical "bastions" of ideas of practical orientation of education, the need for its standardization and simplification, "stretching" for life in the form of continuous education and retraining, a supporter of the monetization of educational services, the United Kingdom has successfully built on the Soviet model. Russia needs a bit. It needs, without waiting for the tendency to come from the West, to recall the best achievements of its practitioners and scientists, to combine them with the achievements of teachers and psychologists of the Scandinavian and some other countries. The solution of this task is not difficult: the corresponding comparative studies have already been carried out (Arpentieva, Kassymova, Lavrinenko, Tyumaseva, Valeeva, Kenzhaliyev, M. B. Triyono, Kosov, Duvalina, 2019; Arpentieva, Krasnoschechenko, Kirichkova, Zalavina, Stepanova, 2018; Arpentieva, Kirichkova, Kosov, Feshchenko, Golubeva, 2018; Bogomolova, Menshikov, Arpentieva, Gorelova, Zalavina, 2018, Kostenko, 2013; Kassymova, Arpentieva, Kosherbayeva, Triyono, Sangilbayev, Kenzhaliyev, 2019; Kassymova, Tyumaseva, Valeeva, Lavrinenko, Arpentieva, Kenzhaliyev, Kosherbayeva, Kosov, Duvalina, 2019; Kassymova, Tokar, Tashcheva, Slepukhina, Gridneva, Bazhenova, Shpakovskaya, and Arpentieva, 2019; Kassymova, Stepanova, Stepanova, Menshikov, Arpentieva, and Merezhnikov, Kunakovskaya, 2018; Stepanova, Tashcheva, Stepanova, Kassymova, Tokar, Menshikov,. and Arpentieva, 2018; Stepanova, Tashcheva, Markova, Shpakovskaya, Arpentieva, Bazhenova, Tokar and Kirichkova, 2019; Stepanova, Gridneva, Menshikov, Kassymova, Tokar, Merezhnikov, and Arpentieva, 2018 and many other works), the productivity and effectiveness of education as a socio-cultural, developing, rather than commercial, and development-limiting practice has been repeatedly proved, including in Russia. In the post-capitalist countries, as in the USSR, education acts not as a service that is sold in order to create specialists selling themselves, but as a manifestation of the care of older generations about the younger ones. Education is a process and result of the transfer and co-creation of universal and national cultural experience.

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## ФОРСАЙТ ЖӘНЕ БІЛІМ БЕРУДІ ДАМЫТУДА ИННОВАЦИЯНЫҢ АЛАТЫН РӨЛІ

**Аннотация.** Форсайт – білім және ғылым, экономика және өндіріс, әлеуметтік және мәдени дамудағы басымдықтарды өзгертудің әдістерінің жүйесі. Қазіргі Ресейде білім берудің болжауы оның құлдырауының құралы ретінде әрекет етеді: компартирлік корпорациялардың атынан жұмыс істейтін білім беру форситаторлары мен әдіскерлері үнемі отандық білім мен тәрбиелеу тәжірибесін ескермей қоймай, басым міндеттер жүйесін қалыптастырады. Сондай-ақ оны және оның идеалдарын бұзады. Адамның дамуы мен өзін-өзі жүзеге асыру адамның сатылу құндылығымен және оны корпорациялар үшін ең қолайлы жолмен пайдалануымен ауыстырылды. Зерттеудің мақсаты – мәдениет пен адамзатты тұтастай алғанда заманауи білім берудің проблемалары мен перспективаларын әртүрлі (пәндік/кәсіптік) салалардағы және көптеген ұрпақтар, қоғамдастықтардың өміріндегі адам өмірін оқыту және оқыту тәжірибесін біріктіретін теория және тәжірибе ретінде талдау. Зерттеудің негізі заманауи білім берудің алдын-ала болжау проблемаларын анықтау мақсатында теориялық және практикалық педагогикалық, психологиялық, социологиялық және басқа білім беру модельдері мен білім беруді дамыту туралы мәліметтерді теориялық талдау және интеграциялау болып табылады. Өмірдің жаңа түріне көшу кезіндегі басты өзгерістердің бірі – адам мен қоғамның «капитал» ретінде күрделі пайдалануы болып табылмайды, бірақ «капиталдың өзі» осы түрлерінің басымдықтарын пайдалану болып табылады.

**Түйін сөздер:** білім, динамикалық қабілет, форсайт, өзін-өзі тану, білім берудің интеграциялық моделі.

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## ФОРСАЙТ И РОЛЬ ИННОВАЦИЙ В РАЗВИТИИ ОБРАЗОВАНИЯ

**Аннотация.** Форсайт – система методов прогнозирования и преобразования трендов, аутсайдеров и приоритетов в сфере образования и науки, экономики и производства, социального и культурного развития. В современной России форсайт образования, однако, выступает средством его разрушения: теоретики и методологи образовательного форсайта, работая в интересах корпораций-компрадоров, последовательно выстраивают систему технологий и задач, которая не только игнорирует отечественный опыт образования и воспитания, но направлена на то, чтобы уничтожить его и его идеалы. Развитие и самореализация человека в нем заменены на более удобными для корпораций идеями приспособления и соперничества. Целью исследования является анализ проблем и перспектив современного образования как теории и практики, который сочетает в себе опыт обучения и воспитания человека на протяжении всей его жизни в различных (предметных/профессиональных) областях и ситуациях, накопленный многими поколениями, сообществами, культурой и человечеством в целом, в том числе анализ проблем современного образовательного форсайта. Основой исследования является теоретический анализ и интеграция данных по различным теоретическим и практическим педагогическим, психологическим, социологическим и другим моделям образования и разви-

тия образования с целью выявления проблем предвидения современного образования. Основной линией преобразований при переходе к новому образу жизни выступает не изощренная эксплуатация человека и общества как «капитала», но приоритет этих типов «капитала» самих по себе.

**Ключевые слова:** образование, динамические способности, предвидение, самореализация, интегративная модель образования.

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# LEGAL SYSTEM OF SCANDINAVIAN COUNTRIES

**Abstract.** The article presents a General description of the legal systems of the Scandinavian countries. The authors come to the conclusion that the common historical roots, the closest political, economic and cultural ties predetermined the existence of similar features in the legal systems of these States. At the same time, the Scandinavian legal systems have features typical of the Anglo-Saxon and Romano-German legal families. Legal systems in Scandinavian countries are divided into two groups. The first includes Denmark, Norway and Iceland, the right of which historically evolved on the basis of almost identical in their content compilations Danish and Norwegian law, implemented in the second half of the XVII century the second group includes Sweden and Finland. The analysis of modern legal systems of Scandinavian countries shows some commonality of Scandinavian and Romano-German law. First of all, it is manifested in the similarity of sources of legal regulation. In the Scandinavian countries, the law is the main source of law, and the courts formally cannot, by resolving a particular dispute, create legal norms. This is the most significant difference between the Nordic and common law.

**Keywords:** legal system, legal family, legislation, codification, judicial decision, judicial precedent, administrative precedent, conflicts, reforms, systematization.

For a number of reasons (colonial expansion, reception, ideological influence, and others) beyond the limits of Europe there are a number of national legal systems which, subject to certain reservations, may be relegated to the Romano-Germanic family. In this connection we consider Latin American law, the legal system of Japan, and also, although not directly within the Romano-Germanic family but close to it, Scandinavian law.

Despite the fact that the countries of Northern Europe - Sweden, Norway, Denmark, Iceland, and Finland - are geographically closer to the countries of the Romano-Germanic legal family than Latin America or Japan, nonetheless when relegating their law to a particular family significantly greater complexities arise and certain European writers deny they are affiliated to this family, asserting the originality and autonomy of Scandinavian law.

Determining the place of Scandinavian law within the principal legal families has been the subject of a long and lively discussion in the literature of comparative law. The majority of legal scholars consider Scandinavian law to be a species, albeit a special species, of the Romano-Germanic legal family or an individual sphere of the continental system of law. The fact is that the law of the countries of northern Europe widely uses the legal constructions and concepts of the Romano- Germanic legal family.

Scandinavian law adheres to the supremacy of lex. A norm of law in Scandinavian countries has a more abstract character than a norm of Anglo-American law. These peculiarities of the legal systems of Scandinavian countries also are used as decisive arguments in favor of relegating the law of the countries of northern Europe to the Romano-Germanic family.

Many comparativists insist upon ("intermediate" status of Scandinavian Law). Famous jurist Saidov A.Kh. places it between the Romano-Germanic legal family and the Common law [1]. Another legal scholar, Gubaidullin A.R., shares that position, referring to the fact that European continental law is more dogmatic in comparison with the legal systems of the Scandinavian countries, whereas Anglo-American law is more pragmatic [2, p. 21]. Yet other jurists, such as Denisenko V.V., Trikoz E.N., relegated the law

of the countries of northern Europe to a "third system" of Western Law. Just using notes that Nordic Law is closer to the Common law than to the Romano-Germanic legal family [3, p. 29]. Finally, certain legal scholars, for example, Verkhoturov D.A.,Verkhoturov A.A., consider disputes with regard to the classification of Scandinavian law to be utterly useless [4, p. 82].

Indeed, there are certain circumstances encouraging this type of conclusion. Roman law played an undoubted lesser role in the development of legal systems in the Scandinavian countries than in France and Germany. There are and were no codes in the northern States similar to the Code Civil in France or German civil code. Judicial practice plays a more significant role than in the countries of continental Europe.

Scandinavian law also cannot be relegated to the Anglo-American system of Common law. The historical development of legal systems of the northern countries proceeded wholly independently of English law. Scandinavian law has virtually no characteristic indicia of the Common law, as a rule, precedent, the technique of drawing distinctions, and the special role of procedural law.

At the same time, one cannot completely exclude nor underestimate the impact on Scandinavian law of the Common law and Romano-Germanic legal families. The impact was various during the course of history and manifested itself diversely with regard to branches of law, especially the civil law.

The forming of law in the Scandinavian countries followed an original path to a significant degree independent of the factors which operated in continental Europe. A relatively underdeveloped administrative hierarchy, the existence of free peasants, democratic forms of taking into account the interests of various strata of the population within the framework of a church congregation, which led to compromise means of settling social conflicts, and the constant adaptation of economic development to the conditions of a patriarchal society were characteristic of the historical development of the northern countries. Consequently, a centralized State arose early in the Scandinavian countries and a law unified on the scale of the country.

Commencing in the thirteenth century a consolidation of legislation was carried out in Sweden. During the mid-fourteenth century two laws were issued, one of which regulated relations with rural localities and the other in cities. These acts operated in Sweden for some 400 years. They were repeatedly changed and added to. The courts played an important role in the process of adapting those laws to new social conditions.

In the seventeenth century Swedish judicial practice accepted many constructions and principles of Roman law that had been received in European countries, as a consequence of which these Roman elements became an integral part of Swedish law and Swedish legal culture.

However, it should not be forgotten that the reception of Roman law affected the Scandinavian countries insignificantly. The principal consequence thereof was to establish closer links with the legal science of continental Europe than with England [5, p. 276].

The close linkages of the northern legal systems are to be explained by the fact that there always had been stable political, economic, and cultural ties historically between the Scandinavian countries. To be sure, a complete union of the three kingdoms - Denmark, Norway, and Sweden - had been merely temporary. It was formed through the Kalmar Union and existed from 1397 to 1523. But ties between Sweden and Finland and between Denmark, Norway, and Iceland proved to be much more stable and were retained for centuries.

During the twelfth and thirteenth centuries, Finland was conquered by Sweden and became part of the Swedish Empire until 1809, when Sweden, as a result of an unsuccessful war against Russia, was obliged to cede Finland to Russia. The Russian State granted significant autonomy to Finland as an autonomous Grand Princedom, and the Tsarist administration interfered little in its legal system. When Finland separated from Russia after the 1917 October Revolution and proclaimed its independence in 1918, its legal unity with Sweden was not materially weakened.

Denmark, Norway, and Iceland were under the centralized administration of the Danish royal family for more than four centuries, from the end of the fourteenth century, so that Danish law in essence operated also in Norway and Iceland. Denmark in 1814 ceded the territory of Norway to Sweden, but the Norwegians were able to achieve significant autonomy within the Swedish Empire and achieve full autonomy in 1906. Finally, in 1918 Iceland was proclaimed to be an independent State, although it remained under the authority of the Danish monarch until the end of the Second World War.

Old German law served as the general historical foundation of Scandinavian law. But in each northern country it developed, of course, its own local peculiarities. Beginning from the twelfth century the norms of Old German law were incorporated into numerous land and, later, city laws. The process of the combining and unification of law had commenced from the early acts of central power. During the fourteenth century in Sweden they had succeeded in combining the law of individual localities into a single land law, and the law of peoples into a single city law.

During the seventeenth and eighteenth centuries, the point of departure for forming the legal systems of the Scandinavian countries became two legislative acts, two digests: the first was the code of King Christian V (Danske Lov) adopted in Denmark in 1683 (its operation was extended in 1687 to Norway under the name (Norske Lov) and the second, the 1734 digest of laws of the Swedish State (Sverigesrikes lag).

The Danish Code consisted of the following sections:

1. on court procedure;                                    4. on maritime law;
2. on the church;                                         5. on the law of things and inheritance;
3. on secular estates, trade and family law;             6. on criminal law.

There were nine sections in the 1734 Swedish code:

1. on marriage;                                           5. on construction;
2. on parents and children;                               6. on trade;
3. on inheritance;                                        7. on crimes (criminal code);
4. on immoveable;                                         8. on execution ofjudicial decisions;
                                                          9. on court procedure and organization.

The digest consisted of 1300 paragraphs. Just as the Danish code, it was written in simple, clear vernacular language. In the interests of fuller specific regulation it rejected theoretical generalizations and the creation of concepts in that form in which they were introduced on the European continent in the eighteenth century by proponents of natural law.

It should be noted that the influence of Roman law on the 1734 Swedish code was insignificant. The authors of the code turned to the traditions of the old Swedish land and city law. This is evident in its structure, style, and language, and in the absence of generalizing norms.

These two digests also comprised the basis of the subsequent development of both branches of Scandinavian law - Danish and Swedish. The development occurred, of course, not in isolation from continental Europe. Rather they should be characterized as digests of legislation in force inasmuch as individual parts of these legislative acts are in no way linked between themselves. Moreover, they should not be deemed to be codes since they included merely an insignificant part of legislative provisions in force. Whereas the 1734 Swedish law performed a practical role, being an integrating factor of positive Swedish law, the Code of Christian V was transformed into a "museum exhibit", although formally it continues to operate.

The Swedish law of 1734, in force to this day, includes virtually no provisions adopted at the time. A number of sections were fully reworked: in 1920 a new section on marriage was adopted; in 1948, on court examination; in 1959 as a result of reworking the old section on inheritance, a section was included in the text under that name, the section on parents having been separated out in 1949; and in 1970 the section on immovable was completely revised. In the other sections there remained an insignificant number of early norms. The majority of the previous provisions were replaced by individual laws whose norms comprise the core of legal regulation of relations in the respective spheres [6, P.68].

At present legislation, no longer based on the system of 1734, has encompassed many branches of Swedish law: labor and joint- stock society law, legislation on the protection of industrial ownership and social security, environmental protection, and many sections of administrative law - in other words, primarily all those domains of legal regulation which have emerged as required by the socio-economic development of the country beginning from the mid-nineteenth century. Although the number of legislative prescriptions goes beyond the bounds of the 1734 code and significantly succeeded the systematized portion of Swedish legislation in accordance with that act, the practical importance of the 1734 law is still considerable.

This cannot be said of the Danish code, which remains basically an historical monument. Codified legislation does not represent a large part of Danish law in force. There, as in Norway, importance is attached to judicial practice as a source of law. The role of judicial practice is significant also in Sweden,

and this distinguishes Scandinavian law from the Romano-Germanic legal family, bringing it closer to some extent to the Common law.

The operation for many centuries of the 1734 Swedish code and the Danish-Norwegian code of 1683-1687 clearly shows that over the years a law is applied less and less and gradually ceases in general to function under the burden of precedential practice developing on the basis thereof. This law of societal development of legal development also applies to the 1804 FrenchCode Civil and the German civil code.

The historical and cultural community of the Scandinavian countries, the development of mutual trade and improvement of transport links, and the similarity of the Scandinavian languages led to close cooperation in the legislative sphere.

Scandinavian law is a unified system not only by virtue of the similarity of their historical paths in the development of law and the peculiarities of legislation and sources of law. A special role is played here by the fact that the Scandinavian countries cooperate closely in the domain of legislation. This process, commencing at the end of the nineteenth century, led to the emergence of a significant number of unified acts equally in force in all the participant States [7, p. 17].

The legal cooperation of the northern countries commenced from 1872, when Scandinavian jurists assembled in conference for the purpose of facilitating the further unification of Scandinavian law. From that time it became a characteristic feature of law-creation in the domain of marriage and family, contract, and delict, company, and intellectual property law. However, in the public-law sphere, criminal law and procedure, taxation, right of ownership lo an immoveable; that is, domains where various national traditions have greater weight, such cooperation is weaker.

In 1880 a uniform law on negotiable documents entered into force simultaneously in three countries: Sweden, Denmark, and Norway. In subsequent year's principal attention was devoted to the unification of trade law (laws on trademarks, trade registers, firms, cheques) and maritime law.

At the end of the nineteenth century even more courageous unification plans emerged. In 1899 Professor Larsen, of Denmark, proposed the unification of all private law with a view ultimately to have a uniform Scandinavian civil code. Although the governments of the Scandinavian States in principle agreed with that proposal, the creation of a draft uniform civil code was deferred and preference given to the unification of individual institutions of the law of ownership and the law of obligations. The result of these two efforts was a draft law on the sale of moveable property. It entered into force in Sweden and Denmark in 1906; in Norway in 1907 and in Iceland in 1922.

Yet another important legal result of cooperation among the Scandinavian countries was the law on contracts and other legal operations in the law of ownership and obligations. It entered into force in Sweden, Denmark, and Norway between 1915-1918 and, in Finland, in 1929. On the basis of the aforesaid and certain other laws, a uniform law of contract was in essence formed in the Scandinavian countries.

The Scandinavian States actively collaborated in the domain of family law, although here the differences between the legislation of the countries of the region was more pronounced than in the law of obligations. It should be noted that many questions under which reforms were conducted in continental Europe only after the Second World War in Scandinavian law were resolved much earlier. Suffice it to recall the equality of husband and wife, rejection of the principle of fault as the principal grounds for dissolution of marriage, equalization of the rights of children born out of wedlock.

Especially favorable conditions existed in the Scandinavian countries to achieve, if not unity, then a high level of harmonization of law. Their historical development and languages were so similar and cultural links so close that serious political differences did not exist between them and their populations, geographic positions, and economic levels of development were virtually identical. All those circumstances, and also the fact that law in those countries had developed along parallel paths, significantly cased legal cooperation. At present Scandinavian experience is considered to the model for respective cooperation at the general European level.

Unification and harmonization of the law of those countries does not, however, mean that their national legislative acts are completely identical. Scandinavian law is not a system of positive law, but rather a legal conception. Scandinavian jurists suggest that the Uppsala School of law is the basis of such a conception. The progenitors of the so-called Scandinavian legal realism were Axel Hegerstrom and his followers.

The community of legal systems of the Scandinavian countries is illustrated by using as an example a book introducing Danish law to foreign jurists [7, p. 18]. That book consists of five parts. The first part is devoted to the legal system - history, sources, legal organizations, legal education, and the profession of jurist. Part two treats branches and institutions of private law, including family, obligations, commercial, air, private international law, ownership, insurance, and juridical persons. The third part is devoted to public law, including constitutional, administrative, criminal-judicial, tax (instruments of planning, and so on). Part four is given to labor law, and the last, part five, to legal philosophy.

At present a unifying influence on the legal systems of the Scandinavian countries is exerted by their membership in such European structures at the Council of Europe, European Union, OCSE, and the Organization for Economic Cooperation and Development. Thus, although the legal systems of the Scandinavian countries as a whole are close to the Romano-Germanic legal family, they have material specific features.

Often the legal systems of the Scandinavian countries are divided into two groups. The first includes Denmark, Norway, and Iceland, whose law historically has developed on the basis of virtually identical compilations of Danish and Norwegian law effectuated during the second half of the seventeenth century. Sweden and Finland are in the second group, where in 1734 the Law of the Swedish State was introduced. In accordance with the 1809 Friedrichsham Peace Treaty which ended die Russo-Swedish Warof 1808-1809, Sweden lost Finland. Nonetheless, the influence of Swedish law in that country has remained significant to this day.

The interpenetration of the legal systems of both groups is obvious. This is to be explained by the following reasons: extended mutual historical links and ethnic similarities of the States; virtually complete absence in all these countries of the reception of Roman law, which exerted a material influence on the development of the legal systems of the continental European countries; the absence of codes systematizing individual branches of law, as was done in the Romano-Germanic legal family; the process of unification of law under way in the countries of Scandinavia for more than a century.

An analysis of the modern Scandinavian legal systems shows a certain community of Scandinavian and Romano-Germanic law. It is manifest mostly in the similarity of the sources of legal regulation. In the Scandinavian countrieslex is the principal source of law. The courts may not, when resolving a specific dispute, create legal norms. On this question a more material distinction is discovered between the systems of Scandinavian and Common law.

It should be acknowledged at the same time that the role of the court in Scandinavian countries is traditionally rather significant. The functions of a judge have never come down to exclusively the application of norms of legislation. The judge in Scandinavian countries possesses great freedom in the interpretation of provisions contained in laws and contracts.

In Sweden the courts of lower instances in virtually all situations follow the decisions adopted by superior judicial agencies, above all decisions of the Supreme Court, deeming them to be an authoritative exposition of law in force.

The role of judicial practice in recent years has grown noticeably. According to a Swedish law of 1971, the Supreme Court considers those cases which are of interest from the standpoint of the establishment of certain orientations of law enforcement activity. Thus, the decisions of the Supreme Court are binding upon the entire judicial system. Ultimately, the growing practice of including indefinite norms in laws has led to an expansion of the discretionary powers of judges. In Sweden this has been called "general reservations". Swedish jurists themselves assess the development of the legislation technique of "general reservations" as a "variety of the delegation of legislative power to judicial agencies". This trend can be seen in the evolution of the system of sources in all countries of the Romano-Germanic family.

Scandinavian law uses general legal concepts of Romano-Germanic law. The system of training legal personnel is similar to the system of higher legal education adopted in continental Europe. All this is a result of the influence of Roman, and then of French and German Law.

During the early decades of the nineteenth century the French legal system exerted strong influence on the law of the countries of northern Europe. A draft civil code using the model of the Code Napoleon was prepared in Sweden in 1826, but it was not adopted.

At the end of the nineteenth and beginning of the twentieth centuries, the need to modernize law forced Scandinavian jurists to turn to the experience of Germany. Virtually all Swedish professors of law received their training in this period at German universities. However, the theoretical views of the Pandects were not accepted by Scandinavian jurists. The Scandinavian countries rejected the codification of civil law along the lines of the German civil code because the last contained a large number of abstract concepts alien to the traditional functional approach to law of Scandinavian jurists. Rather a sociological orientation came to predominate, and the theory of social functions developed principally by French jurists received support.

A number of distinctive features of Scandinavian law distinguish it from the Romano-Germanic family. First, Scandinavian law does not know the division of law into public and private, nor into branches. In this it is similar to the legal family of the Common law. Second, Scandinavian law is not codified. Formally in these countries laws continue to be in force which initially encompassed all normative material but for the aforesaid reasons cannot be identified with codifications as in the countries of the Romano-Germanic legal family [7, p. 19].

Certain elements of the legal systems of Scandinavian countries are closer to the Common law system than to the Romano-Germanic legal family. In particular, the legislator in Scandinavian countries avoided for a long time to use norms with a high level of generalization. Civil and criminal procedure is regulated there by the same rules.

Scandinavian and Common law are united in their pragmatic approach to law, legal concepts, and constructions. This last circumstance to a certain degree also explains the success which the American conceptions of legal realism enjoyed in Scandinavian countries during the Second World War. I lie growing influence of American law also was manifest in recent borrowings of individual legal constructions and concepts from American law, for example, in the sphere of delictual responsibility, insurance, and others. And the methods of teaching legal disciplines in the universities of Scandinavia remind one of the American system of legal education.

In Swedish law are most fully manifested the features peculiar to Scandinavian law as a whole: first, Sweden was the initiator of work to create unified legislativeacts; second, Sweden always was the first of the countries to itself introduce uniform legislative acts; third, the very content of such acts was based on Swedish legislation.

Thus, there exists a significant influence of Sweden on the formation of the sources of Scandinavian law. For example, the draft law of the sale of goods was prepared at the initiative of the Swedish government in order to replace analogous laws in Denmark, Norway, and Finland.

Lex is the principal source of law in Sweden. Despite the fact that Swedish legislation today is an aggregate of detailed norms, the majority of which are unsystematised, many jurists in Sweden insist upon the supremacy oflex in the law of Sweden. Thus lawyers divides the sources of law intolex and other normative acts, acts of interpretation of law, and acts of law enforcement. They defineslexas a written norm of law relating to a certain legal order.

The Swedish legislator never aspired to work out determined legal principles applicable to each branch of law. This has led to the number of norms of a general character being extremely insignificant. At present, a contradictory orientation in Swedish law-creation is to be noted: from special legal norms directed towards regulating a specific vital situation to so-called elastic norms. The idea comes down to endowing judicial and other State agencies with broad freedom of discretion to resolve legal problems encompassed by those prescriptions. The discretionary powers in such instances are virtually unlimited since the respective legal norms also refer to such categories as "reasonableness", "justness", "good faith business practice", and others.

The preparatory materials acquire too much significance in connection with the unspecificity and ambiguity of the norms of the law itself, and legal scholars see in this an objective trend of the development of law as a whole.

Swedish legislation is basically uncodified. The sole official means of systematization is the successive numeration of the acts when they are officially published [7, p. 20].

The final results of the legislative process - laws and decrees - are published in the official bulletin of Swedish legislation founded in 1824. When citing the texts of laws, reference is made to the year and issue number of the bulletin.

Custom in Swedish law is an "unwritten norm of law" retaining its operation in social practice. The domain of the application of custom in Sweden is rather limited: because of the supremacy oflex, custom is relegated to a secondary role. This is connected with the fact that a large part of social relations are regulated by legislative means. However, in those domains such as trade and navigation, customs play a large role and in certain instances (few, to be sure) custom even has priority overlex. For example, in the law on sale and barter of moveable things it is specified that the norms of that law are subject to application unless otherwise provided by a contract or does not arise from a trade custom or usage.

Customs and usages operating in a determined Swedish city, port, or environs are summarized and published by local chambers of commerce, which significantly facilitates the possibility of their application.

Yet another source of law in Sweden is judicial practice. Judges in essence engage in norm-creation in the guise of an interpretation of a law. In Swedish legal doctrine the idea is clearly expressed that a decision of the highest judicial instances is nothing other than the decision of a specific case. Courts of first instance reluctantly change the practice which has formed of deciding determined cases. They in all instances practically are guided by decisions adopted by superior judicial instances in analogous cases.

Swedish courts of first instance fulfill various legal and administrative actions which in other countries are effectuated by other State institutions, for example: regulate transactions with regard to the sale and pledge of land plots, register wills and draw up the obligatory inventory of property of deceased persons, and effectuate supervision over trusteeship and the management of the property of a minor.

In Sweden six appellate courts exist (by territories), the court of last instance is the Supreme Court of Sweden. Special courts also operate, for example, the Supreme Administrative Court, and the court for labor conflicts.

The growing role of judicial practice observed in recent decades is without question linked with the inability of legislation to react flexibly and rapidly to the dynamics of social development. Moreover, by means of the extensive use of "general reservations" in laws the legislator intentionally provides the possibility to judicial agencies to effectuate law-creation activity.

Swedish jurists, however, allot to courts merely the role of interpreters of law and to a much lesser degree that of the creators of precedents. In Sweden there is no concept of precedent in the form in which it exists in English law. Nonetheless, in accordance with the 1971 reform the Supreme Court of Sweden was indirectly endowed with a law-creation function. The highest judicial instance was given the right to consider cases of interest on the plane of establishing specific orientations in law enforcement activity.

A legal norm created by judicial practice has no authority as a norm oflex. It is rather unstable, for at any moment it may be discarded or vacated in connection with the consideration of a new case. A norm created by judicial practice exists and is applied only to the extent that each judge considers it to be a good one.

In the conclusion we would like to note, that Swedish legal doctrine to a certain extent gravitates towards introducing the rules of precedent but all the same takes the view that the role of a court is to clarify legal norms adopted by legislative means, by way of interpretation. One of the dominant trends in the development of sources of law is the growing importance of normative legal acts, which at least correspond to the nature of law, the properties thereof, ensuring the purposeful dynamic development of the particular legal system and which are at the same time the most advisable and convenient in practice. The dynamics of Swedish sources of law testify to this. The Baltic States are all actively gravitating toward the sphere of influence of Scandinavian law. Integration processes are growing in the economic and political domains. Common inter-State structures are emerging. Legal assistance of Scandinavian countries is becoming more noticeable and finds its reflection in the national legislation of the Baltic States.

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**СКАНДИНАВИЯЛЫҚ МЕМЛЕКЕТТЕРДІҢ ҚҰҚЫҚТЫҚ ЖҮЙЕСІНДЕГІ ЖАЛПЫ ЖӘНЕ ЕРЕКШЕ**

**Аннотация.** Мақалада Скандинавия елдерінің құқықтық жүйелерінің жалпы сипаттамасы берілген. Авторлар ортақ тарихи тамырлары, тығыз саяси, экономикалық және мәдени байланыстар осы мемлекеттердің құқықтық жүйелеріндегі ұқсас белгілердің болуын алдын ала анықтады деген қорытындыға келеді. Сонымен қатар скандинавалық құқықтық жүйелер англосаксондық және романо-Герман құқықтық жануя-

ларға тән жалпы қасиеттерге ие. Скандинавиялық елдердегі құқықтық жүйелер екі топқа бөлінеді. Біріншісі XVII ғасырдың екінші жартысында жүзеге асырылған Дат және Норвег құқығының мазмұны жағынан бірдей компиляцияларының негізінде тарихи дамыған Данияны, Норвегияны және Исландияны қамтиды. Скандинавиялық елдердің қазіргі құқықтық жүйелерін талдау скандинавиялық және романо-Герман құқығының кейбір қауымдастығын көрсетеді. Ең алдымен, ол құқықтық реттеу көздерінің ұқсастығында көрінеді. Скандинавия елдерінде заң құқықтың негізгі көзі болып табылады, ал соттар нақты дауды шеше отырып, құқықтық нормаларды құра алмайды. Бұл мәселеде скандинавиялық және жалпы құқық жүйелері арасында айтарлықтай айырмашылық бар.

**Түйін сөздер:** құқықтық жүйе, құқықтық жануя, заңнама, кодификация, сот шешімі, сот прецеденті, әкімшілік прецедент, коллизиялар, реформалар, жүйелеу.

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## ОБЩЕЕ И ОСОБЕННОЕ В ПРАВОВЫХ СИСТЕМАХ СКАНДИНАВСКИХ ГОСУДАРСТВ

**Аннотация.** В статье представлена общая характеристика правовых систем скандинавских стран. Авторы приходят к выводу, что общие исторические корни, теснейшие политические, экономические и культурные связи предопределили наличие схожих черт в правовых системах данных государств. В то же время скандинавские правовые системы имеют черты, характерные для англосаксонской и романо-германской правовых семей. Правовые системы в скандинавских странах принято делить на две группы. Первая включает Данию, Норвегию и Исландию, право которых исторически развивалось на основе почти идентичных по своему содержанию компиляций датского и норвежского права, осуществленных во второй половине XVII в. Во вторую группу входят Швеция и Финляндия. Анализ современных правовых систем скандинавских стран показывает некоторую общность скандинавского и романо-германского права. Прежде всего, она проявляется в сходстве источников правового регулирования. В скандинавских странах закон является основным источником права, а суды формально не могут, разрешая конкретный спор, создавать правовые нормы. В этом вопросе обнаруживается наиболее существенное различие между системами скандинавского и общего права.

**Ключевые слова:** правовая система, правовая семья, законодательство, кодификация, судебное решение, судебный прецедент, административный прецедент, коллизии, реформы, систематизация.

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# POLITICAL TECHNOLOGIES OF LEGAL CULTURE EDUCATION

**Abstract.** The article deals with the issues of political technologies of education of legal culture of the population, which have not yet been studied in political science. The article examines in more detail the forms, methods, techniques, methods and means of political technologies of education of legal culture of Kazakh people.

On the basis of the conducted studies, it was concluded that the education of the legal culture of the population is carried out in Kazakhstan by: state bodies; special bodies ensuring the rule of law (prosecutor's office, court, bodies of the ministries of justice, internal affairs, national security committee); party and public organizations; labor collectives; educational bodies, higher and secondary educational institutions, mass media and propaganda, creative unions and institutions of culture and art. At the same time, it should be said that political technologies, forms, methods, techniques and means of education of the legal culture of the population of Kazakhstan are mobile, they change depending on the political situation and changes in specific conditions and tasks, are improved with the advent of new political technologies. At the same time, the article focuses on the discussion issues.

**Keywords:** politics, law, culture, political technologies, education, state, society, population, person, political and legal work, value, law, order, rights, freedom.

First of all, we should say that the political technology of education of the legal culture is still insufficiently explored in social-political science. Naturally, it is impossible to cover all the issues of this problem in one article. Therefore, we will consider only some issues of political technologies of education of the legal culture of the Kazakh population on the materials of Kazakhstan, which have not yet been studied in political science.

Education of legal culture of the population of both Kazakhstan society and the world community is carried out by certain political technologies. Political technologies of education of legal culture of the population are a set of forms, techniques, methods, means of influence and impact on the individual in order to develop its legal culture and legal behavior.

In this regard, it should be emphasized that there is a need to search for new political technologies of legal education, which would best meet not only the needs of education of legal culture of every citizen of Kazakhstan, but also a strong scientific worldview, integrity, high legal policy, culture, responsible attitude to business, understanding of the place and role of each person, people in the multi-ethnic, multi-confessional Kazakh society, etc.It should be said that there is no ideological, political and legal vacuum in Kazakhstan [1]. The social and legal life of Kazakhstan always gives rise to new political problems. Some of them are solved, new ones appear. It's natural. And if a citizen of Kazakhstan does not find an answer to them in our policy, he tries to find an answer himself, or turn to other ideological, political and legal postulates. This circumstance cannot but be taken into account by the bearers of education of the legal culture of the population. Spontaneity in this case is fraught with negative consequences for Kazakhstan.

We can otherwise conduct legal work than with the available human "material", which is nurtured in the conditions of stagnation of social and political relations, gorbachev-kolba policy and therefore in a certain part is impregnated with distorted ideas about the ratio of moral, legal and political norms, national and universal values and interests. Our ideas about the true essence of moral, legal and political norms, national and universal values have been devalued for many years, and indifference and treasury in the legal process acted destructively on the perception of progressive ideals (including legal) and commitment to them. The rate of coverage of the legal education impact on as many people as possible at the same time also worked negatively. As a result, the individual began to disappear from the attention of educators.

Meanwhile, any society, including Kazakhstan, is a set of individuals. But this aggregate is not mechanical, but dialectical. Therefore, socio-political relations and the individual are so interconnected that they are unthinkable without each other. Their interpenetration is the key to understanding of the political,legal and ideological problems of political science. At the same time, the personal responsibility of the executive power [2] and the civil responsibility of each citizen of Kazakhstan to the society are enhanced.

It should be said that in the conditions of reformation, modernization of Kazakhstan's society there is a need to make full use of the right-educational potential of history and fiction, which are written on legal topics. It's difficult. Its result largely depends on the position taken by the interpreters of historical, political and legal knowledge.The conscious distortion of the history of legal and state policy, characteristic of the times of the cult of personality, stagnation and Gorbachev-kolba period, raised the problem of the reader's trust in the word of the writer, scientist (historian, jurist, political scientist) - the bearers of moral, political and legal values and cultures. But it is formed on the basis of the reliability of the reflected historical and legal experience of their own people and other nationalities, entering into communication with them, the experience of political and legal interaction of the population, etc, in their works.

Half-truths, attempts to circumvent the sharp political and legal angles undermine the credibility of the printed word, reduce its legal potential. Only sincerity, scientific character, honest view on political and legal things, constant objective adherence to the truth, no matter how bitter it may be, give rise to a sense of Kazakh involvement in the fate of his country and a willingness to eradicate violations of the law, exclude legal nihilism, encourage every man to be useful to his country in any conditions.

It is known that Abay's thoughts were filled with pain for the fate of his people, homeland, thoughts about the deadening mustiness of tribal law [3], inter-tribal enmity and colonialist policy of tsarist Russia, hindering the development of the Kazakh people and its culture of legal consciousness. Abay, fighting for justice, law and order, bitterly said: "Ignorance was absorbed into the meat and bones of the people with mother's milk and ate its humanity» [4]. The degree of progress of the Kazakh society to the implementation of the tasks, including the policy of legal culture, will largely depend on how we will be able to part with ignorance, tribal, stagnant, Gorbachev-kolba phenomena, including our morality, law, policy, subjected to serious "temptation" in the years of independence, how we will be able to overcome the differences between the noble political-right postulates of morality and their differentiated content of the stagnant, Gorbachev-kolba period.

It should be said that the formation and improvement of the policy of legal culture of the Republic of Kazakhstan, which includes the types, directions, forms, methods and means of its education is not diversified. When choosing the forms, methods and means of education of the legal culture of the population in the conditions of modernization of the Kazakh society, the experience accumulated over the past period on the basis of a certain continuity should be taken into account.

It should be noted that the means of education of the legal culture of the population of Kazakhstan are printed and oral propaganda, radio and television programs, legal training, artistic means of legal influence*.

One of the most important places among the most popular forms-technologies of legal propaganda of Kazakhstan belongs to the press.

The most common areas of promotion of legal knowledge through the Kazakh press are: promotion of legislation, coverage of the activities of legal, state bodies and public organizations working to strengthen the rule of law, legal and political culture, information on the status of the law, exchange of experience of legal work, legal and historical and political chronicle, promotion of legal, socio-political literature, "politics and law", "law and morality" , etc.

Great right-educational, political importance lies on the materials published in newspapers, magazines, explaining Kazakhstan's laws and legal, state policy, legal culture.

To this end, many press bodies of the Republic have introduced special headings: "Legal advice", "Answers to readers 'questions", "Politics and law", "Law and morality", etc.

An effective means of education of the legal culture of the Kazakh population are stories, essays, articles showing the activities of law enforcement, government agencies, their complex, difficult and noble work.

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*If we consider legal propaganda and training in terms of organizational forms of communication, they will act as separate political technologies of education of the legal culture of the population.

Great right-educational, political importance is in the information reports about the state policy and the offenses committed, the progress of their investigation, trial, etc.

Newspapers and journals such as «Казахстанская правда», «Егемен Қазақстан», «Юридическая газета», «Экономика», «Мысль», «Ақиқат», «Заң» and «Фемида» purposefully and constantly conduct promotion of legal, political knowledge. Suffice it to say that only the central and Almaty newspapers placed in 2014 more than a thousand publications on legal topics, and the total circulation of books on state and law increased in 2009-2011 almost 1.5 times.

The local press of Kazakhstan regularly publishes interesting law-educational materials. For example, Almaty regional newspaper «Жетісу» undertheheading «On guard of law» monthly publishes materials explaining the content of Kazakhstan's laws, legal culture and legal policy, summarizing and disseminating the best experience in the promotion of legal, political knowledge, providing specific assistance to organizations and advocates in the legal and educational work.

Radio and TV programs are very popular among the Kazakh population, for example: «Человек и закон», «Этого могло и не быть», which contribute to increasing the authority of law enforcement, state bodies, legal professions and educate the population a sense of respect for Kazakhstan's laws and rights. In recent years, the production of radio and television magazines on legal policy and legal culture has also increased.

Writers, composers, masters of the stage make a certain contribution to the education of the legal culture of the citizens of Kazakhstan [5]. There were many stories, essays, plays and movies, telling about the noble work of lawyers, politicians, affecting the issues of law, politics and law enforcement.

At the same time, it should be said that the great opportunities of the press, radio and television of Kazakhstan in the education of the legal culture of the population are not fully used. A significant draw-back is the one-sidedness in the coverage of legal topics. The materials published in the Kazakh press are mainly devoted to criminal law problems, at the same time, very little space is given to the explanation of civil, labor, family law. The multifaceted activities of the court, prosecutor's office, Ministry of internal Affairs and other legal and public services of Kazakhstan are poorly covered. In the radio and television of the Republic of the rarely practiced forms, such as attorney referral agency, legal, radio and television universities. It is thought that the system of information of the population of Kazakhstan on the current legislation, newly adopted laws and publicity of policy of legal culture requires the best organization.

In this regard, we would like to focus on one political issue: the right-educational role of publicity policy of legal culture of Kazakhstan.

The phrase "publicity of the policy of legal culture of the Republic of Kazakhstan" as a political concept is rarely used in the scientific literature. Meanwhile, in terms of updating and upgrading it more and more acquires its civil, political and legal value. Not being synonymous with openness and transparency, publicity of the policy of legal culture, however, is in close connection with them. This is an urgent need of the XXI century. The faster it is implemented and the wider its public recognition, the more significant will be its legal result.

Publicity of the policy of legal culture of the Republic of Kazakhstan presupposes openness and transparency. Being an indispensable condition for the effectiveness of openness, transparency, at the same time it acts as a kind of criterion of legal culture and democratization of Kazakhstan's society. Due to the public nature of the policy of legal culture of the Kazakh state, the most important decisions involve un-hindered discussion, accompanied by freedom of opinion, criticism and suggestions on specific issues of legal culture policy. Publicity of the policy of legal culture of the Republic of Kazakhstan is the enemy of social and political demagogy and political, legal formalism. It involves a state policy of legal culture, the formation of which would be made alsoby the population of Kazakhstan. To implement its political and legal plans in the interests of the people, the state needs a clear understanding of the position of Kazakhstan and the practical implementation of the mental, emotional and material potential of the peoples themselves. Without publicity of political, legal actions of this understanding, as well as reliable knowledge from public opinion on the degree of readiness of the population to contribute to the whole-Kazakhstan dealis an unattainable result. Publicity implies, along with the awareness of the population about the state of socio-political, legal relations, and feedback, allowing to judge the degree of participation of the population in the alleged public-state and legal acts and the psychological situation in which they will be

implemented. That is why the publicity of the policy of legal culture of Kazakhstan is an indispensable condition for the further democratization of socio-political, legal relations and, accordingly, the education of legal culture of the population. At the same time, education is a process of "changing the human psyche, its mental processes and mental formations" [6].

Visual agitation can be successfully used as one of the political technologies, i.e. means of education of legal culture of Kazakhstan. Stands, posters, slogans, diagrams, photovitrins promoting Kazakhstan's laws, rights, state and legal policy have a great impact on the education of the legal culture of the population. Satirical Newspapers and other materials that criticized specific violators, labour, government and social studies, have a great right educational, political significance.

It should be said that the widespread use of the means of printed propaganda of Kazakhstan in the education of the legal culture of the population does not reduce the importance of oral legal, political propaganda. Whatever new technical means of information may come into operation, they can not replace the living word, which has a number of advantages compared to printed propaganda. Skillfully using it, the propagandist can alter and affect the most subtle shades of thoughts and feelings of Kazakhstanis, help them to see the unusual in the usual; in the already known – something new, etc.

Oral political means of promoting legal knowledge among the population of Kazakhstan are lectures, talks, question and answer evenings, quizzes, seminars, legal lectures, reports, conferences, meetings on strengthening the rule of law, legal, moral and political culture, discussions at gatherings, in groups, at meetings of commissions on the behavior and actions of individual offenders, as well as some other similar activities bearing the right-educational and moral-political burden.

If means of education of legal culture serve as channels of transfer of the ideological and political content of the right educational work, forms of education of legal culture act as a way of external expression of the contents and appear, first of all, as concrete actions or as types of concrete actions for education of legal culture of the population in system of political and legal processes.

In modern conditions, the following organizational forms of education of legal culture of the population are: legal/political propaganda, legal/political education and individual law-educational work.

The most common political form of legal propaganda in Kazakhstan is lecture. This is the most massive way to communicate with people. In recent years, there have been significant changes in the lecture propaganda, its professional level increased. Only in 2013-2014 in the country lecturers-lawyers, political scientists, sociologists, philosophers read about ten thousand lectures on political and legal topics. So, in recent years, in the practice of legal lecturers, a prominent place is occupied by regular collective outputs with lectures to working groups, student audiences, villages. Such collective campaigns of legal lecturers are practiced in many parts of the country. The population is notified in advance by local radio, through posters about the day and time of processing. Judges, prosecutors, lawyers and police officers of Kazakhstan act on the appointed days in the shops of factories, construction sites, brigades, houses of culture, workers, student dormitories on a variety of legal, moral and political issues.

It should be noted that great importance is also attached to the organization of lectures and thematic cycle lectures. This form allows to convey to the population a certain system of political and legal knowledge.

Legal education is one of the most reliable and systematic forms of education of the legal culture of the Kazakh population [7].

Currently, the legal education of Kazakhstan includes:

- legal education, consisting of training and special training of higher and secondary qualification for science, state and social apparatus;

- the system of legal training of other categories of employees of state institutions related to standard-setting and law enforcement work, which does not require, however, a special broad legal education;

- the system of forms of legal education of the masses of the population, primarily young people.

Legal education in our country is carried out mainly by institutions of higher education (law faculties of universities, law schools and the Academy of the Ministry of internal Affairs of the Republic of Kazakhstan) and special secondary educational institutions (police schools, secondary law schools, etc.).

However, the problem of legal training is still acute, as until now there is a shortage of highly qualified lawyers.

In this regard, there is a politically urgent problem – it is an urgent need to improve the quality of training of specialists of higher and secondary special legal qualification[8]. It is also advisable to introduce specialized secondary legal education in the country for the training of court clerks, bailiffs, legal advisers of enterprises, etc. This will create a reserve for admission to higher legal education institutions from among persons with experience in legal work, which would ultimately improve the quality of training of highly qualified lawyers.

Legal training of other categories of workers, in particular, state and economic personnel, is carried out in the system of political education, on permanent courses for retraining, etc.

In this regard, it should be said that in the curricula and programs of permanent courses on retraining of state, economic and other workers it is necessary to provide for the study of the basics of legislation and law. To organize lectures and special seminars on legal topics in urban and district institutions, as well as to pay more attention to these issues in other forms of political and economic education.

Legal training of Kazakh youth is carried out through the use of various systematic forms of propaganda.

In recent years, an optional course on the basics of Kazakhstan's legislation has been recommended for high school students. Experimental teaching of the basics of Kazakhstan law is conducted in high school in some schools of Kazakhstan. Today, teaching of the basics of Kazakhstan law in vocational colleges has been introduced. Promotion of Kazakhstan's laws in universities, secondary special educational institutions is improving.

Such forms as talks and lectures, meetings with practitioners of legal and state bodies, disputes on moral and legal, political and legal topics, legal competitions, question and answer evenings, clubs, schools "young lawyer" are also held among students in order to promote legal knowledge. Besides, "conversations by all means should be accompanied by supervision over how the basic provisions and requirements are practically acquired by pupils as far as they are accepted to use" [9].

Positive experience on education of legal culture of pupils of comprehensive schools is available in the city of Almaty where this work for many years is carried out systematically and systematically. Its success is facilitated by the close business cooperation of judges, lawyers, prosecutors and the Department of internal Affairs of the city with the local education authorities and directly with the Directors and teachers of schools.

All conversations on state and law issues are perceived by young people vividly and with great interest, as evidenced by the many questions asked. This form of law-educational work in the last three years has covered more than four thousand high school students of secondary schools of the city. At the end of the school year in the Assembly halls of the school conducted final interviews on the basics of law. These activities, together with other educational measures, contribute, in the opinion of school principals and teachers, to a significant improvement in school discipline, to a reduction in the facts of tactless and rude attitude of students to teachers and to each other, to a reduction in improper behavior of students in public places.

When it comes to an individual as an object of education of legal culture, we must not forget that a person is an individual [10] and at the same time a member of society, the workforce. This primarily explains the need for unity and difference between individual and mass forms of legal culture education.

The analysis shows that the individual approach makes it possible to implement and specify the impact on the personality of the citizen of Kazakhstan, allows you to choose the most effective forms of education of legal culture and the formation of a legal person [11].

It should be said that individual work is based on the knowledge of the environment in which a person is located, the living conditions in the family, the team, the level of education, legal and moral-political consciousness, legal and political culture.

In practice, various forms of individual educational work have been developed and successfully applied in the labor and educational collectives of Kazakhstan. So, for the last time in many businesses and organizations are expanding the mentoring of experienced workers over young people and the patronage of persons at risk of delinquency.

An interesting form of individual work in Kazakhstan are reports of workers and employees at meetings or commissions, where it is not only about the performance of production tasks, but also about the observance of law and order, labor discipline, behavior in everyday life, in public places, etc.

It should also be noted that the work of the police and the public with difficult adolescents, the staff of correctional labour colonies with prisoners, conversations of prosecutors, judicial bodies with offenders and criminals, etc., is a political form of individual legal education.

In conclusion, it should be said that political technologies - forms, methods, techniques and means of education of the legal culture of the population of Kazakhstan are mobile, they change depending on the political situation and changes in specific conditions and tasks, are improved with the advent of new political technologies. At the same time, education of legal culture of Kazakh youth has its own characteristics. Today it is important that the solution of the urgent problems of political technologies of education of the legal culture of the population of the Republic of Kazakhstan as a whole contributed to the unification and consolidation of a multi-ethnic, multi-religious society into a friendly family and the progress of the democratic, legal and social state, which owns the future.

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## ҚҰҚЫҚТЫҚ МӘДЕНИЕТТІ ТӘРБИЕЛЕУДІҢ САЯСИ ТЕХНОЛОГИЯЛАРЫ

**Аннотация.** Мақалада саяси ғылымда әлі-зерттелмеген Қазақстан материалында халықтың құқықтық мәдениетін тәрбиелеудің саяси технология мәселелері қарастырылады. Қазақстандық адамдардың құқықтық мәдениетін тәрбилеудің нысандарын, әдістерін, тәсілдерін, амалдарын және құралдары-саяси технология-лары нақтылай зерттеледі.

Жүргізілген зерттеулер негізінде келесі қорытынды жасалды, бұл халықты құқықтық мәдениетке тәр-биелеу Қазақстанда жүзеге асырады: мемлекеттік органдар; арнайы органдар қамтамасыз ететін заңдылық және құқықтық тәртіп (прокуратура, сот, әділет Министрлік органдары, ішкі істер Министрліктерінің, ұлт-тық қауіпсіздік Комитеті); партиялық және қоғамдық ұйымдар; еңбек ұжымдары; білім беру органдары, жо-ғары және орта оқу орындары, бұқаралық ақпарат құралдары және насихаттау, шығармашылық одақтар мен мәдениет және өнер мекемелері. Бұл ретте айта кету керек, саяси технология – формалары, әдістері, тәсіл-дері, техникасы және тәрбиелеу құралдары Қазақстан халықының құқықтық мәдениетін тірбиелеу жыл-жымалы, олар саяси жағдайға және нақты жағдайлар мен міндеттерінің өзгеруіне байланысты, жаңа саяси технологиялардың пайда болуымен жетіледі. Сонымен қатар, мақалада дискуссиялық мәселелерге көңіл бөлінген.

**Түйін сөздер:** саясат, құқық, мәдениет, саяси технологиялар, тәрбие, білім беру, мемлекет, қоғам, ха-лық, адам, саяси-құқық тәрбие жұмысы, құндылық, заң, құқық тәртібі, құқықтары, бостандық.

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## ПОЛИТИЧЕСКИЕ ТЕХНОЛОГИИ ВОСПИТАНИЯ ПРАВОВОЙ КУЛЬТУРЫ

**Аннотация.** В статье на материалах Казахстана рассматриваются вопросы политических технологий воспитания правовой культуры населения, которые еще неизучены в политической науке. В статье более подробно исследуются формы, методы, приемы, способы и средства-политических технологий воспитания правовой культуры казахстанских людей.

На основании проведенных исследований был сделан вывод о том, что воспитание правовой культуры населения осуществляют в Казахстане: государственные органы; специальные органы, обеспечивающие законность и правопорядок (прокуратура, суд, органы министерств юстиции, внутренних дел, Комитет национальной безопасности); партийные и общественные организации; трудовые коллективы; органы обра-зования, высшие и средние учебные заведения, средства массовой информации и пропаганды, творческие союзы и учреждения культуры и искусства. При этом следует сказать, что политические технологии – формы, методы, приемы, способы, техники и средства воспитания правовой культуры населения Казахстана подвижны, они изменяются в зависимости от политической ситуации и от изменения конкретных условий и

задач, совершенствуются с появлением новых политических технологий. Вместе с тем, в статье уделено внимание и дискуссионным вопросам.

**Ключевые слова:** политика, право, культура, политические технологии, воспитание, образование, государство, общество, население, человек, политико-правовоспитательная работа, ценность, закон, правопорядок, права, свобода.

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# EFFICIENCY OF INCLUSION OF BIRD'S-FOOT TREFOIL (LOTUS CORNICULATUS L.) IN PASTURABLE HERBAGES ON THE IRRIGATED SITE OF THE FOOTHILL ZONE OF THE SOUTHEAST OF KAZAKHSTAN

**Abstract.** Results of researches of pasturable use of various bean and cereals grass mixture with participation of bird's-foot trefoil are given in article (Lotus corniculatus L.) in the conditions of irrigation of a foothill zone of the southeast of Kazakhstan. Inclusion in structure of a grass mixture of bird's-foot trefoil increases productive longevity of pasturable herbage and preservation as a part of the pasturable mass of bean herbs. The productivity of pasturable weight during 6 years' use by herbage fluctuates within 256.2-467.1 c/hectare and contents bean in structure at the level of 28.7-30.5%. For the fifth and sixth years the share bean in the mass of a harvest was formed at the expense of bird's-foot trefoil. In structure of a harvest from third year of use there is a decrease in a share of a lucerne and a cock's head and increase in a share of bird's-foot trefoil. This bean grass proved to be as perspective for creation of long cultural pastures on irrigation. At cultivation of bean and cereals grass mixture the structure of the soil significantly improves.

**Key words:** cultural pastures, bird's-foot trefoil, ecologically adaptive technology of cultivation, irrigation, herbage, livestock production, efficiency.

**Introduction.** A decisive condition of further development of livestock production in Kazakhstan is significant increase in production of all types of forages, radical improvement of their quality and on this basis the organization of uninterrupted supply of the cattle with full diet sterns. Depends on the correct organization of a food supply increases in a livestock and increase in their efficiency and cost efficiency of livestock production.

The quality of forages is of great importance for increase in efficiency of livestock production. In this regard the problem of increase in production of protein feeds zoo technical science is especially relevant it is established that for satisfaction of full need of animals for proteins diets have to contain per 1 fodder unit on average not less than 105-110 g to digest a protein. Bean cultures are quite rich with a protein, in cereals it usually lacks. Therefore the balance of fodder diets on a to digest protein can be reached only in case as a part of artificial the grass mixture participate one-two species of long-term bean herbs [1-3].

Are established by researches efficiency of a new long-term bean grass of bird's-foot trefoil (Lotus corniculatus L.) at radical and superficial improvement of aspics and mountain natural haymakings and also as a valuable bean component in grass mixtureduring creation of cultural haymakings and pastures [4, 5].

In Kazakhstan researches and creation of cultural pastures on irrigation for the dairy cattle are begun in the 80th years of last century in the South and the southeast. On the basisof research and production tests good results are received.

However now, the area of cultural pastures in the Republic still remains not high. According to us, wide circulation of this, very necessary technology, restrains for two main reasons: first-this education on the place of collective farms and state farms of small-scale country enterprises where the livestock of the dairy and meat cattle does not exceed 20-30 heads; the second - still not a perfection of this technology, especially at selection of the range of herbs for creation of long-term cultural pastures.

In a year of crops of a grass mixture gave two hay crops. The first alienation was carried out in 67-68 days after emergence of full shoots. The second alienation was carried out in 38 days after the first hay crop: in the first hay crop by options of experience 94.5-108.4 c/hectare, in the second hay crop – 147.0-162.0 c/hectare of pasturable green material are received. For two hay crops of a grass mixture gave 241.5-282.5 c/hectare of a pasturable forage. It should be noted that the high productivity of the first year is provided due to intensive growth of a ryegrass one-year. It is a grass due to intensive growth during the initial period and a good aftermathion after a hay crop considerably increased efficiency grass mixture in the first year of use. The specific mass of an annual ryegrass pasturable in a harvest was within 25-35%.

In the second year began growth of artificial herbs it is noted on April 13-18. More intensive growth allocates bird's-foot trefoil. The first hay crop is made in 31-32 days after growth of herbs. Duration of the second hay crop 30-31 days, the third – 27-29 days, the fourth – 32 days and the fifth – 33 days. The last hay crop is made on August 15-17.

In the second and subsequent years of life, the young lady grows in the spring very early, blooms earlier than other legume grasses and grows until late autumn, remaining in a green state. Well tolerates frequent alienation (cattle bleeding). Steps are high. Timpani not cause. In the blooming state, the animals are poorly eaten, due to the bitter substance in the flowers. After drying the mass in hay, bitterness is absent. In the non-flowering state, eating a pretty bride is good for all kinds of animals.

In the second year for five hay crops of a grass mixture gave 376.2-433.6 c/hectare of pasturable weight. The first hay crop was more fruitful (82.7-92.6 c/hectare). Then on hay crops decrease in a harvest is observed. In the fifth hay crop the pasturable productivity by options of experience was 64.0-75.6 c/hectare (table 1).

Table 1 – Pasture productivity of legume-grass mixtures (2009-2014)

| Grass mixture | Productivity of pasturable green mass by years, c/hectare | | | | | |
|---|---|---|---|---|---|---|
| | 1st year of use | 2nd year of use | 3rd year of use | 4th year of use | 5th year of use | 6th year of use |
| 1st grass mixture (lucerne (25%) + sainfoin (25%) + Bromusinermis Leyss (25%) + orchard-grass (25%)) control | 241,5 | 376,2 | 386,2 | 390,8 | 353,0 | 325,6 |
| 2nd grass mixture (lucerne (25%) + bird's-foot trefoil (25%) + Bromusinermis Leyss (25%) + orchard-grass (25%) | 256,2 | 402,5 | 417,1 | 460,2 | 420,4 | 375,7 |
| 3rd grass mixture (sainfoin (25%) + bird,s-foot trefoil (25%) + Bromusinermis Leyss (25%) + orchard-grass (25%) | 270,9 | 422,9 | 430,0 | 428,2 | 396,5 | 352,2 |
| 4th grass mixture (lucerne (16,7%) + sainfoin (16,7%) + bird's-foot trefoil (16,7%) + Bromusinermis Leyss (25%) + orchard-grass (25%) | 282,5 | 433,6 | 447,0 | 467,1 | 424,7 | 384,6 |

In the third and sixth years of use, 5 cuttings were made on the experiments. The beginning of the spring regrowth and the distribution of the yield of grass mixtures by cutting was approximately as in the second year. In the third year, for 5 cuttings, grass mixtures yielded 386.2-447.0 c / ha of pasture green mass. In the fourth year, 390.8-467.1 centners per hectare of pasture forage were obtained for experiments on 5 hauls.

For 5-6 years of use, there is a general decrease in pasture grass stand productivity. Fertilizing grass mixtures with nitrogen fertilizers helps to maintain their productivity. In the fifth year, grass mixtures produced about 353.0 - 427.7 c / ha of pasture mass. In the 6th year of use, 325.6 - 384.6 c / ha of pasture mass were obtained. From table 1 it can be seen that in all the years of use, grass mixtures with the participation of the horned bird gave higher yields.

In the first year, the increase was 15.1-41.0 c / ha, in the second - 26.3-57.4 c / ha, in the third - 32.9-60.8 c / ha, in the fourth year - 37, 4-76.3 c / ha, in the fifth year - 43.5-71.7 c / ha and in the sixth year - 26.6-59.0 c / ha. There is a decrease in the productivity of the 3rd grass mixture, starting from the 3rd year of use, which is associated with the precipitation of sainfoin.

The botanical composition of the grass stands plays an important role in increasing the yield and quality of pasture mass. The dynamics of the botanical composition of the four legume-cereal grass stands are given in table 2. The analysis of the botanical composition of the stand was carried out by the method of analysis of the test sheaf.

Table 2 – The structure of pasture green mass of legume-grass mixtures (by 2nd cutting)

| Grass mixture | Structure of a harvest by years, % | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1st year of use | | | | | 4th year of use | | | | | 6th year of use | | |
| | Grass family | Le-gumes | including | | | Grass family | Le-gumes | including | | | Grass family | Le-gumes | including |
| | | | lu-cerne | sain-foin | bird's-foot trefoil | | | lu-cerne | sain-foin | bird's-foot trefoil | | | bird's-foot trefoil |
| 1st grass mixture | 54,6 | 42,2 | 22,0 | 20,2 | – | 60,2 | 27,4 | 20,0 | 7,4 | – | 73,8 | 15,0 | – |
| 2nd grass mixture | 53,9 | 43,0 | 30,5 | – | 12,5 | 59,5 | 30,2 | 12,0 | – | 18,2 | 61,8 | 28,7 | 20,6 |
| 3rd grass mixture | 55,8 | 40,9 | – | 27,9 | 13,0 | 61,4 | 25,5 | – | 6,0 | 19,5 | 60,6 | 29,5 | 29,0 |
| 4th grass mixture | 56,3 | 41,3 | 16,7 | 15,4 | 9,2 | 60,7 | 33,5 | 11,0 | 4,5 | 18,0 | 60,8 | 30,5 | 22,8 |

The first years the share of alfalfa and sainfoin in the crop was more than the horned bird. Starting from the third and third years of use, the share of alfalfa and especially sainfoin in the harvest has decreased significantly. By the 4th year, the share of alfalfa in the pasture mass for mowing was in the range of 10.0–13.0%, the share of sainfoin, 1.5–7.0%, and vice versa, the proportion of the sweet horny rose to 18.5–24.6% , by the sixth year, the share of alfalfa and sainfoin was significantly reduced, and the share of the sweet horned bastard increased to 29%, that is, there was an increase and increase in the weight of the sweet horned bird in the pasture mass. In general, by the 4th year, the share of legumes in the crop was at the level of 25.5-35.0%, and in the sixth year - 20.6-29.0%.

The sweetheart has a delicate green mass, more subtle and soft stem than the green mass of alfalfa and sainfoin. When feeding cattle fodder with the participation of a young lady, milk production increases, milk tastes good, and butter has a yellow color [6, 19].

It is known from the literature, and our calculations confirm the receipt of a nutritionally balanced feed, if the proportion of legumes in the pasture mass is no less than 20–25% [20, 21].

In our experience since 4th year of use the share bean in a pasturable forage is formed at the expense of bird's-foot trefoil. This bean grass means is perspective for creation of long cultural pastures on irrigation.

Analyzing the productivity of grass mixtures,it can be noted that in the first year the proportion of cereals in the crop structure was higher. This is due to the inclusion in the grass mixture of one-year pasture ryegrass. It turned out to be promising as a cover crop, and for increasing the pasture mass in the first year of use of grass mixtures.

We have established intensive tillering and high aftermathion of both cereal and legume grasses, which is observed with sufficient moisture and nutrient supply of the soil. Perennial legume-cereal grass stands do not require intensive fertilization with nitrogen; they coarse more slowly and are more eagerly eaten by animals in later phases of development than cereals. They are rich in protein, macro-and micronutrients and to a greater extent have a beneficial effect on soil fertility.

At the same time, in order to obtain high yields on legume-grass pastures, it is necessary to periodically apply phosphorus or phosphorus-potassium fertilizers, and nitrogen feeding is mainly carried out by fixing nitrogen with leguminous components. Sometimes pastures should be fed in small doses (N15-30) with mineral nitrogen [7, 8]. With a lack of moisture, there is a deterioration in the edema of the herbs and even the stopping of this process.

On the whole, in terms of the feeding value of green mass, the horned bird is not inferior, and in some indicators qualitatively exceeds the traditional feed crops of our region. In 100 kg of pasture mass of lotus horned 25 feed. units and 4.5 kg of digestible protein. The protein content ranges from 19.5 to 20.5%. On average, in the fodder from the sacrament, 20.7% more fodder units and 1.4-2.5 times higher content of digestible protein than in the green mass of alfalfa, corn and annual grasses.

Perennial legume-grass mixtures have a positive effect on the agrophysical indicators of soil fertility, the clearing of fields from weeds, pathogens and pests of agricultural crops. Research has established that in the cultivation of grass mixtures with the inclusion of horned dews in the composition, the structure and bulk density of the soil significantly improves (table 3).

Table 3 – The effect of perennial legume-grass mixtures on the structure and bulk density of the arable layer of soil (0-30 cm)

| Grass mixture | Firm phase of the soil, % | General porosity, % | Capillary porosity, % | Not capillary porosity, % | Volume mass of the soil, g/cm³ |
|---|---|---|---|---|---|
| 1st grass mixture | 54,0 | 54,2 | 25,0 | 27,4 | 1,24 |
| 2nd grass mixture | 54,4 | 54,0 | 26,0 | 28,2 | 1,25 |
| 3rd grass mixture | 53,1 | 55,0 | 24,0 | 21,0 | 1,26 |
| 4th grass mixture | 54,2 | 55,0 | 28,0 | 29,5 | 1,26 |

**Findings:**

1. Irrigated cultivated pastures of legume-grass mixtures can provide dairy cattle breeding with green pasture fodder without fail during the summer. The yield of pasture mass is within 460.2-467.1 centners / ha;

2. Inclusion in the seed-bearing legume-cereal grass mixtures of the horned bird increases the productivity of the grass stand from the 2nd year by 15-25%;

3. In the structure of the harvest, from the 3rd year of use there is a decrease in the share of alfalfa and sainfoin and an increase in the proportion of the horned bird. Horned horseman is promising for the creation of long-term cultivated pastures on irrigation;

4. Perennial legume-grass mixtures have a positive effect on the structure and bulk density of the soil.

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**ҚАЗАҚСТАНАЫҢ ОҢТҮСТІК-ШЫҒЫС АЙМАҒЫНЫҢ ТАУ БӨКТЕРІНІҢ
СУАРМАЛЫ ЖЕРІНДЕ ЖАЙЫЛЫМДЫҚ ШӨП ҚОСПАЛАРЫНА МҮЙІЗБАС ШӨПТІ
(Lotuscorniculatus L.) ЕНГІЗУДІҢ ТИІМДІЛІГІ**

**Аннотация.** Мақалада Қазақстанның оңтүстік-шығыс аймағының тау бөктерінің суғармалы жерінде әртүрлі бұршақты-астықты жайылымдық шөп қоспаларына мүйізбас шөпті еңгізудің тиімділігін зерттеу нәтижелері келтірілген.

Шөп қоспаларына мүйізбас шөпті енгіген жағдайда олардың өнімділігі және сапасы артқан. Зерттелген шөп-қоспаларының 6 жылдық орташа жайылымдық өнімі 256,2-467,1 ц/га және өнімде бұршақ тұқымдас шөптердің үлесі 28,7-30,5% құраған. 5-6 жылдары пайдаланған кезде мәдени жайылымда негізгі өнім, оның ішінде бұршақ тұқымдастар үлесін мүйізбас шөп құраған. Бұл бұршақ тұқымдас шөп суғармалы жерде көп-жылдық мәдени жайылымдар жасауға тиімділігін көрсетті. Бұршақты-астықты шөп қоспалары топырақтың құрылымын жақсартатыны белгілі болды.

**Түйін сөздер:** мәдени жайылымдар, мүйізбас шөп, экологиялық бейімделген өсіру технология, суғару, шөп қоспалары, мал шаруашылығы, өнімділік.

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**ЭФФЕКТИВНОСТЬ ВКЛЮЧЕНИЯ ЛЯДВЕНЦА РОГАТОГО (Lotus corniculatus L.)
В ПАСТБИЩНЫЕ ТРАВОСТОИ НА ОРОШАЕМОМ УЧАСТКЕ ПРЕДГОРНОЙ ЗОНЫ
ЮГО-ВОСТОКА КАЗАХСТАНА**

**Аннотация.** В статье приводятся результаты исследований пастбищного использования различных бобово-злаковых травосмесей с участием лядвенца рогатого (Lotus corniculatus L.) в условиях орошения предгорной зоны юго-востока Казахстана. Включение в состав травосмеси лядвенца рогатого повышает продуктивное долголетие пастбищного травостоя и сохранение в составе пастбищной массы бобовых трав.

Урожайность пастбищной массы в период 6-летнего использования травостоем колеблется в пределах 256,2-467,1 ц/га и содержание бобовых в составе на уровне 28,7-30,5%. На пятые и шестые годы доля бобовых в массе урожая формировалась за счет лядвенца рогатого. В структуре урожая с третьего года использования идет снижение доли люцерны и эспарцета и увеличение доли лядвенца рогатого. Эта бобовая трава показала себя как перспективная для создания долголетних культурных пастбищ на орошении. При возделывании бобово-злаковых травосмесей структура почвы существенно улучшается.

**Ключевые слова:** культурные пастбища, лядвенец рогатый, экологически адаптивная технология возделывания, орошение, травостой, животноводство, продуктивность.

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# FORESIGHT INNOVATIONS
# IN EDUCATIONAL SYSTEMS IN THE BRICS COUNTRIES

**Abstract.** BRICS countries are in favor of creating a non-crisis, harmonious system of global governance, the trans-regional community of BRICS is in favor of integration, peaceful cooperation, a harmonious and flexible system of global development, in the basis of which will lie the laws of internal rights, the observance of the sovereignty of all cities, counting the majority of the world's population. Important works in the field of solving problems of cultural integration and the development of culture and education in the world at the level of intergovernmental cooperation have been created within the framework of the so-called concept of "concerts" and "concert diplomacy", including the use of advisory and mediation technologies and institutional diplomacy at the highest level in the field of culture and education, as well as in other areas. Integration creates additional dynamic capabilities for the development of enterprises in these countries, including educational organizations. The joint mutually beneficial use of which will give an integration effect, expressed in the additional economic benefits and advantages for integrating countries, the achievement of which is impossible (or less effective) without integration interaction. Differing greatly in their socio-economic and cultural-political development, the BRICS countries seriously differ from each other in their academic traditions, forms and trends (trends) in the further development of higher education. But they are united by a common main task of achieving a balance between the desire to achieve global recognition, to take a significant place in the global market of educational services and the need to preserve the national and regional culture of education.

**Keywords:** BRICS, concept of concerts, dynamic abilities, educational institutions, foresight education, national traditions, multi-polar world.

**Introduction**. The key principle of the implementation of integration processes is the acceleration of the cultural and economic development of the system as a whole and its individual components in particular through the realization of the integration potential (Arpentieva, Krasnoschechenko, Kirichkova, Zalavina, Stepanova, 2018; Arpentieva, Kirichkova, Kosov, Feshchenko, Golubeva, 2018; Bogomolova, Menshikov, Arpentieva, Gorelova, Zalavina, 2018, Kassymova, Arpentieva, Kosherbayeva, Triyono, Sangilbayev, Kenzhaliyev, 2019; Stepanova, Tashcheva, Stepanova, Kassymova, Tokar, Menshikov,. and Arpentieva, 2018). Integration potential is a combination of natural, industrial, labor, financial, intellectual and other resources of the countries participating in an integration association, the joint mutually beneficial use of which will give an integration effect, expressed in additional economic benefits and advantages for integrating countries whose achievement is impossible (or less effective) without integration interaction (Sidorova, 2016: 1112-113; Sidorova , 2018; Shaumyan, 2013; Brummer, 2012). In the BRICS countries, the problems of effectively forecasting the development of the economy and production, including the functioning and development of the educational market during the crisis period for society, its economy and politics, are closely related to the so-called dynamic abilities of enterprises, their skills to

restructure and diversify due to industry trends. Market, including due to the fact that the integration potential of BRICS opens up new prospects for cooperation and development to member countries. The development of enterprises is also associated with their ability to highlight both strong, obvious, and weak, subtle, but important trends, including threats and development prospects, the challenges of time and the challenges of regional markets in the BRICS countries (Astakhov, 2016; Konkin, 2017; Cooper, 2017; Mikhalchenkova, 2017; Sadovnichiy, Yakovets , Akayev, 2014; WIR, 2015).

**Problem statement.** BRICS countries (informal unification consisting of Brazil, Russia, India, China and South Africa) are in favor of creating a non-crisis, harmonious system of global governance, the trans-regional community of BRICS is in favor of integration, peaceful cooperation, a harmonious and flexible system of global development, in the basis of which will lie the laws of internal rights, the observance of the sovereignty of all cities, counting the majority of the world's population (Il'in, Leonova, Rozanov, 2013; Makoveev, 2016; Mikhailov, 2013; Busygina, Okuneva, 2015; Shaumyan, 2013; Brummer, 2012). "Creating integration associations in several countries allows them to confront modern challenges and threats," this is confirmed by researchers from various schools: functionalism (D. Mitrani), neofunctionalism (E. Haas, L. Lindberg, A. Etzoni), federalism (A Spinelli, C. Friedrich), neoliberalism (V. Röpke, A. Predol, M. Bije), "pluralistic school" (C. Deutsch), "interstate approach" (S. Hoffman, V. Wallace, E. Moravchik) with regard to BRICS - the work of B. A. Heifetz, S. P. Glinkina, O. V. Klimovets, G. D. Toloraya, I. S. Troekurova, M. Ye. Trigubenko, K.A. Pelevin, J. O'Neill, J. Kirton, K. Brummer, K. Bracht, J. Kirton, E. Cooper, F. Birman, C. Dingvert, F. Pattburgh, and other researchers, including the so-called concepts of "concerts" and "concert diplomacy" (Glinkina, 2014; O'Neill, 2012; Sidorova, 2016, p. 111; Dingwerth, Pattberg, 2006; Kirton, 1989; Pelevin, 2013; Gilbert, 2007; Carnoy, Loyalka, Dobryakova, et al., 2013). J. Kirton defines "concerts" as follows: (1) a constructive shock for the stability of the dominant order induces (2) an interdependent group of all great powers with their de facto equality and collective domination, (3) to develop supportive mediation advisory technologies and institutional high-level diplomacy (4) to ensure the stability of the system and to create the necessary intra-state and intergovernmental order (Kirton, 1989). J. Kirton writes that the G20 and other "concerts", including modern BRICS, "combine the minimum number of independent participants (only the great powers) with the aim of mobilizing maximum collective opportunities (of all the great powers). They do this not to dominate in the short term and express temporary interests, obtaining maximum individual benefits (as in the case of a minimal winning coalition within the framework of the balance of power theory), but to predominate for a long time in a system in which there are no unrelated interdependent great powers capable of causing damage or organizing resistance. The inclusion of all the additional great powers (that is, in addition to those necessary to form a minimum winning coalition) removes from the system political initiative and material opportunities for revisionism at the level of great powers, while reducing the possibility of gaining dominant capabilities by an individual state within this system " (Kirton, 1989, p. 3). BRICS countries, like other countries seeking to unite, do this, in many respects, for the sake of preserving national culture and education. In a globalized, unipolar world, education is standardized, simplified, and loses many of the approaches and technologies associated with the unique development experience of each people. The achievements of every nation and country could enrich the palette of approaches and technologies of education, however, in reality this does not happen: the modern globalization of capitalist communities pursues the most diverse goals, however, the priority of sociocultural and human values in capitalist communities has long been lost. It has been lost in almost all socialist communities, a significant part of which ended its existence at the end of the twentieth century. Only post-capitalist countries, including Scandinavia, have distinctive features in this respect. However, the movement towards and the level of culture of relationships, attitudes towards education and other significant areas of the existence and development of people and organizations is very difficult. The countries of the former USSR after the collapse of the country fell into the list of "transitional" countries, with extremely low indicators of the quality of life in general and education in particular. The countries of Asia, including India and China, in many respects are experiencing an ambiguous period of development: despite the rapid growth rates, the problems of national cultures and cultural relations are one of the most acute. China, although it appears in many respects as a mono-national state with an ancient history, is now at the forefront of the capitalist movement. The  progress  of unifying strategies of relations is extremely aggressive: as the first country in

The main problems of innovative development of the BRICS

| BRICS | The main problems of innovative development of the BRICS |
|---|---|
| Brazil | • low levels of productivity compared to developed countries;<br>• low and stagnant level of patent applications, overall low impact of patents and publications;<br>• regional imbalances within the country, imbalances in education and qualification of the workforce;<br>• dependence on commodities and resource-based industries;<br>• overall weak innovation performance and demand for innovation from business sector, compared to developed countries |
| Russia | • low levels of productivity compared to developed countries;<br>• overall low impact of patents and publications;<br>• regional imbalances within the country;<br>• dependence on commodities and resource-based industries;<br>• overall weak innovation performance and demand for innovation from business sector, compared to developed countries |
| India | • low levels of productivity compared to developed countries;<br>• overall low impact of patents and publications;<br>• regional imbalances within the country;<br>• imbalances in education and qualification of the workforce;<br>• overall weak innovation performance |
| China | • low levels of productivity compared to developed countries;<br>• overall low impact of patents and publications;<br>• environmental imbalances within the country;<br>• regional imbalances;<br>• prevalence of "secondary innovations" |
| South Africa | • low levels of productivity compared to developed countries;<br>• overall low impact of patents and publications;<br>• regional imbalances within the country;<br>• imbalances in education and qualification of the workforce;<br>• dependence on commodities and resource-based industries;<br>• overall weak innovation performance and demand for innovation from business sector, compared to developed countries |

(Souza, Baumann, et al., 2015: 152)

the world, China began to create an "electronic concentration camp" and develop methods of population management, inspired by the ideas of capitalism. The situation of Brazil and South Africa is no less ambiguous, the negative trends of the gradually evolving world education system affect the cultural potential of countries and the educational level of citizens of these countries (table).

**Research questions.** The cooperation of the BRIC countries is progressing slowly enough so that we can easily identify strong trends in its development. In general, we can say that so far we are talking about a sufficiently developed in time and space, affecting the interests of many other countries and peoples, unification, the leading points of which are not so much cultural and educational, as the economic and "geopolitical" interests of countries. It also reduces the possibilities of cooperation in the field of education, intensity and productivity, that is, the quality of the results of such cooperation. Differing greatly in their economic and political development, the BRICS countries are no less different in their academic traditions, realities, plans and scenarios for the further development of higher education. However, they are united by the common main problem of achieving a balance between the desire to achieve world recognition, take a significant place in the global market of educational services and the need to preserve the national and regional culture of education, the traditions that are an essential component of national identity. The creation of an effective system of cooperation and mutual support within the framework of the BRICS organization itself can help in this (Mikhalchenkova, 2017, p.166).

**Purpose of the study and research method.** The purpose of the study is to analyze the directions and opportunities for the development of international cooperation of the BRICS countries in the context of education; the analysis of foresight competencies as a component of dynamic abilities (competencies) of educational institutions in the BRICS countries.

Research method is the theoretical analysis of areas and opportunities for the development of international cooperation of the BRICS countries in the context of education. The methodological basis of the study is an integrative analysis of the dynamic abilities of enterprises in the BRICS countries in the context of foresight. Such integration can be very interesting both for practitioners and for theorists who work in the BRICS countries in each of these areas, but do not use the achievements of each other.

**Findings.** The BRICS countries, despite the differences, have similar problems and challenges. They are associated with the presence of the need for large-scale modernization of the economic and social spheres, reforming the collapsing world cultural situation, as well as the sharply asymmetric international financial and economic situation. These provisions no longer take into account the existing cultural and changing economic potential of emerging market countries. The BRICS countries, despite the differences, have similar problems and challenges. They are associated with the presence of the need for large-scale modernization of the economic and social spheres, reforming the collapsing world cultural situation, as well as the sharply asymmetric international financial and economic situation. These provisions no longer take into account the existing cultural and changing economic potential of emerging market countries (Carnoy, Loyalka, Dobryakova, et al., 2013; Fedchuk, 2015). The main prerequisite for sustainable and active cultural and economic development, enhancing the competitiveness of the BRICS member countries is the existence of a developed, efficient and productive educational system that forms mature and independent individuals, citizens of society and members of social groups, highly qualified specialists who are able to work successfully in changing conditions, in including in the conditions of complication of processes and results of cultural knowledge and socioeconomic hierarchization. The processes and results of democratization of culture and all spheres of social life are side by side with the processes of progressive restriction of the rights and freedoms of citizens, social stratification, which leads to an increase in the role of social stratification. A number of leading documents of the BRICS summits set strategic guidelines for joint cooperation in this area. The BRICS countries have repeatedly confirmed the intention of cooperation in the field of science and education, as well as in order to conduct basic research and development of advanced technologies. They intend to work by implementing cooperation programs within the framework of continuing the practice of holding symposia of BRICS research centers; research and solutions to the creation of a network of research centers of the BRICS countries, the BRICS Network University and the BRICS University League, the task of ensuring equal, inclusive and quality education for all and learning opportunities for all. States are working to explore the possibilities of mutual cooperation in the recognition of higher education documents and diplomas, explore the relationship between investment in education, human capital development and economic growth, emphasize the importance of vocational education as a tool for expanding employment opportunities and labor mobility of citizens of different age. Very important are the trends in the integration of educational systems of countries, along with the (re)formation of their own educational strategies of the BRICS countries, trends in informatization of educational systems and redefinition of value bases and principles of organizing information and other educational projects, humanizing information channels, including the Internet, enriching it with scientific and educational programs, materials on world and national cultural heritage. The goal is to create universal and world-class criteria for the quality of education, a single educational space-time, including international training and retraining programs. There are also trends in the separation of mass and elite educational institutions: the latter act as world-class research universities. It is also important to conduct comparative studies of the quality and effectiveness of educational productivity, including on the basis of national reports and expert reports of UNESCO and the UN, other international monitoring organizations, on education systems and their success / non-success (Sidorova, 2018; Fedchuk, 2015).

Modern strategic management in the field of education management in the BRICS countries is focused on systematic accounting of old and new sources of development and threats, restrictions and production prospects in accordance with the challenges of specific time and space. "Adaptation of all innovations implemented under the influence of globalization, internationalization, information revolution and other current development trends to the historically established features of each individual system is especially difficult in relatively young higher education systems that are forced to simultaneously

modernize in line with global trends and sometimes overcome the consequences long periods of unfavorable and contradictory development in extreme political conditions: ideological dictates, apartheid, insufficient financing, refusal to develop certain branches of knowledge and other restrictions (Arpentieva, Kassymova, Lavrinenko, Tyumaseva, Valeeva, Kenzhaliyev, M. B. Triyono, Kosov, Duvalina, 2019; Kassymova, Tyumaseva, Valeeva, Lavrinenko, Arpentieva, Kenzhaliyev, Kosherbayeva, Kosov, Duvalina, 2019; Kassymova, Tokar, Tashcheva, Slepukhina, Gridneva, Bazhenova, Shpakovskaya, and Arpentieva, 2019; Kassymova, Stepanova, Stepanova, Menshikov, Arpentieva, and Merezhnikov, Kunakovskaya, 2018; Stepanova, Tashcheva, Markova, Shpakovskaya, Arpentieva, Bazhenova, Tokar and Kirichkova, 2019; Stepanova, Gridneva, Menshikov, Kassymova, Tokar, Merezhnikov, and Arpentieva, 2018).

This is exactly the situation in the BRICS countries, which are a group of rapidly developing countries seeking to integrate efforts to improve their competitiveness in the world, including in the global market of educational services" (Mikhalchenkova, 2017, p. 167). The productivity and efficiency of educational institutions in the BRICS countries in crisis, unstable periods of socio-economic development can be expressed through an assessment of the system of parameters characterizing the ability of enterprises to change, or dynamic capabilities of enterprises. The object of evaluation in this case is the efficiency or productivity of the institution with one or another dynamic ability or the dynamic ability itself. At the same time, Brazil, China, India and South Africa are focused on the need for rapid expansion of young people's access to higher education, increasing the number of students in universities of these countries, while trying to create world-class research universities at the top of the university hierarchy to provide a rapidly developing economy with scientific research and highly frames. But Russia, having a developed system of higher education that quantitatively satisfies the needs of the economy, the state and society ... seeks to solve the problem of restructuring its research universities, while improving the quality of functioning of the entire higher education system in accordance with the imperatives of globalization (Mikhalchenkova, 2017, p. 169-170).

A general assessment of dynamic abilities in BRICS countries is carried out using methods based on a diagnostic study of an enterprise, industry, cluster or state, based on a system of scales, as well as generalizing indicators. Such indicators include private and integral indicators for evaluating the effectiveness and efficiency of a firm or group of institutions in the BRICS countries. Different approaches to assessing the efficiency and productivity of educational institutions in the BRICS countries are associated with different ideas about the development of enterprises and different strategies for such development, that is, one can say, different foresight models. The characteristics of various development strategies can be identified and assessed at the level of individual institutions, and at the industry level, and at the country level. In this regard, the role of such dynamic abilities of educational institutions in the BRICS countries is increasing, which make it possible to identify and predict the development of the industry and enterprises, to carry out long-term strategic planning, taking into account these forecasts, their conclusions about future more or less important and obvious changes, to manage these changes. In this context, the theory of dynamic abilities is closely intertwined with the theory of foresight, as well as a number of other theories based on the concept of complex systems, their fractal, and synergistic, self-developing and self-regulating nature. Unfortunately, there has been no comparative and integrative theoretical or empirical work in this area in the BRICS countries: our research is the first, initial attempt at a theoretical analysis of the problem (Arpentieva, 2017a; Arpentieva, 2017b).

Analysis of foresight competencies as a component of dynamic abilities of enterprises in the BRICS countries shows their leading role in the implementation of other dynamic capabilities, as well as the fact that foresight enterprises and industries have a transforming effect on their development as systems, helping to transform, not only predict, the development of the industry or institutions. Foresight competencies are closely related to the ability of an organization to recognize opportunities and development threats in the BRICS countries, explore and select opportunities for reconfiguration, and carry out the actual reconfiguration of resources. In addition, dynamic abilities allow you to influence both the markets themselves and the surrounding enterprise reality in the BRICS countries as a whole (Arpentieva, 2017b). At the same time, the foresight shifts the focus of attention to the search for change markers in the BRICS countries

and their strategic consideration, allowing not only to "prepare for future events, but also to influence these events, including" bypass "and" remove "them, affecting not only to central, strong, leading, but also peripheral, weak, "dependent" links of relations. It includes a multi-complex set of routines aimed at solving the problems of effective and productive strategic management of institutions in the BRICS countries. This problem deserves special attention because the integration of these concepts pushes the framework of ideas about management, as well as the study and (trans)formation of the dynamic abilities of educational institutions. The proposed study has a pronounced practical significance, which is associated with a number of prospects for further study and evaluation of functions, components of the dynamic abilities of educational institutions and the industry as a whole in the BRICS countries. Thus, in the direction we have chosen, it becomes possible to develop new, empirical methods for assessing these abilities, as well as new approaches to foresight. In addition, a very interesting direction is the study of the processes of formation and transformation of enterprise management routines related to the ability of an enterprise to recognize opportunities and threats for its development in the short, medium and long term in BRICS countries, as well as routines that allow an enterprise to transform their surrounding reality. The solution of this problem can be actively claimed both by the management of individual educational institutions and the Ministry of Education and Science of the regions and the country as a whole. It has important practical implications that can be used in the development of strategies for the development of educational institutions in the BRICS countries in the context of sustainable development and crisis management tasks, as well as the design and optimization of training and education in various types of educational institutions in BRICS countries (Arpentieva, 2017a).

As noted above, the creation of integration associations in several countries allows them to confront contemporary challenges and threats. Researchers from various schools: functionalism, neofunctionalism, federalism, neoliberalism, "pluralistic school", "interstate approach", etc., note the importance of integration associations in order to create a multipolar world, including cooperation in the field of culture and education. Important works in the field of solving problems of cultural integration and the development of culture and education in the world at the level of intergovernmental cooperation have been created within the framework of the so-called concept of "concerts" and "concert" diplomacy, including the use of consultative-mediation technologies and institutionalized diplomacy at the highest level in the field of culture and Education, as well as in other areas. Integration potential as a set of natural, industrial, labor, financial, intellectual and other resources participants of an integration association, creates additional dynamic capabilities for the development of enterprises in these countries, including educational organizations. The joint mutually beneficial use of which will give an integration effect, expressed in additional economic benefits and advantages for integrating countries, the achievement of which is impossible (or less effective) without integration interaction. Differing greatly in their socio-economic and cultural-political development, the BRICS countries seriously differ from each other in their academic traditions, forms and trends (trends) in the further development of higher education. But they are united by a common main task - the goal of achieving a balance between the desire to achieve global recognition, take a significant place in the global market of educational services and the need to preserve the national and regional culture of education, the traditions that are the leading component of civil-national identity.

**Conclusion.** Foresight of education and other areas of proposed and ongoing cooperation naturally takes into account these strategies of "concerts", the possibilities and benefits of advisory and coordination work in the field of educational reform and innovation in different countries, in the revival or introduction of traditions in education and culture in general, economic and legal transformations of the work of educational institutions as enterprises, in the field of commodification and commercialization of their activities, in the sphere of managerialization and bureaucracy management of education, as well as the introduction of education intersubjective management technology, etc. Joint analysis and joint efforts make it possible to effectively evaluate the productivity of innovations and traditional schemes of education and the work of educational institutions as economic and cultural enterprises, to form more viable foresight models for the development of education as an important part of the development of individual groups, nations, countries and all of humanity.

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## БРИКОҢА ЕЛДЕРІНДЕГІ БІЛІМ БЕРУ ЖҮЙЕЛЕРІНДЕГІ ФОРСАЙТТЫҚ ЖАҢАЛЫҚТАР

**Аннотация.** БРИКОҢА елдері дағдарыссыз, глобалды басқарудың үйлесімді жүйесін құруға мүдделі, БРИКОнА-ның аймақаралық қауымдастығы интеграция, бейбіт ынтымақтастық, жаһандық дамудың үйлесімді жәнеикемді жүйесі, оның негізінде жатыр. Ішкі құқықтардың заңдары, бүкіл әлем халқының басым бөлігін есептейтін барлық қалалардың егемендігінің сақталуы болып табылады. «Концерт» және «концерт дипломатиясы» концепциясының шеңберінде мәдениет интеграциясының мәселелері мен мәдениет пен білім беруді әлемде үкіметаралық ынтымақтастық деңгейінде шешу саласындағы маңызды жұмыстар жасалды. Кеңес беру және медиация технологияларын және мәдениет және білім беру саласындағы, сондай-ақ басқа да салаларда жоғары деңгейде институционалдық дипломатияны пайдалануда. Интеграция осы елдердегі, соның ішінде білім беру ұйымдары кәсіпорындарын дамыту үшін қосымша динамикалық мүмкіндіктерді қалыптастырады. Ынтымақтастықтың бірлескен тиімділігі интеграциялық әсерін беретін қосымша экономикалық пайдалар мен артықшылықтар арқылы көрініс табатын интеграциялық өзара іс-қимылсыз қол жеткізуге болмайтын (немесе кем тиімді) елдерді интеграциялауға мүмкіндік береді. Әлеуметтік-экономикалық және мәдени-саяси дамуында ерекшелене отырып, БРИКОнА елдері академиялық дәстүрлер, формалар мен жоғары білім беруді одан әрі дамытудың үрдістері (тенденциялары) бойынша бір-бірінен айтарлықтай ерекшеленеді. Бірақ олар жаһандық тануға ұмтылу, білім беру қызметтерінің жаһандық нарығында маңызды орынға ие болу және ұлттық және аймақтық білім беру мәдениетін сақтау қажеттілігі арасындағы теңгерімге қол жеткізудің жалпы негізгі міндеті болып табылады.

**Түйінді сөздер**: БРИКОнА, концерттер концепциясы, динамикалық қабілеттер, білім беру мекемелері, форсайттық тәрбие, ұлттық дәстүрлер, көп полярлы әлем.

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## ФОРСАЙТ-ИННОВАЦИИ В ОБРАЗОВАТЕЛЬНЫХ СИСТЕМАХ СТРАН БРИКС

**Аннотация.** Страны БРИКС выступают за создание стабильной, гармоничной системы глобального управления. Трансрегиональное сообщество БРИКС выступает за интеграцию, мирное сотрудничество, гармоничную и гибкую систему глобального развития, в основе которой будут лежать законы внутренних прав, соблюдение суверенитета всех стран и регионов. Существенно различные по своему социально-экономическому и культурно-политическому развитию, страны БРИКС отличаются друг от друга своими академическими традициями, формами и тенденциями (тенденциями) в дальнейшем развитии высшего образования. Но их объединяет общая главная задача – достичь баланса между стремлением добиться глобального признания, занять значительное место на мировом рынке образовательных услуг и необходимостью сохранения национальной и региональной культуры образования. Важные разработки в области решения проблем культурной интеграции и развития культуры и образования в мире на уровне межгосударственного сотрудничества осуществляются в рамках так называемой концепции «концертов» и «концертной дипломатии». Она предполагает, с одной стороны, использование консультативных и посреднических технологий и институциональ-

ной дипломатии на самом высоком уровне в сфере культуры и образования, а также в других областях. С другой стороны, интеграция создает дополнительные динамические возможности для развития предприятий этих стран, в том числе образовательных организаций. Совместное взаимовыгодное использование технологий и моделей образования и развития образования создает интеграционный эффект, выражающийся в дополнительных культурных и экономических выгодах и преимуществах для интегрирующихся стран.

**Ключевые слова:** БРИКС, концепция концертов, динамические способности, образовательные учреждения, предвидение образования, национальные традиции, многополярный мир.

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# MANAGEMENT ASPECTS OF CAPITALIZATION
# IN MODERN CONDITIONS OF ENTERPRISE ACTIVITIES

**Abstract.** The article presents the results of a critical analysis of scientific positions on the interpretation of the content of capitalization, which were streamlined in the following approaches: process, resource, value, analytical, relational, cognitive. Based on the integration of various research aspects of the definition of capitalization, the authors logic of interpreting its managerial nature has been formed, which is disclosed on the basis of the inter-relationship of the set of processes (turning the capabilities of the external environment into enterprise resources, activating resources, productive use of resources, turning cost flows into capital) and objects (organizational abilities, resources, assets), the priority impact on which ensures the growth of business value. The value aspects of capitalization are investigated on the basis of the fundamental value approach, which made it possible to determine systems of critical points and monitoring indicators that signal the state of capital management of enterprises. The results of the implementation of the proposed analytical model of capitalization in the practice of the engineering enterprises of Ukraine are presented. On the basis of assessments of critical points of the strategic level of analysis, the main reasons affecting the dynamics of changes in the value of the studied enterprises are determined. Taking into account the specifics of the development of the business environment in the modern conditions of activity of machine-building enterprises, it was concluded that the value level of capital formation depends on the level of intellectualization and digitalization of production. Within the framework of the new technological paradigm, it is appropriate to develop the machine-building production according to the principles of the Industry 4.0 concept. In accordance with it, changes in the transformation of the way business processes are organized into digital factories are updated, which leads to the acquisition by enterprises of such characteristics as: the rate of customization of reactions to market demands ; digital certification; organization of activities on the principles of system engineering, etc.

**Keywords:** capitalization, fundamental value, machine-building enterprises, VBM-models, economic profit, assets, resources, opportunities, organizational skills.

**Relevance.** Enterprises capitalization is one of the most popular areas of modern economic study, and its substantive nature is multidimensional and is characterized with interdisciplinary study. The fundamental principles of an enterprise capitalization theory are formed at the intersection of the theories of value, capital and economic growth, and its modern specificity of interpretation is due to transformational changes that occur in the context of post-industrial economy development.

The theoretical basis for the study of the economic nature of capitalization was laid in the scientific works of R. Hilferding [1], K. Marx [2], J. Keynes [3], J. Tobin [4] and further developed in the studies of A. Hrytsenko [5], M. Kozoryz [6], N. Kozyr [7], T. Malova [8], I. Khrystoforova [9] and others. Features of the definition and evaluation of capitalization in modern conditions of enterprise development are presented in the works of I. Bulieiev and N. Briukhovetska [10], V. Bukhanets [11, 12], M. Dedkova [13], I. Smirnova [14], N. Shevchuk [15, 16] and others. The constructive analysis of scientific results in this subject area makes it possible to conclude that the existing theoretical and methodological scientific developments are fundamental and significant. At the same time, the rapid dynamic development of the business environment expands the substantive boundaries of capitalization study, which, in the framework of this article, will be worked out from the point of view of defining its managerial specifics.

**Main points.** The consolidation of analysis findings of modern scientific and economic publications on the capitalization of enterprises details makes it possible to distinguish the following subject areas of its study:

– capital formation;

– capital formation relations system;

– process of transformation of income into capital;

– process of value formation;

– process of transformation of different types of resources into capital;

– market valuation of an enterprise.

A wide range of substantive contexts in which multidimensional specifics of enterprise capitalization manifest themselves determined the streamlining of existing scientific positions, which are conventionally combined into the following scientific approaches to its study:

– process [10–16], in accordance with which the content of capitalization is considered in the relationship of processes that ensure the transformation of resources into capital, its formation and the increase in the cost of capital;

– resource [5, 17], which considers capitalization as "…a set of multi-level institutional processes and managerial influences that ensure the effective interconnection of economic resources in order to upgrade the reproduction processes" [17]. Such an understanding of capitalization does not change its essence as a process of transformation of resources into capital, but only expands the areas of study and the mechanisms for its growth securing;

– value [5–17]. Unites aspects of studying capitalization as an enterprise value. Under this approach, two areas of study are being developed, where capitalization is considered as a market [20–24] and as a fundamental value [21–25] of enterprise. The commonality of these two areas is manifested in the fact that capitalization has temporal and spatial parameters. The difference is in its content, target setting, mechanisms and forms of realization. That is, we can talk about the contradictions of the content and form of manifestation, their non-identity. However, we are talking about different phenomena: the first is related to the market valuation of fictitious capital, the second is the result of real capital formation;

– the analytical approach is expedient to be distinguished in terms of capitalization definition as a method of valuing the assets of an enterprise "...through income, which is obtained as a result of production and economic activity" [26, p. 89]. Capitalization is also considered as a method of assessing the value of a business based on the income approach;

– the relational approach to capitalization study is associated with the presence of developed institutional mechanisms (the stock market, the banking sector, credit and monetary institutions and public-private partnership institutions) that ensure effective self-regulation of market-type business processes. Besides, the topical issue in this aspect is the study of relations that are associated with the ownership of capital and the appropriation of newly created value, the contradiction between the social nature of production and the private form of appropriating its results;

– cognitive approach to capitalization study is associated with intellectualization of public production trend, which is based on incorporating of knowledge to the processes of transformation of resources, which leads to the replacement of the labour theory of value to the theory of "knowledge value" [27]. The accumulation of intellectual capital becomes a priority in the formation of economic results, which is realized on the basis of the synergistic interconnection between the intellectual component and other types of capital (social, financial, etc.). That is, an intellectualization of all capitalization processes takes place, actualizing the need for their study based on knowledge and anthropocentric models of economic development.

Thus, within the meaningful boundaries of the selected approaches to the study of enterprises capitalization, contextual interpretation of capital is implemented, which is carried out on an interdisciplinary basis and combines methodologies of various areas of economic theory. Synthetic use of the above approaches allows substantiating the author's logic of studying the enterprise capitalization in a managerial aspect, which provides for a continuous targeted impact on capital formation processes and objects, in order to ensure the achievement of an economic result in the form of enterprise value increase.

Based on the generalization of the modern provisions of the theory of enterprise capitalization, its main processes are defined as [5, 11, 13, 28]: transformation of business environment capabilities into enterprise resources, activation of resources, productive use of resources; conversion of value flows into capital flows. Following this logic of capitalization processes, it is advisable to single out the main objects of managerial focus: organizational capabilities, resources and assets of an enterprise.

The focus of managerial influences is directly related to the definition and formalization of economic results, which it is logical to consider as an enterprise value in the aspect of capitalization. But not a market enterprise value, which is traditionally accepted as a criterion for making managerial decisions by Western researchers, but fundamental one. This is due to the fact that the fundamental value is the basis for the formation of the market value, that is its part which is controlled by the actions of the management of enterprises and does not depend on the factors of market pricing.

Fundamental and value approach to managing of enterprise capitalization can be characterized from the point of view of subject-object relations. As a subject of economic relations, an enterprise produces and sells economic benefits, that is, as a form of organization of capital, it is a source of formation and growth of its intrinsic value. As an object, an enterprise is characterized with investment attractiveness for capital investment by other market process participants, which leads to accumulation and, consequently, to an increase in its cost value. From such positions, the subject aspect of fundamental and value management of capitalization is determined by the level of development of organizational abilities, resource asymmetry, and asset performance; the object aspect – by the level of investment attractiveness of an enterprise. The scientific issue of capitalization evaluation in terms of the fundamental and value approach is one of those issues that are not sufficiently and ambiguously covered in modern financial and economic literature. The scientists and practitioners traditionally choose the market value as a criterion of managerial decisions effectiveness in all areas of the enterprise. At the same time, from the point of view of both the content put in the interpretation of the results and the choice of evaluation methods, they usually focus on the fundamental one.

Methodologically, the evaluation of an enterprise fundamental value is carried out on the basis of either the concept of discounting cash flows, or economic profit. Taking into account the possibilities of multi-factor interpretation of the results, the concept of economic profit has a higher analytical potential, is the basis for its choice as a methodological basis for building a managerial business analytics in the substantive framework of this study. In this formulation, the evaluation of an enterprise fundamental value, as a result of capitalization, can be formalized in the following form (formula 1):

$$V_{fund} = NA_{bal} + \sum_{t=1}^{n} \frac{EP_t}{(1+k)^t}, \tag{1}$$

where $V_{fund}$ is fundamental value; $NA_{bal}$ is net assets balance cost; $EP_t$ is economic profit in the $t$ period; $k$ is discount rate.

The choice of the economic profit measurement model is made by the analyst, based on the availability of a reliable information base and the final needs of the analysis. The main types of analytical value based models (VBM) that can be used in the proposed analytical design (formula 1) are [29–34]: models based on balance sheet values and indicators of Residual Income (RI); Economic Value Added (EVA); cash flow added (CVA) models based on cash flow (Cash Value Added, CVA). The factor interpretation of economic profit makes it possible for the management to determine control critical points and systems of monitoring indicators that are informative from the point of view of implementation of timely, adequate managerial actions aimed at ensuring the growth of the fundamental value of an enterprise. The formalization of the author's logic on capitalization in the system of fundamental value management of an enterprise is presented in figure.

The implementation of the proposed analytical capitalization model was made for machine-building enterprises of Ukraine (machine-building industry-wide as well as for the leaders of Ukrainian machine-building (PJSC Turboatom, PrJSC Novokramatorsk Machine-Building Plant (PrJSC NKMZ)), whose activities are characterized as export-oriented, and the products are known in many countries of the world).

*Strategic level of management*

| **Capitalization processes** | **CRITICAL POINTS SYSTEM** | **Capitalization objects** |
|---|---|---|
| Transforming environmental capabilities into enterprise resources.<br><br>Resource activation | $$EP = Sale \times Sped_{sale}$$ $$EP = Ass \times \mathrm{Pr}_{ass} \times \left(R_{sale} - R_{sale}^{cr}\right)$$ | Organizational abilities.<br><br>Resources.<br><br>Assets. |

**MONITORING INDICATORS SYSTEMS**
1. The system of indicators of strategic analytics, which characterizes the changes in sales volumes.
2. The system of indicators of strategic financial analytics, describing changes in the profitability of products and sales.
3. The system of indicators of strategic financial analytics, which characterizes the quality of capital.
Other.

*Financial level of management*

| **Capitalization processes** | **CRITICAL POINTS SYSTEM** | **Capitalization objects** |
|---|---|---|
| Rationalization of capital structure.<br>Minimization of capital costs.<br>Ensuring capital adequacy.<br>Other. | $$EP = Cap \times Spred_{cap}$$ $$EP = Cap \times \left(R_{cap} - k_{cap}\right)$$ | Assets (current/non-current; financial/operational)<br>Capital structure<br>Capital costs<br>Other. |

**MONITORING INDICATORS SYSTEMS**
1. The system of indicators of optimality of the capital structure.
2. The system of capital adequacy indicators to finance investment needs and current assets.
3. The system of indicators characterizing the ability of the enterprise to redeem a debenture of financial stakeholders.
4. The system of indicators of capital adequacy to compensate for the expectations of financial stakeholders.
Other.

*Other functional levels of management*
*(logistics, production, sales, marketing, communications, etc.)*

| **Capitalization processes** | **CRITICAL POINTS SYSTEM** | **Capitalization objects** |
|---|---|---|
| Are formed depending on the specifics of the functional area and type of activity. | $$\mathrm{Pr}_{ass} = K_{pur} \times w_{cur.ass}^{pur} \times k_{solv} k_{srt.cap} \times k_{eq}$$ *Other (are formed taking into account the specifics of an enterprise).* | Basic capital (by type).<br>Inventories (by type).<br>Working capital.<br>Other. |

**MONITORING INDICATORS SYSTEMS**

Analytical model of enterprise capitalization: managerial aspect

The machine-building industry is traditionally called the locomotive of the national economy development in Ukraine, while the trends characterizing the functioning of the machine-building industry enterprises are negative. Despite the fact that machine-building has the third ranking position among the total volume of industrial products, the trend of its changes makes it possible to characterize the situation as critical (the corresponding figure was 30.5% in 1990, 10.0% in 2011, 6.1% in 2016). To put this in perspective, in economically developed countries this figure ranges from 30% to 55% [35]). Since 2013, the indicator of the fundamental capitalization of machine-building enterprises has been characterized by a decay dynamic, indicators of equity return spread and sales yield spread have negative values (see table), and the main topical issue, which this situation is connected with, is the competitiveness of Ukrainian machine-building.

Critical points of the strategic level of capitalization of machine-building enterprises of Ukraine in 2011–2016*

| Indicators | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|
| 1. Growth rate (+/-) of fundamental value, % of the previous year | | | | | | |
| Machine-building of Ukraine | 20.66 | 12.95 | -7.36 | -30.93 | -38.39 | -13.63 |
| PJSC Turboatom | x | 22.43 | 13.98 | 27.78 | 46.87 | 26.94 |
| PrJSC NKMZ | x | 0.06 | 1.97 | 2.72 | 26.59 | 7.51 |
| 2. Capital productivity spread, % | | | | | | |
| Machine-building of Ukraine | -4.46 | -5.27 | -9.00 | -18.66 | -11.34 | -3.84 |
| PJSC Turboatom | -1.94 | -5.43 | -1.29 | -3.21 | 11.12 | 1.47 |
| PrJSC NKMZ | -22.32 | -22.33 | -20.10 | -17.19 | -8.71 | -17.43 |
| 3. Sales yield spread, % | | | | | | |
| Machine-building of Ukraine | -5.73 | -6.42 | -13.92 | -34.20 | -19.76 | -6.28 |
| PJSC Turboatom | -17.98 | -3.64 | -13.54 | -2.77 | -6.99 | 19.88 |
| PrJSC NKMZ | -18.58 | -33.34 | -40.85 | -32.22 | -34.59 | -16.13 |
| 4. The ratio of the actual level profit margins to the critical ones | | | | | | |
| Machine-building of Ukraine | 0.62 | 0.57 | 0.25 | 0.00 | 0.00 | 0.24 |
| PJSC Turboatom | 0.53 | 0.90 | 0.64 | 0.92 | 0.83 | 1.49 |
| PrJSC NKMZ | 0.43 | 0.17 | 0.09 | 0.21 | 0.28 | 0.67 |
| 5. Growth rate (+/-) of asset performance, % of the previous year | | | | | | |
| Machine-building of Ukraine | 23.65 | 5.49 | -21.28 | -15.54 | 5.19 | 6.57 |
| PJSC Turboatom | -5.40 | -24.78 | 16.79 | -1.95 | 21.95 | -18.27 |
| PrJSC NKMZ | -17.63 | -18.35 | 14.09 | -20.32 | 8.71 | -3.28 |
| *All indicators are calculated based on the Residual Operating Income model (*ReIO*-model); x – no data to calculate the indicator. | | | | | | |

Thus, in the sale structure of machine-building products by Ukrainian manufacturers, the products of the third technological mode prevail, which is produced on morally and physically worn-out equipment (physical wear is estimated at 60–80%, and the moral one is over 50 years) [35]. Machine-building production is characterized by a high proportion of production mechanization and critically low innovation-level indicators. The share of research expenditure in the machine-building industry of Ukraine hardly reaches 0.1% of GDP (in the USA; 2.0 - 2.5% of GDP, in EU countries, 3% of GDP). A significant problem for the Ukrainian machine-building enterprises is the loss of the Russian sales market, the dependence on which until 2014 was very high (in 2012, 52% of machine-building products sales (worth $6.8 billion) were exported to Russia).

A positive trend in changes in fundamental value was characteristic for the leaders of the Ukrainian machine-building, PJSC Turboatom and PrJSC NKMZ, during 2011 – 2016. And although these enterprises generated negative value-added flows due to their profitable activities, net assets balance cost had a dynamic increase, which in general had a positive effect on the resulting value indicator. The ratio of the

actual level profits margin of the implementation to a critical level for PJSC Turboatom was characterized by relatively high values, and in 2016 the company reached a positive value of economic profit. The peculiarity of PJSC Turboatom activity is that it is one of the largest enterprises in the field of manufacturing turbines in the world, and its products are represented in 45 countries. Almost 2/3 of the enterprise's products are exported to Europe, Asia, and America. PJSC Turboatom is a carrier of cutting-edge technologies, know-how, and developments that outperform the technological level of many competitors.

PrJSC NKMZ is one of the largest Ukrainian specialized manufacturers of machinery and equipment for the mining and smelting enterprise. Low rates of investment development of Ukrainian metal producers adversely affect domestic demand for the corresponding machine-building products, which leads to the need of searching for sales markets abroad. At the same time, the global trends in the development of metallurgical production are also downward, which directly affects the demand and the nature of competition for the investment engineering products for metallurgical purposes. In this context, although the enterprise provides profitable activities based on the existing innovation and technological potential, the sales yield indicators and their critical values make it possible to acknowledge that there are serious problems of a strategic level. The quality parameters of PrJSC NKMZ potential do not correspond to those satisfying the demand for high-tech products. That is, the long-term capitalization growth is determined by the presence of such a strategy, which would ensure the development of intelligent engineering production with a focus on the parameters of the vision of the future.

Those parameters are summarized and described in the concept of "Industry 4.0", and their main content is reduced to the fact that the activities of future engineering productions will be organized in the form of "Factory of Tomorrow", which are the systems of comprehensive technological solutions that provide design and manufacture of globally competitive new generation products in the shortest possible time. Even today, the development of digital technologies sets the prototype for the immediate future, which is characterized by a high concentration of smart devices in digital machine-building factories and beyond, capable of performing routine operations without human involvement. In this context, the relevant changes in the transformation of the way business processes are organized into a "Digital Factory" form, which leads to the acquisition by machine-building enterprises of such characteristics as the speed of customization of the response to market or customer requests; digital certification based on thousands of virtual tests of both individual components and the system as a whole; organization of activities on the systems engineering principles; the formation of a multi-level matrix of target indicators and constraints as the basis for a new design, characterized by a significant reduction in risks, scope of field tests and the work related to "coupling samples and products based on tests"; ensuring a high level of adequacy of mathematical models to real objects and processes ("smart models"); ensuring permanent change management throughout the product life cycle, etc.

Thus, the post-industrial specificity recalibrates the development of the enterprise capitalization theory. Thus, financial criteria for capitalization are modified to maximize capitalization "...in an absolute competitive market environment" [36, p. 462], which, in turn, causes the transformation of relevant mechanisms in enterprises and the transition from the financial and investment model, when the value of enterprises was determined based on expectations of income receivable, into a strategically oriented one, the peculiarity of which is intellectualization and digitization of capital formation processes. In a competitive environment, such objects as tangible forms of capital lose their priority, and intellectual and technological factors become the development keynote. The struggle between the subjects of economic relations for limited resources is transformed into a strategic interaction, which involves the synchronization of the pace of development and the trajectories of their evolution, but not their acquisition or merger. The dominance of intellectual capital means the transition from unpredictable behaviour of business entities to their movement along predetermined invariant trajectories, which makes it possible to shape and achieve goals set by economic target subjects in the process of their coherently competitive interaction.

**Conclusions.** Drawing together the results of the study of the managerial peculiarities of capitalization of an enterprise's activity in the modern conditions brings us to certain key accents from the point of view of the development of this research area:

– The economic nature of capitalization is complex and ambiguous, generating a need for the appropriate logical ordering of existing scientific positions. It is necessary to emphasize that the contextual

interpretation of capital, that is, capital processes, relationships, results are explored on an interdisciplinary basis and integrates methodologies of various trends in economics, within the meaningful limits of the selected thematic areas of capitalization research, and their accumulation makes for the multidimensional research of the general market form of capital flow in the context of business entities' economic relations;

– managerial aspects of enterprise capitalization are a kind of symbiosis of certain selected thematic approaches to its study, which determine the content of capitalization in terms of the specificities of the characteristics, which form the basis for the study of this phenomenon. Under these conditions, the level of capital's ability to be used productively, to accumulate and create value becomes dependent on organizational abilities (both dynamic and static) to turn the capabilities of the external environment into its resources, which, in turn, leads to a substantial expansion of the essence of capitalization and the need to introduce a strategic aspect into the study of modern capital formation processes;

– the analytical interpretation of capitalization is based on the concept of fundamental value. The change in the priority of managerial focusing from the market value to a fundamental one is justified by the fact that the latter is controlled by the management from the point of view of managerial influences on the factors ensuring its growth. According to the factor interpretation of economic profit, which can be measured on the basis of a set of VBM models, critical points and monitoring indicators systems are formed at all levels of the management hierarchy, and their informativeness and adequacy to managerial needs is confirmed according to machine-building enterprises of Ukraine;

– ensuring the long-term industrial enterprises growth becomes dependent on the level of technological development, which, according to the authors, it is advisable to determine in accordance with the principles and parameters of the "Industry 4.0" concept. Within the framework of the new technological paradigm, the modern engineering production becomes digital, more automated and robotic, waste-free, customized and more geographically spread. Commitment to these parameters is the basis for ensuring the quality of capital formation processes in enterprises and, as a result, the sustainable of growth of their fundamental value in the long run.

**Legend:**

| $EP$ | economic profit | $Spred_{cap}$ | equity return spread |
|---|---|---|---|
| $Sale$ | sales volumes in terms of value | $R_{cap}$ | return on equity |
| $Spred_{sale}$ | sales yield spread | $k_{cap}$ | capital costs |
| $Ass$ | assets | $K_{pur}$ | supplies turnover ratio |
| $Pr_{ass}$ | asset performance | $w_{cur.ass}^{pur}$ | the share of supplies in total current assets |
| $R_{sale}$ | profitability of sales | $k_{solv}$ | solvency ratio |
| $R_{sale}^{cr}$ | critical profit margins | $k_{str.cap}$ | capital ratio |
| $Cap$ | amount of capital | $k_{eq}$ | autonomy ratio |

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**КӘСІПОРЫНДАР ҚЫЗМЕТІНІҢ ЗАМАНАУИ ЖАҒДАЙЫНДА
КАПИТАЛИЗАЦИЯНЫҢ БАСҚАРУШЫЛЫҚ АСПЕКТІЛЕРІ**

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# УПРАВЛЕНЧЕСКИЕ АСПЕКТЫ КАПИТАЛИЗАЦИИ
# В СОВРЕМЕННЫХ УСЛОВИЯХ ДЕЯТЕЛЬНОСТИ ПРЕДПРИЯТИЙ

**Аннотация.** В статье представлены результаты критического анализа научных позиций относительно содержания капитализации, которые были упорядочены в следующие подходы: процессный, ресурсный, стоимостный, аналитический, реляционный, когнитивный. На основе интегрирования разных исследовательских аспектов определения капитализации сформирована авторская логика интерпретации её управленческой природы, которую раскрыто на основе взаимосвязи совокупности процессов (трансформации возможностей внешней среды в ресурсы предприятия, активация ресурсов, продуктивное использование ресурсов, превращение стоимостных потоков в капитальные) и объектов (организационные способности, ресурсы, активы), приоритетное влияние на которые обеспечивает рост стоимости бизнеса. Стоимостные аспекты капитализации исследованы на основе фундаментально-стоимостного подхода, что позволило определить системы критических точек и мониторинговых показателей, сигнализирующих о состоянии управления капитализацией предприятий. Представлены результаты имплементации предложенной аналитической модели капитализации в практику деятельности машиностроительных предприятий Украины. На основе оценок критических точек стратегического уровня анализа определены основные причины, влияющие на динамику изменений стоимости исследованных предприятий. Учитывая специфику развития бизнес-среды в современных условиях деятельности машиностроительных предприятий, сделан вывод о высоком уровне зависимости стоимостных результатов капиталообразования от уровня интеллектуализации и цифровизации производства. В рамках новой технологической парадигмы современное машиностроительное производство целесообразно развивать на основе принципов концепции «Индустрия 4.0», в соответствии с которой актуализируются изменения в трансформации способа организации бизнес-процессов в форму цифровых фабрик, что обеспчивает такие параметры деятельности как скорость кастомизации реакций на запросы рынка; цифровая сертификация; организация деятельности по принципам системного инжиниринга и т.д.

**Ключевые слова:** капитализация, фундаментальная стоимость, машиностроительные предприятия, VBM-модели, экономическая прибыль, активы, ресурсы, возможности, организаторские способности.

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# THE KAZAKH LEXICON
# OF THE VIRTUAL COMMUNICATION

**Abstract.** During the globalization process, various innovations, novelties, new phenomena in every field of society are emerging due to technology and computer equipment. All phenomena occurring in the society are reflected and recorded in the language. The article examines the features of virtual communication compared to real communication, the different features of the language units in virtual communication, the lexicon of social network users which deviate from literary norms of the language and its causes.

**Keywords:** virtual communication, Kazakh virtual environment, new words, language novelties, language norms, literary language.

**Introduction.** The flow of information as a fruits of globalization increases the overall advantage of communication in society. Verbal and non-verbal linguistic tools in real communication in the oral or written form differ from the use of linguistic means of virtual communication. This issue has become a special object of research among modern linguists. For the human race living in information society is gradually increasingly relying on virtual tools to compensate for the need for communication.

Communication needs are as follows: information exchange; expressing one's own thoughts; organizing of a common activity; influencing on will (valutation service); emotionally or expressively.

All communication needs exist both in real and virtual communication. In the virtual communication, these needs are met by technical means. In the virtual communication, both oral and written forms of real communication exist, but mechanisms of its implementation differ from facial communication. Thanks to the equipment, real communication is projected in a virtual space, resulting in unique features of virtual communication. In modern linguistics, the search for features of linguistic tools related to virtual communication is increasing. For example, in virtual communication, information may come from an unfamiliar addresser as a voice message, a text message, or a video message.

In virtual communication, communication between the addresser and the addressee is not as in real communication. In real communication, the addressee can only communicate with familiar addressee, while in the virtual communication, he or she can also communicate with an unfamiliar addresser. If one can describe and put down emotions in the written form of real communication, in virtual communication, one can send an emoticon ('smile' in English). Punctuation marks in written communication take part in virtual communication to express the emoticons, which means that the verbal tools in real communication has a completely different function when projected in virtual communication. For example, this emoticon 🙂 is expressed with a right parentheses in the written form of virtual communication -), and if he or she is happy, he or she puts several right parenthesis -)))). But if a person is sad, if he or she is distracted by the information he or she has read or heard, instead of this emoticon 🙁 he or she puts the right parentheses - (, - (((.

The reproduction of verbal tools in virtual communication arises interest among the linguists. At the same time, the desire to explore aspects of virtual communication is also encouraged by other areas such as IT-technology, artificial intelligence, philosophy, psychology, sociology, and criminalistics.

IT professionals continuously examine the ways to build a variety of interfaces in order to improve the virtual communication to such an extent that it can replace the face-to-face communication. They suggest that the virtual communication architecture can be closer to the "natural" environment only in case the virtual organizational environment and groups are described by dynamic reconfiguration [1, 9]. Also, one of the studies aimed at improving the dynamics of virtual communication, its service and developing communicative skills has identified the linguistic needs as the main mechanism of the virtual communication [2].

In the philosophical context, the virtual communication has been studied by L. V. Baeva [3], Solodovnik L. V., Basai M. Yu. [4] etc. and regarded as "phenomenon". The phenomenon (phenomenon in Greek) in English means a unique occurrence, a fact whose cause or explanation is difficult to establish. Philosophers are also studying in detail the process of change in relationship between the "Self and Others" system under the influence of virtual communication.

In the field of sociology, this type of communication has been considered by A. A. Zamorkin [5], R. V. Leushkin [6], O. A. Trofimova [7], etc. When discussing about virtual communication, sociologists use the term "virtual social communication".

Educators and psychologists are the group of active researchers of virtual communication. They examine the impact of virtual communication on the person, the negative effects on the process of a person's formation, and the behavior of a person in virtual and real life. Kushzhanova N. V. and others described the negative impact of virtual communication on the child [8].

The representation of verbal tools in virtual communication has become the core of researches by numerous linguists. The relationship between verbal and written elements in virtual communication and the virtual relationships as a new stage of written communication have been considered by B. Altulhova [9], the genre of virtual communication has been considered by I. Egorova, S. M. Karpoyan, Yu. A.Mikheeva, S. A. Ignatieva, A. Ageyeva, E. N. Galichkina, the forms of virtual communication has been considered by S. G. Agapova, A. V. Polojan, its linguistic features have been considered by M. G. Dovgal, S. E. Mikhailova, L. V. Mikhailova, Khairullina, I. A. Borisova, I. B. Tubalova, Yu. A. Emer, N. M. Smakovskaya and others. E. N. Galichkina studied the genre stratification of the Russian blogs in virtual communication, indicating the criteria for the division of the Russian blogs genres, describing texts of various genres based on these criteria [10]. V. I.Yegorova concentrates on the genres of virtual communication, showing carnival and usual types of genre [11]. S. M. Karpoyan describes Instagram as a special genre of virtual communication [12]. S. A. Ignatieva, A. Ageyeva consider the comments as the genre of Internet communication based on the content of the French virtual discourse [13].

In domestic linguistics, linguistic features of the current social networking in the Kazakh language, the linguistic competence of users, the use of language tools and their classification has been considered by A. Fazylzhanova, A. Aushenova [14].

**Methods.** Over time, through social networking in the Internet, new concepts and new language units are emerging in all of the world languages. This phenomenon also affects the Kazakh language. In the Kazakh-speaking social networks there are being formed new words that come through the English language. These words are used by the "internet inhabitants" in everyday life and are the key words of today's linguistic community in the network [15]. Recently, since 2010, works on virtual communication, linguistic innovations and their codification in Kazakh linguistics have been published in various periodicals and online publications. It is necessary to analyze the published scientific articles on this topic, and systematically study the newly created language units in the context of literary language. Therefore, we believe that our work on studying language novelties in virtual communication is vital for modern Kazakh linguistics. Nowadays, the Kazakh-speaking virtual environment is being developed in the Internet. The study of the linguistic features of the virtual environment, the definition of language novelties in virtual communication, the study of coding of language novelties and lexicography issues show that our work is topical. Our upcoming searches are dedicated to the issues of finding, learning, coding and lexicography of language novelties in virtual communication. In the course of the research, we use the comparative method, the method of typological description. Also, used are the grouping, sorting methods.

**Results.** The development of IT technology has led to the strengthening of virtual communication in society. Virtual communication space has been superseding real communication day by day. Virtual communication has the potential to change the linguistic standards of real communication. The linguistic

units of virtual communication are replacing the language units that have become the norm in real communication, and the abnormal use is becoming "normal" for virtual communication. In addition, as a result of the rapid development of virtual communication, through the Internet, social networks, more and more new words, new names, and new concepts appear in every world language. This phenomenon also affects the Kazakh language. In the Kazakh-speaking virtual environment, the number of new words that come through the English language is increasing day by day, and the neologization process in the language is intensifying. As a result, the lexical fund of the Kazakh language is being enriched by new words, new language innovations.

Neologization is understood as the process of complex renewal through the new meaning of adopted words, new words and denominations in the lexico-semantic system of the national language. Today, the language policy in Kazakhstan, based on a liberal principle, has borne fruit: during the years of independence the Kazakh language has been used in all spheres of public life; along with the expansion of the Kazakh language, there is a tendency for the development of language culture. In this regard, the dynamics of neologization has increased in the lexical system of the modern Kazakh language. At the same time, the neologisms that before were parts of the passive ('passivus' in Latin) lexicon have been able to move into the active vocabulary of the lexicon in a short period of time. All this can serve as a proof of transformation in public consciousness. It is noteworthy that these language innovations have an impact on the society and can lead to a reverse process, which is a means of renewal of public consciousness. However, the process of understanding, description, stocktaking, lexicography, coding and standardization of the scientific and linguistic meaning of neologisms in the Kazakh linguistics has significantly slowed down in recent years under the influence of known and unknown reasons. This is evidenced by the period of publication of the latest normative dictionaries of new words in the Kazakh language [16].

As stated in the program article of the President of the Republic of Kazakhstan N. A. Nazarbayev "Future orientation: the spiritual revival" [17] the solution of the major ideological problems on the revival of public consciousness that has been set in the present-day Kazakh society is not possible without using the unifying ('identifico' in Latin), consolidating ('consolidatio' in Latin) and modeling functions of the language. Unifying, consolidating and future modeling functions of the language are related to its modernizing ('modern in English) function. The latter is accomplished through the active involvement in the linguistic consciousness of units of all language groups of language layers. Those linguistic innovations, including neologisms, being the representative of the "novel" in the system of knowledge in the consciousness takes a burden for its revival. The study of neologization in structural, psycholinguistic, linguocultural, linguocognitive and other aspects is not only influenced by the key role of lexical and semantic innovations in the language renewal, but also by the intensity of the impact of scientific and technological progress, of information technology on the linguistic consciousness of society.

By the end of the 20th century, scientists observed the growing neologization, "neologic breakthroughs" in many languages [18]. The high level of modernization ('neogenity' in Russian) was increased in geometric progression at the beginning of the 21st century [19]. Neologists came to a consensus that the emergence of new words and meanings, that is, the development of neologisms are only characteristic of viable languages and are an important factor for their social development ('factor' in Latin). As researchers showed, at the end of 20th century, the neurology was formed as a special branch of linguistics [20, 10]. In connection with the above, the "neological breakthrough" is also clearly seen in the Kazakh language nowadays. Neological searches, on the one hand, enable one to explore the language as a viable one, and, on the other hand, give one the most important results in lexicography of language innovations, clarifying the social need for the denomination of a new thing or the semantic renewal of existing denominations. The role of virtual communication in creating new words, spreading among the speakers of language is increasing day by day. It is noticeable that the flow of new words into the Kazakh language via the virtual environment is currently going intensively than ever before. Here are some of the factors:

- the speed of globalization;
- Internet access for the world's population;
  dominance of English as many new words are being introduced in English;
- spontaneous spreading among "internet inhabitants" of new words entered by means of virtual communication and understanding of those by the "internet inhabitants".

K. Aldasheva groups the new words in the modern Kazakh language by degree of their social and applicability significance as follows: "New words in the modern Kazakh language:
- scientific and technical names (terms);
- socio-public names: 1) terms of social sciences; 2) everyday household names" [21, 41].

In this classification we can include a new group of words that can only be used in virtual communication. We cannot classify new words of virtual communication as "everyday household denominations", as it has become the main tool of communication that covers all aspects of society and increases productivity and efficiency. At present, any public sphere cannot increase the efficiency of productivity without virtual communication. Take, for example, e.gov.kz portal of the e-Government of the Republic of Kazakhstan. Using the Internet resources anywhere in the world any citizen of the Republic of Kazakhstan can receive any document, data and information by electronic digital signature. That is, electronic services are implemented through the triple mechanism of *Kazakhstan Citizen or Legal entity - Computer - E- Government of the Republic of Kazakhstan*. A number of new words related to the launch of the E-Government Portal of the Republic of Kazakhstan have been widely used within language speakers of different social groups: *digital signature, e-Government, virtual consultant, electronic application, e-licensing, receipt or renewal of electronic digital signature, online receipt of address, e-Government mobile application* etc. Also, words such as *webinar, online workshop, online conference, live stream, and deadline* are widely used in educational process, marketing, business, and everyday life. The new vocabulary of such virtual communication cannot be classified as a group of "scientific and technical denominations (terms)" as well as the "terms of social and public sciences" and "everyday household denominations". For these new words are not used only within a certain group or industry; they are used by language speakers in all areas of society. There is no inter-industry (scientific, technical, social and public sciences, everyday life) or age restrictions (i.e. new words are used both by youth and older people) for the use of new words generated by virtual communication, it is commonly used. Therefore, it is necessary to distinguish the new words of virtual communication as an individual large group.

Virtual communication covers various social networks, blogs, forums, chat (programs for online communication, site chat), and virtual mail (email). Virtual communication is used as a tool for obtaining information, as a means of expressing one's ideas, in business, for communicating with friends, learning, and have no age restrictions on Internet users.

In global linguistics, the term "electronic communication" is used as a type of virtual communication. In his research, Atef Odeh AbuSa'aleek considers the term "e-discourse" as a term that expresses the written form of the language used by adolescents in writing electronic messages, and suggests that electronic discourse is a new type of language that can dramatically change the structure of the written language. Through the linguistic analysis of the electronic messages of teenagers under the age of 22, he shows various characteristics in writing electronic messages such as short-cutting words, deliberately dropping letters, changing the traditional form of words, swapping words, phrases, replacing words with emoji, using initialism. The researcher suggests that if students increase the use of such language of electronic discourse, that threatens their literacy in English; he emphasizes the need to raise awareness among students about language variants between the standard form of language and the electronic communication [22]. D. Crystal asserts that the internet language is characterized by non-traditional spelling [23].

**Discussion.** In the Kazakh-speaking virtual environment, new words are created under the influence of the English language, and some new words are being developed in the Kazakh language. The following is the English words penetrated into the Kazakh language without alteration: *troll, hype, post, fake, hash tag, vine, viner, ban, blogging, blogger, spam, dislike, online, chat, deadline*, etc. New words whose equivalent in Kazakh and the original in English are used alternatively: *repost* (*Dear friends, I need your help! We would appreciate if you do repost) - spread* (*Please, spread the message*), *like* (*Sorry to bother you. Please, could you press "like".*), the words developed in Kazakh language: "*жазылушы*" *- the follower* (in Russian - подписчик) (*I am selling a YouTube channel with 10 thousand followers*), "*қаралым*" *(qaralim) – the view (*in Russian – просмотр*) (The most popular clip on YouTube has reached 5 billion views*). The word "қаралым" (qaralim) in Kazakh language is created from the verb *қара (qara) (to view)* and the suffix for making new words -*lım*. The -*lım* suffix is commonly used in the field of education to create terms such as *жазылым (jazılım), айтылым (aytılım), оқылым* (*oqılım*) (*subscription, utterance, reading*). The word *қаралым (qaralim)* is a successful language innovation.

At the same time, in Kazakh-speaking virtual environment, the language speakers resort to different language abnormalities to attract readers / listeners / viewers. For example, *сұқбат (сұхбат is the norm) (interview), крузак (ланд крузер) (Land Cruiser), сәбет (кеңес is the norm) (advice), әліпбисымақ, бу (*in Russian *бывший в употреблении) (secondhand), кузов (шанақ is the norm) (car body), МГУ (ММУ is the norm) (Moscow State University), пенсия (зейнетақы is the norm) (pension), добавил (қосты is the norm) (added), поделился (бөлісті is the norm) (shared), понт (showing off), сиез (съезд is the norm) (congress), санаторий (шипажай is the norm) (spa resort), сотка (ұялы телефон is the norm) (cell phone), уатсап (Whatsapp), фото (photo), etc.* The words collected from Facebook indicate that they have deviated from the literary language norms. These are Russian, English words that were not translated and of spoken speech style, used as they are and there are slang, jargon words used by repre-sentatives of a particular social group.

N. Uali suggests that in order to be viable, literary language should have a lot of speakers of that language, among those there should be the elite group using that language, the average statistical group, the group below the average. But most importantly, the average statistical group needs to represent a large percentage of all language speakers. Functional styles must be fully-featured. It is important that the language circulation is homogeneous, to be comprehensible to all [24].

There are frequent language norm deviations among social network users, for some reason. N. Uali calls it "a pragmatic deviation from language norms". "This type of deviation directly relates to the language system and structure. The linguistic norm is a part of the language system that has been carefully selected in the course of social communication. The following is the types of deviation from language norms for pragmatic purposes:

- matching up a word with an incongruous one;
- transforming a word with an inapplicable affix;
- misuse of phraseology;
- misuse of spelling norm;
- misuse of the pronunciation norm.

These last two deviations are also called kakozemia.

Kakozemia is one of the types of deviations from orthoepic, orthographic norms, and one of the rhe-torical methods for pragmatic purposes. Traditional language norms are used to attract the attention of readers / listeners.

Deviation from the orthoepy f the literary language for pragmatic purposes is a rhetorical approach often used in oral speech. Elements of such noncanonical phonetics have an exceptional stylistic function. The misuse of graphic-spelling norms can be attributed to the kakozemia, the deviation type used for pragmatical purpose [25, 117] For example, K. Olzhai in his notes "*In the era when humanity is measured by counting the "likes"* misuses the phraseological unit by breaking the composition of phrases and attracting the attention of the reader.

In virtual communication, including Kazakh virtual environment, there are five types of functional styles.

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### ВИРТУАЛДЫ КОММУНИКАЦИЯДАҒЫ ҚАЗАҚТІЛДІ ЛЕКСИКА

**Аннотация.** Жаһандану үдерісі кезінде қоғамның әрбір саласында алуан түрлі жаңалықтар, жаңарт-палар, жаңа дүниелер, құбылыстар технология мен компьютерлік техникаға байланысты пайда болып жатыр. Қоғамда пайда болып жатқан құбылыстардың барлығы тілде көрініс тауып, тілде тіркеліп отырады. Мақа-лада виртуалды коммуникацияның реалды коммуникациямен салыстырғандағы ерекшеліктері, виртуалды қарым-қатынастағы тілдік бірліктердің өзгеше сипаты, әлеуметтік желі пайдаланушылары тіліндегі әдеби нормадан ауытқыған лексика және оның себептері қарастырылады.

**Түйін сөздер:** виртуалды коммуникция, қазақтілді виртуалды орта, жаңа сөздер, тілдік жаңартпалар, тілдік норма, әдеби тіл.

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## КАЗАХОЯЗЫЧНАЯ ЛЕКСИКА В ВИРТУАЛЬНОЙ КОММУНИКЦИИ

**Аннотация.** В процессе глобализации благодаря технологиям и компьютерной технике во всех сферах жизни общества появляются различные инновации, новшества, новые явления. Все явления, происходящие в обществе, отражаются и фиксируются в языке. В статье рассматриваются особенности виртуальной коммуникации в сравнении с реальной; особый характер языковых единиц в виртуальном общении, а также лексика, отклоненная от литературной нормы в языке пользователей социальных сетей и его причины.

**Ключевые слова:** виртуальная коммуникация, казахоязычная виртуальная среда, новые слова, языковые инноваций, языковые нормы, литературный язык.

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# VIRUSES OF MARINE MAMMALS AND
# METAGENOMIC MONITORING OF INFECTIOUS DISEASES

**Abstracts.** The review presents information on epizootic diseases in marine mammals caused by influenza viruses of genera A and B, morbilliviruses, adeno-, herpes-, calici- and coronoviruses. Virological and serological data about the spectrum of viral infections in marine mammals are given. Describes epizootic events in marine mammals induced by influenza A viruses and isolation of strains with antigenic formulas H1N1, H1N3, H3N3, H3N8, H4N5, H4N6, H7N7, H10N7, H13N2, H13N9. It is suggested that the seals may be infected with a wide range of influenza viruses by direct transmission without prior adaptation. It is emphasized that marine pinnipeds can serve as one of the reservoirs of human influenza B virus in nature. Data on the classification of pinniped and cetacean coronaviruses are presented. A variety of pinnipeds herpesviruses and the clinical significance of their morbidity indicators in the diagnosis of viral infections of seals are shown. It emphasizes the need for the development of proactive diagnostic tools for the timely detection of new viruses with zoonotic potential that can cause disease outbreaks. The negative effects of diseases with unknown etiologies on the population of Caspian seals are noted. The conclusion is made about the need for metagenomic monitoring of Caspian seal virome in order to establish the role of viral pathogens in their morbidity and regular mortality under conditions of intensive habitat development.

**Key words:** virus**,** marine mammals, Caspian seal, virom, metagenomic monitoring.

Health survey of marine mammal populations is one of the most important and significant scientific directions in ecology. Current knowledge about the diversity of pathogens of marine mammals is expanding rapidly [1, 2]. Viral diseases play a major role in regulating the dynamics of the population of wild animals, limiting their growth and enhancing selection at the genetic level. The impact of viruses becomes even more sever to the species endangered or fragmented at the result of anthropogenic pressure.

Viruses from marine mammals were isolated for the first time in 1972 from Californian sea lion *(Zalophuscalifornianus)*, on San Miguel Island during an outbreak of infection among these animals. The etiological agent attributed to caliciviruses and adopted as the San Miguel type I sea lion virus. They were isolated from 11 species of pinnipeds and cetaceans [3].

Paramyxovirus infection caused by members of the genus morbillivirus is widespread among marine mammals and causes serious threat to the population of these animals. To date, four species of morbilliviruses that infect marine mammals have been described: canine distemper virus in the Baikal *(Pusasibirica)* and Caspian seals *(Pusacaspica)*; cetacean morbillivirus - in dolphins and whales; phocine distemper virus - in harbor seals *(Phocavitulina)*; porpoise morbillivirus- in porpoises *(Phocoenaphocoena)*.

Morbilliviruses in marine mammals were first discovered in the late 1980s during the mass mortality of harbor seals and gray seals (*Halichoerusgrypus)* on the North European coasts in 1987-1988.

Phocine distemper virus (PDV) caused widespread epizootics among harbor seals in the coastal waters of Northern Europe in 1988, which killed more than 12 thousand animals [4]. In 2002, this virus returned to the indicated population, causing the death of about 1000 animals on the coasts of Scandinavia [5].

Morbillivirus epizootics (including canine distemper virus) occurred in populations of pinnipeds and cetaceans of the Northern Hemisphere [6]. The canine distemper virus caused the mass death of the Baikal seal (*Pusasibirica*) in 1987-1988 in Siberia, this virus was also involved in the mortality of crabeater seals

(*Lobodoncarcinophagus*) in 1955 in Antarctica. It was thought that the virus was transmitted to the population of pinnipeds through contact with domestic dogs [7].

Morbillivirus infections with high mortality have been registered among porpoises, stripeddolphins *(Stenella coeruleoalba)* and bottlenose dolphins (*Tursiopstruncatus*) [8, 9], harbor seals and harp seals (*Pagophilusgroenlandicus*) [10]. The mass die-off of Caspian seals in the spring and summer of 2000 was caused by canine distemper virus[11].

An infection potential of influenza A virus for the seals was made known from the epizootic outbreak on the coast of New England in 1979-1980resulted death of 600 animals [12]. The genetic characterization of the virus showed that all its RNA segments showed a close resemblance to those of avian strains. The second epizooty among the seals, occurring with pronounced clinical manifestations of pneumonia, occurred on the coast of New England in June 1982-August 1983 was associated with the influenza A virus (H4N5) [13].

Five strains of influenza A virus were isolated from seals that died from pneumonia on the Cape Cod Peninsula (Massachusetts, USA) from January 1991 - February 1992, two of which were identified as A (H4N6), and three as A H3N3. The HA genes of influenza A(H3N3) viruses were 99.7% identical to each other. Phylogenetic analysis demonstrated a close relationship between their sequences and those of the hemagglutinin H3 avian isolate. These data indicate that the influenza virus subtype H3 has been circulating for a long time in seal populations [14].

Identification of various types of influenza viruses in the seal populations indicates the possibility of their participation in genetic reassortment. Molecular- genetic studies established an avian origin of seal influenza isolates [13].

Pandemic H1N1 influenza A virus isolated from northern elephant seals *(Miroungaangustirostris)*, near the California coast of the United States in 2010. Full genome sequencing revealed more than 99% homology with pandemic "swine" influenza virus A/California/04/2009which circulated among people since 2009 [15].

In the fall of 2011 in New England (Massachusetts, USA), 162 seals died from pneumonia caused by the influenza A virus (H3N8). The pathogen was found to be similar to influenza viruses of waterfowl that circulated in North America since 2002 and had a mutation in the PB2 gene, characteristic of the highly pathogenic for humans variant H5N1, which indicated its potential for interspecies transmission and adapting to mammals [16].

Until recently, influenza A viruses did not isolate from the pinnipeds of the Palearctic. Previously, virological evidence of their involvement in outbreaks of infection among seals was obtained only in the North American continent.

Epizootics of marine mammals caused by influenza A viruses in other parts of the world, were first reported in 2014. The influenza A virus (H10N7) is isolated from found dead harbor seals (Phocavitulina) on the North Sea coast in Sweden, Denmark, Germany [17-19] where over 1400 animals died.

Influenza A (H1N3) virus is isolated D.K. Lvov et al. [20] from a dwarf whale *(Balaenopteraacutorostrata)* in the South Pacific in 1975-1976. From toothed whales (long-finned pilot whale - *Globicephalamelas*) V. Hinshaw et al. [21] identified the H13N9 and H13N2 influenza viruses genetically close to the H13 viruses circulating among gulls.

The data about isolation of influenza A virus (H7N7) from the materials collected during mass mortality of Caspian seals in April-June 2000-2002 was reported by Shestopalov A.M. et al. [22, 23] and Chuvakova Z.K. et al. [24, 25] in conference papers and review article. Despite of an extreme importance of those findings any other data about further characterization of genetic or pathobiological peculiarities of epizootic strain have not been published.

Later, influenza A (H4N6) viruses were isolated from seals in the Russian waters of the Caspian Sea in 2002 and 2012 [26, 27]. Phylogenetic analysis demonstrated that all genes ofseal origin A(H4N6) were closely related to avian-derived influenza viruses of the classical Eurasian lineage circulating in wild birds.

In contrast to influenza A viruses, which have been isolated from many different species, influenza B viruses were human pathogens with no or unknown reservoirs in nature until 1999. However, further it was argued that common and gray seals can become infected with this virus [28]. Influenza virus B was isolated from juvenile harbor seal with symptoms of respiratory disease and *in vitro* infected cell culture of

phocine kidney cells. Since the moment of acknowledgment of marine mammals as new hosts, there have been several reports on the detection of antibodies to the influenza B virus in some species of *Otariid* and *Phocid* species [29, 30]. Based on these data, it was suggested that the seals may serve as a reservoir of the human influenza B virus.

Adenoviral infections with clinical signs of hepatitis and enteritis have been noted in sea lions [31]. Outbreaks of this infection have also been observed in fur seals, sei whales(*Balaenoptera borealis*), bowhead whales*(Balaena mysticetus)*, beluga whales(*Delphinapterus leucas*), bottlenose dolphins [32-34].

Herpesviruses are isolated from seals with clinical signs of acute pneumonia and hepatitis in the Netherlands in 1985. [35]. They are subsequently isolated from bottlenose dolphins, killer whales*(Orcinus orca)*, California sea lions and gray seals [36]. At present, seven species of herpes viruses (PhHV-1 - PhHV-7), belonging to the genera alpha and gamma herpes viruses, have been isolated from phocids [35-40]. In the infectious pathology of these animals, herpesvirus seals 1 [Phocid Herpesvirus type 1] (PhHV-1) of the genus α-herpesviruses are most significant pathogen. Infection caused by these viruses in the harbor seals and gray seals is characterized by respiratory manifestations with interstitial pneumonia and coagulative necrosis of the adrenal tissues and liver [35, 41].

The rest six herpesviruses (PhHV-2 - PhHV-7) belong to the genus γ- herpes viruses, of which PhHV-4 and PhHV-7 have diagnostic importance in inflammation and ulceration of oral cavity soft tissues of seals. PhHV-6 herpesvirus in seals is associated with eye disorders [39]. The role of the PhHV-2, PhHV-3 and PhHV-5 viruses in the infectious pathology of seals remains unknown.

Herpesvirus PhHV-1 was isolated from newborn harbor seals with clinical signs of acute pneumonia and hepatitis at a rehabilitation center in the Netherlands in 1985 [35]. In the Pacific harbor seal *(Phoca-vitulinarichardsii)*; this virus is associated with focal caogulatory necrosis of the adrenal cortex and liver. In phylogenetic studies of PhHV-1DNA polymerase (gB) gene, their close relationship with herpesviruses of dogs and cats has been established.

Serological studies have shown widespread infection of PhHV-1 or other closely related α-herpes viruses in the free-ranging seal populations of the North Sea, as well as in the waters of the Antarctic and the North Pacific [42-44].

The results of virological screening, molecular genetics and serological studies indicate the circulation of PhHV-1 among Caspian seals and its possible involvement in their infectious pathology and recurrent mortality [45].

Coronaviruses are common pathogens of the respiratory system, gastrointestinal tract and cause systemic infections of domestic animals and wildlife.

Coronaviruses in marine animals were first described during seal mortality investigation in an aquarium of Florida [46], as well as among free-ranging pinnipeds along the coast of central California []. In harbor seals (harbor seal coronavirus - HSCoV), the infection is manifested by hemorrhagic pneumonia and causes epizootics with high mortality. In cetaceans, coronoviruses were isolated from the beluga whales in captivity [47] and from the feces of three Indo-Pacific dolphins (*Tursiopsaduncus*) [48].

HSCoV belongs to the genus of α-coronaviruses, closely related with coronoviruses of cats, dogs, ferrets and pigs [1]. Beluga whale coronavirus and dolphin coronavirus are γ-coronaviruses and represent a special type of cetacean coronavirus [50].

In addition to the listed viruses that infect marine mammals, there are reports of astro-and poxvirus zoonoses of cetaceans and pinnipeds [49-51].

Taken together, the available evidence suggests that the causative agents of these diseases are detected only after mass outbreaks of infections that have reached an epizootic scales. Therefore, it requires proactive diagnostic tools for the timely detection of new viruses with zoonotic potential capable of causing outbreaks of diseases, in order to develop an effective strategy to combat the devastating epizootics of vulnerable animal species.

Routinely, for the diagnosis of viral diseases, cell cultures are used to isolate pathogens, specific antibody based immunological tests, and polymerase chain reaction (PCR) for amplifying viral gene segments [52]. Unfortunately, all of them turned out to be ineffective in identifying previously unknown viral pathogens due to their unculture ability and lack of diagnostic antibodies to them. The possibilities of PCR diagnostics in such cases are also limited due to the need for specific oligonucleotide primers complementary to the conserved sequence of the pathogen genome fragment.

Unlike the above methods of identifying pathogens, viral metagenomics allows to identify new viruses without prior knowledge of their genome sequences. Viral metagenomics is used to directly identify new etiological agents from the affected animal tissues with pathological alterations [53, 54]. For example, in metagenomic studies of Ng et al. identified annelovirus (ZcAV) infection in two dead sea lions [55].The authors showed that ZcAV is found only in the lungs and pleural cavity, absent in the tonsils, lymph nodes, liver and other organs. This indicates that metagenomics can be used to determine the tissue tropism of new viruses. Subsequent studies have shown that the prevalence of the virus was high during outbreaks among sea lions in captivity (100%), low in wild representatives (11%); all this indicates the possibility of using metagenomic studies to detect viruses in marine animals. In addition to ZcAV, seal anneloviruses and fur seal sacobuviruses have been discovered using metagenomic studies [56]. Bodewes et al. [40] using metagenomic studies identified herpesvirus seal type 7 as an etiologic agent for ulcerative gingivitis in seals. With a similar method of analysis, it is also shown that Enhydralutis papilloma virus 1 is the etiological agent of oral cavity tumors in sea otters.

In the context of the above provided, the Caspian seal, as an endemic marine mammal, is one of the indicators of the Caspian Sea ecosystem. Diseases of unknown etiology [57-59] have a negative effect on its population, which indicates the importance of metagenomic studies of Caspian seal virom seals to establish the role of viral pathogens in their morbidity and regular mortality in conditions of intensive habitat development.

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**ТЕҢІЗ СҮТҚОРЕКТІЛЕРІНІҢ ВИРУСТЫҚ ИНФЕКЦИЯЛАРЫ
ЖӘНЕ МЕТАГЕНОМИКАЛЫҚ МОНИТОРИНГТЕ ЖАҢА ВИРУСТАРДЫ ТАБУ**

**Аннотация.** Шолуда теңіз сүтқоректілеріндегі тұмау А және В вирустары, морбилливирустар, адено-, герпес-, калици- және короновирустар қоздырған індеттер туралы мағлұмат берілген. Теңіз сүтқоректілерінің вирустық инфекцияларының ауқымы жайында вирусологиялық және серологиялық деректер келтірілген. Теңіз сүтқоректілердегі тұмау А вирустарының індетімен олардан антигендік формулалары H1N1, H1N3, H3N3, H3N8, H4N5, H4N6, H7N7, H10N7, H13N2, H13N9 штамдарды оқшаулап алу жағдайлары сипатталады. Итбалықтардың алдын-ала бейімделмеген тұмау вирусының ауқымды спектрін тікелей жұқтыру мүмкіншілігі топшыланған. Теңіз ескекаяқтылары адамның В тұмауы вирусының табиғаттағы сақтаушысыдеген түсінікке басымдық берілген. Ескекаяқтылар мен киттәрізділер коронавирустарының классификациясы туралы мәліметтер ұсынылған. Итбалықтар герпесвирустарының түр алуандығы мен олар туғызатын ауруларды балауда клиникалық белгілерінің маңызы көрсетілген. Ауру тудыруы мүмкін зооноздық әлеуеті бар жаңа вирустарды дер кезінде анықтау үшін ұтқыр диагностикалық құралдарды әзірлеу қажеттілігіне баса назар аударады. Каспий итбалықтары популяциясына этиологиясы белгісізаурулардың теріс әсерлері жөнінде айтылған. Шолуға тіршілік ортасын қарқынды игеру жағдайындағы каспий итбалығы ауруларымен тұрақты өлім-жітіміне вирустардыңқатысынзерделеу үшінолардың виромына метагеномикалық мониторинг жүргізу қажет деген қорытынды жасалынған.

**Түйін сөздер:** вирус, теңіз сүтқоректілері, каспий итбалығы, вирус, метагеномдық мониоринг.

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**ВИРУСНЫЕ ИНФЕКЦИИ МОРСКИХ МЛЕКОПИТАЮЩИХ И
ОБНАРУЖЕНИЕ НОВЫХ ВИРУСОВ ПРИ МЕТАГЕНОМНОМ МОНИТОРИНГЕ**

**Аннотация.** В обзоре представлены сведения об эпизоотиях среди морских млекопитающих, вызванных вирусами гриппа родов А и В, морбилливирусами, адено-, герпес-, калици-, короновирусами. Приводятся вирусологические и серологические данные о спектре вирусных инфекций морских млекопитающих. Описываются случаи эпизоотииу морских млекопитающих вирусами гриппа А и изоляция от них штаммов с

антигенными формулами H1N1, H1N3, H3N3, H3N8, H4N5, H4N6, H7N7, H10N7, H13N2, H13N9. Высказывается предположение о возможности инфицирования тюленей широким спектром вирусов гриппа путем прямой трансмиссии без предварительной адаптации. Подчеркивается положение о том, что морские ластоногие могут служить одним из резервуаров вируса гриппа B человека в природе. Приведены данные о классификации коронавирусов ластоногих и китообразных. Показано разнообразие герпесвирусов ластоногих и клиническая значимость показателей их заболеваемости в диагностике вирусных инфекций тюленей. Подчеркивается потребность в разработках упреждающих диагностических инструментов для своевременного выявления новых вирусов с зоонозным потенциалом, способных вызывать вспышки болезней. Отмечаются отрицательные воздействия заболеваний с невыясненными этиологиями на популяцию каспийских тюленей. Делается заключение о необходимости проведения метагеномного мониторинга вирома каспийских тюленей для установления роли вирусных патогенов в их заболеваемости и регулярной смертности в условиях интенсивного освоения среды обитания.

**Ключевые слова:** вирус, морские млекопитающие, каспийский тюлень, виром, метагеномный мониторинг.

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# REVIEW AND ANALYSIS OF PREVIOUS RESEARCHES IN THE SPHERE OF ENSURING THE PROTECTION OF INFORMATION AND EDUCATIONAL ENVIRONMENT OF UNIVERSITIES

**Abstract.** The paper reviewed and analyzed previous researches in the field of protection of the information and educational environment of universities (IEEU). It is shown that the priority development of digital education systems in many industrialized countries of the world requires appropriate technical and methodological support of specialists not only in the field of pedagogical activity, but also in information technology, taking into account the problems of cyber security and information protection. It is shown that the protected data that is stored and circulate in the information and communication systems of universities, in particular, include: personal data of students, teachers, researchers, support staff; digitized information representing the intellectual property of an educational institution; information arrays that provide educational process (for example, multimedia content, databases, tutorials); others. It is substantiated that these information resources can act as an object of theft or distortion from external (internal) computer intruders or from hooligan motives, from the side of students or employees.

It is substantiated that the trend towards globalization of access to information resources, formed in many countries, makes relevant the task of implementation the latest digital and information and communication technologies in all areas of activity of a modern university. The relevance of research in the direction of development of the models for decision support systems for finding investment control strategies for various ratios of the parameters of the investment process in the cyber security systems of educational institutions is also proved. There is shown the necessity of computer support for solving problems of finding investment control strategies in the cyber security strategies of educational institutions. There is described the necessity of developing a conceptual model of the adaptive control of cyber security of an informatization object on the example of IEEU.

**Key words:** cybersecurity, information and communication environment, educational institution, game theory, decision-making support, a choice of financial strategy.

**1.1. Prerequisites for the formation of a safe information and education a lenvironment of a modern university.** The priority of digital education systems development in many industrialized countries of the world required appropriate technical and methodological support of specialists not only in the field of educational activities, but also in the field of IT. Therefore, the trend towards globalization of access to information resources, formed in many countries, makes relevant the task of implementation the latest digital and information and communication technologies in all areas of activity of a modern university [1, 2].

At the end of the last century, but especially active at the beginning of 21st century, there was used the term "information and educational environment of the university" [1]. This concept in many scientific publications [3,4] is interpreted as: "A set of computer tools and methods of their functioning, which are used in order to implement learning activities" [2, 5]. Many aspects of the creation of the IEEU have already been studied in detail in the works of such authors as Mikhnev IP [6], Conklin A.[10], Gordon LA. [15] and others. In Kazakhstan, similar researches were carried out by Bidaybekov EY.[19], Nurgaliyeva KK. [20], Shafeev DE[2], Tleuberdiyeva G. [17], Kubieva TSh. [14] and others. However, beyond the framework of most existing researches on the development of IEE of the universities, there are aspects related to the tasks of ensuring the information protection and cybersecurity of information and

communication systems of the universities from any kind of destructive interference by computer intruders.

The globalization of education brought the questions about the use of information technologies and systems (ITS) in universities to the first place. However, the attention was not always paid to the parallel consideration of the tasks of ensuring information and cybersecurity (hereinafter, respectively, IS and CS) of both staff and students.

IT specialists have repeatedly noted [1,3,6] that in the tasks of IS and CS support the resource provision and protective mechanisms management of the universities (equally to other educational institutions (EI)) requires solving a number of problems:

1) the need to eliminate the lack of equipment with technical means of information protection (TMIP);

2) the lack of specialized training of personnel responsible for IS and CS of the university;

3) optimization in the tasks of the targeted funding distribution for IS and CS of the university;

4) and another.

Modern educational institutions unite beyond their walls a large number of highly qualified teachers, staff of research departments, students, as well as support staff.

However, constantly accumulating a variety of information, both of educational and methodological direction, as well as other data, for example, which connected with the EI, personal data of employees and students, IT specialists of universities faced to additional problems [7]. First of all, we should note the lack of a clear procedure in the accumulation process and in practical application of disparate and diversely formatted information resources. However, these resources often do not undergo an audit procedure regarding their IS and CS. Many of the software products installed in the university's information and educational environment (IEEU) are not related to each other, are often obtained from unreliable or compromised sources, therefore, they may pose a potential danger to IEEU.

To the protected data, stored and circulated in the information and communication systems of universities (ICSU), there can be attributed [2, 4, 7]:

- personal data of students, teachers, researchers, support staff;

- digitized information representing the intellectual property of the educational institution;

- information arrays that provide the learning process (for example, multimedia content, databases, training programs);

- others.

This information can act as an object of theft or distortion from external (internal) computer intruders (CI) or from hooligan motives, from students or employees.

During the dissertation research, there was performed an analysis based on the results of an audit of IS and CS of international companies dealing with relevant issues for state organizations, including universities and other large educational institutions (EI). First of all, they are EU, the USA and Canada [7, 8]. As the results of such studies [4,8] showed, as well as the data cited in [9,10], and not taking into account specific targeted attacks aimed at buffer overflow and violation of cryptographic protocols [11], a significant amount of violations is associated with unauthorized data changes in IEEU (> 12%), with bypassing the restrictions policy on IS in IEEU (> 15%), with insufficient protection of the authentication procedure, etc., see figures 1.1 and 1.2.

Different according to the source data [8,11] can be the targets, objects and subjects of cyber attacks on IEEU, see table 1.1.

Also, in there were noted threats for ICEI, associated with the rapid evolution of viral software, which poses a serious danger for many components of IEEU. Note that modern viruses are designed not only for Windows OS, but can also be dangerous for other systems in the IEEU structure, for example, for HDI and sensory subsystems (figure 1.3).

Modern computer networks of universities are usually associated with corporate information systems (CIS), and also have unlimited access to public networks. This increases the efficiency of the educational process implementation, but in parallel creates additional vulnerabilities, for IEEU, as well as for computerized OS control systems (for example, accounting systems for employees and students, accounting for material values, etc.). At the same time, such cyberattacks are quite realizable through the elements of interconnecting of IEEU with the local networks of student and teaching campuses, as well as with global networks, see figure 1.4.
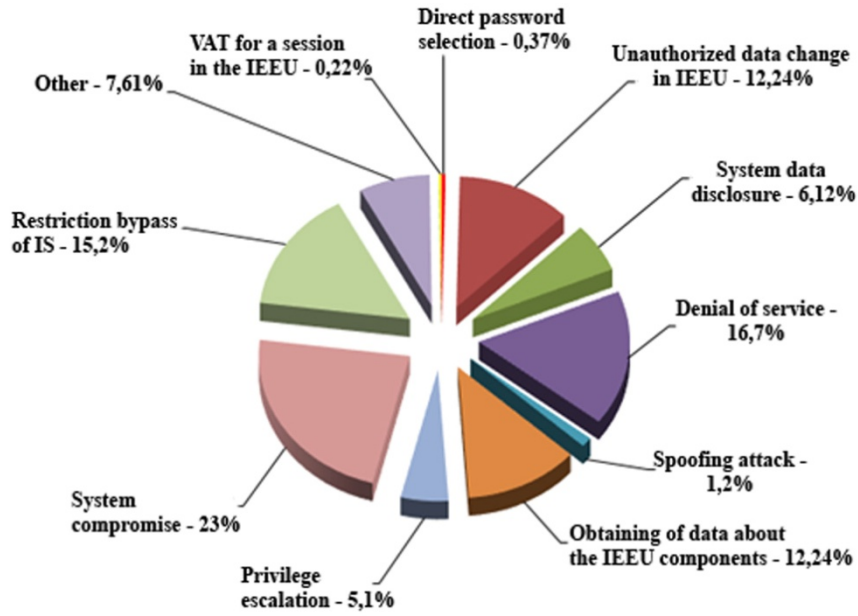
Figure 1.1 – Distribution of ICS vulnerabilities of public organizations
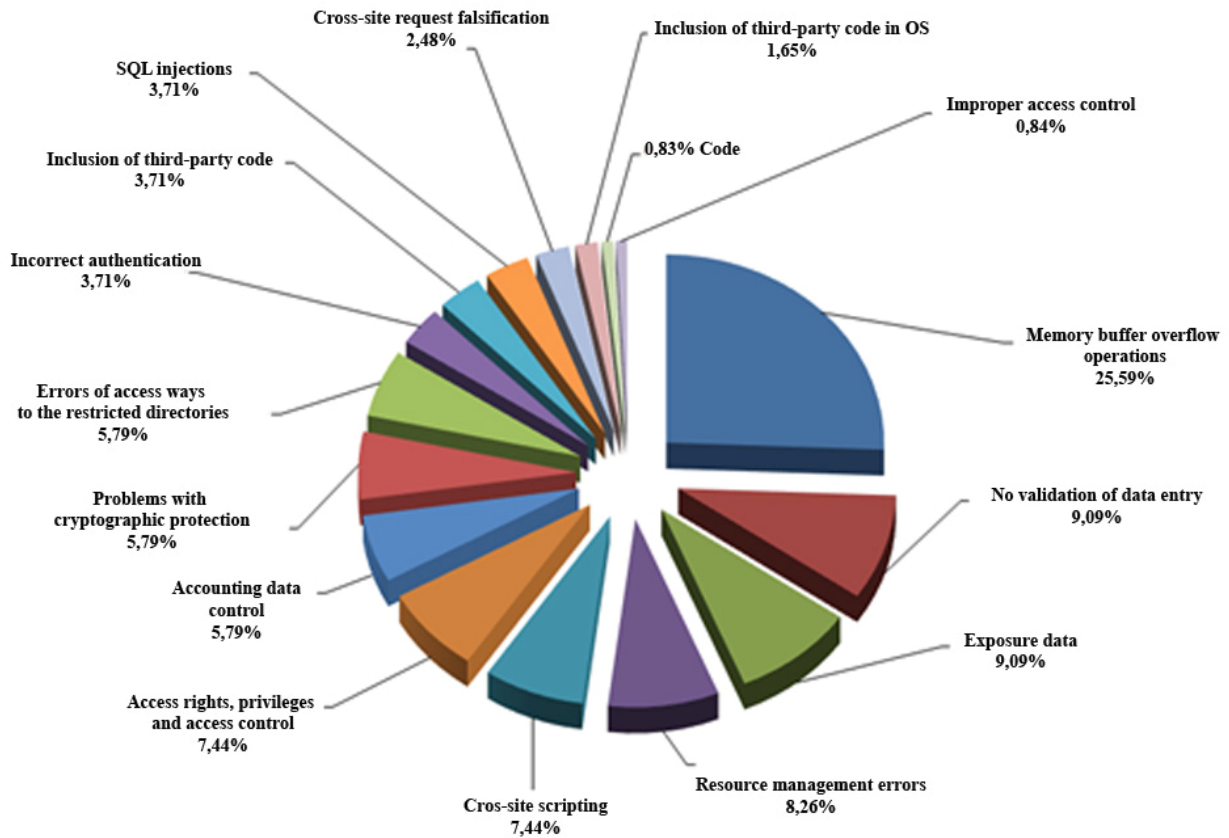


Figure 1.2 – Attacks on ICS of public institutions

Table 1.1 – Aims, objects and subjects of attacks on IEEU

| Types of cyberattacks | | | |
|---|---|---|---|
| Cyber espionage - unauthorized transmission using hidden (undeclared) data communication channels, IP programs, etc.) | Cyber audit - development of cyber attack scenarios, hacker and "friendly" cyber attacks, search for vulnerabilities in the IEEU. | Cyber fraud - the "sale" of fake electronic documents, and etc. | Cyber sabotage - a decrease in productivity, including at the expense of the IEEU resources, in particular, till a complete stop of the educational process. |
| Objects of cyberattacks | | | |
| InformationSystemsof EI | Own or ordered software of EI | EI databases | Local network components |
| The objects of cyber attacks on IEEU are: IS of EI, distance education systems, database servers, data of students, staff, support staff, etc. | | | |
| Attacking side | | | |
| Novice hackers, professional hackers, competitors, insiders, organized crime groups, etc. At the same time, the level of technical equipment and competence of the attacking side can be quite high. | | | |

Figure 1.3 – Virus attacks on ICS of publicin stitutions (penetration methods)
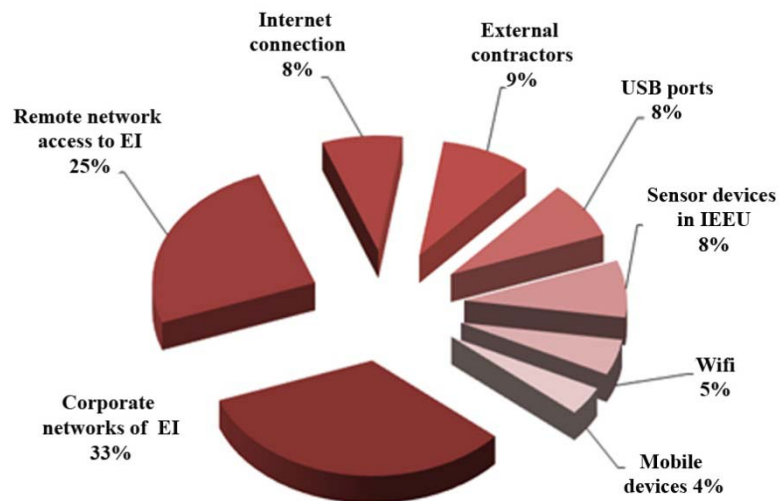


Figure 1.4 – Sources and channels for the development of attacks on IEEU and on the control systems of educational institutions
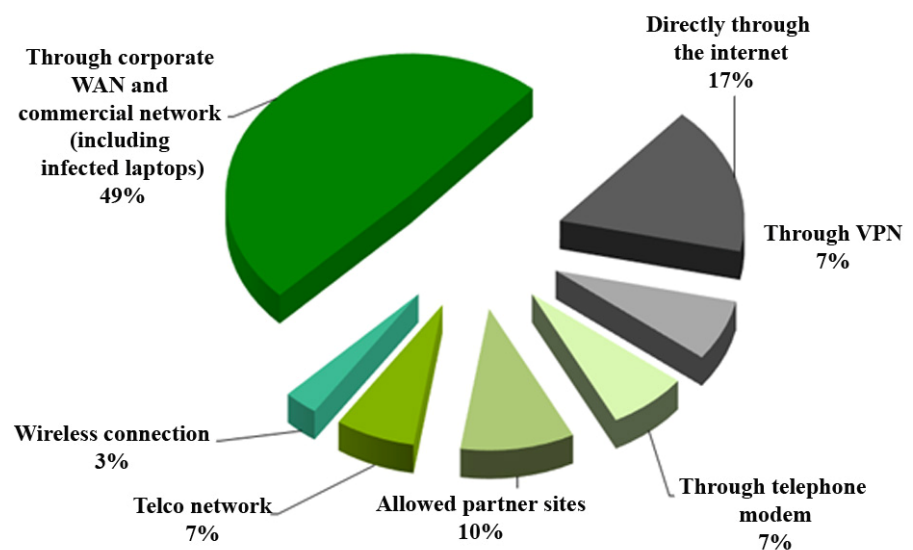
Analysts of various companies that deal with IS and CS issues, including for government organizations (including major EU and US universities), on the basis of long-term cyber incident statistics, cite such data on the distribution of ICS vulnerabilities. Web-applications account >40% of vulnerabilities, about 23% for server software, > 25% for client software and about 11% for operating systems [12], see figure 1.5.

Similar data are cited by other sources. According to [93, 95, 96] approximately 40% of all detected in 2010–2018 vulnerabilities of ICEI were accounted for Web-applications.

For several years, analysts in the field of IS and CS have fixed a trend indicating a steady increase of the amount of cyber incidents and cyberattacks in IEEU, figure 1.6.
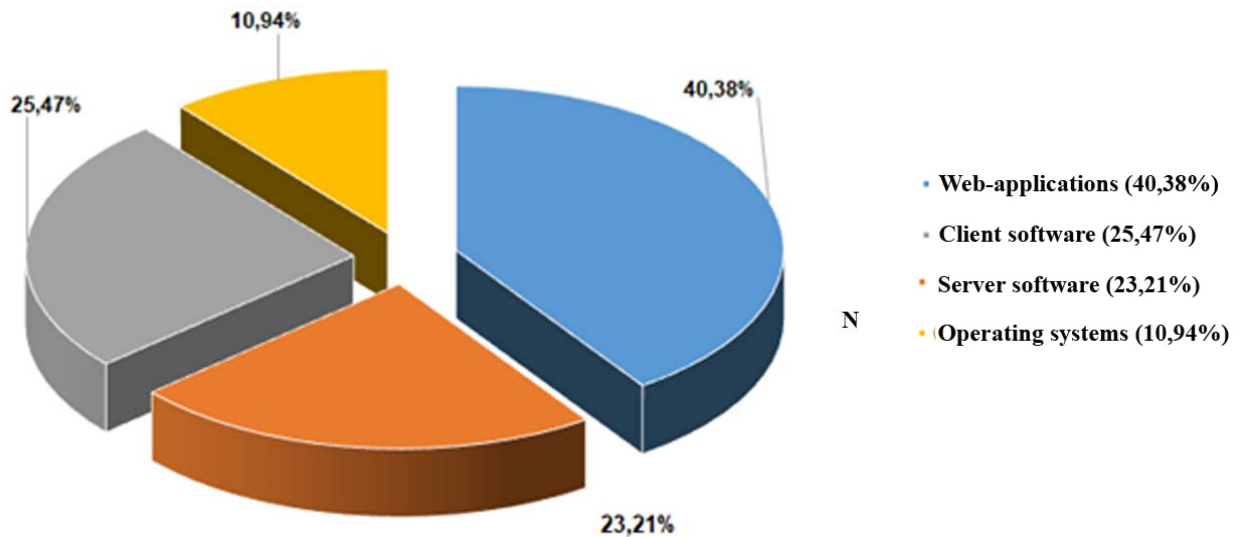


Figure 1.5 – Distribution of vulnerabilities by the type of application in IEEU
(For the period 2010-2018)
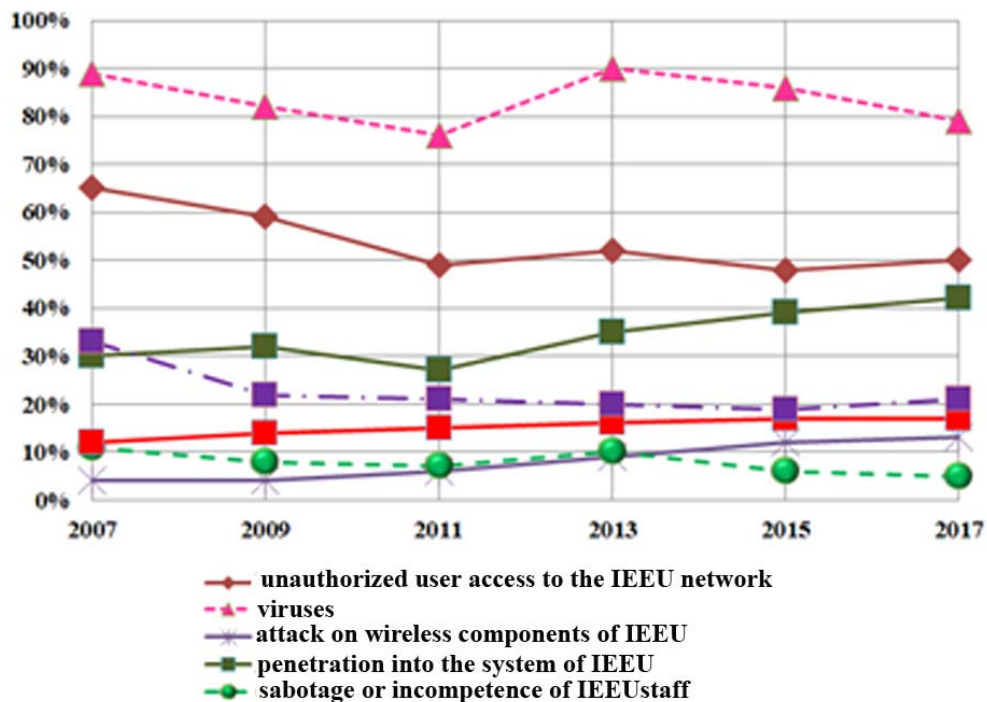


Figure 1.6 – Cyberthreats dynamics for ICS of EI
[According to 7, 11, 18]

This, in particular, can be explained by the increase of the amount of local networks of universities and other EI that are connected to public networks [12, 13].

In publications devoted to the problem of evaluating the security of IEEU [10, 12] it is noted that in addition to the technical tasks on protection of the information circulating in ICSU, it is necessary to analyze periodically information risks and to monitor the effectiveness of the implemented measures aimed at ensuring IS and CS of the university. These procedures allow to consider:

- the variability of requirements in the tasks of information protection (for example, from content protection to protection of personal information of employees and students);

- the potential possibility for the emergence of new cyberthreats and vulnerabilities in ICSU;

- the decrease of the effectiveness of already implemented measures for information protection over time;

- the decrease of the reliability of information processing in IEEU by physical obsolescence of the equipment and software.

An active implementation and widespread use in universities and other educational institutions of wireless networks, including sensor networks and technologies [13, 14], has created new vulnerabilities for the cyberattacks class - denial of service.

In addition, as was shown in [10, 14], the sensor nodes are often least protected from unauthorized access (UAA). At the same time, their resources and service life depend on the power supply, the amount of on-off cycles, which in turn may become a target for hackers. Therefore, an attacker can use such restrictions in order to obtain full control over the IEEU sensor node, for example, over the terminal through which tuition fee is paid or for other services provided at the university (payment for a hostel, Internet services, a gym or other). Sensor nodes are also can be easily compromised, in particular, by DoS-attacks.

During the development and modernization of CICS, there are implemented modules and components of third-party suppliers in them, in particular, sub-components can be responsible for IS of CICS. But, during such modernization the procedure of preliminary testing of their cyber-security is not performed, such components may be vulnerable to potential attacks.

We also note the data of the researches [9, 15], in which there were considered the problems of reducing the complexity of successful cyberattacks aimed at ICS of state structures. In particular, it is noted that the complexity level of successful attacks has decreased from a maximum value of more than 87% in 2004, to 46% in 2018, see figure 1.7.
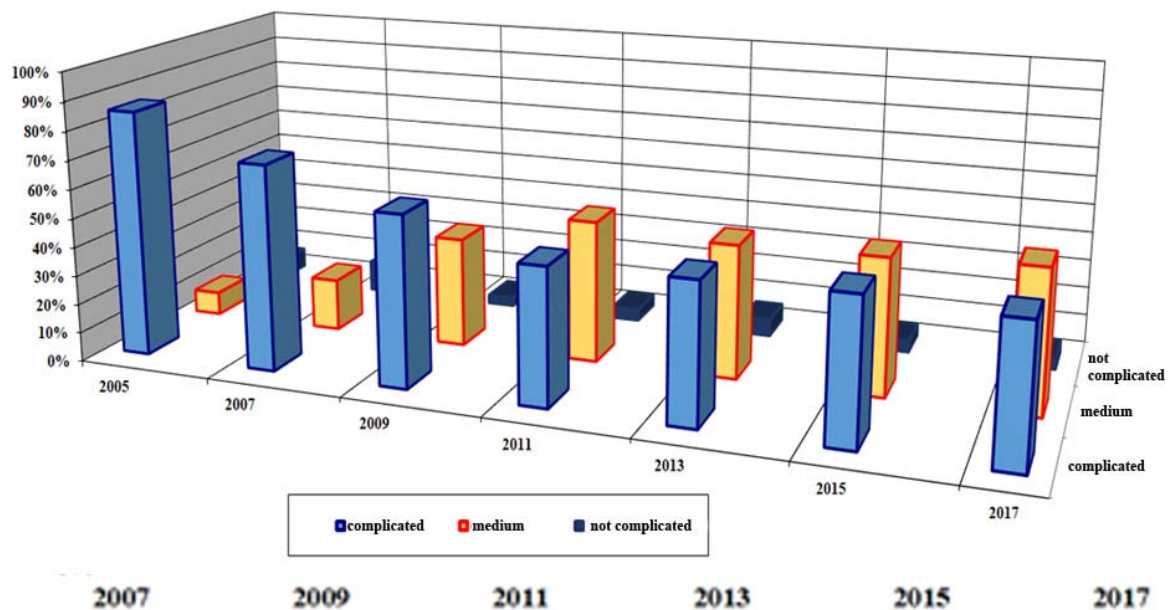


Figure 1.7 – Requirements growth dynamics for the level of cyberattacks complexity

However, for the same period of time, the amount of vulnerabilities of medium complexity in ICS has increased from 5% to 44%. Attacks on complicated vulnerabilities in ICS remain approximately at the same level for the last decade and do not exceed 3-4 4% [12].

Details in carrying out such an analysis in comparison with past results will ultimately determine the allowable risk levels for IS and CS of IEEU [15].

The approaches to solving the above problems [15,16], described in many literary sources, at one time allowed to make significant progress in solving them for commercial enterprises and organizations. However, EI with their specific of access organization to information resources cause a slightly different specifics of the organizational and technical control of IS and CS.

It should be noted that many EI (schools, colleges, universities, student campuses, libraries, etc.) still retain their traditional approach to solving problems of financing of means and information protection systems (IP) and cybersecurity (CS) [1, 2]. Most of the funding strategies to the CS systems involve only the allocation of funds for anti-virus programs and for relatively uncomplicated network protection tools [2, 3]. This is a very simple financial strategy for cyber protection of EI. Even experienced administrators of information and cyber security services are not always ready for the worst case scenario during cyber-attacks on computer systems and EI networks [2, 3]. The information protection side needs to shift its attention to changing traditional approaches on CS means (CSM) financing. For example, at the stage of choosing the financial component of CS strategy investment the change to the policy, which involves the detection and blocking of potential hacks of computer systems and networks of ICTS of EI [4].

In works [15, 17] there is noted that today international investment projects in the field of education and, in particular, in the field of digital information and educational platforms, have become common practice of international cooperation. In our opinion, such investment projects must necessarily involve a deep analysis of the financial strategies for ensuring the cybersecurity of EI and their joint information and educational environment. As many specialists of information protection (IP) note, CSM of educational institutions, in particular, large international, public and private universities should not only ensure the safety of information files and data, including confidential, but also guarantee the impossibility of external unauthorized penetration into IEE of EI [1-3]. The constant increase of the amount of cybercrimes in the world only reinforces the need to increase financial investments in CSM [4–6], in particular for EI.

We should note that to the protected information, that is stored and circulate in the EI, there can be attributed [2, 4, 7]: personal data of students, teachers, employees; digitized information representing the intellectual property of the educational institution; information arrays that provide the learning process (for example, multimedia content, databases, training programs); others

This information can act as an object of theft or distortion from external (internal) computer intruders (CI) or from hooligan motives, from students or employees.

Taking into account the interpretation of IEEU, given by different authors, it is possible to modify its structure taking into account the problems of ensuring cybersecurity [17]. Therefore, is there is proposed such a protected structure of IEEU and, accordingly, the information and educational space of the university, see figure 1.8.

Naturally, the construction of such a complex organizational structure as protected IEEU (hereinafter - IEEU) requires sufficiently large financial resources, which still need to be properly managed.

The procedure for investing in innovative projects, in particular, in the development of digital educational technologies with a focus on formation of the information and educational environment (IEE) of EI, is often characterized by a high degree of uncertainty and riskiness in the tasks of ensuring the cybersecurity of EI. The landscape of cyberthreats that has changed in recent years [5, 6] has fundamentally influenced the attitude to the problems of CS of many EI [1, 2]. First of all, this was due to significant potential vulnerabilities and cyberthreats for IEE of EI, to the emergence of new classes of cyberattacks, to the widespread use of wireless data transmission technologies, etc. With the rapid implementation of digital technologies in education, not all investors, for example, at the creation private and including large international universities in the Russian Federation, Ukraine, and Kazakhstan, paid due attention to the problems of CS of IEE EI [1, 2, 5]. We also note that not many publications in this field contain a description of models related to finding different variant strategies in mutual financial investment of EI in CS [3, 4].
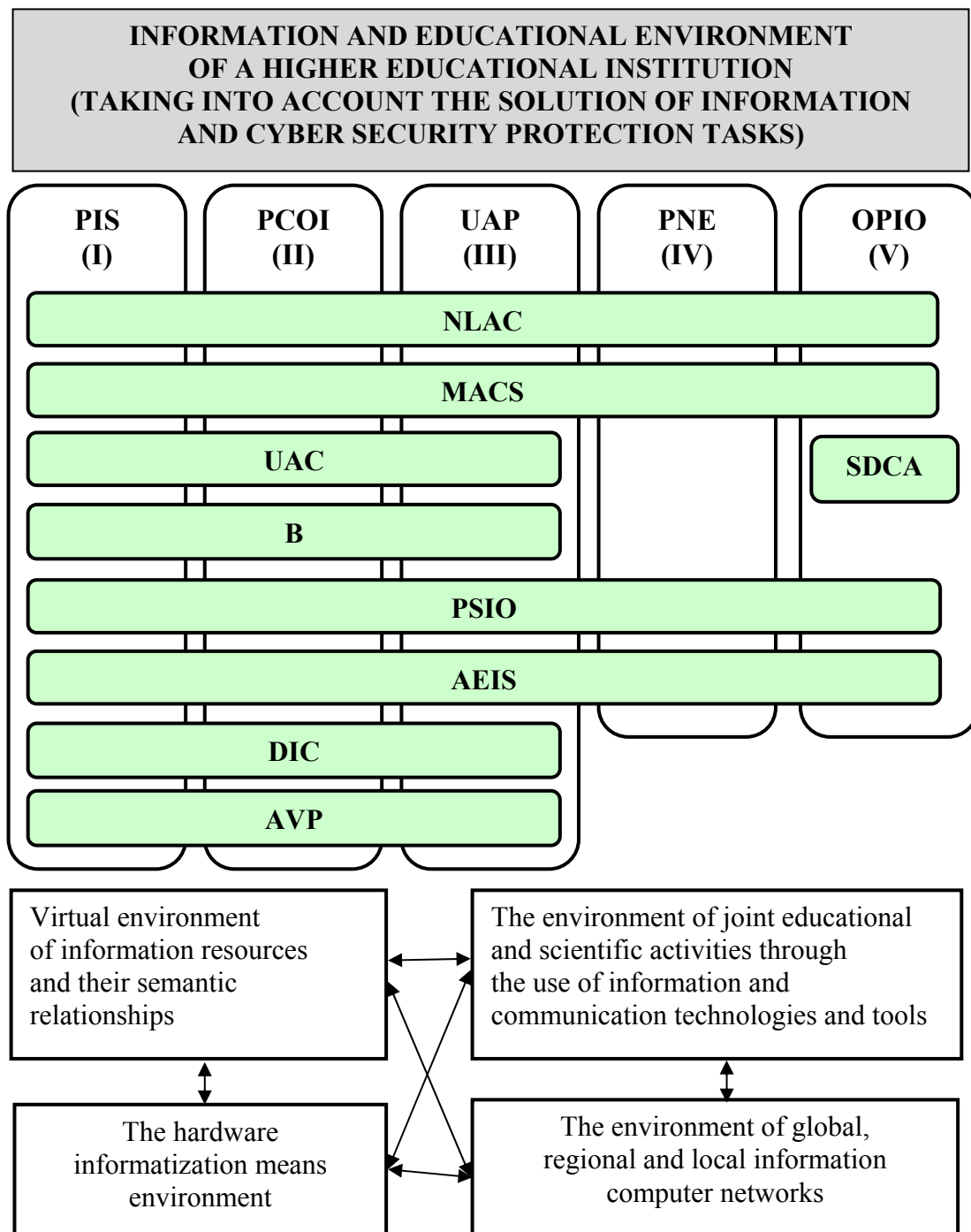
Figure 1.8 – The structure of the protected information and educational environment of the university

The following notations are accepted: AVP – antivirus protection; DIC – data integrity control; AEIS – audit of events of information security; PSIO – physical security of information object; B – backup; UAC – user access control; SDCA – subsystem of detection of cyber attacks; MACS – Monitoring and; analysis of cyber security; NLAC – Network-level access control.

CS of IEEU perimeters: PIS (I) – The perimeter of the information system; PCOI (II) – Perimeter of control of object of informatization; UAP (III) – User Access Perimeter; PNE (IV) – The perimeter of the network equipment; OPIO (V) – The outer perimeter of information object.

In order to improve effectiveness in evaluating various investment projects CSM of EI, and the subsequent decision-making, related to investment, it is necessary to use modern information technologies [5]. For example, technologies that are based on the use of decision support systems (DSS) [1, 2].

The filling of the information and algorithmic component of the DSS can be implemented by introducing blocks that contain algorithms for mathematical models for CSM of EI investment.

We should note that despite the commonality of the taskson CS for various informatization objects (hereinafter IO, it is accepted that IO can be IEEU, an automated control system for complex production control or a banking system), each of them has its own specificity of cyberthreats [1-5]. However, a common initial task at the creation of effective protection systems and CS of any IO remains the task of examining a specific protection object, forming models of a potential intruder (computer intruder - CI) and cyberthreats [1-5]. The implementation of the above steps will ultimately provide adequate requirements for information security systems (ISS) of IO and IEEU, as a special case.

In the conditions of increasing complexity of cyberattack scenarios on IEEU, information security analysts at universities and other educational institutions need to respond fairly quickly to cyberattacks, threat anomalies. This makes it urgent to search for new ways to improve the effectiveness of decision-making in tasks of respond to attempts of destructive interference by CI or unfair university staff in IO work. And in this situation, various intellectual decision support systems (IDSS) and expert systems (ES) can play a significant role in the tasks of ensuring cyber protection of IO [5-7].

The mathematical component of the IDSS and ES in the tasks of CS are the various models and algorithms that enable professionals to intellectualize decision support. As part of the research, there was considered the possibility of synthesizing analytical models for the main types of unauthorized access to the IEEU resources. The possibility of describing functional models of cyber protection systems of IEEU in terms of Petri network theory [7, 8] seems quite promising. Such a presentation will allow IS and IP analysts to detail the threats in protected IEEU. In addition, in the future, it is possible to determine the states that potentially determine the vulnerability of IO to the new cyberthreats. There is also considered the perspective of using this model based on Petri networks (and Petri – Markov networks) and colored Petri networks as a mathematical and algorithmic component, designed by IDSSat analyzing cyberthreats for various IOs. In our opinion, these judgments make our work relevant and increase the effectiveness during the creation of IDSS in the tasks of IS and CS for various IOs.

Consequently, the task of developing new mathematical models for DSS, which will allow adequately to describe the actual processes of CS investment, is an urgent task. This will allow more sensible to choose approach of funding strategies for CSS of EI.

**1.2. Review and analysis of previous researches in the field of cyber protection of the information environment of educational institutions.** To the theoretical researches of the cyber protection problem of information and communication systems (ICS) of state structures, including IEEU, there were devoted a great number of works of scientists from the CIS countries: Bidaybekov EY. [19], Fedorov A [1], Shafeev DE. [2], Zhankalova ZM. [3], Khokhlov YE [4]., Yakovlev AS [7], Kubieva TS. [14], Tleuberdiyeva G. [17].

However, in Kazakhstan and other CIS countries these publications are rather limited in scope or are very fragmented, being limited only by theses of reports on the topic "the needs for cyber protection of educational institutions". Theoretical studies and research results are presented in some publications [4, 8, 13-15], and in others - experimental data or results of simulation modeling [15]. A separate segment of research is devoted to the problems of developing hardware and software means for IS and CS for EI [15, 18, 19].

To the researches of the effective strategies choice for financial investment in CS, in particular for EI, there were devoted a fairly large amount of publications [4-6].

Among the IS and CS models, the Gordon-Loeb (GL) model [8, 9] is the most thorough and widespread. The purpose of this model is to solve problems associated with determining the optimal amount of investment to information protection. The key point in the GL model is the implementation and development of the vulnerability function, which determines the level of IS and CS for the considered informatization object, in particular for IEEU. An informatization object can have various forms – a list of users, a book of accounts, a strategic development plan, a website, and etc. Security enhancement may occur in the direction of protecting confidentiality, integrity, authenticity, reliability, availability of user authorization, etc.

The model is static in its structure. Consequently, decisions and results occur simultaneously, and dynamic effects, including the dependence of money on time, are not taken into account.

Considering that investments in the means and methods of IS and CS are ineffective with sufficiently small and sufficiently large values of vulnerability, the authors of the GL model, as well as several works [8, 9] who developed the ideas embodied in the GL model [16, 17], noted the following circumstance. Many authors believe that the first task of control the separation of objects into low, medium and high levels of vulnerability should be addressed at the preliminary design stage. However, at the same time, the authors of the GL model [18], similar models noted its disadvantages:

1. There is no simple procedure for determining the possibility of an attack and the vulnerability of information arrays.

2. It is problematic to determine the potential losses from the security violation of the protection perimeters and cybersecurity of the informatization object. (For ourselves, we note that for IEEU these perimeters of IS and CS are rather conditionally enough).

3. The complexity of the research results implementation on a specific object.

4. It does not take into account how the attacker will change his strategy at making additional investments for protection, that is, there is no analysis of the opposition in a dynamic mode.

Despite the fact that the GL model has been widely recognized and has been developed in many works over a decade since its publication, most of the posed problems have not been solved till today. The undeniable merit of the authors of the model is that for the first time they thoroughly examined the problem and identified the vulnerability function, which is a key oneat considering the confrontation in the information sphere.

Determination of the function form expresses the vulnerability of a dynamic system, and is a key task in the mathematical modeling of information opposition, and the work of many researchers has been devoted to this problem [18].

According to the history of the problem the confrontation of the two sides was firstly thoroughly examined by specialists of the RAND Corporation at the end of the Second World War during the development of the mathematical foundations of military planning. The model of confrontation of the two sides, developed within the framework of the RAND company, is the model of Gross [12, 15], designed in order to simulate tactical military operations. According to this model, the conflicting sides have the resources $X$ and $Y$, and the result of their opposition is determined by the target function, which linearly depends on the difference of the invested resources and which leads to the task of linear programming. The task of Gross, which arose during the planning of military operations, has a number of differences from the considered problems. Firstly, the target function is discrete, since it determines the amount of units that broke through the defense or destroyed an attack or defense. Secondly, these units in each confrontation episode are the same for attack and, accordingly, for defense.

The uniformity of objects greatly simplifies the solution of the problem, but limits the confrontation conditions. However, the main disadvantage of the Gross model is the piecewise linear character of its target function, which, of course, cannot correspond to real conditions. For this reason, the Gross model, taking into account its simplicity, is used only to approximate the target function and to obtain results at the first approximation [4, 12, 18].

Another mathematical model, that makes it possible to calculate the level of losses due to the realization of threats,and which depends on the amount of costs on IS and CS, is the model described in [11]. The purpose of the researches [12] was to assess the stability of the technical information protection complex (TIP) over time using known probability distributions [4, 5].

In the absence of financial investments in protection or its modernization, the probability of reliability, security is zero regardless of time. This model allows to establish the dependence of the protection probability from the most effective investment.

The main difficulties at the creation of the model are connected with the collection of statistical data on the hacking results (and the need for the fact of the protection hacking itself), since such a protection system cannot be used afterwards. In this regard, the author [13, 21] developed a method for determining the probability of reliability of TIP based on actual hacking attempts, which allows to evaluate the probabilistic reliability of single protection systems and at its installation on several objects (for example, installation of an antivirus program on several computers allows to predict not only an attempt, but also

the time at which hacking is possible on other computers) [16]. The disadvantage of this method is the need to know the effectiveness of TIP, which in this case is obtained as a result of analysis the consequences of a real hacking of the system.

As a result of the researches conducted in [17, 19], the authors showed that the parameter that determines the properties of TIP can be not only a constant value, but also a function. Moreover, this function will depend on hacking attempts and on the time when such attempts take place, for example, at the selection of passwords during the user authentication procedure in the informatization object network []. According to the researches there were obtained functions that allow to calculate the frequency of hacking attempts.

The Glushak-Novikov model [17, 18] is aimed at optimal placement of protection mechanisms between the components (objects) of the system, which will ensure the maximum level of security.

The search for the optimal set of protection mechanisms that ensures the minimum risk of information loss is carried out using the example of a district offices system of theinformatization object distributed territorially (the author considered an example of a bank branch) [10, 20]. The amount of information in each department is proportional to the potential amount of customers, that is, to the amount of residents in the district. The probability of individual threats realization, as well as the cost and effectiveness of each of the protection mechanisms, is determined by the method of expert evaluation. It is assumed that the probability of a threat realization for each object is the same and depends only on the type of the threat. Considering the various combinations of protection elements for each of the territorial branches, there are calculated the total damage for the entire system (which characterizes the degree of risk) and the optimal set of protection elements for each branch. In this case, there is made a check of the conditions for imposing restrictions on the total cost of the protection system.

Calculating the total risk, the problem of the size of the cross-section equations, which express the amount of damage from the realization of various types of threats (these events are considered compatible), remains open.

To the use of the "attack-protection" economic value models for risk assessment and for the researches on the investment effectiveness in information security there is devoted the work of O.E. Arkhipov [4, 5]. In order to determine the risk probability parameters in these models, there are used certain characteristics of motivational value and economic and financial relations characteristic for the "attack-protection" situation in the information sphere. In particular, the there is considered the situation arising from the realization by the attacking side *A*(the attacker) of the threat *T*regarding some information resource *I*, which belongs to the side *B*.

The describedin [9, 20] models are proposed to be used in order to calculate directly the risks of any particular organization if there is a real opportunity to analyze and to quantify the economic and cost characteristics of the information threat realization. Output data for these assessments can be obtained by performing a survey (audit) of the organization's information security state in accordance with the guidelines and recommendations of risk management standards with certain additional information. Static-time assessments can be developed into dynamic ones that change their values in time according to the accepted economic and cost attack scenarios [5].

The economic and cost-based "attack-protection" models also provide an opportunity, on the basis of specific information about a real organization, to check whether the funds invested in the information security of this organization are sufficient [6].

To theresearches of cyber attacks on information systems there is devoted the work of Khoroshko V.A. [10]. An assessment of the attacker's capabilities in cyber attacks is carried out using game analysis methods [15].

Formalizing the optimal cyber attack cycle on the information sphere there is supposed the operating of the equilibrium concept of Nash B.[15].

We should note that this model does not take into account the impact of investments on the optimal solution choice, however, the researchers demonstrate how the developed game analysis methods allow to evaluate both single and group cyber attacks.

This allows to obtain guaranteed and reliable assessments of the level of information security from cyber attacks on the information sphere, for example, of an educational institution [9].

The development of economic relations and the information sphere, particularly, in the field of education, leads to an increase in competition, to an increase in the volume and cost of information, as well as potential losses from its leakage, to an increase in the amount of information objects (in IEEU this is especially noticeable and dynamic),tothe frequency of cyber incidents. At the same time, the opposition conditions are constantly changing, reflecting the dynamic interaction of two opposite sides - the side of information protection and the side of the attackers. Changes in the strategy and tactics of the cyber protection side cause new attacks on information resources, which, on the one hand, show the opponent's intentions, on the other hand, point to weaknesses of the protection side, which are usually targeted by attacks or other attempts of destructive intervention. Other reasons for changes in approaches of IS and CS of IEEU can be factors related to the "obsolescence" of information, to the introduction of new information and additional resources, to the redistribution of information resources between objects, to the occurrence of new connections between them.

The antagonistic confrontation of the two sides (the protection and attack sides) in the information sphere is characterized by the fact that the protection side is usually in uncertainty about the actions and financial capabilities of the enemy (hacker). At the same time, the attackers have some idea about the structure of the protection system and can direct their efforts towards breaking the weakest points of the security system. That will give the attacker the greatest effect. The distribution of protection resources to blocking various types of threats can be carried out both in active mode – ahead of the opponent's actions, and in adaptive one with aninvestmentdelay when the direction of possible attacks is clear.

We should note that the need for dynamic resource control is due to the following reasons:

- the uncertainty of the opponent's action variants, namely the focus of his efforts to obtain information and the scale of these efforts, which in particular depend on the financial hackers' resource component, spent on hacking;

- the changes in both internal and external confrontation conditions - the information cost, its distribution among objects, the direction of enemy attacks, the occurrence of new attackers;

- a change of the information system state (IEEU is considered as a special case), in particular, a change in its weakest unit after detection of the attacks target and the adoption of appropriate measures by the protection side.

Analysis of scientific works on mathematical modeling of information protection systems showed that the main efforts are focused on determining the amount of investment in protection (table 1.2).

Several works are devoted to theproblems of distribution of these investments among the protection objects. In addition, existing developments [9] rarely take into account the impact of possible actions of the attacker and their consequences on the indicators and characteristics of the system.

Therefore, the conducted analysis of the workson the subject under study showed that the task of efficient using of limited financial resources in order to protect information of business entities and educational institutions in particular is becoming increasingly important and significant [15, 16, 20, 21].

Table 1.2 – Comparative characteristics of mathematical models of investment
in information and cybersecurity of the informatization objects

| Compared criteria / Models | Security resources are taken into account | Attacking resources are taken into account | The cost of the individual protection mean is taken into account | Object vulnerabilities are taken into account | Optimization of resource distribution between protection objects | Calculation of the optimal solution in the dynamic mode |
|---|---|---|---|---|---|---|
| Gross model | + | + | – | – | + | – |
| Gordon-Loeb model | + | – | – | + | – | – |
| Zadirako model | + | – | – | – | – | – |
| Glushak-Novikov model | + | – | + | – | + | – |
| Zhurilenko model | + | – | – | + | – | + |
| Arkhipov model | + | + | + | + | – | + |
| Khoroshko-Khokhlachova model | – | – | – | + | – | + |

In addition, in conditions of uncertainty, when the actions and financial resources of the attacking side can be assumed only with a certain probability, the search for the optimal distribution of limited resources among the information protection objects through the use of game-theoretic methods and taking into account the dynamics of opposition conditions will reduce financial losses from information leakage to a minimum.

The development of computer systems and information technology has given a rise to a separate concept of works on optimizing investment in CS. This research concept is based on the extensive use of expert systems (ES) [7-9] and DSS [10-12] in the tasks of determining rational investment strategies in the field of CS. We studied quite a lot of works in this area and came to the conclusion that most of these publications [12] do not contain specific decisions on the choice of rational strategies for mutual financial investment in CS of EI.

Also, as follows from the conclusions of [8, 9] and [11, 12], the use of ES and DSS in order to automate procedures for choosing rational investment control strategies for CS is not always accompanied by clear recommendations.

These circumstances led to the problem associated with the need to develop new models for DSS in the tasks of determining rational strategies for mutual financial investment in CS of EI.

Based on previous experience and approaches presented by the authors in earlier publications on this topic [9], as well as works of third-party authors [14] that are close to the research methodology, we can state that a rather effective approach in order to solve this class of problems is to use methods of the theory of differential qualities games with several terminal surfaces [4-7].

Therefore, the analysis of publications on this topic confirmed the relevance of the problem of the further development of models for DSS in the tasks of continuous mutual investment in CS of EI. The last one is especially important in cases where it is necessary to develop clear recommendations for investors. But there is no need to apply complex mathematical calculations, since most of the computations are done by computer programs.

In works [1-6] there were presented the results of researches on the use of Petri networks for describing the threat model of CS of IO. And although these works have made an undeniable theoretical contribution in this area, in our opinion, the models proposed by the authors are somewhat difficult to implement programmatically, in particular in the IDSS and ES on IP and CS of IO.

On the basis of the works [2, 3] it is possible to construct threat models using a fairly visual tabular form of displaying threats at updating the task of IO security assessment. But as mentioned earlier, this approach to the development of threat models is laborious. And besides, the growth in the amount of threats makes such a tabular presentation format difficult to understand, especially for specialists with small experience in the field of CS.

Petri networks (and Petri – Markov networks) were also successfully used to describe intruder models [4]. However, the authors did not consider the possibility of adjusting the intruder model (CI), in particular, by combining it with models based on the graph theory, which would more accurately describe the transition states in the process of probable overcoming of the cyber defense perimeters (borders) of CS by CI for a particular IO.

In the works [13, 19, 20] the ISS models for various IOs were considered as a sequence of elementary operations that were pre-allocated on the Petri network, from which a cyber attack is possible. The models made it possible to calculate the probabilities of the implementation of different attacks over a given period of time. However, the models considered in [13] did not allow the calculation of temporal characteristics during the process of implementing new cyber threats.

In the works [17, 21] there were also proposed the models based on Petri networks and describing the processes of realization of threats in information systems (IS). And although these models make it possible to assess many of the parameters of IO security, in particular, the possibilities of threats, the time for threats, the consistency of the CI actions seems to be incomplete. In particular, in these works there has not been studied the problem of resolving conflict situations that arise when IS states change during attacks belonging to different classes. This circumstance, in our opinion, limits the practical applicability of these researches.

Therefore, the addition of existing methods of detecting and analyzing threats, as well as intruder models on the basis of algorithmization and visualization of Petri networks can be an effective tool for

predicting the security state and new threats for specific IOs. This will significantly simplify the understanding for new cyber threats and in the future it will be possible to use the proposed approaches by analysts of the IP and CSservices of different IOs.

**1.3. Conclusions and statement of research objectives.** In order to achieve the aim of the research it is necessary to solve the following tasks:

- to develop a model for a decision support system for searching the investment control strategies for various ratios of the investment process parameters in the cyber security systems of educational institutions;

- to develop a computer program "Decision Support System for Searching the Investment Control Strategies in Cyber security Strategies of Educational Institutions";

- to perform computer simulations for different investment strategies, in order to verify the adequacy of the model;

- to develop a conceptual model of the adaptive cyber protection control of an informatization object (for example, IEEU) using the apparatus of Petri networks;

- to develop models for user tasks distribution in the IEEU computer networks;

- to complement access control methods in the context of reconciliation of access rights in IEEU.

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**УНИВЕРСИТЕТТЕРДІҢ АҚПАРАТТЫҚ БІЛІМ БЕРУ
ОРТАСЫН ҚОРҒАУДЫ ҚАМТАМАСЫЗ ЕТУ СФЕРАСЫНДАҒЫ
АЛДЫҢҒЫ ЗЕРТТЕУЛЕРГЕ ШОЛУ ЖӘНЕ ТАЛДАУ**

**Аннотация.** Жұмыста университеттердің ақпараттық білім беру ортасын қорғауды қамтамасыз ету сферасындағы алдыңғызерттеулерге шолу және талдау жасалған. Әлемде көптеген өнеркәсіптері дамыған мемлекеттерде цифрлық білім беру жүйесінің дамуындағы артықшылығы тек қана педагогикалық қызмет облысындағы мамандарға ғана емес, ақпаратты қорғау және киберқауіпсіздік проблемаларын ескере отырып ақпараттық технологиялар мамандарына да сәйкес технико-методологиялық қолдауды талап ететіні көрсетілген. Университеттердің ақпараттық-коммуникациялық жүйелерінде сақталатын және айнала отырып қорғалатын мәліметтерге атап айтқанда: оқушылардың, оқытушылардың, ғылыми қызметкерлердің, көмекші қызметкерлердің жеке мәліметтері; оқу орнының интеллектуалды жеке меншігі ретінде қарастырылатын цифрланған ақпарат, оқу процесін қамтамасыз ететін ақпараттық массивтар (мысалы, мультимедиялық контент, берілгендер базасы, оқыту бағдарламалары); т.б. жататыны көрсетілген.Осы ақпараттық ресурстар ішкі және сыртқы компьютерлік қаскүнемдерден немесе бұзақылық әрекетпен оқушылар немесе қызметкерлер тарапынан ұрлауға немесе бұзуға болатын объект ретінде қарастырыла алатыны негізделген.

Көптеген мемлекеттерде ақпараттық ресурстарға қол жетімділікке қалыптасқан жаһандану тренді заманауи жоғары оқу орындарының қызметтерінің барлық сферасына жаңа цифрлық және ақпараттық-коммуникациялық технологияларды енгізу есебінің өзектілігін көрсететіні дәлелденген. Оқу мекемелерінің киберқауіпсіздік жүйелерін қаржыландыру процесінің параметрлерінің түрлі қатынастары үшін қаржыландыруды басқару стратегияларын табу бойынша шешімдерді қолдау жүйелері үшін модельдерді әзірлеу бағытында зерттеудің өзектілігі негізделген. Оқу мекемелерінің киберқауіпсіздік стратегияларына қаржыландыруды басқару стратегияларын табу есебін компьютерлік қолдау арқылы шешу қажеттілігі көрсетілген. Обоснована необходимость разработки концептуальной модели адаптивного управления киберзащитой объекта информатизации на примере ИОСУ. Университеттің ақпараттық білім беру ортасы мысалында информатизация объектісін киберқорғауды бейімделген басқарудың концептуалды моделі нәзірлеу қажеттілігі дәлелденген.

**Түйін сөздер:** киберқауіпсіздік, ақпараттық-коммуникациялық орта, оқу мекемелері, ойындар теориясы, шешімдерді қабылдауды қолдау, қаржылық стратегияларды таңдау.

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## ОБЗОР И АНАЛИЗ ПРЕДШЕСТВУЮЩИХ ИССЛЕДОВАНИЙ В СФЕРЕ ОБЕСПЕЧЕНИЯ ЗАЩИТЫ ИНФОРМАЦИОННО-ОБРАЗОВАТЕЛЬНОЙ СРЕДЫ УНИВЕРСИТЕТОВ

**Аннотация.** В работе проведен обзор и анализ предшествующих исследований в сфере обеспечения защиты информационно-образовательной среды университетов (ИОСУ). Показано, что приоритетность развития цифровых систем образования во многих промышленно развитых государствах мира требует соответствующей технико-методологической поддержки специалистов не только в области педагогической деятельности, но и информационных технологий с учетом проблематики кибербезопасности и защиты информации. Показано, что к защищаемым сведениям, которые хранятся и циркулируют в информационно-коммуникационных системах университетов, в частности относятся: персональные данные учащихся, преподавателей, научных сотрудников, вспомогательного персонала; оцифрованная информация, представляющая интеллектуальную собственность учебного заведения; информационные массивы, которые, обеспечивают учебный процесс, (например, мультимедийный контент, базы данных, обучающие программы);др. Обосновано, что данные информационные ресурсы могут выступить как объект хищения или искажения со стороны внешних (внутренних) компьютерных злоумышленников или из хулиганских побуждений, со стороны учащихся или сотрудников.

Обосновано, что сформированный во многих странах тренд на глобализацию доступа к информационным ресурсам делает релевантными задачи внедрения новейших цифровых и информационно-коммуникационных технологий во все сферы деятельности современного вуза. Обоснована актуальность исследований в направлении разработки моделей для систем поддержки решений по нахождению стратегий управления инвестированием для различных соотношений параметров инвестиционного процесса в системы кибербезопасности образовательных учреждений. Показана необходимость компьютерной поддержки решения задач по нахождению стратегий управления инвестированием в стратегии кибербезопасности образовательных учреждений. Обоснована необходимость разработки концептуальной модели адаптивного управления киберзащитой объекта информатизации на примере ИОСУ.

**Ключевые слова:** кибербезопасность, информационно-коммуникационная среда, учебное заведение, теория игр, поддержка принятия решения, выбор финансовой стратегии.

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# CULTURAL HERITAGE OF GREAT SILK ROAD
# IN TURKESTAN REGION

**Abstract.** The article deals with the development of cultural heritage of Great Silk Road from the literary, cultural, historical and economic point of view in Turkestan region. The leader of Kazakhstan N.A. Nazarbayev in his article "Seven facets of Great Steppe", points to the Great Silk Road business and emphasizes its value in global development. Since Great Silk Road is not just measured today, the location of the Turkestan city along the Great Silk Road, which was the beginning of civilizations in the Turkestan region, and the historical monuments in Sauran, Turkestan, Sidaq, Karaspan, Zhuantobe, Kultobe and Burzhar were not only the world trade places, but also centres of books, handicrafts, literature. The contribution of this sacrel lands to the development of culture is historically analyzed.

**Key words:** Great Silk Road, Written Heritage, Literary Sculpture, Otyrar Library, Concept of Dialogue, Poetry Period.

**Introduction.** Nowadays, after the first chapter of the Nation's Leader Nursultan Nazarbayev's "Seven Facets of Great Steppe" [1], public breakthroughs and vigorous steps in the country were aimed at the future and civilization of Kazakhstan. The progress in the economy and culture of the country is crucial for the revival of the Great Silk Road. Moreover, the geographical location of our country in the heart of the Eurasian continent. A wide range of scientific concepts were presented in the cultural sphere to demonstrate the phenomenon of the Great Silk Road. Under these concepts, a culture of dialogue has emerged. This means dialogue-dialogue will be the main driving force of culture. In the context of cultural dialogue and cultural dialogue, scientists are searching for a great deal. Bakhtin [2], Bibler [3], Kulsarieva [4] have been the authors of several works on the phenomenon of the Great Silk Road. The history of the Silk Road begins with important information about the importance and significance of the Great Silk Road. The Silk Road is not only a great way to develop ties, trade, handicrafts, education and science, literature and culture, lying, the strength of the concept of cultural dialogue at the very outset.

We know that dialogue is a connection between two countries. In the scientific circle, the concept of cultural dialogue has played an active role in promoting cooperation and peace. Throughout the centuries inter-state meetings and interviews have identified individuals and their support for one another - a positive outcome of the culture. However, when talking about culture, the concept of relativity is reminiscent. Looking at the economic indicators of any country, no country's economy has been stable for centuries. Especially in the lifetime, you do not meet or even experience a country where the economy has been developing steadily or in poverty or poverty. This phenomenon proves that the economics is unstable, temporary. But scientists, philosophers, poets, writers, composers or astounding architecture in the universe, who are famous for their history, have a long history of centuries-old history of the cultural sphere.

**Materials and methods.** Numerous examples of cultural prosperity are in line with human history. Names such as Falles, Aristotle, Confucius, Al-Farabi, Hippocrates, Herodotus, and many other branches of science and philosophy have been put into circulation. The concept of education and social conscious-

ness, the world of existence and cognition, the environment, and various branches of science have been developed and implemented since the past. The Silk Road culture, which includes China and Central Asia, the Arab Caliphate and Byzantium, which takes place in the history of the world civilization, is not merely the root of trade, but as a real poetic creative era. Let's clarify how the Great Silk Road developed. Since the beginning of the silk production in China, China has become the equivalent of the word "*Silk*". Along with the silk, porcelain, tea, ammunition, paper money, and stone pavement were found to have originated from China, and it is clear that they were early in their discoveries. At the same time, with respect to science and education, the higher education is involved in the management of the state.

According to famous scientist, academician N.I. Conrad's works, the West and the East compare the world literature history with comparisons with various data and proves that literary periods in western countries also existed in the Oriental literature. This information will help us to define the point of development of the Great Silk Road Civilization. Of course, in addition to studying the history of the Great Silk Road, K. Baipakov's "*Great Silk Road: Dialogue of Eurasian Cultures*" (History of Kazakhstan - Almaty, 2003), "*Great Silk Road and Medieval Kazakhstan*" (Almaty, Kazakhstan, 1992, with A. Nurzhanov), A.H. Margulan's "*History of the City and Stone Age Construction in Kazakhstan*" (Almaty: Science, 1950); Orynbekov's "*Ancient beliefs in Kazakhstan*", "*Ancient Kazakh worldview*" (Almaty: Writer, 1996) Khasenov's "*History of culture and art of Kazakhstan*" (Almaty, Kazakh University, 1988), Zh. Mutalipov's "*Cultural Dialogue and Interconnectivity of Civilizations*" (Almaty, 2002); Kulsariev's "*Dialogue between Cultures and Religions*" (Peace of Culture, Almaty, 2000) is of particular importance. These scientists prove that creative work of the Oriental philosophical thought and science and the culture of the Great Silk Road of Central Asia were active for about five hundred years. Besides, the roots of the Kazakh-Chinese relations can be very old, along with Kazakh nomadic life, Taraz, Otyrar, Syganak, Saraishyk and others. Our famous cities have come to this Great Silk Road, and they have conveyed to us the important information about these cities in the Chinese chronicles and records.

The main content of the Great Silk Road is the conclusion that there is a rapprochement and mutual enrichment of countries, peoples and civilizations. If we give a brief overview of such issues as cities and holy places along the Silk Road, legends about the people's memory, historical monuments to them, as well as the treasures of the Kazakh steppes by Baipakov's words, "… highlands and fertile valleys, extending from Europe to Asia and vice versa Our values along the Great Silk Road show that each other's cultures are mutually reinforcing and enriching each other in the cities of East and West, Asia and Europe.

As a result of the interaction, settlers and nomadic tribes have been able to create a stunning culture of pearl in the ancient culture of humanity" [5, 6].

Today, eight monuments in the Turkestan region as Sauran, Turkestan, Siddak, Karaspan, Zhuantobe, Kultobe, Otyrar and Burzhar are registered in the "Great Silk Road Monuments". President Nursultan Nazarbayev in his article "Seven Facets of the Great Steppe", the Great Silk Road was a platform for the establishment and development of global mutual commodity turnover and intellectual co-operation among nations. In this connection, the cluster will be "the heart of the Great Silk Road", introducing the "Great Silk Way cluster". An important step in the path of civilization is the acquisition of more than 1,200 historical and archaeological, cultural and architectural monuments and the status of Turkestan's regional center, included in the UNESCO World Cultural Heritage List of the Great Silk Road and the historical value of Khoja Akhmed Yassawi Mausoleum.

The Turkestan region along the Great Silk Road is the largest concentration of cultural heritage. These include not only the cities, the ancient monuments, or the Mausoleums, but also the oldest historical books. The science has grown up, and the immortal works of the great thinkers and literary thinkers are still on their own. It is no secret that education and science spread along the Great Silk Road. Abu Nasr al-Farabi, Akhmet Yassawi, Ahmed Yeguniki, Kadyrgali Zhalairi and others were born in Otyrar, Turkestan, Turkestan region. The works of the scientists are now in world libraries.

If the name of the Great Silk Road above comes from China, we would like to emphasize that the beginning of the civilization is Otyrar. Otyrar is located along the Syrdarya River, a region bordering on settlements and nomadic civilizations. Although Samarkand is the main route of traders returning from the history, it is clear that they are not going through the Taraz-Tashkent (Hodzent) -Samarkand route and turn around Otyrar. In the north of the road from Samarkand to China, the Kyzylkum Desert and Betpakdala, in the south, mountains along the coast, and the foothills in the foothills were a major obstacle. For

merchants, Otyrar and Turkestan in the mouths of Arys river going to the Syrdarya River was no good places. Therefore, Otyrar was the Derbent Gate in the Caucasus that connects Eastern Europe and Western Asia, the former Byzantium, which connects Asia and Western Europe, the Bosporus Strait in the modern Turkey, and the gateway to the east through Central Asia such as the narrow canopy to Asia from Africa to Africa. and the natural boundary between Central Asia and East Asia was Otyrar in the Syrdarya River. Otyrar, like Istanbul, Egypt's Cairo and Alexandria cities, has become one of the richest cities in the ancient and middle ages, with a high level of science, education and art. In history, Genghis Khan, who easily overthrew the Golden Empire with millions of people in northern China, can be found in Ottoman history as a giant in the early ninth century, when he could not get Otyrar for six months with two hundred thousand troops.

A well-known scientist, Akzhan Mashani, said in his study that he was the second times in Otyrar, the second largest in the world after Alexandria. And Professor Yerengaip Omarov is suggesting that the Otyrar library can be much larger than the Alexandria library. "In other words, it is doubtful that the Otrar city has flourished, and the library has grown up, and even if the library was small enough until 341, it would be unlikely that it would compare the number of books and the library. The Alexandria Library was burned in 391, and the Otyrar Library was the largest library in the world for about 830 years. The burning of most of the Alexandrian library was completed in BC. Given that it is 47 years old, even if there are books that survived the fire, it may be less than the library of Otyrar. Thus, the Otyrar Library was the largest library in the world for about 1000-1200 years! Thousands of years are short. Greater than the Roman Empire [8].

According to the historian Uakhit Shakenenov, the vast majority of Kazakhs were settled and lived in cities. So the Kazakhs have written books and have written so much that they have to invent new material for writing. Formulated primarily on skin. These books are hard to deal with. This is evidenced by the fact that at the beginning of our era the paper was invented in southern Kazakhstan, Taraz. Apparently, paper was prepared in close proximity to Otrar, the world's largest library [6, 7].

As we have seen, the extensive collection of books in the Otrar Library has been collected through the Silk Road. Clearly, there were many scholars who learned from it from the Ottoman library of the famous Egyptian scientist Ptolemy Abunasir al-Farabi. It is known that al-Farabi did not collect books in the Otyrar library. It is well-known that the largest library in the world is not a big city to finance. Al-Khwarizmi's "Bait Al-Khakma" Center for the Development of the Arab Civilization, along with scholars from Central Asia, has also reported that Abu Nasr al-Farabi's visit to Baghdad and the Khalif's officials in Baghdad were from Otrar. It is clear that the most knowledgeable about the Khaleef was that the scientists were from Otrar, and the culture and education of Otrar was at a very high level.

**Results and discussion.** According to Rukhaniyat-Abu Nasir al-Farabi Museum, the historical monument to the city of Otyrar has been preserved in the Arystanbab mosque, preserved by Otyrar's library, and many books contain religious books. The evidence for this is the copies of the Quran, published in Egypt, Delhi, Kazan, Tashkent and Istanbul in the 18-20th centuries (published in the edition of Muhammad in 1312/1894 by Hussain), "Thousand Habits" (in 1915, Dori al-Mukhtar 2,3,4 volumes, "Sopy Allayar" (1901), "Khafiz's verses" (19th century), "The wise words of Khoja Ahmed Yasawi" (19th century) etc. Hundreds of manuscripts and books in Turkic, Arabic and Persian languages were written down to Aryslanbab and sealed with the inscription "Mullah Fahriddin Siddiq". These books, which are now being made, are in the Rukhaniyat-Abu Nasir al-Farabi Museum. Residents of the surrounding area, who persistently booked these books, hid the bag at the Arystanbab library of A.Ongarbaevich and K.Musupirovich in the beginning of the 20th century. However, A. The manuscript, which was preserved by Ongarbaevich, was written by his cousin K. Serikbayev is a local historian, ethnologist, literary critic A. Through Zhumashev, Rukhaniyat Abu Nasir handed over the al-Farabi Museum, and the manuscript, kept by Kalmyrza Musapirovich, was buried with his grave in his grave. Historically, the information about the Otyrar library's wing was widely spread, not only to the people of the city, but also to the cities of the Great Silk Road. The founder of Islamic history in the Turkish world, Korkyt Ata, Farabi, not only Akhmet Yassawi, but also a spiritual teacher at Suyar, Ithas, in the mausoleum set up at the head of the Arystanbab, did the library work in the past until the beginning of the 20th century sour cream.

Not only in Arystanbab but also in the mosques and madrassas around Turkestan, some versions and copies of Arabic, Persian, Turkish, Old Chagatai books were discovered everywhere thanks to subsequent research. Historical evidence shows that centuries-old heritage is preserved in the library of Khoja Akhmed Yassawi Mausoleum in Turkestan.

**Conclusion.** Written heritage of every nation is the history, value of the country. According to the above-mentioned heritage of our nation through the Great Silk Road records stored in the libraries of the world is party to all parts of the world today is a testament to the history books and manuscripts detection. To eradicate the nation's history and literature provides for the abolition of the Soviet government because of religious and historical heritage accumulated over the centuries and download heritages to another location, burned hands, touch disappeared. At present, an expedition is created on the initiative of the people of the nation, such as Uzbekali Zhanibekov, and a wealth of materials from the surrounding people. Specialists have been able to group and organize sculptures and valuable manuscripts in several ways. Today, "Hazrat Sultan" state historical and cultural reserve museum was created According to the health department, ethnographic, archaeological, numismatic material other than a 2679 record in the archive can be found in the preservation of monuments. Among them, in 1906 in Kazan, "Karimov" was published by the Prophet Muhammad (s.a.w.) "Thousand and One hadith" on page 103 and page 303 of the book published in two version, published in 1904 in the ancient "Himets" by Yassawi , "Miratul Qulub" (Heart of Miraculous), "Fuqahama" and a copy of the subsequent findings of the book "Risale Qadbiy Tarikat" (Tale of Wisdom), the compiler of the Yassaui trace Sheikh Hudaydadir Tash-Mohammed Al-Bukhari's theoretical content and wisdom of the Yassawi story written at the end of 18th century practical value The manuscript of Bustan ul-Muhibbin written in the Turkish language, and also the version of Fiqhul Akbar by Imam Aqmab Abu Hanifah, the Islamic sciences scholar, translated from the version 1252, 1836-37, by Fared Ad-Deen Muhammad ibn Ibrahim Atler in the Farsi "Tazkirat ul-auliya written in the book of life" (Saints), Persian or ancient Turkic language that is written in Chagatai Yassawi disciples Omar Margunf works "Bedil Divan", S.Baqyrgani's "Divan", "Sufi Allaiyar" Books The discovery is a big catch.

Nowadays the ancient manuscripts are collected and classified, systematically grouped as ancient manuscripts, ancient printed books, new valuable books and historical documents.

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### ТҮРКІСТАН ОБЛЫСЫНДАҒЫ ҰЛЫ ЖІБЕК ЖОЛЫНЫҢ МӘДЕНИ МҰРАСЫ

**Аннотация.** Мақалада Ұлы Жібек жолы мәдени мұрасының ғылыми сипат алып, әдеби-мәдени, тарихи, экономикалық тұрғыдан Түркістан аймағында дамуы жөнінде сөз болады. Елбасы Н. Ә. Назарбаев «Ұлы даланың жеті қыры» мақаласында Ұлы Жібек жолы ісіне арнайы мән беріп, жаһандық дамудағы құнды-лығын атап өтеді. Ұлы Жібек жолы бүгінмен ғана өлшенбейтіндіктен, өзіміз мекен етіп отырған Түркістан аймағында өркениет бастауы болған Отырар қаласының Ұлы Жібек жолы бойында орналасуы, Сауран, Түркістан, Сидақ, Қараспан, Жуантөбе, Күлтөбе, Бөржар ескерткіштерінің әлемдік сауданың ғана емес, кітап ісі, қолөнер, әдебиет пен мәдениеттің дамуына қосқан үлесі тарихи тұрғыдан талданады.

**Түйін сөздер:** Ұлы Жібек жолы, жазба мұра, әдеби жәдігер,Отырар кітапханасы, диалог концепциясы, поэтикалық шығармашылық дәуірі.

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### КУЛЬТУРНОЕ НАСЛЕДИЕ ВЕЛИКОГО ШЕЛКОВОГО ПУТИ В ТУРКЕСТАНСКОЙ ОБЛАСТИ

**Аннотация.** В статье рассматривается развитие культурного наследия Великого Шелкового пути с литературной, культурной, исторической и экономической точек зрения в Туркестанском регионе. Лидер Казахстана Н. А. Назарбаев в своей статье "Семь граней Великой Степи", указывает на Великий Шелковый

путь как источник бизнеса и подчеркивает его значение в мировом развитии. Расположение Туркестанского города вдоль Великого Шелкового пути, который был началом цивилизации в Туркестанском регионе, и исторических памятников в Сауране, Туркестане, Сидаке, Караспане, Жуантобе, Култобе и Буржаре были не только мировыми торговыми местами, но и центрами библиотек, ремесел, литературы. Исторически проанализирован вклад этих сакральных земель в развитие культуры.

**Ключевые слова:** Великий Шелковый путь, письменное наследие, Литературная скульптура, библиотека Отырара, концепция диалога, поэтический период.

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# SYSTEM OF PREPARATION OF FUTURE ECONOMISTS
# FOR ENTREPRENEURSHIP ACTIVITY

**Abstract.** The article addresses the problem of preparing future economists for entrepreneurial activity. The purpose of the article is to substantiate the structure of the system of preparing future economists for entrepreneurial activity through its reflection - the model of the same name. Used methods: observation, questioning, interviews, testing of students, analysis of literature on the problem of research, curricula and programs.

It has been substantiated that business activity is an independent activity carried out at its own risk, aimed at systematically receiving profits from the provision of various services, the sale of goods, etc. It is revealed that entrepreneurial activity is problematic for the majority of future economists, although many of them strive to start their own business after graduation. It has been established that students of the economics department are familiar with the state policy on creating favorable conditions for the development of small and medium-sized businesses, have a grasp of its state, including the most promising direction of business development in a particular region, etc. However, they are poorly informed about legal acts that underlie the organization of entrepreneurial activities have a general understanding of the technology of drawing up a business plan, the procedure for its approval to the appropriate authorities, their personal potential etc.

It is proved that the activities of the institution of higher education for the preparation of future specialists in the economic sphere and management for this type of work is a holistic educational system that includes interrelated elements that have their own structure: goals and objectives, patterns and principles, organizational forms, methods and means functioning in the system of higher professional education and provide high quality training of future economists to professional activity in general, to entrepreneurial activities, in particular.

The prospect of further research is seen in the experimental verification of the system of preparing future economists for entrepreneurial activity through approbation of its reflection - the model of the same name.

**Keywords:** training of future economists, entrepreneurial activity, system of preparing future economists for entrepreneurial activity, model of preparing future economists for entrepreneurial activity.

**Introduction.** Analyses of the socio-economic conditions prevailing over the past two decades, and the results of research by economists have shown that the further development of the labor market and market relations in Ukraine is impossible without the development and improvement of small and medium enterprises. It is these forms of economic activity that create favorable conditions for economic recovery, as the competitive environment develops, additional workplaces are created, structural adjustment is underway, and the consumer sector is expanding.

The development of entrepreneurship leads to a saturation of the market with goods and services, to an increase in export potential, and a better use of local resources. And finally, small enterprises can be created in any sector of the economy in response to the unmet needs of the population, which is their distinctive and important feature [10].

All this contributes to the fact that for a large number of people (and especially for young people), entrepreneurial activity becomes attractive.

The results of student social poll indicate that a significant proportion of graduates would like to have their own business, and not to be employed. The survey of 124 students of the Faculty of Economics showed that the vast majority of them (71.3%) associate their future with business activities, of which 32.6% plan to become owners of private firms and offices. However, they estimate their readiness for

entrepreneurial activity as low - 29.6% of the total readiness for this type of labor activity. The survey also revealed that students would like to acquire relevant knowledge, skills and abilities during training.

All this requires the system of vocational education to carry out systematic and purposeful work on the preparation of student youth for entrepreneurial activities and in the conditions of higher education.

**Analysis of sources.** Analysis of the scientific literature on the research topic has shown that in recent years a number of studies have been conducted on certain aspects of this subject, in particular, the analysis of conceptual approaches to identifying the nature of such a phenomenon as entrepreneurship, its content, structure, and conditions of functioning. In the works of Y. Avksentyev, V. Bazilevich, A. Batur, A. Belyaev, S. Belaya, Y. Blagodir, A. Galchinskiy, Ya. Dombrovsky, G. Klimko, A. Mazur, S. Mocherniy, V. Savchuk, A. Saykevich, V. Sizonenko, D. Stechenko, N. Suprun and others. Scientists see the essence of entrepreneurial activity in the search for goods and services that an entrepreneur could develop and sell profitably; in the organization of production of goods and services; in the manufacture of goods and services; in the sale of goods and services. In their opinion, entrepreneurial activity is conditioned by the unity of the personal, economic, organizational and managerial elements of this activity.

Entrepreneurship, according to M. Lapusta, is the purposeful activity of the subject (subjects) to implement new combinations of factors of production in the framework of the enterprise he leads on an innovative basis, economic risk, economic responsibility for the final results in order to obtain entrepreneurial income [9].

So, entrepreneurship integrates in itself almost all types of economic activity: production, marketing, personnel management and finance, and others.

In our study, it was not by chance that special attention was paid to entrepreneurship and considered in sufficient detail the various approaches to entrepreneurial activity, because without them it is difficult to evaluate the preparation of future economists for entrepreneurial activity.

According to Y. Shcherbatykh, "it is the psychological component: motivation, attitudes, volitional qualities and other personal characteristics that the person will determine whether the person will become an entrepreneur or not" [12, p. 7]. So, the arming of future specialists in the sphere of economic and management with only knowledge and skills of economic content is not enough today. For successful adaptation of graduates of the Faculty of Economics in the conditions of the modern labor market and market relations, it is important to carry out special work with students in preparing for entrepreneurial activities.

**Result.** Based on the fact that vocational education is considered as a pedagogical system, we consider the training of future economists and managers in entrepreneurial activity as an important part of this system. Pedagogical systems, like any systems in general, have their own structure, consist of certain elements that are interconnected. The interaction of various elements of the pedagogical system or its subsystems is aimed at achieving a common goal for the system, a general positive result. Such goal is the education, upbringing and development of the individual. The measure of achieving this goal is the result that finds expression in the personality of the graduate, and not in the technology of training, methods of education, organization of the educational process, the creation of a material base and so forth.

Some components of the pedagogical system may have a specific goal, but they also transform a common goal into special tasks (psychological, pedagogical, organizational, etc.). It is considered that all elements of the pedagogical system are not just included in the interaction process, but their main feature is the interaction aimed at achieving the tasks related to training, education and personal development, and in the conditions of the higher education institution - with specialist training.

We presented the system of training future specialists in the sphere of economic and management in business activities in the context of a modern higher education institution in the form of a structural model.

The system-structural approach to the consideration of system objects provides for:

- identifying the elements of the system, their functions, connections and relationships, based on the target settings for its study;

- the selection and analysis of the system-creating factors of one or another set - the object of study;

- description, explanation of the properties and relations of the system, its internal and external relations, the conditions of its functioning and development

- system behavior management, etc.

Modeling as a method of scientific knowledge studies objects of different nature on their material, ideal, physical, mathematical, and other analogues to determine or refine the characteristics of existing or created objects. The model acts as such a prototype substitute that allows you to get new knowledge about it. The basis of the design and use of pedagogical models is the philosophical method of abstraction. It is abstraction that allows you to analyze an object as a whole, highlighting its parts (factors, states, qualities, etc.), establishing the essence of the selected parts [2].

A systematic approach to the pedagogical phenomenon provides for the selection of its main components, as well as the study of the existing relations between them.

The basis for building our model was formed by such parameters as the goal and objectives; laws and principles; content; organizational forms, methods and means of training and education.

From the standpoint of the system-structural approach, according to scientists, the main component of the training is the goal, which defines the principles, content and methods of its implementation in methods, technologies, means and forms [5, p. 39].

As part of our research, the goal is to improve the training of future economists and managers for entrepreneurial activity in the conditions of a modern institution of higher education.

This goal can be specified by a number of pedagogical tasks. The main ones, in our opinion, are:

- providing the future economists with the knowledge of the legal, economic and psychological foundations of entrepreneurship;

- formation of ideas about the role of entrepreneurs in the process of the historical development of mankind, about the socio-economic aspects of the activities of modern entrepreneurship, about the main directions of activities to ensure the security of business, etc.;

- development of economic thinking, abilities to carry out various operations related to mental activity;

- formation of skills and abilities to use knowledge of the mechanisms of cognitive processes in business, to apply business communication skills in business, find optimal strategies in the development of your business, to carry out basic management functions (planning, organization, motivation and control), etc.;

- development of personal qualities of a modern entrepreneur (efficiency, perseverance, interpersonal skills, independence, responsibility, diligence, confidence, ability to take risks, etc.).

Among all the regularity (objectively existing, repetitive, stable and significant connections between phenomena, separate aspects of the pedagogical process), we, following G. Kodjaspirov and A. Khojaspirov, highlight the following:

1) regularities caused by social conditions (dependence of education and training of students on the specific needs of society, the level of development of the economy, national and cultural characteristics, etc.);

2) regularities caused by the human nature itself (the formation of the personality of a future specialist, his preparation for professional activity are directly dependent on their age and individual characteristics);

3) patterns determined by the essence of the pedagogical process organized in the conditions of a modern institution of higher education (the learning process and the process of upbringing, education and personal development are in close interaction and dependence on each other; the interrelation of the student community and a specific personality; the interrelation of tasks, content, forms, methods and means of training and education, etc.) [3, p. 42].

As the initial provisions determining the content, forms, methods, means and nature of the interaction of teachers and students in the holistic pedagogical process, in which the future economist is trained, including business activities, we selected the principles proposed by M. Bulanova-Toporkov, namely: the compliance of the content of vocational education with the modern requirements of society and the projected development of the economy, science and production; orientation of higher education on the development of the personality of the future specialist; the optimal combination of mass, group and individual forms of organization of the pedagogical process in universities; rational use of modern forms and methods of training and education; the principle of consistency; the principle of cooperation of subjects of the pedagogical process [8, p. 46].

An analysis of scientific literature (Yu. Belova [1], N. Kurinaya [4], M. Lyashenko [6], V. Maikov-skaya [7], A. Skibitsky [11], I. Yuri [13]) higher education institutions activities and personal experience as a teacher of higher education, showed that the main areas of work for the preparation of future economists for entrepreneurial activity are: theoretical training, practical training and personal training.

Theoretical training is related to solving the problems of providing future economists with special knowledge; practical training is aimed at developing students with relevant skills; personal training involves the formation of personality traits of a modern entrepreneur.

Determining the content of training future economists, we relied on the requirements of the State Standard specialty 051 "Economics", as well as the curricula of academic disciplines of the general training cycle (humanitarian, fundamental), vocational training, disciplines of free choice of the student.

Practice has shown that a sufficiently high level of mastering by future economists knowledge of academic disciplines creates favorable conditions for their preparation for entrepreneurial activity. An important role in the system of training future specialists in the sphere of economic and management belongs to the disciplines of the subject block.

A special place in this system is occupied by the optional subject "The Psychology of Business and Entrepreneurship", which is read by third-year students of the Faculty of Economics. Its study is aimed at providing students with special knowledge that underlies the psychological aspect of entrepreneurial activity, namely: the structure of the human psyche; cognitive processes in the activities of the entrepreneur and business motivation; emotional and volitional sphere of the personality of the entrepreneur and his personal qualities; communication processes in the activities of the entrepreneur; psychological characteristics of a successful entrepreneur; organization of labor of the entrepreneur and so forth.

An important component of the system of training future specialists in the sphere of economic and management in business is the forms of organization of the educational process (classroom and extra-curricular). These are: lectures, practical and seminar classes, conferences, consultations, study tours, round tables, trainings, oral journals, coursework and qualification works, various types of practices, etc.

Its place in the general system of training students of the Faculty of Economics in business activity is occupied teaching methods (explanatory, illustrated, reproductive, partly exploratory, problem statement, research, etc.) and nurture methods (methods of formation of consciousness: story, conversation, debate, example, etc.), methods of organizing activities and shaping the experience of social behavior (schooling, exercise, requirement, assignment, creation of upbringing situations); methods of stimulating behavior and activities (encouragement, punishment, competition).

Among the means used by the higher school to increase the level of readiness of future economists for entrepreneurial activity, we used: curricula and programs; textbooks and tutorials; equipment class-rooms; Internet and computer classes; production base of enterprises, organizations and firms; the potential of modern specialists in the sphere of economics and business, etc.

The result of the introduction of the model into the pedagogical process of higher educational institutions can be a sufficiently high level of readiness of future economists for entrepreneurial activity.

**Findings.** Our research and educational practice show that entrepreneurial activity in certain areas of the country's economy (which is commonly understood as an independent activity at your own risk, aimed at systematically receiving profits from the provision of various services, sales of goods, etc.) is problematic for most future economists, although many of them strive to start their own business after graduation. Our study showed that students of the Faculty of Economics are familiar with government policies to create favorable conditions for the development of small and medium-sized businesses, have an idea of its state, the most promising areas of business development in a particular region, etc. However, they are poorly informed about the existing legal acts underlying the organization of entrepreneurial activity, have a general understanding of the technology of drawing up a business plan, the procedure for its approval in relevant instances, their personal potential, and so forth.

The activities of higher education institutions for the preparation of future specialists in the sphere of economics and management for this type of work can be represented as a holistic educational system that includes interrelated elements that have their own structure: goals and objectives, patterns and principles, organizational forms, methods and means functioning in the system of higher professional education and provide high quality training of future economists to professional activity in general, to entrepreneurial activity, in particular.

The prospect of further research is seen in the experimental verification of the system of preparing future economists for entrepreneurial activity through approbation of its reflection - the model of the same name.

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## СИСТЕМА ПОДГОТОВКИ БУДУЩИХ ЭКОНОМИСТОВ ДЛЯ ДЕЯТЕЛЬНОСТИ ПРЕДПРИНИМАТЕЛЬСТВА

**Аннотация.** В статье раскрыто проблему подготовки будущих экономистов к предпринимательской деятельности. Целью статьи является обоснование структуры системы подготовки будущих экономистов к предпринимательской деятельности через ее отражение – одноименную модель. Использованные методы: наблюдение, анкетирование, беседы, тестирования студентов, анализ литературы по проблеме исследования, учебных планов и программ.

Обосновано, что предпринимательская деятельность – самостоятельная, осуществляемая на свой риск деятельность, направленная на систематическое получение прибыли от предоставления различных услуг, реализации товара и тому подобное. Раскрыто, что предпринимательская деятельность для большинства будущих экономистов является проблематичной, хотя многие из них стремятся после окончания вуза открыть свое дело. Установлено, что студенты экономического факультета знакомы с политикой государства по созданию благоприятных условий для развития малого и среднего предпринимательства, имеют представление о его состоянии, и в том числе, о наиболее перспективном направлении развития бизнеса в конкретном регионе и др. Однако они слабо информированы об имеющихся нормативно-правовых актах, которые лежат в основе организации предпринимательской деятельности, имеют общее представление о технологии составления бизнес-плана, порядка его утверждения в соответствующих инстанциях, своем личностном потенциале и тому подобное.

Доказано, что деятельность учреждения высшего образования по подготовке будущих специалистов в сфере экономики и менеджмента к этому виду трудовой деятельности является целостной педагогической системой, включающей в себя взаимосвязанные элементы, которые имеют свою структуру: цели и задачи, закономерности и принципы, организационные формы, методы и средства, функционирующие в системе высшего профессионального образования и обеспечивают высокое качество подготовки будущих экономистов к профессиональной деятельности вообще, к предпринимательской деятельности, в частности.

Перспективу дальнейших исследований видим в экспериментальной проверке системы подготовки будущих экономистов к предпринимательской деятельности через апробации ее отражение – одноименной модели.

**Ключевые слова:** подготовка будущих экономистов, предпринимательская деятельность, система подготовки будущих экономистов к предпринимательской деятельности, модель подготовки будущих экономистов к предпринимательской деятельности.

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# RELIGIOUS CONFESSIONS IN THE INTERNET SPACE: RELIGIOUS ANALYSIS

**Abstract.** The relevance of the research topic is explained by the small number of articles and publications on this topic in the post-Soviet space. Attention is paid to the first studies of Western researchers. This article discusses Kazakhstan's Internet sources, as well as the very theme of religion in the Internet space. The modern world, which is characterized by diverse and large processes, is changing very quickly. The process of globalization is growing in the modern postmodern society, its structure is changing. The religious segment of the Internet has an increasing influence on the religious life of the society and gradually occupies an equal place in the religious media system, along with the press, radio and television. In the future, more detailed study of this subject is expected.

**Keywords:** Religiousness, Kazakhstan, Internet, Religion.

Today the Republic of Kazakhstan has created a universal model of consent between different religious denominations. This model is based on the exceptional characteristics of the development of the history of the people who lived in Kazakhstan. The revival of religious life, which began in Kazakhstan in the last decade of the 20th century, coincided chronologically with the emergence of an information society around the world and the emergence of a new information and communication environment - the Internet.

It's not a coincidence. According to many Western researchers, secularization was a characteristic feature of industrial society, but now, at the time of the formation and development of the information society, when ethnocultural-national and religious identity has an increasing influence on the socio-political. In many countries, the process of desecularization has begun. These two directions - unfinished secularization and the beginning of desecularization - characterize the religious and social life at the present stage.

In Kazakhstan, where in the Soviet Union for a long time dominated by atheism, religious organizations and associations began to develop actively. Issues of tolerance, interreligious and interreligious relations have acquired particular urgency. In parallel, the search for new forms of relations between religion and society, religion and the state was conducted. One of the central issues in the world is the access of religious organizations to the media and the use of the media for the dissemination of their worldview, informing society about their activities. By the beginning of the 21st century, a system of religious media was gradually developing in Kazakhstan, uniting printed periodicals, radio stations, as well as individual television channels and TV programs. A special place in this system is occupied by religious Internet resources.

Today, the Internet is one of the main channels for disseminating information about religion, an important platform for exchanging information and communication within a religious organization and as one of the means to realize one's cultural and religious identity. The religious segment of the Internet has an increasing influence on the religious life of the society and gradually occupies an equal place in the religious media system, along with the press, radio and television. Moreover, it is impossible to study the development of mass media of various religious organizations at the present stage without studying Internet publications of the corresponding religious affiliation. It should be noted that the emergence and

formation of religious Internet resources occurred with the rapid development of the Internet and the return of religion to society. Both these processes developed quite chaotically, which made the work of researchers.

The methodological basis of this article was the following methods:

**Logical method:** The article has a logical structure that considers the foreign experience of religion research in the Internet space. On the basis of this analysis, a short analysis of religious websites was conducted in the"kz" domain zone.

**Method of comparative analysis:** Based on the analysis of religious websites, located in the "kz"domain zone, a comparative analysis method was performed in this article. This method was used in comparison of websites of religious content located in the "kz" domain zone and Internet sites of religious content in the domain zone "ru".

**The method of theoretical and legal forecasting:** Based on the historical and legal method, a small forecast was made on the main aspects of the development of religious content sites located in the"kz" domain zone in the context of building a secular, democratic and independent country.

**Religion in the Information Society.** The first studies of religion in the Internet space were published in the mid-1990s. This is the work of David Lohad, Stefan O'Leary and other researchers. Recently, Brenda Brasher, Lorne Dawson, Morten Hosgaard deal with this problem. Most of the great thinkers of the second half of the twentieth century, considered in their work understanding of social transformations of recent decades, associated with the ever-growing influence of the media. Most of them marked the beginning of desecularization - the revival of the influence of religion on the individual and public consciousness. The Internet is the most organic media channel for religious organizations, since it reproduces the system of verbal communication "from person to person". This communication channel is most adequate to the discussion of religious communities and individual believers. Religious organizations use various channels of mass communication, not only for missionary purposes, but also for their internal needs as one of the factors supporting the integrity of the organ of the religious community and its development, providing the necessary intensity of information exchange [1]. Today the Internet is one of the main information channels where news about religious life in Kazakhstan appears and spreads. In addition, the religious Internet segment has become the main resource for journalists writing about religion, a source of reference information for publications on topics related to religion.

Thus, Herbert Marshall McLuhan believed that figurative systems created by religions acquire a new potential in the information society. Sociologist Alvin Toffler also notes that religion in the information society is much more important than in an industrial society. One of the chapters of his work "Metamorphosis of power", which describes the changes associated with the transition to a new type of society in various spheres of human life, is called "Revival of Religion." On the example of Islamic and Catholic leaders, Toffler reflects the fact that religions claim the corresponding supranational authority as "global control over the mind." Various religious tendencies in different states demonstrate Toffler's tendency to be the "apostasy of secularism" when the religious factor becomes increasingly important, primarily in political life and culture, in the functioning and interaction of state institutions, in shaping the mood of society [2]. Toffler tends to negatively assess this trend, treating it as a threat to democracy and a "return to dark times." Religion as a state institution is a complex system of communication. This was noted by many researchers, both by religious scholars and theologians. For example, British researcher on religious activities of religious communities Chris Arthur believes that "any expression of human religiosity is inevitably mediated, media expression." In this sense, a significant part of the activities of religious organizations in society can be analyzed from the point of view of the functioning of communication systems. Preaching, religious education, worship and social work are various acts of communication. It is not by chance that in European languages the word denoting the central Christian sacrament, the sacrament or communion, has a common root with the word «communication», «communication» (communication) [1].

In this context, the analysis of the information activity of religious organizations is of particular importance. Experts, both theologians and religious scholars, are just beginning to study the spiritual foundations of the information society, so today there are more questions in this area than answers. It is important that both Christianity and Islam, despite the fact that these religions associated with the book, with written text, were distributed orally. No traditional religious organization, even when it was completely disconnected from the official channels of communication and information, as happened with the Orthodox churches and mosques in the Soviet period did not disappear from the public consciousness.

Probably, this is due to a special way of religious communication. A religious organization can use any modern media and communications, but the basic, essential and constructive way of communication, and also a millennium ago, remains an oral message, a direct transmission of tradition and spiritual experience from person to person.

**Internet and its specific properties in the context of religious communications.** Religious organizations are actively using the Internet than other media channels. The number and quality of Internet sites about religion can be compared with the resources included in other subject areas of Kaznet. It should be noted that there is no religious Kaznet as a holistic phenomenon. Orthodox, Muslim, Jewish, Protestant and other religious objects are separate thematic sectors of Kaznet, each of which is primarily due to the specifics of this religion and the understanding of information activities for its leaders has a number of very significant differences. These areas are not integrated with each other, and there is no reason to assert that such integration is possible in the future.

The Internet is the most organic for the media channel of religious organizations, as it reproduces the whole system of communication "from person to person" [3]. This channel of communication proves to be the most adequate discourse, which is used by religious communities and individual believers. Religious organizations use various channels of mass communication, not only for missionary purposes, but also for their internal needs, as one of the factors that support the integrity of the religious community and its development, providing the necessary intensity of information exchange. Today the Internet is one of the main information channels where news about religious life in Kazakhstan appears and circulates. In addition, the religious Internet segment has become the main resource for journalists writing about religion, a source of reference information for publications on topics related to religion. The most important role of the Internet in the religious life of Kazakhstan is that it is the only platform for interreligious dialogue at the present stage, and not at the official level, but at the level of ordinary members of religious organizations. In real life, representatives of different religions and confessions are quite rare to discuss a wide range of issues. On the Internet, they enter into a dialogue in one information space, for example, "The Missionary Forum of Deacon Andrey Kuraev".

The Internet promotes the transformation of forms of expression of religiosity. Because of the possibility of participating in various Internet communities, the believer receives a "second religious identity" - in addition to being a member of a real parish community, most often - territorial or connected with the circle of communication, he becomes a member of the worldwide dispersed community in which the interpersonal relations, there are discussions on theoretical and religious-social issues. Often this virtual life is more diverse and more in line with the spiritual and intellectual needs of the individual than the real parish community. In the case of Orthodoxy and Catholicism, the virtual community cannot replace the participation of a person in church services and sacraments, so he is forced to lead a "double" religious life. Other religions are more free to perform joint rituals, so, for example, you can become a member of the Muslim community or a supporter of neo-Protestant and Oriental cults, without departing from the computer and not actually meeting with a person. At the same time, members of virtual online communities can submit thoughts that are unacceptable from the point of view of traditional religious organizations. With the study of the development of religious communities on the Internet, one cannot help but notice that the missionary activity of traditional institutional religions on the Internet is much less effective than the propagation of new religious movements. For "old" religions, the Internet is another additional tool of the mission, which once became printed, whereas for religious and almost religious movements that emerged in the post-industrial era, it is often the only means of spreading its idea [3].

**Review of Religious Sites of Kazakhstan Internet.** To compare the content of Kaznet, we studied the results of the research conducted in Russia. In specialized Christian catalogs there are more than 3000 Christian sites, not counting other religions. In the sections "Religion" are the main online directories - "Yandex", "Mail.ru" - their number varies from 800 to 1700. Although the number of Muslim, Jewish and Buddhist sites of the catalog of data does not exceed 100 [4]. Researchers relied only on the data of open statistics Internet, rating sites and online catalogs, as well as various indirect indicators that allow us to draw conclusions about the relevance of the audience to religious sites.

Thanks to the openness of the data of counters and catalogs, researchers used other methods to study the level of interest of the audience to a particular thematic segment. These methods include analyzing the statistics of the search engine for selected keywords, analyzing the attendance statistics of sites included in the segment, if possible - the general audience of the segment, visitor surveys.

It can be concluded that the inquiry of the Internet audience about information about religion is stable. As a rule, the information itself is news, calendar and culture, as evidenced by the high attendance of texts about religious life on the websites of news agencies. Visiting Orthodox sites is higher than in other religions, in general, Christian themes attract more users than topics related to other religions. Since Islam and Christianity are some of the main denominations in Kazakhstan, the presence of religious sites over them prevails. If you take official and verified sites, then such quality and authentic content is available on the site www.muftyat.kz - "Official website of the Spiritual Office of Muslims of Kazakhstan. To take, for example, the largest group in the CIS space in the social network "In Contact", "Islam is the religion of peace and good," you can see that it is aimed at a younger generation. In this group, most of the quotations are for various kinds of divine revelations, where they refer to the word of Allah. Also this group has its own page in the social network "Instagram", which is by far the most popular among young people. In social networks, the positive image of the believer is moving forward and there is also some propaganda for a strengthened faith, which we usually call recruitment [4].

But already this area is engaged in religious scholars - experts who identify the most dangerous sites, hinting at recruiting for further terrorist or extremist nature. At this stage of the study, we can only conduct content analysis, because of a lack of professional knowledge and skills, but in the future, as our profession requires, we will engage in this kind of activity.

**Conclusion.** Considering the above, the proposed measures, in our opinion, will strengthen the secular principles of the state, restrict further Islamization of the country's indigenous population, to avoid conflict in the Kazakh society on interreligious grounds and thereby strengthen the inter-confessional agreement, and effectively counteract radicalism and religious extremism. The Internet, as a media channel, is the most appropriate information channel that meets the needs of religious organizations due to its unique capabilities - multimedia, hypertext and interactivity. The flexibility of reporting formats, the ability to form and maintain horizontal links, the possibility of creating personalized content - these properties of the Internet are used to convey religious knowledge, dissemination of religious information, missionary communication and internal interaction between members of religious organizations.

Despite the active formation of virtual religious communities on the Internet that are not connected with real territorial communities, speaking about the phenomenon of "cyberreligies", it is premature to assume that this will spread further. However, the Internet contributes to the creation of religious and social movements, which are formed and function for a long time on the Internet, and then come out in real life. Thus, a number of anti-globalization projects appeared that called for the abandonment of electronic documents and confrontation with the authorities - both the state and the church. Religious organizations pay great attention to activities that promote the spread of their worldview on the Internet, but they prefer to create media sites, where they mainly disseminate information. Interactivity is less involved [1].

The following conclusions were made during the research:

1. Religious organizations widely use the Internet and Internet technologies in information and communication activities aimed at:

a) Informing the public about their activities;

b) The creation and support of a common information space in religious communities;

c) Popularization of their teaching in different layers of modern Kazakhstan society.

2. The Internet more than other types of media corresponds to the information and communication needs of religious organizations based on the use of specific properties of the Internet - multimedia, interactive and cross-border.

3. The ability to create and maintain horizontal social networks via the Internet facilitates the development and communication and communication of both traditional religious communities and informal extraterritorial religious groups.

4. Interreligious dialogue on the Internet is insignificant; members of each religious organization make up their own, more often autonomous segment of Kaznet, not connected with the resources of other religions and confessions.

5. In the typological structure of religious resources, types of places are formed: religious affiliation, by the nature of the founder / creator, by the nature of the content and the like.

6. The most developed and higher in the areas of the audience type of sites in the religious segment is the media sites.

To date, a model of information support for major religious events has been developed, in which interaction between sociopolitical and religious online media plays a decisive role. We believe that this article will serve as an impetus for further in-depth study of this field of activity. Since it requires more investment and time for static data, which will later be used by researchers in this field. Serious calculation and qualitative research of the audience of the religious segment of Kaznet was not conducted.

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## ҒАЛАМТОР КЕҢІСТІГІНДЕГІ ДІНИ КОНФЕССИЯЛАР: ДІНИ ТАЛДАУ

**Аннотация.** Зерттеу тақырыбының өзектілігі посткеңестік кеңістікте осы тақырып бойынша мақалалар мен жарияланымдардың аздығымен түсіндіріледі. Батыс зерттеушілердің алғашқы зерттеулеріне назар аударылады. Бұл мақалада Қазақстан Интернет-ресурстары, сондай-ақ ғаламтордағы дін тақырыбы талқыланды. Түрлі және үлкен процестермен сип-атталатын қазіргі заманғы әлем тез өзгеріп отырады. Қазіргі заманғы постмодернистік қоғамда жаһандану процесі өсіп келеді, оның құрылымы өзгеруде. Интернеттің діни сегменті қоғамның діни өміріне үлкен әсерін тигізеді және баспасөз, радио және теледидармен қатар діни медиа жүйесінде біртіндеп орын алады. Болашақта бұл тақырыпты егжейтегжейлі зерделеу күтілуде.

**Түйін сөздер:** Дінтану, Қазақстан, Интернет, дін.

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## РЕЛИГИОЗНЫЕ КОНФЕССИИ В ИНТЕРНЕТ-ПРОСТРАНСТВЕ: РЕЛИГИОВЕДЧЕСКИЙ АНАЛИЗ

**Аннотация.** В статье рассматриваются религиозные конфессии в Интернет-пространстве. Современный мир, который характеризуется разнообразными и крупными процессами, меняется очень быстро. Процесс глобализации растет в современном постмодернистском обществе, его структура меняется. Религиозный сегмент Интернета оказывает все большее влияние на религиозную жизнь общества и постепенно занимает в системе религиозных СМИ равноправное место наряду с печатью, радио- и телевидением.

**Ключевые слова:** религиозность, Казахстан, Интернет, религия.

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# ECOLOGICAL COURT AS THE GUARANTEE OF PROTECTION OF RIGHTS OF HUMAN AND CITIZENS

**Abstract.** The article presents the results of the legal analysis of the foreign experience in the formation of the ecological courts, as one of the guarantees of the protection of rights of human and citizens. It is established that on the current date in the whole world there is a large number of the different variants and forms in which the environmental justice is carried out. Each country has its own specifics, related to its legal system and the place that is given up in its legal protection of the environment.

It is detected that there are three types of systems of ecological justice in the world, namely: 1) systems that transfer environmental affairs to the courts of the general jurisdiction; 2) systems based on the internal specialization of the judiciary (creation of green benches, so called «green shops» or green judges without formal change of the judicial structure); 3) systems in which innovative environmental courts or tribunals are created. The first type includes the judicial systems of the most countries of the Romano-Germanic law, as well as Ukraine. The second involves the US judicial system (Vermont and Hawaii), Austria, a number of countries in Asia and South America. The third type of environmental justice system is the most innovative and progressive, based on the practice of Sweden, Australia, New Zealand, India, etc.

It is considered that the analyzed examples of introduction the ecological justice, as well as the tendencies for the continuous increase in the number of ecological courts in the world, shall demonstrate the efficiency and viability of the specialized environmental justice. In our opinion, the main advantages of such courts are the expertise of the judiciary, public engagement, and a broad field for the use of mediation.

The introduction and establishment of the ecological courts in Ukraine is necessary, considering a number of problems that exist in the domestic environmental legislation and enforcement activities, as well as the progressive world trends. It should be gradual and include three functional stages: 1) preparation of judges who would be competent regarding the scope of their specification, which would begin their activity in courts of general jurisdiction, but their respective competence would include relevant environmental disputes; 2) creation of «Green benches». At this stage, it would be advisable to foresee, besides imposing the responsibility of ecological justice, also the obligation to allocate the resources; 3) creation of the system of the specialized ecological courts.

**Keywords:** ecological justice, ecological court, rights of human and citizen, environmental rights, guarantee of rights protection.

**Relevance.** The person should always be able to exercise his rights guaranteed by the Constitution of Ukraine and international agreements. The key to this is the ability to protect them in the case of violation. The real protection of human rights is the one of the most important problems of the Ukrainian reality. The constitutional desire to develop and strengthen the democratic state can not be realized without the approval of the social consciousness, social practice of inalienable human rights and freedoms, and the normative consolidation of their guarantees. The state is obliged to demonstrate its activity in the provision of human rights, the creation of material, organizational, social, political and other conditions for the full use of human rights and freedoms. In the current conditions the person can not always freely exercise its rights and freedoms. In particular, on the way to the realization of environmental rights and freedoms, because of the lack of real influence of the civil society on the adoption of environmentally relevant decisions, the person often has to face such a negative phenomenon as the ecological and legal nihilism, despite the fact that Part 2 of Art. 3 of the Constitution of Ukraine [1] states: «Human rights and freedoms

and their guarantees determine the content and direction of the state. The state is responsible to the person for his activities. The assertion and guarantee of human rights and freedoms is the main responsibility of the state». Consequently, only the effective system of guarantees of the implementation of the environmental rights of citizens is capable to overcome these obstacles.

On the current date such system includes a set of organizational, regulatory, enforcement, preventive and restrictive, procedural and legal, protective and securable means to ensure the implementation of the environmental rights [2, p. 51-52], as defined in the Art. 9 of the Law of Ukraine On Environmental Protection [3] and other normative legal acts of the ecological direction.

However, despite the extremely wide range of legal measures to ensure the implementation of environmental rights determined by the state, according to the status of the environment, given in the draft Law of Ukraine On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the period up to 2030 [4], the level of environmental pollution in Ukraine remains extremely high, which makes it impossible to adequately protect the most important environmental law - the right to the safe and healthy life and health environment.

The practice of non-effective environmental activities at the state level has led to an aggravation of the climate change in the world and raising the issue of the necessity to consolidate the concept of climatic human rights in the national policies [5, p. 115-121].

Such transformations in the system of ecological rights shall oblige to bring to the new level of the judicial way of protecting the ecological rights of human and citizen, namely, to create the specialized ecological court, whose practice of activity in the world is not new.

The theoretical basis for the investigation of the formation of the specialized ecological court were laid down in the scientific papers by B. Birdsong, F. Jacobs, L. Lavrysen, K. Mulqueeny, G. Pring, C. Pring, R. Sharma, D. Sheppard, R. Stein, O. Muzaleva, A. Solntsev, A. Chikildin, A. Shvarova.

Constructive analysis of the scientific results in this subject area suggests to draw conclusions about the significance of the theoretical and methodological scientific developments. At the same time, it was established that in the domestic legal science the issue of the establishment of an environmental court has not yet been investigated, and therefore the purpose of this article is to study the existing experience of the foreign countries in the formation and operation of such courts in order to choose the most optimal option for the creation of its own ecological court.

**Main points.** It should be reminded that the proposals for the establishment of the new institute in the UN system were put forward in 1989 in the Hague Declaration on the environment [6]. Within referring all states of the world and international organizations competent in this matter, it was proposed to participate in the elaboration of the framework of the conventions and other legal instruments necessary to establish the institutional authority of such a court in order to prevent climate change and global warming.

Additionally, in the same year, it was hold the conference in the Rome regarding «Improving the effectiveness of the international environmental law and the creation of the court for environmental matters within the United Nations», the rules and procedures for which were discussed until the mid-1990s of the twentieth century. However, in 1999, UNEP's Executive Director rejected the proposals [6].

The creation of the such court was also proposed at the conference at the National Academy of Linceia in Rome in 1989. The activities of the such court should be governed by the special convention on the environment and human rights. This proposal led to the adoption in 1992 the draft of the convention, which in 1999 acquired the form of the draft treaty establishing an international environmental court [6].

The special role in the preparation of the program for the national and international judges in the field of environment and policy during the creation of the new international environmental court was discussed at both the Aarhus Conference at 1998 and the World Summit on Sustainable Development in Johannesburg at 2002.

In 2012, the International Court of the Environment Foundation (the International Court of the Environment Foundation) submitted a new draft for the creation within the framework of the UN International Ecological Court to the Conference on Environment and Development. As a result of the consideration of this project, a Commission on the formation of the International Ecological Court was established [7, 8].

Improving the ecological rule of law, access to justice and resolving of the environmental disputes has become an indispensable tool for achieving the United Nations Agenda for Sustainable Development for 2030 and the Sustainable Development Goals, in particular, Goal 16 – «Ensure access to justice for all

and build effective, accountable and inclusive institutions», where specialized ecological courts and tribunals are seen as a successful way to achieve this important goal.

In order to support the idea of introducing the ecological courts at the state level, till the 2010 year it was originated more than 380 national and regional environmental court instances in more than 50 countries of the world (for example, in the UK, Belgium, the Netherlands, Denmark, Finland, Sweden, China, Vermont USA, Mexico City (Mexico), New South Wales in Australia, Ontario Province in Canada, Paraguay, Philippines, South Africa, Thailand, etc.) [9, p. 11-23].

The main reasons for the creation of such courts are: 1) increasing the number and extent of the environmental problems; 2) adoption in many countries of the integrated environmental legislation; 3) activation of the position of civil society; 4) the inability of courts of the general jurisdiction to effectively administer justice in the field of the environmental protection [10, p. 15].

The conducted analysis shall allow to distinguish the three types of systems of implementation of environmental justice: 1) systems that transmit environmental affairs to courts of general jurisdiction; 2) systems based on the internal specialization of the judiciary (creation of the green benches, so-called «green benches» or green judges without formal change of the judicial structure) (for example: in Vermont, Hawaii, DC, Massachusetts, Texas USA, Austria, a number of countries in Asia and South America); 3) systems in which separate ecological courts or tribunals are established (for example: New South Wales Australia, Ontario Province Canada, New Zealand, Sweden, India, etc.) [11].

The first system is widespread in the western countries, especially in the European countries of the Roman-Germanic legal family, where individual courts dealing with the environment are rather the exception. As a rule, ecological justice is carried out in traditional courts. Environmental affairs are not singled out separately, for them there is no separate procedural form. Depending on the specifics of the particular case, they are considered, respectively, by civil, criminal, administrative or constitutional courts.

For such an example, ecological justice is also is executed in Ukraine. However, comprehensive study provided by the author of the issue of activity of such courts in resolving environmental disputes has shown their low effectiveness that proves once again the fact that the disputes of this category should be carried out by qualified specialists who have a thorough knowledge of the current environmental legislation [12, p. 357-360].

Thus, the creation of «green benches» (or «single green judges») is a simple solution used by the countries that already have a consolidated and structured judicial system. Such a system is used in some European countries and the USA.

The tendency for unofficial specialization of individual chambers or subdivisions of courts (for example, separate lobes of administrative courts) also exists. As it is rightly observed, «... this model allows the court to manage cases where the number and complexity of environmental cases fluctuates, and gives a guarantee that the workload of the court will be evenly distributed among all judges. It does not involve applying to a separate court, which may be in another place, and does not require plaintiffs to know about what constitutes an environmental matter. The appointment of judges who will be specially trained or even interested in the environmental legislation is not the mandatory requirement» [13, p. 21].

For example, the Environmental State Division Court of Vermont (United States of America), which was established in 1990 [9, p. 12] is the state court of the Vermont state, a full and independent part of the judicial system of Vermont as a sovereign subject of the federation dealing with the environmental law. The Vermont Environmental Court reviews appeals from municipal councils and commissions, appeals for decisions adopted under Act 250, as well as cases filed by the Agency for the Natural Resources, the Council for Natural Resources Management and municipal authorities. The court consists of two judges specializing in the environmental law and appointed to the Vermont Environmental Protection Department. The court is located in Barre, Vermont [14].

The Environmental State Division Court of Vermont specializes in examining lawsuits and enforces enforcement measures, which include: applications for decisions based on the Act 250 (regulatory document governing the use and development of state land); appeals from municipal councils, including the use of coercive measures; appeals from the Agency for Natural Resources and the Council for the management of the natural resources and natural resources, including enforcement of coercive measures.

The procedure for reviewing cases by the Court is governed by the Vermont Rules of the Court Proceedings. The court reviews and resolves approximately 300 cases a year [15]. However, there are two

types of cases that the Court does not deal with: cases involving the execution of criminal penalties and cases involving administrative delinquencies, since such cases are required to participate the jury trial as it is demanded by the law of the state.

The court holds hearings throughout the state. This judicial division has the right to organize the earliest telephone hearings, if the judge does not want to hear the parties and other participants in the trial in an orderly manner or if there are evidences that are subject to the direct investigation by the court. In the event that the hearing is subject to be conducted in the court, it is should be executed in the area where the incident has occurred, which is the basis for the trial in order the litigants not to overcome the long distances [14].

Law of the state does not impose any requirement for the Vermont Environmental Court judges to have the academic background. Two judges who are currently judges of the Vermont Ecological Court attend court education courses to support and develop their competence in the ability to understand the specialized environmental laws and evaluate scientific and technical data. In addition, it is recommended that judges should feel comfortable in the scientific field and have scientific literacy [14].

At the same time, the ecological court, adopted by the legislative body of Hawaii, is the significantly different from the Vermont court. The Hawaiian Environmental Court exists within the framework of the state judicial system. The judges of environmental courts are appointed in the district and district courts throughout the state. Courts have jurisdiction over civil and criminal matters relating to water, forests, beaches, air and mountains, as well as land and sea life.

The purpose of the environmental court, as it is described by the Supreme Court of Hawaii by Mark E. Recktenwald, is «to ensure the fair, consistent and effective resolution of the environmental affairs» [16].

Environmental courts in Hawaii have been created in accordance with the Act No. 218 of the Charter of the Hawaiian Islands, adopted as revised Chapter 604A «Environmental Courts» in Hawaii. They started their business on July 1, 2015.

The Chief Justice of the Supreme Court appoints an environmental judge or judges for each district and district court in each district if necessary; provided that the volume of environmental affairs in the district or district in which the environmental judge presides is not sufficient to provide the judge a full-time environmental court, the judge may consider cases arising out of other areas of law. In any district where more than one judge is appointed to the ecological court, the chief judge appoints one of the judges as the senior judge. The Chief Justice may temporarily appoint a judge of the environmental court to preside in another district, where the chief judge decides that the urgency of one or more cases in the district court or district court or the volume of cases before the district court or district court requires it [17].

Environmental court judges are assigned to district courts throughout Hawaii to handle both civil and criminal environmental matters, as well as other types of cases.

The parties may appeal the decision of the Ecological Courts in accordance with the Hawaiian Rules of Appeal through the Hawaii Intermediate Court of Appeal and / or the Hawaii Supreme Court.

Jurisdiction of the Hawaiian Environmental Court include: HRS Chapter 340E: Safe drinking water; HRS Chapter 342B: Air Pollution Control; HRS Chapter 342D: Water Pollution; HRS Chapter 6D: Protection of caves; HRS Chapter 6E: Preserving History (Ivy Kupun, Archaeological Research); HRS Chapter 174: Water and Land Development; HRS Chapter 183: Forest Reserves, Water Resources Development, Zoning; HRS Chapter 183B: Hawaiian Bets; HRS Chapter 183D: Wildlife; HRS Chapter 188: Rights and Rules of Fisheries; HRS Chapter 189: Commercial Fishing; HRS Chapter 195D: Conservation of aquatic life, wildlife and terrestrial plants; HRS Chapter 199: Resource Conservation and Recovery Program; HRS Chapter 343: Statements of negative environmental impact.

Numerous criminal offenses are dealt with in the Ecological Court. Examples include: the illegal catch of some marine animals (octopus, tacos, calamari); illegal hunting; catching or destroying Hawaiian monk seals, representative of the genus Monachus, seals (Phocidae). Mentioned family members and others mebers are the threat of extinction [16].

The third model is based on the creation of environmental courts (or tribunals), specialized courts, dealing only with environmental affairs. It is an exception to Europe and the United States, but is widespread in the rest of the world. As a rule, environmental courts have certain advantages: the speed of the trial, the efficiency, readiness and specialization of judges, as well as the presence of extrajudicial experts in this area.

For example, in New Zealand, the Environmental Court was created in 1991 on the basis of the Resource Management Act (RMA). It is an independent specialized court consisting of 8 permanent and 10 reserve judges specially trained in the field of environmental and environmental law and 15 environmental commissars (experts in the certain areas of science and technology, economics, agriculture, as well as mediation specialists). Functions and powers of this court cover not only the interpretation of law and resolution of disputes, but also the execution of decisions [18, p. 38].

The judges are permanently located in three districts (Wellington, Auckland and Christchurch). If necessary, judges from these three districts go to the place of hearings on environmental issues. This allows the Court to exercise the environmental justice and to ensure the uniform application of the environmental law, protect rights and be accessible to all citizens, including the indigenous Maori population [19].

The Ecological Court considers disputes between individulas and legal persons in the field of ecology and disputes between citizens and executive authorities, local self-government bodies. In the most issues, cases are heard with the participation of one judge and one or two specialists, the judge decides complex cases with three specialists, and minor ones – alone. Another feature of this body's activity is that the procedure for examining disputes is not as formalized as in courts of general jurisdiction. Preference is given to the written evidence, expert opinions, experts, oral evidence is practically not used in deciding on the case [13].

In accordance with the Law on Resource Management, the Environmental Court may, in accordance with the applications and complaints related to: the content of regional / district plans and development programs, as well as publicly important projects (energy projects, projects for the construction of hospitals, schools, prisons, projects sewage works, landfills, fire departments, transport communications, etc.).

Individuals may require changes to the plans, and the Resource Management Act specifically authorizes the Court to confirm, correct or cancel regional / district plans. In fact, the Ecological Court today is the only court in New Zealand that has the right: 1) to amend or abolish subordinate legislation [20]; 2) to agree on the use of natural resources (for example, use of land, coastal strips, water supply and drainage, granting of permits for discharges of pollutants); 3) meet the requirements for the termination of environmentally harmful activities, ensuring compliance with environmental requirements, restoration of the disturbed state of the environment; 4) issue declarations to determine the legal status of environmental measures and instruments; 5) to declare the presence or absence of contradictions between the provisions of various political declarations, management decisions, plans or programs on environmental protection, etc. [21].

The court has the right to make a retrial decision on the basis of decisions of local and regional authorities and is empowered to carry out civil and criminal proceedings in matters relating to the environment. Within execution of its jurisdiction, the Ecological Court has the status and authority of the ordinary court of first instance, but does not adhere the usual procedural and evidence formalities of the other New Zealand courts [20].

Thus, the Ecological Court, through the implementation of justice not only by the qualified lawyers, but also by experts in the field of environmental protection experts, has the right to review decisions of the regional and local authorities and self-government authorities. This legal capacity provides the Court with the opportunity to review the main planning, regional and local planning and regional planning and reporting tools, as well as the approval of the provision of natural resources to the property or use. Only program documents of the national level are not subject to review by the Court of the main instruments of the environmental policy [21].

**Conclusions.** It should be emphasized that such courts in the most countries play the significant role in improving the effectiveness of the environmental law and the implementation of the environmental human and civil rights. It is no coincidence that the UN General Assembly decided to give priority to strengthening the rule of law at the national and international levels (Resolution 61/39 in the report of the Sixth Committee A/61/456 [22]), which will be implemented through the creation of new environmental courts and tribunals in the world.

It is considered that the introduction of such court in Ukraine should take place in the form of the separate specialized court or chamber, as, as practice in the courts [23, c. 34], it is today the least efficient in the environmental sphere: courts and arbitration courts have not turned to the environmental issues,

generalization of the environmental issues is not executed, proper ecological specialization of judges is not carried out, environmental affairs are very reluctant to be accepted into production, rarely considered in substance, provision of ecological actions of citizens in court instances is delayed.

The objective reasons of this are the following: judges' workload, lack of qualifications, the relevance of many other non-environmental cases (corruption, organized crime, elections, honor and dignity), insufficient public attention to environmental issues, and the economic crisis in the country. Elimination of these shortcomings will mean the advancement of the legal reform of the courts in the environmental sphere, taking into account existing foreign experience and domestic specifics.

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**ЭКОЛОГИЧЕСКИЙ СУД КАК ГАРАНТИЯ ЗАЩИТЫ ПРАВ ЧЕЛОВЕКА И ГРАЖДАНИНА**

**Аннотация.** В статье представлены результаты правового анализа зарубежного опыта формирования экологических судов, как одной из гарантий защиты прав человека и гражданина. Установлено, что сегодня во всем мире действует большое количество различных вариантов и форм, в которых осуществляется экологическое правосудие. Каждая страна имеет свою специфику, связанную с ее правовой системой и местом, которое отводится в ней правовой охране окружающей среды.

Установлено, что в мире действует три типа систем осуществления экологического правосудия, а именно: 1) системы, передающие экологические дела судам общей юрисдикции; 2) системы, опирающиеся на внутреннюю специализацию судебных органов (создание green benches, так называемых «зеленых скамеек» или зеленые судьи без формального изменения судебной структуры); 3) системы, в которых созданы инновационные экологические суды или трибуналы. К первому типу относятся судебные системы большинства стран романо-германского права, а также и Украина. Второй включает судебные системы США (штаты Вермонт и Гавайи), Австрии, ряда стран Азии и Южной Америки. Третий тип систем экологического правосудия является наиболее инновационным и прогрессивным, опирается на практику Швеции, Австралии, Новой Зеландии, Индии и тому подобное.

Считаем, что рассмотренные нами примеры внедрения экологического правосудия, а также тенденции к постоянному увеличению количества экологических судов в мире убедительно демонстрируют эффективность и жизнеспособность специализированного экологического правосудия. По нашему мнению, основными преимуществами таких судов есть экспертность судопроизводства, привлечения общественности и широкое поле для использования медиации.

Внедрение и становления в Украине экологических судов необходимо, учитывая ряд проблем, имеющихся в отечественном экологическом законодательстве и правоприменительной деятельности, так и на прогрессивные мировые тенденции. Оно должно быть постепенным и включать три функциональные этапы: 1) подготовку судей, которые были бы компетентны относительно сфер спецификации и начнут свою деятельность в судах общей юрисдикции, но к их компетенции будут отнесены соответствующие экологические споры; 2) создание «зеленых рядов». Целесообразно на данном этапе было бы предусмотреть кроме возложения обязанности экологического правосудия, также обозначить обязанность выделения ресурсов; 3) создание системы специализированных экологических судов.

**Ключевые слова:** экологическое правосудие, экологический суд, права человека и гражданина, экологические права, гарантия защиты прав.

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## CHARACTERISTICS OF MOTIVATION IN THE SELLERS' PROFESSION

**Abstract.** The research target is to reveal peculiarities of sellers motivational profile.

The research was carried out in "Kego-S" ltd in Almaty city. There have been sellers and founders of "Kego-S" ltd involved in research. The total volume of choice amounted to fifty people. There have been three men and forty seven women among them. An average age of tested was 33. To research peculiarities of sellers motivational profile we applied the following methodic: Motivation profile of Ricci Martin, Psychological typology of leading roles identification of Meredit Bellbin, Definition of labor motivation type of V.I.Gerchikov, "Constructiveness of Motivation" methodic of O.P.Eliseyev. The recognition gain from other people is leading, i.e. in people around appreciated merits, achievements and various means: from oral gratitude to material encouragement that says about the prevailing factor of non-monetary motivation of the trade personnel. The received arithmetic-mean indicators of sellers role features in a section of Belbin test results correspond to a standard professiogramm of the seller, implementers and diplomats on the role qualities correspond to this professional identity. The seller with the prevailing role of the diplomat, is adjusted on cooperation, a susceptibility, diplomacy and prevention of friction, has a high need for closer contacts with others for establishment of rules and directives of work performance and for a comfortable surrounding situation. As the conclusions drawn by results of research, authors state about need of "actions" system for introduction of not monetary motivation. The main effect reached by means of similar stimulation is an increase of loyality level and interest of employees in the company.

**Key words:** motivational profile, non-monetary motivation, role features of professiogramm.

**Introduction.** Consequences of financial crisis influenced the world can be seen now throughout the globe. Majority of enterprises in many regards are now suffering from negative impact of crisis and being unable to resist against current conditions fell down into hard financial and economic situation. At the present circumstances during transition from the stage of crisis to the stage of economical growth it is necessary to find a rational and effective approach to solve the problems which enterprises and companies face with. Labor is not now an incentive but became a means to survive. In such conditions no a word can be said about highly productive and effective work, or professional development of employees, or stimulation of initiatives, or producing a strong labor enthusiasm.

Practice shows that unsuccessful people and those who try to avoid difficulties find nothing or a little activity sphere where they could have realized their potentials. Recreating activities by means of building situation of success can provided a change in labor motivation, thus, the main task of a manager of any levels consists of promoting moral inspiration in a staff as a whole and high motivation of every employee in particular [1].

High motivation of staff is the most important condition for an enterprise success. No company can succeed without high intention of employees to work efficiently, without high level of devotion to their responsibilities, without employees' interest in final results and without their striving to remarkably contribute into achieving the goals. That is why the interest of managers and researches, who are involved in management, to the study of reasons, which make people to work with full potentials for company's interests, is so high. Retention of key-workers is one of the main concerns in the conditions of crisis and to reach this goal it is important to realize adequate system of motivation and to inform staff in time. Mentioned above conditioned the urgency of research.

Questions of motivation are reflected in many scientific researches at the interface of disciplines: organization management, personnel management, labor economics, psychology and sociology of labor. Among the most important and useful in the theory and practice of motivational management in fundamental research there are: the theory of hierarchy of needs Maslow an individual, two-factor theory of F. Herzberg (Herzberg et. al., 1959), theory X and Y D. McGregor (McGregor, 1960), acquired needs theory D. McClelland (Mc Clelland, 1971.), the model needs categories K. Alderfer, (Alderfer, 1972.), V. Vroom (Vroom, 1983) expectations theory, a theory of justice John. Adams and comprehensive procedural model of Porter-Lawler (Porter & Lawler,1968).

In terms of methodology contemporary Russian scientists' works the most thoroughly investigated are questions of material forms of motivation and stimulation of employees.

The research target is to reveal peculiarities of motivation profile of sellers.

Characteristics of choice of tested. The research was carried out in "Kego-S" ltd in Almaty city. There have been sellers and founders of "Kego-S" ltd involved in research. The total volume of choice amounted to fifty people. There have been three men and forty seven women among them. An average age of tested was 33.

**Methods.** In order to research peculiarities of motivation profile of sellers we applied the following methodic;
1. Motivation profile of Ricci Martin ( Richie., Martin 2004),
2. Psychological typology of leading roles identification of Meredit Bellbin. (Samoukina, 2008).
3. Definition of labor motivation type of V.I.Gerchikov. (Samoukina, 2008).
4. "Constructiveness of Motivation" methodic of O.P.Eliseyev. (Shahova, Shapiro, 2006).

**Results.** A correlation analysis of the motivation type's interdependence of Gerchikov with dominating demands of Ricci was carried out. We used coefficient of linear correlation of Kendall. Correlation analysis was carried out with applying SPSS 16.0 program. Obtained data are presented in tables. For understanding data in tables only valuable correlations are given, the other indicators are not given, as they do not have required information for analysis.

Consider the results obtained.

Table 1 – Correlation links of motivation types of Gerchikov with dominating demands of Ricci Martin

| Demands | Type of motivation | | | | |
|---|---|---|---|---|---|
| | instrumental | professional | patriotic | managerial | lumpish |
| Demand in friendly relations | -0,304[**] | | | | |
| Demands in socializing | -0,274[**] | | 0,275[**] | | |
| Demand in clear structuring of work | | -0,282[**] | | | |
| Demand in authority and power | | | | 0,257[**] | |
| Demand in targeting | 0,211[*] | 0,238[*] | | | |
| Demand in recognition | 0,214[*] | | | | |
| Demand in sense of being required | | 0,186[*] | | | |
| Demand in development | 0,232[*] | 0,270[**] | | | |
| Demand in high payment | | -0,242[*] | -0,234[*] | | 0,204[*] |
| Demand in being creative | 0,188[*] | 0,231[*] | | | |

As it seen in the table, the instrumental type of motivation is correlating with the following demands:
- Demand in friendly relations          -0,304[**]
- Demands in socializing          -0,274[**]
- Demand in targeting          0,211
- Demand in recognition          0,214[*]
- Demand in development          0,232[*]
- Demand in being creativeм          0,188[*]

Out of which: four – positive and two – negative links.

That is the more a man considers work as only a source of earnings and other benefits received as payment for work the more he is self-motivated to achieving higher and promising targets. The more willingness for independence, self-sufficiency and self-perfection the more demand in being respected for merits, achievements and accomplishments and higher apt to demonstrate curiosity and inquisitiveness; and less demand in closer relations with others and less credibility with colleagues.

On the contrary, the less man thinks of work as only source of earnings and other benefits received as payment for work - the less he is self-motivated to achieve difficult and promising targets; the less wish of self-sufficiency, independency and self-development, less demand in respect by surrounding people for his merits, achievement and success and lower inclination to demonstrate curiosity and inquisitiveness; and higher demand in closer relations with others, are investigated. Probably, that happens due to a man with such qualities is self-sufficient and within the frameworks of the environment cannot find a necessity in closer relations.

Professional type of motivation correlates with six pairs of the stated following dominating scale of demands:

- Demand in clear structuring of work      $0,282^{**}$
- Demand in targeting      $0,238^{*}$
- Demand in sense of being required      $0,186^{*}$
- Demand in development      $0,270^{**}$
- Demand in high payment      $0,242^{*}$
- Demand in being creative      $0,231^{*}$

The four are positive and the two are negative correlating links among them. That is the more a man appreciate in work its content, a chance to realize himself and demonstrate (not only for surrounding people but also for himself) that he can cope with difficult task, which is difficult for others. The more willingness for independence, self-sufficiency and self-perfection; the more he is self-motivated to achieve difficult and promising targets; the higher apt to demonstrate curiosity and inquisitiveness. The stronger is demand in work full of sense and meaning with the element of societal usefulness. Additionally the lower is demand in rules and directives to work and lower demand to have a work with a sufficient social packet.

Opposite, the less man appreciates in work its content, a chance to realize himself and demonstrate (not only for surrounding people but also for himself) that he can cope with difficult task, which is difficult for others; the less wish of self-sufficiency, independency and self-development; the less he is self-motivated to achieve difficult and promising targets; the less apt to demonstrate curiosity and inquisitiveness and lower demand in work full of sense and meaning, with element of societal usefulness. Furthermore, the higher is demand in rules and directives to work and higher demand to have a work with a sufficient social packet. Probably, that happens due to workers distinguished by developed professional dignity towards established rules that often are posed to them with a certain sense of irony. It is a matter of honor for them to work perfectly whatever is the payment. It is typical for them to be mobilized and concentrated on achieving the targets.

Patriotic type of motivation correlates with two pairs of stated dominating scale of demands:

Demand in social relations      $0,275^{**}$

Demand in high salary      $-0,234^{*}$

That is the more a man is persuaded in his usefulness for organization, based on high moral, religious, ideological principles, the higher is a demand in communication with a large number of people, close relations with colleagues. Besides, the lower is demand to have a work with a sufficient social packet.

On the contrary, the less a man appreciate in work its content, a chance to realize himself and demonstrate (not only for surrounding people but also for himself) that he can cope with difficult task, which is not easy for others; the less wish for self-sufficiency, independency and self-perfection. The less he is self-motivated to reach promising targets; the less apt to demonstrate curiosity and inquisitiveness; the less demand in work full of meaning and sense with elements of societal usefulness. Additionally the higher demand in established rules and directives for performing work and higher demand in having work with sufficient social packet. Probably, that happens due to workers distinguished by developed professional dignity towards established rules that often are posed to them with a certain sense of irony. It is a matter of honor for them to work perfectly whatever is the payment. It is typical for them to be mobilized and concentrated on achieving the targets.

Patriotic type of motivation correlates with two pairs of stated dominating scale of demands:
Demand in social relations                          0,275**
Demand in high salary                               -0,234*
That is the more a man is persuaded in his usefulness for organization, based on high moral, religious, ideological principles, the higher is a demand in communication with a large number of people, close relations with colleagues. Besides, the lower is demand to have a work with a sufficient social packet.

On the contrary, the less a man is persuaded in his usefulness for organization, based on high moral, religious, ideological principles, the lower is a demand in communication with a large number of people, close relations with colleagues. The higher is demand to have a work with a sufficient social packet. Probably, it is related to satisfying demand in communication to collect and use information for individual purposes. An individual, weak in self-assertion, is compensated by belonging to a group (contact), providing by that to himself a feeling of safety, using mechanism of identification to valuable surrounding. Importance of social communications between co-workers can be explained, as a demand in understanding everything happens around. Without that an employee feels expelled from relations [2]. This fear causes a certain way of adaptation to situation, as a rule – non-functional (blackmail, manipulations, conflict situations).

Managerial type of motivation correlates with one pair of stated dominating scale of demands:
Demand in authority and power                       0,257**
The more a man voluntarily takes on full responsibility for performed work without any more directions and constant control, the higher is his persistent insistence for power. Opposite, the less a man voluntarily takes on full responsibility for performed work without any more directions and constant control, the less is his persistent insistence for power.

Demand in power and authority, is related to emotional maturity, quietness and self-confidence. Such employees are not afraid of looking to the face of difficulties, do not give in to occasional hesitations of mood, does not get upset over trifles and have a rich imagination and non-trivial thinking. That, probably, is related to the aspiration to escape control.

Lumpish type of motivation correlates with one pair of stated dominating scale of demands:
Demand in a high payment                            0,204*
The more a man has a very weak motivation to effective work and low qualification, the more he tries to avoid a work related to individual responsibility, the higher is his wish to have a work with sufficient social packet.

Seemingly, his aspiration to minimize working efforts to the level, acceptable for his direct manager, who can be quite satisfied with such comfortable for him situation. Such on employee can be given a work, which can be rejected by workers with other type of motivation, he agrees to leveling and agrees to rather low payment but if only the others had been paid less than he; he is extremely dependent on his manager and takes that dependence as something due.

Thus, if a man is more characterized by instrumental type of motivation, he is self-motivated to reach difficult, promising targets; he is self-sufficient, curious, inquisitive and has a demand in appreciation of his merits, accomplishments and success by others.

When a professional type of motivation is realized the wish for self-sufficiency, independence and self-perfection, high level of self-motivation, apt to curiosity and inquisitiveness can be observed. Demand in work full of sense and meaning with element of societal usefulness is dominating.

Managerial type of motivation demonstrates a man who voluntarily takes on full responsibility for performed work without any more directions and constant control and demonstrates a persistent aspiration for influence.

At lumpish type of motivation we can observe a high aspiration for having a work with sufficient social packet.

Further, table 2 is described. It shows correlations of motivating strategies by O.Eliseev, and with stated dominating demands by Ricci Martin.

Table 2 shows that motivating strategy of Bear is correlating with three pairs of stated dominating scale of demands:
Demand in friendly relations                        -0,242**
Demand in influence and power                       -0,170*
Demand in recognition                               0,216*

Table 2 – Correlations of motivating strategies by O.Eliseev, and with stated dominating demands by Ricci Martin

|  | Bear | Tiger | Panther |
|---|---|---|---|
| Demand in friendly relations | -0,242** |  |  |
| Demand in influence and power | -0,170* |  |  |
| Demand in targeting |  |  | 0,177* |
| Demand in recognition | 0,216* |  |  |
| Demand in being required |  | -0,310** |  |
| Demand in high earnings |  |  | -0,178* |

Out of them, one is positive and two are negative correlation links. That is the more man is inherent to the motif of internal and external mutual negation of the negative, which determines the stability and balance of a certain thorough, unhurried development of the individual, the more is demanded in appreciation of his merits, achievements and success by surrounding people; the less is demanded in a close, trustful relationships and the lower is demanded in persistent desire for competition and influence.

Conversely, the less a person is inherent in the motif of internal and external mutual negation of the negative, which determines the stability and balance of a certain thorough, unhurried development of individuality, the less is demanded in appreciation of his merits, achievements and success by surrounding people; the more is demanded in close, trustful relationships and higher is demand in persistent aspiration for competition and influence.

Probably, this is due to the inherent motivational profile of mechanism of "adaptation" (by K.To-math) to the customs of other people and to his own habits, which provides a certain stability of existence. This correlation reflects the social orientation of individuality lying in the framework of partnering, belonging and, probably, compensates failure in the area of productivity (the inability to self-realization and self-assertion).

Motivation strategy of Tiger negatively correlates with one pair of stated dominating scale of demands:

Demand in being required               - 0,310**

That is, the more individuality is inherent to motif of denying internal to external, not only to himself but also to others: all have to follow formally certain idea, so to say, rule-norm; the lower is demand in work which is full of meaning and sense and with element of societal usefulness.

Conversely, the lower is inherent to motif of denial internal to external, not only to himself but also to others: all have to follow formally certain idea, so to say, rule-norm; the higher is demand in work, which is full of meaning and sense and with element of societal usefulness.

Perhaps this is due to the inherent motivational profile mechanism of wish to "competition" (by K.Tomath), on the basis, which the self-education and self-assertion of the individual in outward. Motivational strategy Panther, correlates with two pairs of stated dominating scale of demands:

Demand in targeting                 0.177 *
Demand in high earnings            -0.178 *
One positive and one negative of correlation links among them.

Thus, the more man is inherent to motif of interaction – "yes – no", that is motif of the reconstruction unity of achievement motivation and motivation of relationship, when self-actualization is realized in communication rather of mind than the heart: the higher he is self-motivated to reach difficulties, promising targets and the lower is demanded to have a work with a sufficient social packet.

Perhaps, it is more important to test himself in solving difficult situations but not to have a sufficient social packet.

So, on the basis of the data obtained, if a seller has prevailing motivational strategy Bear, there is a demand to be appreciated for his merits, achievements and success; and demand in a close and trustful relationships and demand in persistent aspiration for competition and influence.

 When motivational strategy Tiger is dominating, the staff has reduced demand in work, filled with meaning and sense and with element of social usefulness.

At Panther motivational strategy, the higher a person is self-motivated, the less is demand in having a work with a sufficient social packet.

Table 3 shows correlation links of roles by methodic of Bellbin and types of motivation by V.Gerchikov.

Table 3 – Correlation links of roles by methodic of Belbin and types of motivation by V.Gerchikov

|  | Instrumental | Managerial | Professional | Patriotic |
|---|---|---|---|---|
| Implementer | 0,181* |  | -0,175* |  |
| Coordinator |  |  | 0,296** |  |
| Creator |  | 0,224* |  | -0,185* |
| Researcher | 0,207* |  |  |  |
| Diplomat |  |  | -0,268** |  |

In the figure, it can be seen, that instrumental type of motivation is positively correlating with two managerial roles

Implementer                                                 0,181*
Researcher                                                  0,207*

That is, the more an employee is considering a job only as a source of earnings and other benefits received as a reward for work, the more he is disciplined, reliable, conservative and practical; he often turns ideas into actions and the more a man is focused on the development of new fragments of ideas suggested by others.

Conversely, the less an employee considers work only as a source of earnings and other benefits received as a reward for work, the less he is disciplined, reliable, conservative, practical; less turns ideas into actions and less he is focused on the development of new fragments of ideas suggested by others.

Perhaps, this shows an adequate assessment of his capabilities and demands, where there is willingness for self-assertion in professional activity; and at a low intellectual productivity there are dominating compensatory aspirations focused on social approval [3].

Managerial type of motivation positively correlates with a command role of Creator.

The more an employee voluntarily takes on full responsibility for work without requiring any additional instructions or continuous monitoring the more he is energetic and courageous in overcoming obstacles.

Conversely, the less an employee voluntarily takes on full responsibility for the work performed without requiring any additional instructions or continuous monitoring the less he is energetic and courageous in overcoming obstacles.

This fully corresponds to motivational profile. Naturally feeling the owner, a man realizes inherent qualities to this role.

Professional type of motivation correlates with three team roles:
Implementer                                                 -0.175 *
Coordinator                                                 0.296 **
Diplomat                                                    -0.268 **

Of these, one is positive and two are negative correlations.

That is, the more the employee values work in its content, opportunity to prove himself and prove (not only to others, but also to himself) that he can cope with a difficult task, which is not feasible for others. The less a person is disciplined, reliable, conservative, practical, the less he turns ideas into practical actions; the less he is focused on cooperation, sensitivity, diplomacy and prevention of conflict situations.

Conversely, the less an employee values its content in work, opportunity to prove himself and prove (not only to others, but also to himself), that he can cope with a difficult task, which is not feasible for others; the more a man is disciplined, reliable, conservative, practical; more often he turns ideas into practical actions and the more he is focused on cooperation, sensitivity, diplomacy and prevention of conflict situations.

Of full corresponding to motivational profile, a professional, as a rule, is oriented to the result, and it is not important for him to have background in the form of loyal charged environment or liberal leadership.

This correlation reflects the orientation of employees on the development in the long term perspective, the willingness to invest in professional development, ensuring the competitiveness and increasing the rate of his value on labor market. It can serve as a ground for commitment to the organization, which creates conditions for the maintenance and development of both professional skills and career development.

Patriotic type of motivation negatively correlates with one command role of Creator

That is, the more a man is convinced in his usefulness to the organization, the less a man is energetic and courageous in overcoming obstacles. Conversely, the less a man is convinced in his usefulness to the organization, the more a man is energetic and courageous in overcoming obstacles.

Perhaps, in this situation, patriotism is only a screen, justifying his passivity as an employee. Though, based on professiogram, we believe that a man, who shares valuesof company, put the social interests above those of his own.

Thus, on the basis of the above analysis, it is clear that a seller, who shows the instrumental type of motivation is disciplined, reliable, conservative, practical; he more often turns ideas into practical actions and is focused on development of new fragments of ideas suggested by others.

A seller with managerial type of motivation voluntarily takes on full responsibility for work without requiring any additional instructions or continuous monitoring; he is energetic and courageous in overcoming obstacles.

A man with prevailing patriotic type of motivation convinced in his usefulness to organization; he is less energetic and courageous in overcoming obstacles.

Analyzing tables 1-3 we built up a correlation pleiad which represents professiogram of sellers.



---- negative correlation (p<= 0,05)
___ positive correlation (p<= 0,05)
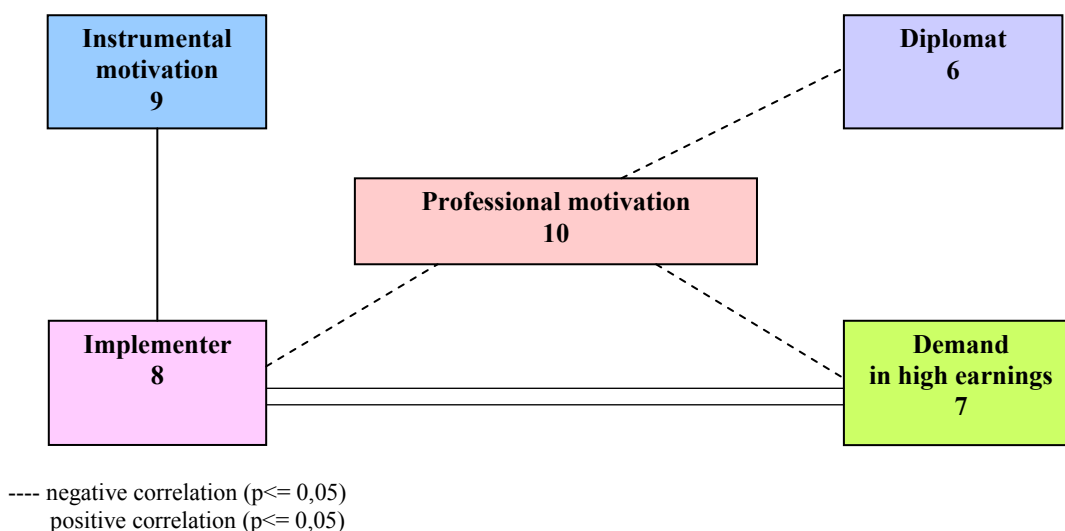
Correlation pleiad of seller's motivation profile

Figure shows that the basis of the hierarchy is a factor of "professional motivation", having the largest number of correlations and that namely this factor will identify four other factors: instrumental motivation, implementer, demand in high earnings, a diplomat.

**Discussion.** Thus, the study carried out let reveal peculiarities of motivational profile of sellers. It was found that the more a man is disciplined, reliable, conservative, practical; the more often turns ideas into practical actions, the more an employee considers a work only as a source of earnings and other benefits received as reward for work; the more is his desire to have work with a sufficient social packet. It is important to note that there is no direct links between diplomat factor, focused on cooperation, gentleness, sensitivity, diplomacy, ability to listen, to build and to prevent conflict situations and the implementer factor with its qualities of discipline, reliability, conservatism, practicality. Figure shows that they

are negatively related through an additional variable professional motivation with which an employee appreciates its content, the ability to realize himself and prove (not only to others, but also to himself) that he can cope with difficult task which is not feasible for others.

Additional negative correlation can be observed, the following tendency can be visible: the less people like to work as a team and prefer to receive money for their own efforts, the less they value in work its content.

In our case, construction of the pleiad is one of the steps of motivational audit, as it demonstrates information about the peculiarities of motivational structure of personnel in modern trade organization.

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## САТУШЫ МАМАНДЫҒЫНЫҢ МОТИВАЦИЯСЫНЫҢ СИПАТТАМАСЫ

**Абстракт.** Зерттеудің мақсаты-сатушылардың мотивациялық бейінінің ерекшеліктерін анықтау.

Зерттеу Алматы қ. "Kego-S" ЖШҚ-да жүргізілді. Зерттеуге "Kego-S" ЖШҚ сатушылары мен құрылтайшылары қатысты. Таңдаудың жалпы көлемі елу адамды құрады. Олардың арасында үш ер және қырық жеті әйел болған. Сыналушылардың орташа жасы 33 жасты құрады. Сатушылардың мотивациялық бейінінің ерекшеліктерін зерттеу үшін мынадай әдістеме қолданылды: Риччи Мартиннің мотивациялық профилі, Мередит Беллбиннің жетекші рөлдерін сәйкестендірудің психологиялық типологиясы, В. И. Герчиковтың еңбек мотивациясының түрін анықтау, О. П. Елисеевтің "мотивацияның конструктивтілік" әдістемесі. Басқа адамдардың тарапынан, яғни, айналасына сіңірген еңбегі, жетістіктері мен әр түрлі құралдары бағаланған адамдардың мойындалуы көшбасшы: ауызша алғысынан материалдық көтермелеуге дейін, бұл сауда персоналының ақшалай емес уәждемесінің басым факторын білдіреді. Белбин тестінің нәтижелері бойынша сатушылардың рөлдік сипаттамаларының алынған орташа арифметикалық көрсеткіштері сатушының стандартты профессиограммасына сәйкес келеді, орындаушылар мен рөлдік қасиеттері бойынша дипломаттар осы кәсіби сәйкестікке дәл келеді. Дипломаттың басым рөлімен сатушы ынтымақтастыққа, сезімталдыққа, дипломатияға және кикілжің болдырмауға бағытталған, жұмысты орындаудың ережелері мен нұсқауларын белгілеу үшін және жайлы қоршаған жағдай үшін басқалармен неғұрлым тығыз байланыста болу қажеттігіне ие. Зерттеу нәтижелері бойынша жасалған қорытындылар ретінде авторлар ақшалай емес уәждемені енгізу үшін "әрекеттер" жүйесінің қажеттілігін көрсетеді. Мұндай ынталандырудың көмегімен қол жеткізілетін негізгі нәтиже-бұл қызметкерлердің компанияның адалдығы мен мүдделілігі деңгейін арттыру болып табылады.

**Түйін сөздер:** мотивациялық профиль, материалдық емес мотивация, рөл, профессиограмма ерекшеліктері.

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## ХАРАКТЕРИСТИКА МОТИВАЦИИ СПЕЦИАЛЬНОСТИ ПРОДАВЦА

**Аннотация.** Цель исследования – выявить особенности мотивационного профиля продавцов.

Исследование проводилось в ТОО "Kego-S" г. Алматы. В исследовании принимали участие продавцы и учредители ТОО "Kego-S". Общий объем выборки составили пятьдесят человек. Среди них было трое мужчин и сорок семь женщин. Средний возраст испытуемых составил 33 года. Для исследования особенностей мотивационного профиля продавцов применялась следующая методика: мотивационный профиль Риччи Мартина, психологическая типология идентификации ведущих ролей Мередита Беллбина, определение типа трудовой мотивации В. И. Герчикова, методика "конструктивность мотивации" О. П. Елисеева. Лидирует признание со стороны других людей, т. е. в людях, вокруг которых ценятся заслуги, достижения и различные

средства: от устной благодарности до материального поощрения, что говорит о преобладающем факторе неденежной мотивации торгового персонала. Полученные среднеарифметические показатели ролевых характеристик продавцов в сравнении результатов теста Белбина соответствуют стандартной профессиограмме продавца, исполнитель и дипломаты по ролевым качествам соответствуют этой профессиональной идентичности. Продавец с преобладающей ролью дипломата, настроен на сотрудничество, восприимчивость, дипломатию и предотвращение трений, имеет высокую потребность в более тесных контактах с другими для установления правил и указаний выполнения работы и для комфортной окружающей обстановки. В качестве выводов, сделанных по результатам исследования, авторы констатируют необходимость системы "действий" для внедрения неденежной мотивации. Основной эффект, достигаемый с помощью подобного стимулирования – это повышение уровня лояльности и заинтересованности сотрудников в компании.

**Ключевые слова:** мотивационный профиль, нематериальная мотивация, роль, особенности профессиограммы.

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# CURRENT TRENDS OF DIRECT FOREIGN INVESTMENT IN THE WORLD

**Abstract.** The purpose of the article is to identify the world trends in the movement of foreign direct investment (FDI) in modern conditions.

The methodology of the research has made general scientific principles of cognition of economic phenomena - dialectical, concrete historical, systemic approaches. The research used such scientific methods as analysis and synthesis, comparison, generalization, as well as methods of economic and statistical analysis. The information basis for the study was the annual World Investment Reports of the United Nations Conference on Trade and Development (UNCTAD).

The article analyzes the dynamics of FDI in certain periods from 1982 to 2016, the results of which showed an ambiguous fluctuation in their volumes. The analysis of the sectoral structure of FDI on which the main motive of foreign investments was determined at the beginning of the period under review was access to natural resources. The geographic structure of FDI in the world is studied. The author analyzes the data on FDI in the context of developed, developing countries and countries with economies in transition, in order to identify the activity and role of groups of countries with different economic development in the processes of direct foreign investment, and to determine the structural shifts in the geography of FDI in recent decades. Thus, it was revealed that the lion's share of FDI is in developed countries, but their share decreases slightly each year in favor of developing countries. Also, the article reveals the trends regarding investment policies of countries, which are the desire of many states to encourage, simplify and liberalize investments.

**Keywords:** foreign direct investment, investment policy, world trends, outflow of FDI, inflow of FDI, geographical structure of investments.

**Introduction.** In the modern world economy, there is an increase in capital migration. Such development seems natural in the context of globalization, the various processes of which are unfolding particularly intensively in the investment sphere.

Foreign direct investment (FDI) is an essential part of the world's capital flows. For Kazakhstan, they are of interest, primarily because they serve as a factor in the modernization of the national economy, stimulate economic growth and help to smooth objectively existing economic and social problems in the period of market reforms. Foreign experience shows the high role of FDI in the implementation of structural adjustment of economies, investment reconstruction and modernization of production.

**Results and discussion.** Looking at the dynamics of foreign direct investment since 1982, we see a rapid growth of all forms of international investment, the volume of which increased more than fivefold by the beginning of 2000. They grew most dynamically in the late 1990s. Thus, by the beginning of 2000, the assets of institutional investors doubled – up to 30 trillion US dollars, which almost coincided with the total GDP of all countries (the share of FDI in total world investment increased from 11.6% in 1980 to 22.4% in 2005, portfolio investment from 15.5% to 31.3%, respectively) [1].

In 2000, global inflows amounted to approximately 1.5 trillion US dollars (table 1). This figure was achieved mainly due to massive FDI inflows to the United States and the growth of Mergers and Acquisitions (MaA) transactions.

Table 1 – Particular indicators of FDI and international production in 2016 and in selected years

| Indicator | Value in current prices, billion US dollars | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1982 | 1990 | 2000 | 2001 | 2005-2007 | 2009 | 2014 | 2015 | 2016 |
| FDI income | 59 | 205 | 1491 | 735 | 1426 | 1198 | 1324 | 1744 | 1746 |
| FDI outcome | 28 | 244 | 1379 | 621 | 1459 | 1175 | 1253 | 1594 | 1452 |
| The volume of import FDI | 734 | 2197 | 6314 | 6846 | 14 496 | 18 041 | 25 108 | 25 191 | 26 728 |
| The volume of export FDI | 552 | 2254 | 5976 | 6582 | 15 184 | 19 326 | 24 686 | 24 925 | 26 160 |
| MaA | | 98 | 1144 | 601 | 729 | 250 | 428 | 735 | 889 |
| Revenue of foreign branches | 2541 | 5097 | 15 680 | 18 517 | 19 973 | 23 866 | 33476 | 36 069 | 37 570 |
| Assets of foreign branches | 1959 | 4595 | 21 102 | 24 952 | 41 140 | 74 910 | 10 4931 | 108 621 | 112 833 |
| Employment in foreign branches (thousand people) | 17987 | 21 438 | 45 587 | 53 581 | 49 478 | 59 877 | 75 565 | 79 817 | 82 140 |
| For reference | | | | | | | | | |
| GDP | 10 805 | 23 464 | 31 895 | 31 900 | 52 331 | 57 920 | 78 501 | 74 178 | 75 259 |
| Gross fixed capital formation | 2285 | 5797 | 6466 | 6680 | 12 431 | 12 735 | 19 410 | 18 533 | 18 451 |
| Export of goods and services | 2081 | 4424 | 7036 | 7430 | 14 952 | 15 196 | 25 563 | 20 921 | 20 437 |
| *Note:* compiled by the authors according to the sources [2-4]. | | | | | | | | | |

In 2015, there was a sustained recovery of foreign direct investment (FDI) in the world economy. Global FDI flows increased by 25% to 1774 billion US dollars. This is the highest level of FDI growth since the global economic and financial crisis of 2008-2009. There was a surge in cross-border mergers and acquisitions (MaA) transactions to 721 billion US dollars, compared to 2014, which amounted to 432 billion US dollars [5].

After strong growth in 2015, global FDI flows began to lose momentum in 2016, demonstrating that the road to recovery remains bumpy. With sluggish economic growth and serious political risks as perceived by multinational enterprises (MNEs), FDI inflows fell by 2% to 1.75 trillion US dollars [4].

Looking at the sectoral structure of foreign direct investment, we see that in the first half of the XX, access to natural resources was the main motive for foreign investment. Mainly food, mining and oil corporations from developed countries invested in former colonies and developing countries in Africa, Asia and Latin America.

Scientific and technical revolution and toughening of competition, manifested in 1970-1980-ies, forced companies such as IBM, AT&T, Toshiba, Alcatel, Digital and Siemens, to look for more profitable places for the production and assembly of computers, telecommunications and other high-tech equipment (computer parts, disk drives, printers and office automation elements). Overcoming trade restrictions, TNCs such as General Motors, Volkswagen, FIAT and Ford moved car production to new markets (Mexico, Brazil) with lower wages.

The beginning of the 1990s was marked by the growth of service TNCs: banks, mobile companies, transport agencies, management and legal consulting, real estate agencies and retail trade. The expansion of these TNCs around the world is linked to the increasing importance of services to national economies. In the US, the UK and France, this sector is already 65-70% of GDP.

UNCTAD estimates that service TNCs hold 55-60% of the world's FDI funds (30-35% in the early 1970s). It is convenient for service TNCs to follow their industrial partners when they move part of their production or try to approach end-users in new markets. Service companies are usually faster than industrial companies to respond to market changes. They do not need warehouses, they are almost completely dependent on the human factor and it is easier for them to open their branches abroad [1].

Table 2 – Distribution of the accumulated amount of foreign investments by sectors of the economy in 1970-2015, %

| Economy sector | Inward investment | | | | | |
|---|---|---|---|---|---|---|
| | 1970 | 1980 | 1990 | 2000 | 2010 | 2015 |
| Primary sector | 12,1 | 6,7 | 9,1 | 5,7 | 11,0 | 6 |
| Manufacturing industry | 56,5 | 55,2 | 42,5 | 36,4 | 50,0 | 26 |
| Services sector | 31,4 | 38,1 | 48,4 | 55,5 | 39,0 | 68 |
| *Note:* compiled by the authors according to the sources [4, 6]. | | | | | | |

In 2015, the manufacturing and commodity sectors accounted for 26 per cent and 6 per cent of global FDI stock, respectively, and 65 per cent of such investment was in the services sector. Looking more closely at FDI in services, it is clear that its huge share (two thirds of total FDI) overestimates the importance of the tertiary sector in international investment. A significant part of FDI in the services sector is intended for companies related to raw materials industries and the production of MNEs and performing like services functions, including the functions of head structures and back-office functions of financial holding companies, centres of procurement and logistics, distribution, research and development. In the data on the sectoral structure of FDI, such activities are automatically related to services. Thus, FDI in services could be overstated by more than a third [3].

The overall increase in FDI projects is contributed by the following five industries: extractive industries (mining (both underground and open pit) and the oil industry), chemical industry, infrastructure industries (electricity, gas and water supply), transport and communications and other services (mainly services and the oil and gas industry).

Looking at the geographical pattern of foreign direct investment inflows since 2000, we see that developed countries account for the largest share of FDI inflows. However, their share systematically declined from 79.8% in 2000 to 59.1% in 2016 (the lowest rate was in 2014 and amounted to 42.6% of all FDI). Among the highly developed countries, Europe had the largest share, but with a downward trend (50.2% in 2000 to 30.5% in 2016). The highest recorded FDI stock in Europe was in 2007, at 899 billion US dollars, which represented a 45.5% share of FDI at the time.

During the period under review, foreign direct investment increased by 27% from 1,388 billion US dollars in 2000 to 1,746 billion US dollars in 2016 (table 3).

Table 3 – FDI inflows, by region and by country, 2000-2016

| Country/region group | Years | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2005 | 2007 | 2008 | 2009 | 2010 | 2011 | 2014 | 2015 | 2016 |
| All countries of the world | 1388 | 973,3 | 1978,8 | 1697 | 1197,8 | 1309 | 1524,4 | 1324 | 1774 | 1746 |
| Developed countries | 1108 | 613,1 | 1358,6 | 962,3 | 606,2 | 618,6 | 747,9 | 563 | 984 | 1032 |
| Europe* | 697 | 506,1 | 899,6 | 518,3 | 378 | 432 | 478 | 272 | 566 | 533 |
| North America | 381 | 104,8 | 271,2 | 316,1 | 149 | 226 | 270 | 1231 | 390 | 425 |
| Developing countries | 253 | 329,3 | 529,3 | 620,7 | 519,2 | 616,7 | 684,4 | 704 | 752 | 646 |
| Africa | 8,7 | 38,2 | 69,2 | 87,6 | 52,6 | 43,1 | 42,7 | 71 | 61 | 59 |
| Asia | 146 | 213,8 | 331,4 | 387,8 | 315,3 | 384 | 423,1 | 460 | 524 | 443 |
| Latin America and the Caribbean region | 98 | 77,1 | 127,5 | 144,4 | 149,4 | 187,4 | 217 | 170 | 165 | 142 |
| Countries with economies in transition** | 27,5 | 30,9 | 90,9 | 114,4 | 72,4 | 73,8 | 92,2 | 57 | 38 | 68 |
| Share of global FDI, % | | | | | | | | | | |
| Developed countries | 79,8 | 63 | 68,7 | 56,7 | 50,6 | 47,3 | 49,1 | 42,6 | 55,5 | 59,1 |
| Developing countries | 18,2 | 33,8 | 26,8 | 36,6 | 43,3 | 47,1 | 44,9 | 53,2 | 42,4 | 37 |
| Countries with economies in transition | 2 | 3,2 | 4,6 | 6,7 | 6,1 | 5,6 | 6 | 4,3 | 2,1 | 3,9 |
| *Note:* compiled by the authors according to the sources [4, 7, 8]. | | | | | | | | | | |

The United States was the largest source of investment during the period under review. The share of FDI inflows to the US was 22.6% in 2000 and 22.3% in 2016. In 2000, developed countries dominated in FDI inflows. Among the 10 countries in the ranking, 7 were developed and accounted for 60.4% of all FDI [8]. In 2016, only 5 developed countries remained among the top 10 FDI recipients, accounting for 48.3% of all FDI. Germany, Spain, Canada, Denmark lost their positions. China (7.7%) and Hong Kong (6,2%) achieved the greatest success during this period (table 4) [4].

Table 4 – The largest country recipients of FDI in 2000 and 2016 years (billion Us dollars and %)

| № | Country | FDI in billion US dollars | Share of world FDI inflows (%) | № | Country | FDI in billion US dollars | Share of world FDI inflows (%) |
|---|---|---|---|---|---|---|---|
| | | | 2000 | | | | 2016 |
| 1 | USA | 314 | 22,6 | 1 | USA | 391 | 22,3 |
| 2 | Germany | 198 | 14,3 | 2 | Great Britain | 254 | 14,5 |
| 3 | Great Britain | 122 | 8,8 | 3 | China | 134 | 7,7 |
| 4 | Canada | 67 | 4,8 | 4 | Hong Kong, China | 108 | 6,2 |
| 5 | Netherlands | 64 | 4,6 | 5 | Netherlands | 92 | 5,3 |
| 6 | Hong Kong, China | 55 | 4 | 6 | Singapore | 62 | 3,5 |
| 7 | China | 41 | 3 | 7 | Brasil | 59 | 3,4 |
| 8 | Spain | 40 | 2,9 | 8 | Australia | 48 | 2,7 |
| 9 | Denmark | 34 | 2,4 | 9 | India | 44 | 2,5 |
| 10 | Brasil | 33 | 2,4 | 10 | Russia | 38 | 2,2 |
| | *Note:* compiled by the authors according to the sources [4, 8]. | | | | | | |

The geographical pattern of FDI outflows is also currently dominated by developed countries. However, there is a tendency to change this situation. In 2000, developed countries exported 91.3% of investments, and in 2016 - 79.1% [8]. Countries with economies in transition are experiencing growth in FDI exports. While in 2000 Countries with economies in transition exported 0.3% of FDI, in 2016 they exported 1.7% of FDI (table 5).

Table 5 – FDI outflows by region and by country, 2000-2016

| Country/region group | Years | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2005 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2015 | 2016 |
| All countries of the world | 1187 | 879 | 2146 | 1857,7 | 1175,1 | 1451,4 | 1694,4 | 1284 | 1594 | 1452 |
| Developed countries | 1084 | 742 | 1809 | 1506,5 | 857,8 | 986,6 | 1237,5 | 873 | 1173 | 1044 |
| Europe* | 859 | 799,6 | 1270 | 944,5 | 458,1 | 568,4 | 651,4 | 376 | 666 | 515 |
| North America | 187 | 15,4 | 378 | 311,8 | 266,9 | 304,4 | 396,6 | 365 | 370 | 365 |
| Developing countries | 99 | 122,7 | 285 | 292,7 | 268,5 | 400,1 | 383,8 | 357 | 389 | 383 |
| Africa | 1 | 2,3 | 10,6 | 9,3 | 3,2 | 7 | 3,5 | 12 | 18 | 18 |
| Asia | 84 | 84,3 | 223 | 220,1 | 210,9 | 273 | 280,5 | 299 | 339 | 363 |
| Latin America and the Caribbean region | 14 | 36 | 51,7 | 63,2 | 54,3 | 119,9 | 99,7 | 44 | 31 | 1 |
| Countries with economies in transition** | 4 | 14,3 | 51,5 | 58,5 | 48,8 | 61,6 | 73,1 | 54 | 32 | 25 |
| | Share of global FDI, % | | | | | | | | | |
| Developed countries | 91,3 | 84,4 | 84,3 | 81,1 | 73 | 68,2 | 73 | 68 | 73,6 | 79,1 |
| Developing countries | 8,3 | 14 | 13,3 | 15,8 | 22,8 | 27,6 | 22,6 | 27,8 | 24,4 | 26,4 |
| Countries with economies in transition | 0,3 | 1,6 | 2,4 | 3,1 | 4,2 | 4,2 | 4,4 | 4,2 | 2 | 1,7 |
| | *Note:* compiled by the authors according to the sources [4, 7, 8]. | | | | | | | | | |

In 2000, more than 80% of foreign direct investment was exported from 10 countries (tab. 5) [8]. Almost 20% of FDI was exported from the UK, about 15% from France and 12% from the US. These three countries exported 553 billion US dollars, which accounted for 46.6% of all FDI in the world at that time. In 2016, the top ten FDI suppliers exported 1.1 trillion US dollars of FDI (76% of all investment) [4]. Comparing to 2000, only the United States maintained its leading position with a share of 20.6% in the total outflow of foreign direct investment. The growing share of developing countries deserves special attention: in 2000, Hong Kong's share was 5% (sixth in the ranking), and in 2016, China joined Hong Kong (4.3%) with a share of 12.6% (table 6).

Table 6 – The largest suppliers of foreign direct investment in accordance with its value and share in the structure of outflow in 2000 and 2016 years (billion US dollars and %)

| № | Country | FDI in billion US dollars | Share of world FDI outflows (%) | № | Country | FDI in billion US dollars | Share of world FDI outflows (%) |
|---|---------|--------------------------|--------------------------------|---|---------|--------------------------|--------------------------------|
| | | 2000 | | | | 2016 | |
| 1 | UK | 233 | 19,6 | 1 | USA | 299 | 20,6 |
| 2 | France | 177 | 14,9 | 2 | China | 183 | 12,6 |
| 3 | USA | 143 | 12 | 3 | Netherlands | 174 | 12 |
| 4 | Belgium and Luxembourg | 86 | 7,2 | 4 | Japan | 145 | 10 |
| 5 | Netherlands | 76 | 6,4 | 5 | Canada | 66 | 4,5 |
| 6 | Hong Kong, China | 59 | 5 | 6 | Hong Kong, China | 62 | 4,3 |
| 7 | Germany | 56 | 4,7 | 7 | France | 57 | 3,9 |
| 8 | Spain | 55 | 4,6 | 8 | Ireland | 45 | 3,1 |
| 9 | Canada | 45 | 3,8 | 9 | Spain | 42 | 2,9 |
| 10 | Switzerland | 45 | 3,8 | 10 | Germany | 35 | 2,4 |
| *Note:* compiled by the authors according to the sources [4, 8]. | | | | | | | |

Large economic groups play a special role in attracting foreign direct investment. FDI inflows to large economic groups such as the G20 and Asia-Pacific Economic Cooperation (APEC) continued to dominate the global FDI landscape in 2016 (table 7). These groups accounted for more than 50% of global FDI inflows and outflows. In some groupings, FDI flows between members are becoming increasingly important.

Table 7 – FDI in selected groups of countries in 2015 and 2016 years (billion Us dollars and %)

| Mega groups | FDI inflow | Share of world FDI inflows % | FDI inflow | Share of world FDI inflows % |
|-------------|-----------|------------------------------|-----------|------------------------------|
| | | 2015 | | 2016 |
| G20 | 888 | 50 | 1147 | 66 |
| APEC | 913 | 53 | 926 | 51 |
| NAFTA | 423 | 24 | 452 | 26 |
| CIS | 259 | 15 | 488 | 28 |
| BRICS | 258 | 15 | 277 | 16 |
| ACP | 56 | 3 | 51 | 3 |
| *Note:* compiled by the authors according to the source [4]. | | | | |

Current trends in investment policies in different countries show that at present, measures (institutional) taken by states are aimed primarily at promoting, simplifying and liberalizing investment. In particular, many countries have simplified registration procedures, introduced investment preferences, and continued the process of denationalization. According to UNCTAD, in 2016, one in five measures taken in

the world is related to the regulation of investments, which is much more than in 1990. New investment restrictions and benefits have been reflected not only in laws and regulations but also in administrative decisions, especially in the context of the regulation of mergers with foreign participation.

Currently, in many states, cross-border investments are regulated by specific investment laws, the essence of which is similar to international investment agreements (IIAs). Thus, such laws exist in at least 108 countries [9]. The similarity of their laws to IIAs is determined by the following identical paragraphs: definitions; regulation of investor access and treatment, investment promotion and dispute settlement. It should be noted that this is quite logical, given that the reform of the IIA and the modernization of the relevant provisions of the investment legislation should go in parallel.

**Conclusion.** Studies of the investment policy of the countries of the world show that the general trend of the situation with the regulation of foreign direct investment in most countries of the world is shifting towards greater liberalization, the conscious opening of an increasing number of sectors of national industry for the participation of foreign investors, reducing the set of tools and methods of restrictions on foreign direct investment by national legislation, which is enshrined in international acts restricting and prohibiting certain types of state regulation of foreign direct investment.

It was also found that most FDI flows were from developed countries. It should be noted that the share of developed countries in global FDI flows is declining. Developing countries, on the contrary, are increasing their share of FDI flows, led by China and Hong Kong.

Foreign direct investments are considered to be desirable all over the world. This leads to changes in the structure of the economy, stimulates national actors to act and contribute to development as a whole. In the period 2000-2016, there were changes in the structure of the world economy, which were of great importance for the flow of FDI. Despite some failures of the global market caused by the crisis, direct investment, usually increasing its pace. Developed countries with declining trends have the largest share of FDI flows. The U.S. is the largest exporter and importer of FDI. Developing countries, particularly Asia with China as the leader, rapidly increase its share in the structure of FDI.

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**ӘЛЕМДЕГІ ТІКЕЛЕЙ ШЕТ ЕЛДІК ИНВЕСТИЦИЯЛАР САЛУДЫҢ ЗАМАНАУИ ҮРДІСТЕРІ**

**Аннотация.** Мақаланың мақсаты заманауи шарттардағы тікелей шет елдік инвестициялардың (ТШИ) қозғалысының әлемдік үрдістерін айқындау болып табылады.

Зерттеу әдістемесінің негізін экономикалық құбылыстарды ұғынудың жалпы ғылыми қағидалары құрады, оның ішінде – диалектикалық, нақты-тарихи, жүйелік тәсілдер. Зерттеуде талдау және синтез, салыстыру, жалпылау әдістері, сонымен қатар экономико-статистикалық талдау әдістері қолданылды. Зерттеудің ақпараттық базасын Біріккен ұлттар ұйымының сауда және даму бойынша конференциясының (ЮНКТАД) дүниежүзілік инвестициялар туралы жыл сайынға есептері құрады.

Мақалада 1982 ж. және 2016 ж. арасындағы кейбір кезеңдердегі ТШИ серпініне талдау жасалған, оның нәтижелері олардың көлемінің әркелкі өзгергендігін көрсетті. ТШИ-дың салалық құрылымына талдау жүргізіліп, қарастырылып отырыған кезең басындағы шет елдік инвестициялардың мотиві анықталды, ол – табиғи ресурстарға қол жеткізу. Дүние жүзіндегі ТШИ-дың географиялық құрылымы зерттелді. Автор ТШИ бойынша мәліметтерді дамыған, дамушы және өтпелі экономикасы бар елдер аясында саралаған, ол экономикасының даму деңгейі әр түрлі елдердің тікелей шет елдік инвестициялау процесіндегі белсенділік деңгейін анықтау үшін, сондай ақ соңғы онжылдықтарда орын алған ТШИ географиясындағы құрылымдық өзгерістерді анықтау үшін жасалған. Мәселен, ТШИ көп үлесі дамушы елдерге келсе де, ол елдердің үлесі жыл сайын ақырындап азаю үстінде, есесіне, дамушы елдердің үлесі аз қарқынмен ұлғаюда. Одан басқа, мақалада емлекеттердің инвестициялық саясатына қатысты үрдістер анықталған, олар мемлекеттердің инвестицияларды ынталандыру, қарапайымдастыру және либеризацияалуға талпынуында жатыр.

**Түйін сөздер:** тікелей шет ел инвестициялары, инвестициялық саясат, әлемдік үрдістер, ТШИ кетуі, ТШИ келуі, инвестициялардың географиялық құрылымы.

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# СОВРЕМЕННЫЕ ТЕНДЕНЦИИ
# ПРЯМОГО ИНОСТРАННОГО ИНВЕСТИРОВАНИЯ В МИРЕ

**Аннотация.** Целью статьи является выявление мировых тенденций движения прямых иностранных инвестиций (ПИИ) в современных условиях.

Методологию исследования составили общенаучные принципы познания экономических явлений – диалектический, конкретно-исторический, системный подходы. В исследовании были использованы такие научные методы как анализ и синтез, сравнение, обобщение, а также методы экономико-статистического анализа. Информационную базу исследования составили ежегодные доклады о мировых инвестициях Конференции организации объединенных наций по торговле и развитию (ЮНКТАД).

В статье выполнен анализ динамики ПИИ в отдельных периодах с 1982 г. по 2016г., результаты которого показали неоднозначное колебание их объемов. Проведен анализ отраслевой структуры ПИИ по которому был определен основной мотив иностранных инвестиций в начале рассматриваемого периода – доступ к природным ресурсам. Исследована географическая структура ПИИ в мире. Автор анализирует данные по ПИИ в разрезе развитых, развивающихся стран и стран с переходной экономикой, с целью выявления активности и роли этих групп стран в процессах прямого иностранного инвестирования, а также для определения структурных сдвигов в географии ПИИ за последние десятилетия. Так, было выявлено, что львиная доля ПИИ приходится на развитые страны, однако их доля с каждым годом незначительно снижается в пользу развивающихся стран. Также в статье выявлены тенденции относительно инвестиционных политик стран, которые заключаются в стремлении многих государств на поощрение, упрощение и либерализацию инвестиций.

**Ключевые слова:** прямые иностранные инвестиции, инвестиционная политика, мировые тенденции, отток ПИИ, приток ПИИ, географическая структура инвестиций.

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# THE ESTABLISHMENT OF INNOVATION CLUSTERS, BRINGING TOGETHER SCIENCE AND INDUSTRY

In 2004, Kazakhstan launched the project "Diversification of Kazakhstan's economy through the development of clusters in the non-extractive sectors of the economy", which will lead to an increase in productivity, competitiveness and sustainable economic development of individual regions and the country as a whole. Clusters serve as points of growth of the domestic market and contribute to the increase in the international competitiveness of goods.

The main segments of the food industry are: the production of beverages, flour and cereal products, vegetable and animal oils and fats, meat and meat products, dairy products, fruit and vegetable processing. Cluster integration processes are successfully starting to work in them all over the world.

In the Republic of Kazakhstan, in particular in the food industry, there are certain prerequisites for the formation of similar clusters, which in their scale and potential would be able to significantly exceed Russian and even foreign in the future.

Integration relations in the food industry are aimed at effective use of the potential of enterprises, including information, production, scientific, trade, financial component, aimed at increasing the overall economic effect of the successful development of a particular branch of the food industry.

The use of resource-saving technologies has one important advantage - the cost of the manufactured product, as well as transport and operating costs are reduced. In addition, the savings accumulated funds can be used for the development of an activity.

Improving the competitiveness of production through cluster initiatives is currently a basic element of Kazakhstan's development strategy. Cluster initiatives implemented in recent years show that the high competitiveness of the country, based on the strong positions of individual clusters, is the engine of advanced technologies competing in the world market. In clusters, the close relationship between science and production reduces the time of introduction of scientific innovative technologies, contributes to the rapid solution of not only financial issues, but also to the provision of market demand products aimed at improving the population. The cluster model of the organization of innovative activity leads to the creation of an innovative product of joint activity and allows to accelerate its spread not only in the domestic but also in the international space. It should be noted that due to the unification of stakeholders in the innovation cluster formed not a spontaneous concentration of a variety of technological solutions or inventions, and creates a certain system of dissemination of technologies aimed at the formation of a sustainable consumer, including all the mechanisms of marketing promotion of goods in the market.

Taking into account the advantages of cluster technologies, a good example was the creation of clusters that combine advanced scientific developments of scientists of the Kazakh Academy of food and food producers (LLP «Ордабасы кус», «Амиран» factory, LLP «Племенное хозяйство Зеренда», LLP «FoodExco», LLP «Евразия Инвест ЛТД» etc.), that allowed to provide effective introduction of new innovative developments of scientists in production.

It should be noted that Kazakhstan has rich sources of raw materials, including milk of various farm animals (cow, goat, mare), dietary turkey meat, bee products, fruit, vegetable and cereal crops.

From the position of national and ethnic characteristics of food, the mare's milk is of particular interest, although previously mainly used for the production of saumal and koumiss. Taking into account the uniqueness of the chemical composition of mare's milk, its high therapeutic properties, specialists of the Kazakh Academy of Nutrition have developed children's and therapeutic-prophylactic products based on

it, which have been successfully introduced into production thanks to the established clusters that unite science and production.

For the first time in Kazakhstan, the production of dry mare's milk is put on an industrial basis with the use of new technologies that allow not only to improve its taste characteristics, but also to preserve its unique medicinal properties, while increasing its shelf life.

Thanks to the close union of scientists and producers of goat milk, for the first time in Kazakhstan new liquid and pasty products of children's and dietary food on its basis are developed and prepared for industrial production.

Along with the milk of various farm animals, of particular interest is turkey meat as a dietary raw material for the production of children's products and therapeutic-preventive nutrition.

Taking into account the high nutritional and biological value of turkey meat, the development of new products has allowed not only to expand the range of meat products with national content, but also to create products with targeted preventive properties, dietary orientation, easy digestibility for mass consumption, as well as for children and therapeutic-preventive purposes.

In recent years, interest in natural biologically active products of beekeeping has increased significantly. Bee products (honey, propolis, flower pollen, royal jelly) have extremely valuable healing properties; they are essential nutritional factors; they are aimed at the normalization of metabolic processes, improving the protective functions of the body and the quality of life in general. Honey has been successfully introduced into schools and is included in the diet of schoolchildren as a product of high nutritional and biological value, and bee products are successfully used in the prevention of a number of non-infectious and infectious diseases, as well as to increase the body's resistance to adverse environmental factors.

Bee products are one of the ideal means to create on their basis specialized products that carry not only nutritional functions, but also are unique means of prevention and body's defense increase.

Thus, the creation of innovative clusters, combining science and production, allowed for the first time in Kazakhstan to introduce scientific developments and organize the industrial production of children's and specialized food products, as well as products of mass consumption of dietary orientation with national content. The development of cluster associations and the creation on their basis of a wide range of children's and dietary food products is in unison with the long-term priority of the strategy of socio-economic development of the Republic – "Kazakhstan-2030", in which much attention is paid to the formation of a healthy lifestyle, namely proper, rational nutrition of the population. The solution of these issues can be successful in the active development and implementation of new products with increased nutritional and biological value, taking into account regional, national and ethnic characteristics of nutrition of both children and adults on dairy, meat, fruits and vegetables, food and other bases using modern science and production with their close mutually beneficial cooperation.

Thus, the management of food industry enterprises on the basis of the cluster approach is an actual and necessary process aimed at improving the competitiveness of enterprises in this industry, their transition to a new qualitative level, including international, while developing the national economy with the maximization of their own profits.

Creation and effective functioning of the enterprises of the food industry on the basis of the cluster approach assumes existence of the modern hi-tech industrial zone for placement of agricultural and processing productions in the territory of infrastructure of the cluster with a task of release of competitive modern production not only for internal, but also for the external market.

**Ю. А. Синявский, С. А. Терещенко**

Қазақ тағамтану академиясы, Қазақстан

**ҒЫЛЫМ ЖӘНЕ ӨНДІРІС АРҚЫЛЫ
ИННОВАЦИЯЛЫҚ КЛАСТЕРЛЕРДІ ЖАСАУ**

**Аннотация.** Бұл жұмыс балалар мен мамандандырылған азық-түлік өнімдерін, сондай-ақ тұтыну тауарларын ғылыми тұрғыда дамытуға және оларды сүт, ет және азық-түлік концентраттары өндірістерінде кеңінен енгізуге арналған.

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**ПЕРСПЕКТИВНОСТЬ СОЗДАНИЯ ИННОВАЦИОННЫХ КЛАСТЕРОВ,
ОБЪЕДИНЯЮЩИХ НАУКУ И ПРОИЗВОДСТВО**

**Аннотация.** В статье излагается значение кластерного подхода, объединяющего научные разработки и организацию промышленного выпуска продуктов, что позволяет достаточно эффективно решать вопросы не только производства, но и внедрения новых технологий. Работа посвящена научным разработкам детского и специализированного питания, а также продуктов массового потребления и их широкому внедрению на предприятиях молочной, мясной и пищеконцентратной отраслях промышленности.

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# SYNTHESIS AND PHYSICOCHEMICAL PROPERTIES
# OF ACETYLENE AMINO ALCOHOLS

**Abstract.** The article is given an overview of publications devoted to the synthesis of acetylenic amino alcohols and the possibility of obtaining on their basis of microbiologically active compounds by interaction with phenyl isocyanate and phenyl isothiocyanate. Acetylene amino alcohols having not only biological activity, but also other valuable properties, are also the basis for obtaining their derivatives. The yield of derivatives of acetylene amino alcohols by Manich reaction was 66-73%. Implementation of the reaction at high temperature leads to the passing of side processes, in particular, the decomposition of acetylene alcohols, resin formation and others.

Absorption spectra corresponding to functional groups and bonds of acetylene amino alcohols are observed on IR spectra. Physical and chemical characteristics of acetylene amino alcohols were determined: boiling point, chromatographic characteristics of $R_f$ substance, elemental composition of carbon, hydrogen, nitrogen (mass.) and gross formulas.

**Key words:** acetylene amino alcohols, carbamic acids, carbamates, thiocarbamates, microbiological activity.

**Introduction.** From the point of view of various specific properties of compounds, compounds with an amino group in the composition of which there is an acetylene bond are of particular interest [1-6], because among them there are compounds that differ in chemical, physiological and biological properties.

One of the most important ways to produce amino acids in the acetylene range is the amino methylation reaction of the German chemist Karl Mannich. To continue this reaction, you need three components - the first substrate to be used for aminomethylation (in our case, acetylenic alcohol), the second is carbonyl (formaldehyde in our case), and the third is the amino component (in our case, dialkyl (diaryl) amines) [7-9]. As a result of the reaction, the product of aminomethylation is formed and water, the so-called Mannich base.

V. Nazarov and his colleagues approve that vinyl acetylene homologs do not react with amines and paraffin even with prolonged heating at atmospheric pressure, but when introduced into the reaction medium in a catalytic amount of iron salts ($FeCl_3$), the reaction occurs easily and gets amino acid derivatives in good yields ( up to 90%) [10]:

$$-CH=C-C\equiv CH + CH_2O + HNR_2 \longrightarrow -CH=C-C\equiv C-CH_2-NR_2$$
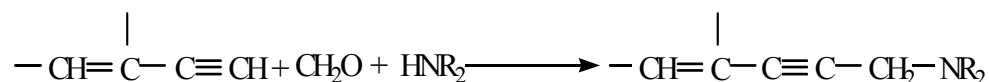
The interaction of amines of acetylene alcohols with paraformam has been the themes of many studies. E. Jones and his colleagues obtained the corresponding acetylenic amino acids with a small yield by the interaction of α-ethynylcarbinol with trioxymethylene and secondary amines [11]:

$$R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv CH + CH_2O + HNR_2'' \longrightarrow R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv C-CH_2-NR_2''$$
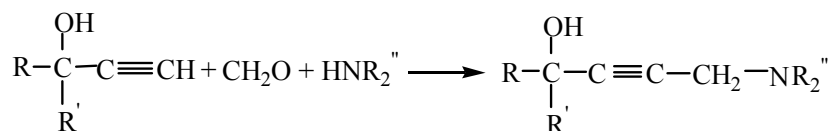
These alcohol acetates under the reaction conditions of Mannich give acetylenic amino alcohols in high yield (50-90%). Based on these data, the authors concluded that it inhibits the reactions of the hydroxyl group in α-conditions, close to the three bonds of acetylene alcohol.

I.N. Nazarov and G.A. Schwechheimer [12] approve that in the presence of an excess amount of paraffin compared to equimol when heated amine with dioxane, are formed esters of acetylene and amine in good yields (56-96%).

$$R-\underset{\underset{R'}{|}}{\overset{\overset{O-CH_2-CH_2-CN}{|}}{C}}-C\equiv CH + CH_2O + HN R_2'' \longrightarrow R-\underset{\underset{R'}{|}}{\overset{\overset{O-CH_2-CH_2-CN}{|}}{C}}-C\equiv C-CH_2-NR_2''$$
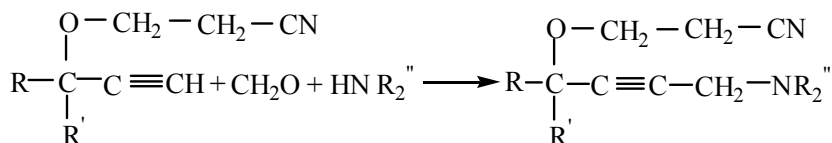
The reactions of aminomethylation of acetylenic alcohols, benzoates and phenoxyacetates have also been investigated, and it has been proven that the Mannich reaction going hard with benzoate, especially phenoxyacetates, compared to acetates [13].

G.A. Schwechheimer [14] proposed a method for the aminomethylation of acetylenic alcohols with acetals. Given that acetals, acetylenic alcohols are easily formed, and saponified after the mannich reaction, this method is advantageous and can be widely used. However, all the methods described above, when performing the Mannich reaction, protection of the hydroxyl groups of acetylene alcohols is required, and after the saponification reaction for obtain an amino acetylenic alcohol with a free hydroxyl group, it prolongs the reaction by several stages for obtain the desired end product.

Therefore, in our opinion, recommended N.M. Liebman and S.G. Kuznetsov method of amino-methylation of acetylene alcohols is convenient [15]:

$$R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv CH + CH_2O + HNR_2'' \xrightarrow{CuCl} R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv C-CH_2-NR_2''$$
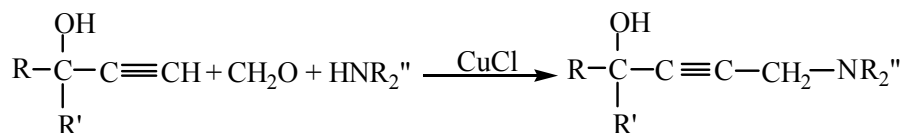
These authors carefully studied the situation with the Mannich reaction and concluded that the reaction of aminomethylation easily occurs with the use of copper salt (I) as a catalyst for hydrogen atoms near the triple bond of acetylene alcohol. According to these scientists, in the case of the Mannich reaction, the process of aminomethylation is always accompanied by one valence copper (possibly with the formation of intermediate copper acetylide). If during the synthesis copper (II), with the help of formaldehyde, is reduced to copper (I) (in alkaline medium) then its catalytic capacity at the beginning of the reaction will probably be the same with copper (I). It has been established that in a neutral and weakly acidic medium (using the amine salt), the transition from copper (II) to copper (I) will be difficult and the yield of the reaction product decreases. The content of the catalyst has little effect on the reaction.

I.N. Azerbayev and his colleagues [16–18] proposed a convenient method for obtaining various acetylene amines by decomposing the amino alcohols of amino acetylene and diacetylene, followed by aminomethylation of the obtained products:

$$R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv CH + CH_2O + HNR_2'' \longrightarrow R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv C-CH_2-NR_2'' \longrightarrow$$

$$HC\equiv C-CH_2-NR_2'' + R-\overset{\overset{O}{\|}}{C}-R'$$

$$R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv C-C\equiv CH+CH_2O+HNR_2^{''} \longrightarrow R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv C-C\equiv C-CH_2-NR_2^{''}$$

$$R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv C-C\equiv C-CH_2-NR_2^{''} \longrightarrow HC\equiv C-C\equiv C-CH_2-NR_2^{''}$$

$$R_2^{''}N-CH_2-C\equiv C-C\equiv C-CH_2-NR_2^{''} \qquad R_2^{'''}N-CH_2-C\equiv C-C\equiv C-CH_2-NR_2^{''}$$

(with arrows labeled $CH_2O, \; HNR_2^{''}$ and $CH_2O, \; HNR_2^{''}$)
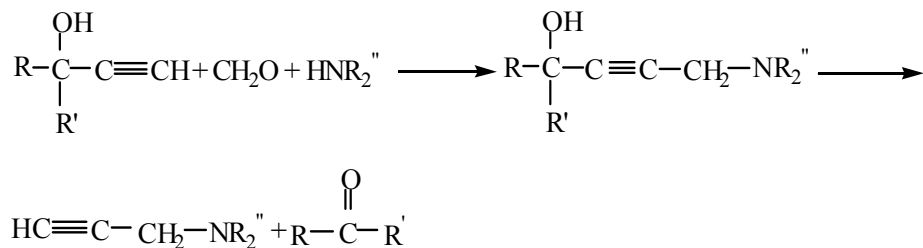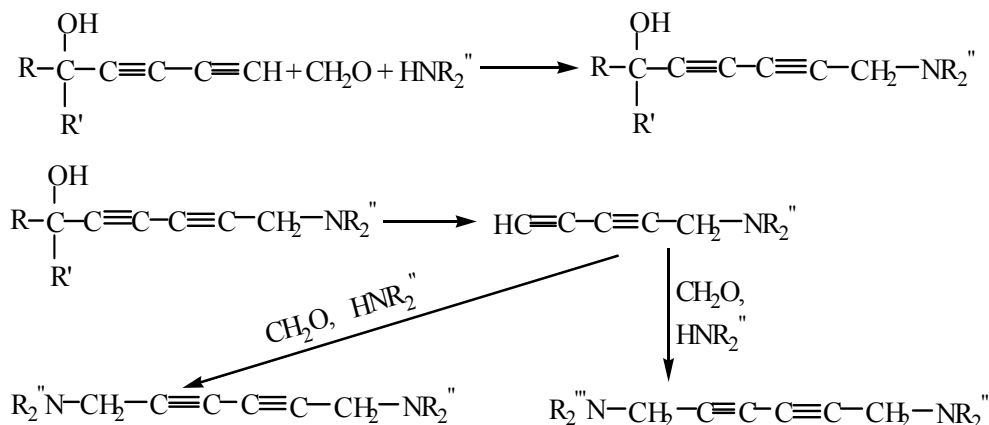
Although aminomethylation of acetylene compounds using the Mannich reaction is widely used at the laboratory level, its mechanism has not yet been confirmed by organic scientists.

The hypothesis that the aforementioned condensation reaction is accompanied by the formation of an intermediate product of amine and formaldehyde may be testified producing an acetylene base directly from methylolamines and acetylenes [19]:

$$HC\equiv CH + HOCH_2-NR_2 \xrightarrow{\quad Cu \quad} HC\equiv C-CH_2-NR_2 + H_2O$$
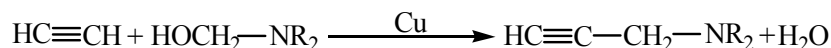
According to I.N. Azerbaev and his colleagues compared to hydrogen atoms near triple bonds in the composition of vinyl acetylene and venyl acetylene, hydrogen atoms near triple bond in the composition of acetylene alcohols, are non-active under Mannich reaction conditions. In these cases, for reduce the activation energy of acetylenic compounds with using only the copper compound as a catalyst, they are involved in the condensation reaction with paraffin and secondary amines.

The synthesis of cycloalkyl and aryl derivatives of acetylenic amino alcohol and their holonolitic properties were studied in order to search for biologically active compounds. There is evidence that, when a carbon atom is replaced near the carboxyl groups with cycloalkyl, the biological activities of cycloalkyl derivatives of acetylene amino alcohols may be higher and more toxic compared to aryl derivatives [20].

The authors of [21], continuing the search for biologically active compounds, were synthesized succinates, sulfonates, tartrates and adipates of pyrrolidine and rows of piperdiae, and were established that the cholinolytic properties of cyclopentyl and cyclohexyl derivatives are high.

Thus, acetylenic amino alcohols are not only biologically active, but are also the basis for obtaining derivatives with useful properties, and are capable of having such properties. In this regard, these compounds are of great interest.

**Methods.** Some amino alcohols have been obtained by aminomethylating acetylenic alcohols using Mannich reaction. For aminomethylation of acetylenic alcohols in the presence of formaldehyde, diphenylamine reacts with morpholine

$$R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv CH+CH_2O+H\underset{\underset{R'''}{|}}{N}-R'' \longrightarrow R-\underset{\underset{R'}{|}}{\overset{\overset{OH}{|}}{C}}-C\equiv C-CH_2-\underset{\underset{R'''}{|}}{N}-R''+H_2O \quad (I-IV)$$

where:

R = R' = -CH_3, R'' + R''' = -(-CH_2-)_2-O-(-CH_2-)_2-      (I)

R = -CH_3, R' = -C_2H_5, R'' + R''' = -(-CH_2-)_2-O-(-CH_2-)_2-      (II)

R = R' = -CH_3, R'' = R''' = -C_6H_5      (III)

R = -CH_3, R' = -C_2H_5, R'' = R''' = -C_6H_5      (IV)
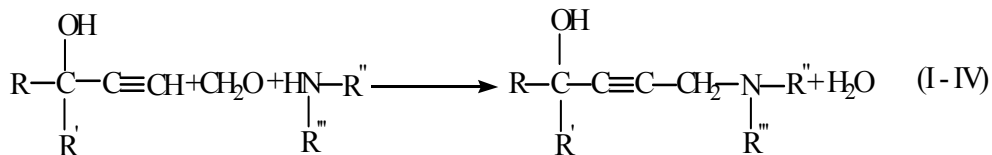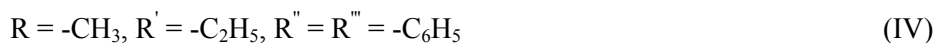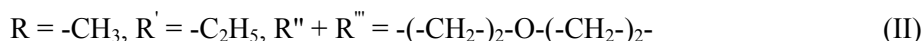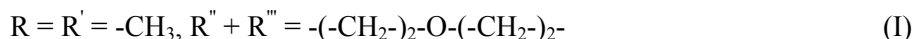
Carried out the reaction of aminomethylation in a dehydrated medium of dioxane while heating at the temperature of 80-90°C. As catalyst used is freshly prepared copper chloride.

**Results and discussions.** In tables 1 and 2 are presented the physics-chemical characteristics of the obtained acetylene aminoalcohols.

$$R-\overset{\overset{\displaystyle OH}{|}}{\underset{\underset{\displaystyle R'}{|}}{C}}-C\equiv C-CH_2-\overset{}{\underset{\underset{\displaystyle R''}{|}}{N}}-R''$$
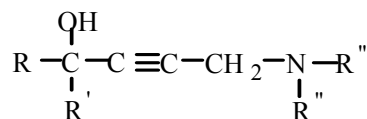
Table 1 – Physicochemical characteristics of the obtained acetylene aminoalcohols

| Compound ordinal № | R | R' | R'' | Output, % | $t^o_{heat.,}$ $^oC/$. mm. mercury column | $R_f$ |
|---|---|---|---|---|---|---|
| I | -CH$_3$ | -CH$_3$ | (R'')$_2$=-(CH$_2$)$_2$-O-(CH$_2$)$_2$ | 72 | 128/4 | 0,31 |
| II | -CH$_3$ | -C$_2$H$_5$ | (R'')$_2$=-(CH$_2$)$_2$-O-(CH$_2$)$_2$ | 67 | 125/3 | 0,27 |
| III | -CH$_3$ | -CH$_3$ | -C$_6$H$_5$ | 73 | 127/3 | 0,36 |
| IV | -CH$_3$ | -C$_2$H$_5$ | -C$_6$H$_5$ | 66 | 126/3 | 0,31 |

Table 2 – Elemental composition of acetylenic amino alcohols

| Compound ordinal № | found, % | | | Brutto formula | calculated, % | | |
|---|---|---|---|---|---|---|---|
| | C | H | N | | C | H | N |
| I | 65,62 | 9,33 | 7,72 | C$_{10}$H$_{17}$NO$_2$ | 65,57 | 9,29 | 7,65 |
| II | 67,30 | 9,71 | 7,20 | C$_{11}$H$_{19}$NO$_2$ | 67,00 | 9,64 | 7,11 |
| III | 81,54 | 7,21 | 5,32 | C$_{18}$H$_{19}$NO | 81,51 | 7,17 | 5,28 |
| IV | 81,83 | 7,65 | 5,13 | C$_{19}$H$_{21}$NO | 81,72 | 7,53 | 5,02 |

From table 1 it can be seen that the yield of acetylenic amino alcohols at the Mannich reaction is in the range of 66-73%. Compared to acetylene alcohols, these values are slightly low. Because, in our opinion, this is due to the high temperature of the process, as well as the production of side reactions such as decomposition of acetylene alcohols, coating with resin, and other additional reactions.

Table 3 – The main absorption zone of the IR spectra of acetylenic amino alcohols

| Compound ordinal № | Connections or groups | | | | | |
|---|---|---|---|---|---|---|
| | C≡C | C–N | C–O-C | –CH$_2$– | C$_6$H$_5$ | O–H |
| | Vibration of Valence Frequency, $\nu$, sm$^{-1}$ | | | | | |
| I | 2207 | 1219 | 1195 | 1921 | – | 3625 |
| II | 2195 | 1220 | 1185 | 1924 | – | 3614 |
| III | 2200 | 1220 | 1190 | 1923 | 1580 | 3623 |
| IV | 2213 | 1220 | 1195 | 1924 | 1585 | 3621 |

From table 3 it can be seen that, depending on the bond and the main groups, the oscillation frequency of the IR spectra of acetylene amino alcohols is shown in the characteristic vibration zones, so proves their structure.

**Conclusion.** Thus, the synthesis of acetylenic alcohols, glocolev and aminoalcohols is realizable processes without obstacles. With a high yield, acetylene amino alcohols under Favorsky reaction conditions in a medium of dried diethyl ether in the presence of thoroughly crushed technical potassium hydroxide at low temperature are obtained with a process of condensation of ketones with acetylene (to obtain acetylene alcohols) acetylene alcohols with ketone (to obtain symmetric and asymmetric acetylene glycols) , at the conditions of Chodkiewicz-Kadio reaction of diacetylenic glycols, acetylene alcohols with bromoacetylene alcohols.

Also, with the interaction of acetylenic alcohols with formaldehyde and dialkylamines (or cyclic amines) under the conditions of the Mannich reaction in the presence of copper (I) chloride in the catalytic

content and in the medium of the dried diethyl ether can be obtained synthesis of glokolev and amino alcohols.

With this, by synthesis several acetylenic amino alcohols were obtained. Our upcoming goal is to investigate the biological properties of salt-like esters - carbamates and thiocarbamates, after synthesis obtained through interaction their with phenyl isocyanate and phenyl isothiocyanate.

Such interest is not only based on the above information, but is also related to the data obtained in recent times. For example, with French scientists were found among compounds of a substance with medicinal properties, similar the above substance [22, 23] and Chinese scientists have found carbamate compounds with high action against microorganisms [24]. Russian scientists claim that some of the carbamites have fungicidal properties significantly [25].

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## АЦЕТИЛЕН АМИНОСПИРТТЕРІНІҢ СИНТЕЗІ ЖӘНЕ ФИЗИКА-ХИМИЯЛЫҚ ҚАСИЕТТЕРІ

**Аннотация.** Мақалада ацетилен аминоспирттерін синтездеуге бағышталған жарияланымдарға шолу жасалып, оларды фенилизоцианат және фенилизотиоцианатпен әрекеттестіру арқылы микробиологиялық белсенді заттарды алу мүмкіншілігі қарастырылған. Ацетилен аминспирттері биологиялық белсенді ғана емес басқа да пайдалы қасиеттерге ие туындыларды алуға негіз болуымен қатар өздері де сондай қасиеттерге ие болуы ықтимал. Ацетилен аминспирттерінің шығымы Манних реакциясы жағдайында 66-73% аралы-ғында болды. Реакцияның жоғары температурада жүруіне байланысты кейбір қосымша реакциялардың – ацетилен спиртінің ыдырауы, шайырлану және т.б. байқалды. ИҚ-спектрлерінде ацетилен спирттерінің функционалдық топтары мен байланыстарына тән жұтылу жолақтарының барлығы дерлік анықталды. Аце-тилен аминспирттерінің физика-химиялық сипаттамалары: қайнау температурасы, заттың хроматографиялық сипаттамасы $R_f$, көміртек, сутек, азоттың элементтік құрамы (масс.) және брутто-формулалары анықталды.

**Түйін сөздер:** ацетилен аминоспирттері, карбамин қышқылдары, карбаматтар, тиокарбаматтар, микробиологиялық белсенділік.

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## СИНТЕЗ И ФИЗИКО-ХИМИЧЕСКИЕ СВОЙСТВА АЦЕТИЛЕНОВЫХ АМИНОСПИРТОВ

**Аннотация.** В статье дается обзор публикаций, посвященных синтезу ацетиленовых аминоспиртов и возможности получения на их основе микробиологически активных соединений взаимодействием с фенили-зоцианатом и фенилизотиоцианатом. Ацетиленовые аминоспирты, обладающие не только биологической активностью, но и другими ценными свойствами, являются также основой для получения их производных. Выход производных ацетиленовых аминоспиртов по реакции Манниха составил 66-73%. Осуществление реакции при высокой температуре приводит к протеканию побочных процессов, в частности, разложение ацетиленовых спиртов, смолообразование и другие. На ИК-спектрах наблюдаются спектры поглощения, соответствующие функциональным группам и связям ацетиленовых аминоспиртов. Определены физико-химические характеристики ацетиленовых аминоспиртов: температуры кипения, хроматографическая характеристика вещества $R_f$, элементный состав углерода, водорода, азота (масс.) и брутто-формулы.

**Ключевые слова:** ацетиленовые аминоспирты, карбаминовые кислоты, карбаматы, тиокарбаматы, микробиологическая активность.

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# DIGITALIZATION PROCESSES AND THEIR IMPACT
# ON THE DEVELOPMENT OF THE REPUBLIC OF KAZAKHSTAN

**Abstract.** The global economy is on its way to digital transformation. The processes of the digital economy are actively continuing in all developed countries, affecting all spheres of life. Numerous studies show a significant dependence of the level of economic development on the indicators of access and use of information and communication technologies (ICT) by enterprises and the public. International organizations are involved in research on maximizing benefits for the growth of the value added of business and society and the potential to minimize losses from digitalization. The analysis of state and interstate program documents, the scientific literature and the most important indices of the development of information and communication technologies and digitalization allows generalizing the main factors of the development of the digital economy:

- high innovation activity in the economy as a fundamental factor determining the potential for generating new ICT solutions;

- infrastructure that provides access and use of ICT by the population of the country (citizens, companies, government services and departments);

- human potential ensuring production, on the one hand, and consumption (use) of new information and communication technologies, on the other hand.

**Keywords:** digitalization, digital economy, digital transformation, information and communication technologies, electronic commerce.

**Introduction.** Increasingly and deeper developing digitalization is one of the strongest trends that are changing the global economy today. The era of digitalization is slowly and surely, and at the same time inevitably, changing the face of the industry, the structure of economies, and the whole way of life and thinking.

The formation and functioning of the knowledge economy is directly dependent on the possibilities of intellectual activity, to obtain a variety of information (exchange), information services and products. The knowledge economy is characterized by an increase in information intensity, which forces ICT to be considered not only as a support, but also as an independent driver of such a model [1].

The World Economic Forum is exploring the possibilities of disclosing the benefits of digitalization, both for society as a whole and for enterprises. Thus, the aggregate value of digital transformation for the economy (both industry and society as a whole) of the UK will be more than 1 trillion. US dollars over the next decade. In particular, 335 billion dollars (13% of GDP in 2015) can bring in just six digital initiatives (e-commerce, related travel services, cross-sourcing, participatory driving, demand and supply platforms in real time, etc.). Four digital initiatives (e-commerce, travel related services, sharing economics, and participatory driving) can attract $ 54 billion (20% of 2015 GDP) in Danish business and society over the next decade. Digital initiatives such as digital payments, e-commerce, related travel services, the economy of sharing, can bring 1.2 trillion. dollars (40% of 2015 GDP) for industry and society in India over the next decade [2].

For enterprises, digitalization is an opportunity to increase efficiency both by reducing costs and implementing new business models. According to a McKinsey study, companies investing in digital

solutions expect annual growth and cost efficiency increases of 5–10% or more over the next 3-5 years [3].According to the researchers, the introduction of "end-to-end" digital technologies (technologies of artificial intelligence, robotics, the Internet of things, wireless communications, etc.) can increase labor productivity in companies by 40% [4].It is obvious that the main effect for enterprises on the development of digitalization is associated precisely with changes in production processes that ensure the reduction of fixed cost [5], achieving higher overall organizational performance and creating competitive advantages equally important for both survival and growth [6].At the same time, the return on investment in new digital technologies from industry leaders is 2.5 times higher than that of followers [7].

Different countries use different initiatives to develop digitalization and digital transformation of national economies and regions in general.

**Research methodology.** Used such universal research methods as observation, synthesis, analysis, analogy, induction, deduction, abstraction, comparison and analogy. A statistical analysis of the information and communications technology industry was carried out on the basis of data: the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan, the World Bank, the World Economic Forum on the Global Innovation Index and the Global Competitiveness Index.

**Results.** *Development of ICT industry in Kazakhstan.* `A major contribution to the digitization of the economy is made by the telecommunications market and the IT market. The share of the ICT industry in Kazakhstan's GDP in 2017 was 3.5%. The volumes of both markets are growing annually compared to previous periods. In previous years, the volume of the telecommunications market has always exceeded the volumes of the IT market, and the proportion of shares in the ICT industry has remained at about the same level. However, over the past 3 years, the proportion of shares began to rise in the direction of the IT market, whose share increased from 29% to 37%. The structure of the IT market should be divided into three large segments: equipment, licensed software and IT services. In recent years, the IT market in Kazakhstan has shown a significant growth and in 2017, the market volume in relation to 2016 was 123%. Served this is the increase in the volume of the IT equipment market and the increase in the IT services market. At the same time, the volume of licensed software decreased by 29% compared to last year.

The number of legal entities in the ICT sector is increasing annually, and by the end of 2017, the total number was 5,888 companies, of which 52% work in the area of "Computer programming, consulting and other related services". In terms of the number of individual entrepreneurs in the ICT industry, the largest number of companies (41%) work in the same sphere, and a large share is occupied (27.5%) by individual entrepreneurs in the field of Repair of computers and communication equipment.

In accordance with the analysis of data on the development of the ICT sector in Kazakhstan, the costs of enterprises for information technology for 2010-2014. increased by 60% in 2014-2018 - almost 30% (table 1). At the same time, the ratio of these costs to GDP tended to decrease, which was due to the lagging rate of industry growth compared with GDP growth rates.

According to the data of 2017, the most expenses for ICT are carried out in the sectors "Wholesale and retail trade; repair of motor vehicles and motorcycles" - 31%," Information and communications "-13% and "Mining and quarrying" and "Manufacturing industry " - 8.8% each," Professional, scientific and

Table 1 – The main indicators of development of the ICT sector of Kazakhstan, 2010-2018

| Indicator | 2010 | 2014 | 2018 | Growth rate, % | |
|---|---|---|---|---|---|
| | | | | 2014/2010 | 2018/2014 |
| The share of expenditure on information technology in GDP,% | 0,68 | 0,61 | 0,52 | 89,7 | 85,2 |
| The cost of information technology, total, million tenge | 147 538,30 | 237 079,36 | 305 217,4 | 160,7 | 128,7 |
| The share of employees in the field of Information and communication,% | 1,35 | 1,88 | 1,91 | 139,2 | 101,6 |
| The share of IT-specialists among the employed population,% | 0,34 | 0,34 | 0,43* | 100,0 | 126,5 |
| *Data for 2017. | | | | | |

technical activities "- 8.4% , "Construction" - 8.0%, "General Government Administration" - 7.2%, "Transport and Storage" - 5.6%, "Healthcare Activities" - 2.6%, "Electricity Supply, Gas Supply , steam and air conditioning" - 1.7%.

In general, the information technology sector is developing ambiguously: against the background of growth in production volumes in the IT sector, net exports are declining, and vice versa (figure 1, 2). This fact can be explained by the fact that the development of production of goods in the IT sector is closely associated with the import of components, raw materials and materials, which once again confirms the need to localize this sector of production within the country.
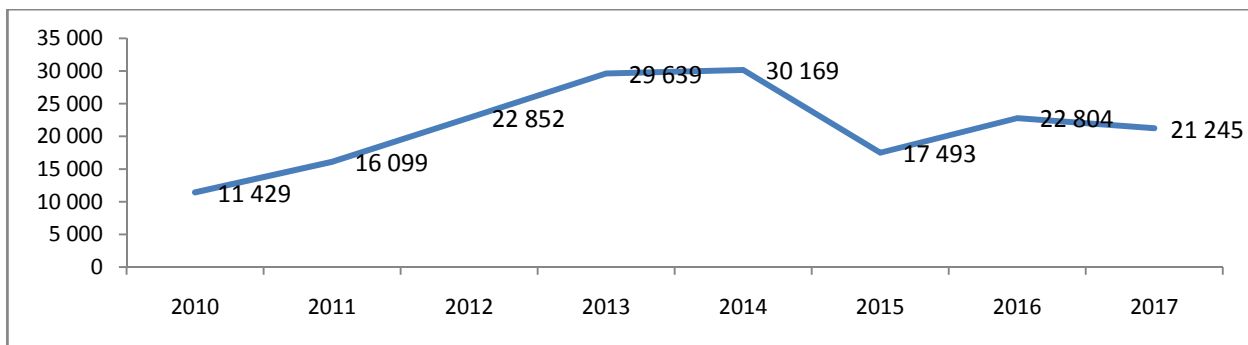


Figure 1 – The volume of industrial production (goods, services) in the ICT sector, million tenge
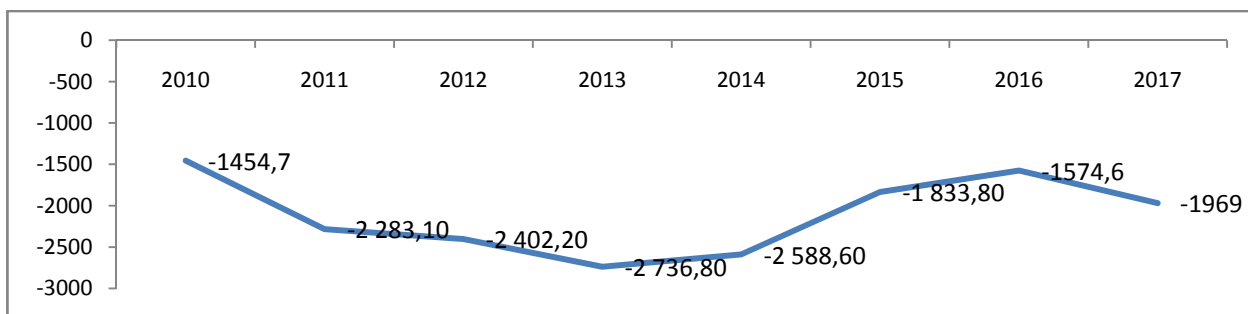


Figure 2 – Net exports of goods in the information and communications technology sector, million $

Telecommunication equipment dominates both in the structure of exports (28.7%) and in the structure of imports (4.6%) according to 2017. However, the export volume of this product has a clear downward trend (2.5 times in 2013-2017 years). Analysis of changes in the structure of foreign trade leads to the conclusion about doubling the share of exports of ICT goods in foreign trade in the field of ICT (table 2).

Table 2 – Dynamics of export share in foreign trade turnover in the ICT industry of Kazakhstan for 2007-2017

| Indicator | 2007 | 2009 | 2011 | 2013 | 2015 | 2017 |
|---|---|---|---|---|---|---|
| The volume of foreign trade in the ICT industry, mln. $ | 1493,7 | 1547,2 | 2224,7 | 3055,6 | 2042,4 | 2133,0 |
| Export share in foreign trade turnover,% | 1,9 | 3,4 | 2,9 | 5,2 | 5,1 | 3,8 |

The total volumes of foreign trade in the ICT sector showed an increase until 2014, in 2015 there was a decline of 53%, associated with a general decline in exports and imports of the Republic of Kazakhstan [8].

*Electronic commerce.* As already noted, the enterprises of the industry "Wholesale and retail trade; repair of cars and motorcycles "ranked first in ICT costs (31%). This is due to the development of e-commerce in the field of trade. So, for 2013-2017, the share of e-commerce in the total volume of retail trade increased from 0.5% to 1.2%, the volume of sales of services via the Internet grew 3.7 times (table 3).

Today, the Internet is used by a huge number of people, the emergence and popularization of social networks have completely erased the age and state boundaries of the virtual communication of people [11]. According to Western researchers, by 2040, 95% of purchases will be made online. The experience of foreign countries shows that there is a huge potential for growth in this area. In the field of electronic

Table 3 – Volumes of the e-commerce market in Kazakhstan, 2013-2017

| Indicator | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| The volume of retail trade over the Internet, mln. tenge | 28 046 | 41 263 | 50 920 | 78 501 | 106 918 |
| The share of e-commerce in total retail sales, % | 0,5 | 0,7 | 0,8 | 1 | 1,2 |
| The volume of wholesale trade via the Internet, mln. tenge | 52 988 | 50 818 | 65 656 | 67 741 | 87 249 |
| The share of e-commerce in the total volume of wholesale trade, % | 0,4 | 0,3 | 0,4 | 0,4 | 0,4 |
| The volume of sales of services via the Internet, mln. tenge | 71 256 | 73 488 | 155 732 | 226 440 | 264 523 |
| *Note:* compiled based on [9, 10]. | | | | | |

commerce, China is leading with a share of 23.7% of national retail trade, the EU countries - 14.8%, the USA - 10.8%, and South Korea - 7.2%.

According to the Ministry of Digital Development, the defense and aerospace industry of the Republic of Kazakhstan, in 2018 the planned indicator of the share of e-commerce was fulfilled and amounted to 2.9%, in 2025 e-commerce will be 24% of retail sales. The number of online shoppers in 2018 amounted to 2.32 million people, by 2025 it could reach 15 million people. This opportunity is planned to be expanded using the transit potential of Kazakhstan between China and Europe [12].At the same time, experts note the following shortcomings and barriers to the development of e-commerce in Kazakhstan [13]: weak government regulation, lack of competence and awareness, insufficient infrastructure development, cyber security problems, gaps in educational programs of universities.

For the digital transformation of the economy, first of all, recognition of the need for digitalization of socio-economic systems at the state level and the allocation of resources [14], in particular, the consistent development of innovative high-tech industries, the development of information and communication technology infrastructure [5],staffing of digitalization processes.

The international development indices are also based on the evaluation of these parameters. For example, the European Union, which developed the *International Digital Economy and Society Index* (I-DESI), assesses the level of development of the digital economy in countries based on five main factors: the spread of broadband access and communication quality, Internet use, human capital (as far as residents know how to use network technologies), the integration of digital systems and technologies, and the development of digital services and public services. The World Economic Forum's *Network Readiness Index* measures the level of ICT development by three main groups of parameters: the availability of conditions for ICT development, the willingness of citizens, business and government agencies to use ICT, the level of ICT use in the public, commercial and public sectors. *The Information and Communication Technology Development Index* (ICT Development Index) is calculated according to the methodology of the International Telecommunication Union, a specialized UN agency that defines world ICT standards. The index is calculated on the basis of three groups of sub-indices: access to ICT, use of ICT, ICT skills.

Based on the criteria for digitalization of the economy, determined by these indices, Kazakhstan has developed its own directions for the development of digitalization. In 2013, the state program "Information Kazakhstan-2020" was approved. The goal of the Program is to create conditions for the transition to the information society. The objectives of the Program are: ensuring the effectiveness of the public administration system, ensuring the availability of information and communication infrastructure, creating an information environment for the socio-economic and cultural development of society, developing the national information space. As a result of the Program implementation, in the period from 2013 to 2017, the share of Internet users increased from 63.3% to 78.8%, the computer literacy rate of the population increased from 63.2% to 78.2%, the share of industrial workers who passed computer literacy training increased from 1.4% to 2.7%. However, the share of the ICT sector in GDP grew only slightly, from 3.5% to 3.6%. The share of expenditures on innovations in the field of ICT decreased 5 times (from 0.15% to 0.03%). The level of activity in the field of innovation in the ICT sector in the country decreased from 16.7% to 12.6% [15]. Nevertheless, according to the results of three years of implementation of the state program "Information Kazakhstan 2020", 70% of activities were completed, target indicators were exceeded by 40% [16].

The state program "Digital Kazakhstan", approved in 2017, aims to consistently develop these processes and eliminate the barriers and gaps existing at this stage. The goal of the Program is to accelerate the development of the economy of the Republic of Kazakhstan and improve the quality of life of the population through the use of digital technologies in the medium term, as well as creating conditions for the transition of Kazakhstan's economy to a fundamentally new development trajectory ensuring the creation of a digital economy of the future in the long term. The program implementation period is 2018-2022. The five main areas of the Program implementation: Digitalization of economic sectors, Transition to a digital state, Implementation of the digital Silk Road, Development of human capital, Creation of an innovation ecosystem. The main objectives of the State Program "Digital Kazakhstan" are: growth of labor productivity in basic sectors of the economy, development of electronic commerce, creation of jobs through digitalization, increasing the volume of electronic public services provided, increasing the number of Internet users, increasing digital literacy of the population, improving Kazakhstan's position in the rating of the EIC GIC on the indicator "Ability to innovate", an increase in the volume of attracted investments in start-ups, an increase in the Index times Itijah ICT.

Thus, the analysis of state and interstate program documents, scientific literature and the most important indices of the development of information and communication technologies and digitalization allows to summarize the main factors of the development of the digital economy:

- high innovation activity in the economy as a fundamental factor determining the potential for generating new ICT solutions;

- infrastructure that provides access and use of ICT by the population of the country (citizens, companies, government services and departments);

- human potential ensuring production, on the one hand, and consumption (use) of new information and communication technologies, on the other hand.

*ICT infrastructure development.* Ensuring ubiquitous access to ICT opportunities is one of the tasks that were set back in 2000 by the leaders of the G8 countries and should be addressed to achieve the Millennium Development Goals. At the jubilee session of the UN in 2015, the leaders of the countries again recognized and confirmed that "the spread of ICT can have a powerful positive impact as a tool for sustainable (world) development". Since 2015, developed and developing countries are moving to the next stage of regulation and development of the digital environment, focused on improving the efficiency of ICT application and digitization of all aspects of the life of the state, business and society [17].

In addition to manpower with relevant analytical, computational and methodological skills, an ICT infrastructure with high bandwidth is also needed to comprehend information that is rapidly growing [18].

ICT infrastructure is a set of basic information services, computing systems, data storage and transmission systems, which is the basis for the operation of any information services [19]. Analysis of the level of ICT infrastructure development includes the following sub-indicators: the level of development of information and communication technologies, network readiness, the level of development of telephone communications, the level of development of the Internet, the level of development of e-government [20].

The relative efficiency of the ICT infrastructure is reflected partly in such indicators as: the number of Internet users, the Internet bandwidth, the number of fixed and mobile broadband subscribers to the Internet, mobile cellular communications. These indicators are monitored in the ICT implementation parameter of the Global Competitiveness Index (GIC).

A comparative analysis of these GIK indicators (in comparison with countries such as Turkey and Korea) shows Kazakhstan's leading position in comparison with Turkey in almost all parameters (figure 3). In turn, Korea leads in this group in all indicators, except for the indicator "Mobile cellular subscribers", in which Kazakhstan's position is 2.5 times higher than Korea's and 5 times higher than Turkey's.

Comparative analysis of the level of ICT infrastructure development is also possible on the basis of the analysis of indicators of the Information and Communication Technologies sub-index of the Global Innovation Index (figure 4). So, despite the fact that Turkey is ahead of Kazakhstan by 24 points according to the rating in the GII, in terms of ICT development indicators, such as Access to ICT, Use of ICT, Government's Online Services, Kazakhstan is 15-33 points ahead.

This situation is particularly related to the fact that the government of Kazakhstan is doing a lot of work in terms of introducing digital technologies. This includes the indicators of programs adopted in the 90s and in the early 2000s for accelerated industrial-innovative development, the formation of an
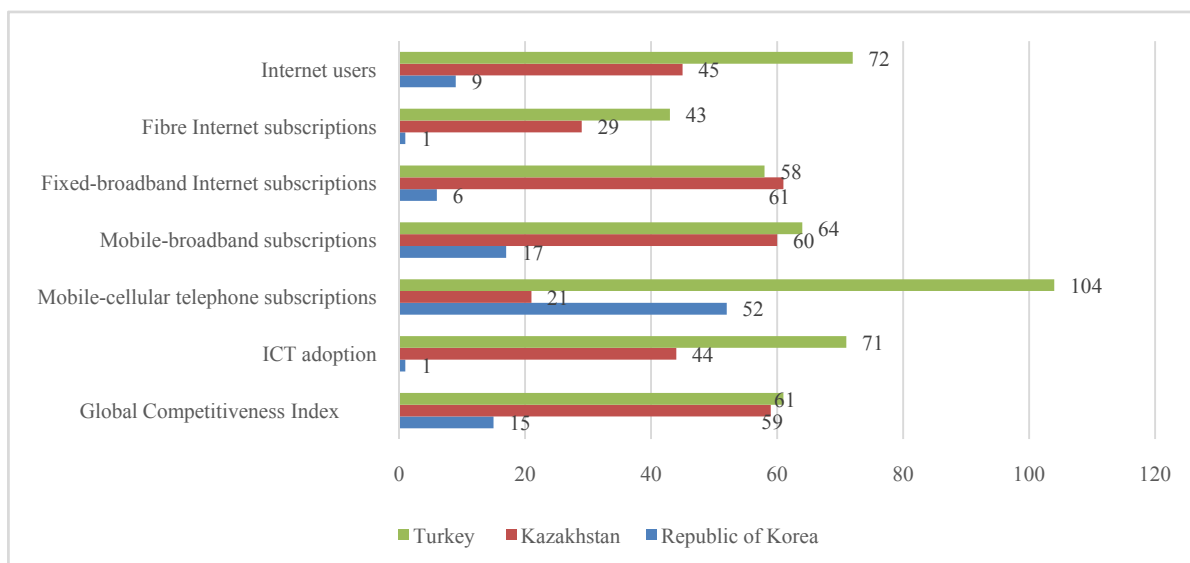
Figure 3 – Country rankings in the Global Competitiveness Index,
ICT Implementation sub-index and its sub-indicators, 2017
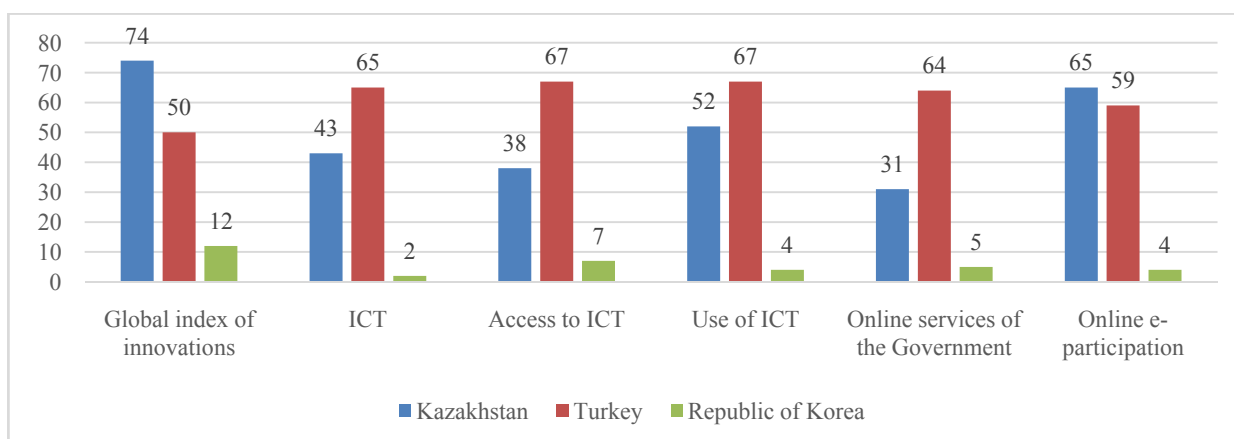


Figure 4 – Indicators of the Information and Communication Technologies sub-index
of the Global Innovation Index for three countries, 2018

 "e-government", the creation of an FEZ, the launch of the Astana Hub international technology park, the opening of scientific innovation hub in Central Asia. The data of the Statistics Committee of the Republic of Kazakhstan on the transition to the information society, increasing the digital literacy of the population by age and by region show that there are positive developments in the field of digitalization. For example, the share of Internet users from 6 to 74 years has increased by almost 30% over the past 7 years [21].

However, the ICT sub-index in the GII of Kazakhstan has been steadily decreasing: over the past 5 years, the country has shifted by 20 positions, from 23rd to 43rd place, whereas, for example, Turkey has risen by 15 points (figure 5).

In terms of the ICT sub-index across Kazakhstan, there is a slight increase: from 65.76 to 67.13 (by 2%) over the period from 2013 to 2018. It is assumed that the decline in the position of Kazakhstan on this sub-index in the GII ranking was due to external factors. In Turkey, the growth of this indicator is significant and amounts to 190%, which naturally reflected in the increase of Turkey's position by 15 points. The Republic of Korea lost one position, losing to the leadership of Great Britain.

The analysis shows that the loss of positions in this sub-index of both Kazakhstan and the Republic of Korea is due to the deterioration of the Online participation indicator (figure 6). Thus, the Electronic Participation Index for Kazakhstan decreased from 94.74 to 59.32 (by 37.4%), and for Korea - from 100 to 96.61 (by 3.5%).
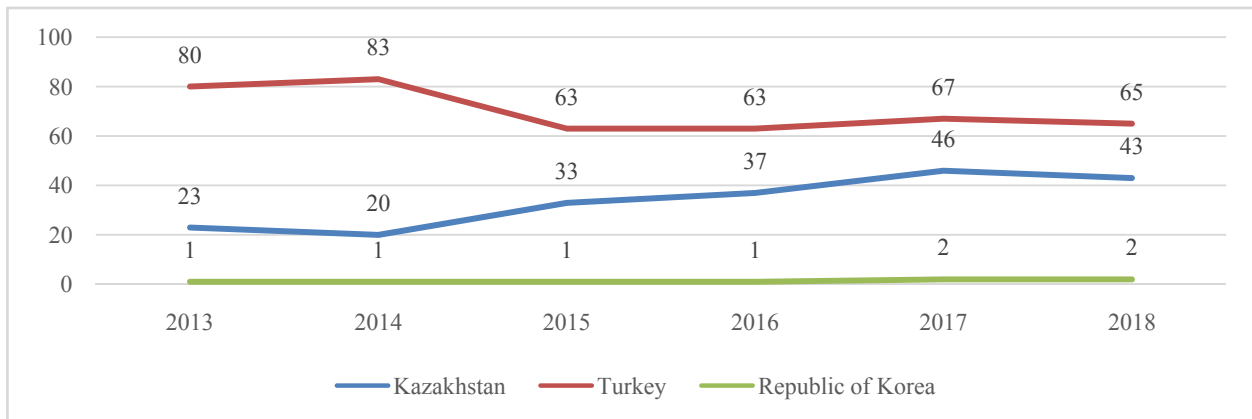
Figure 5 – Dynamics of ICT indicator in the ranking of the Global Innovation Index for 2013-2018
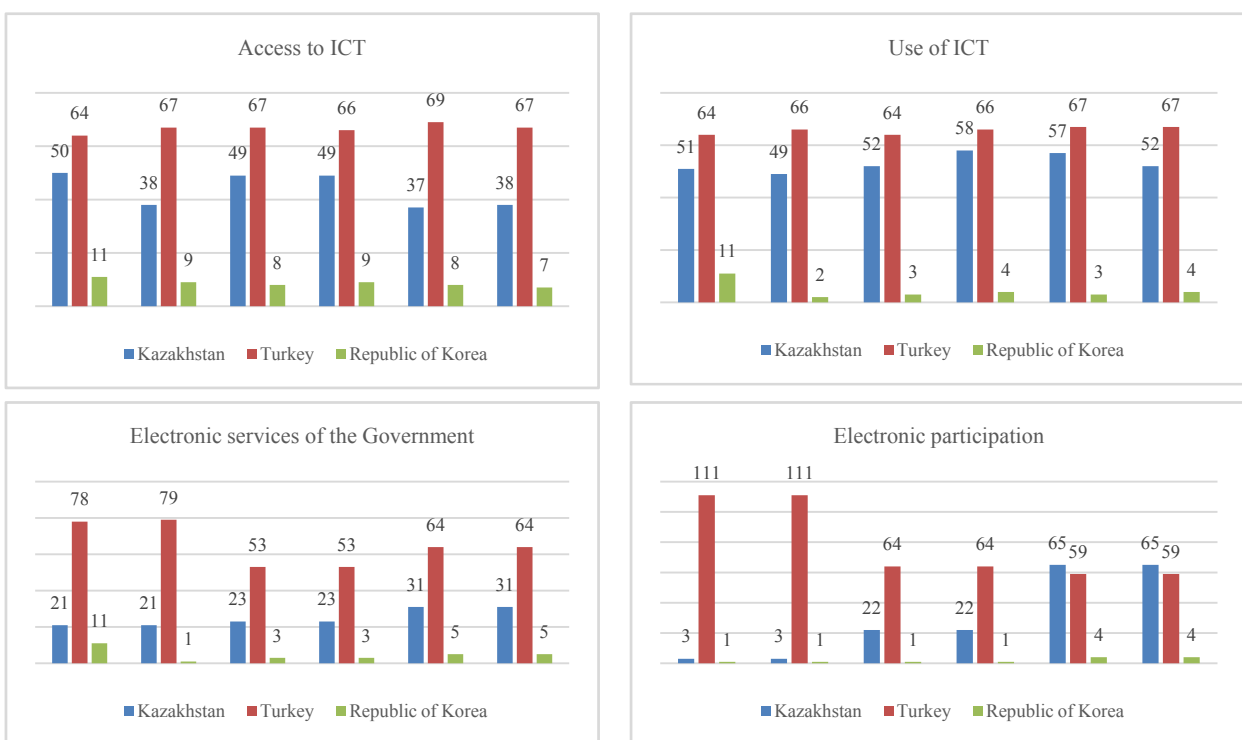


Figure 6 – Dynamics of ranking of indicators of the ICT subindex o
f the Global Innovation Index for three countries, 2013-2018

The e-Participation Index is a supplement to the e-Government Index, calculated by the UN. The index reflects the development of active communication services between citizens and the state. Promoting citizen participation is the cornerstone of socially inclusive governance. The goal of e-participation development initiatives should be to improve the access of citizens to information and public services, promoting participation in public decision-making that affects the well-being of society in general and individuals in particular.

Thus, ICT infrastructure is the basis for achieving the goal of reaching as many people as possible with digital technologies, that is, it is about providing universal, sustainable, ubiquitous and affordable access to ICT for all. The development of ICT infrastructure - the main technology platform that provides people and organizations with access to a wide range of ICT services and government services provided in electronic form, is one of the most important strategic directions for the development of the information society [22].

**Conclusion.** Although the digital economy is not an industry, it has begun to play a large role in the entire economy. In Kazakhstan, as well as in all developed and developing countries, the paramount importance is attached to the important and difficult task of transforming the economy, without which long-term development is impossible. The transition to digitalization of the economy involves complex changes both at the company level and at the state level, which requires joint efforts at all levels.

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## ЦИФРЛАУ ПРОЦЕСТЕРІ ЖӘНЕ ОЛАРДЫҢ ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ЭКОНОМИКАСЫН ДАМЫТУДАҒЫ ӘСЕРІ

**Аннотация.** Жаһандық экономика цифрлық трансформацияға апарар жолда тұр. Цифрлық экономика процестері өмірдің барлық саласын орап, барлық дамыған елдерде белсенді жалғасып келеді. Көптеген зерттеулер экономикалық даму деңгейінің кәсіпорындар мен тұрғындардың ақпараттық-коммуникациялық технологияларға (АКТ) қолжімдігі мен пайдалану көрсеткіштеріне елеулі түрде тәуелді екенін көрсетуде. Бизнес пен қоғамның қосымша құнын өсіру және цифрлаудан келетін ысыраптарды барынша азайту әлеуеті үшін, халықаралық ұйымдар барынша көп пайда табу туралы зерттеулерге тартылған. Мемлекеттік және мемлекетаралық программалық құжаттарды, ғылыми әдебиеттің және ақпараттық-коммуникациялық технологиялар мен цифрлаудың ең маңызды даму индекстерін талдау цифрлық экономиканың негізгі даму факторларын жинақтап қорытуға мүмкіндік береді:

- жаңа АКТ-шешімдерді тудыру әлеуетін негіздеуші болатын іргелі фактор ретінде экономикадағы жоғары инновациялық белсенділік;

- елдегі тұрғындардың (азаматтар, компаниялар, мемлекеттік қызметтер мен ведомстволар) АКТ-қа қолжетімін және пайдалануын қамтамасыз ететін инфрақұрылым;

- жаңа ақпараттық-коммуникациялық технологияларды, бір жағынан, өндіруді, екінші жағынан, тұты-нуды (пайдалануды) қамтамасыз ететін адами әлеует.

**Түйін сөздер:** цифрлау, цифрлық экономика, цифрлық трансформация, ақпараттық-коммуникациялық технологиялар, электрондық сауда.

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## ПРОЦЕССЫ ЦИФРОВИЗАЦИИ И ИХ ВЛИЯНИЕ НА РАЗВИТИЕ ЭКОНОМИКИ РЕСПУБЛИКИ КАЗАХСТАН

**Аннотация.** Глобальная экономика находится на пути к цифровой трансформации. Процессы цифровой экономики активно продолжаются во всех развитых странах, затрагивая все сферы жизни. Многочисленные исследования показывают существенную зависимость уровня экономического развития от показателей доступа и использования информационно-коммуникационных технологий (ИКТ) предприятиями и населением. Международные организации вовлечены в исследования об извлечении максимальных выгод для роста добавленной стоимости бизнеса и общества и потенциала минимизации потерь от цифровизации. Анализ государственных и межгосударственных программных документов, научной литературы и важнейших индексов развития информационно-коммуникационных технологий и цифровизации позволяет обобщить основные факторы развития цифровой экономики:

- высокая инновационная активность в экономике как фундаментальный фактор, обуславливающий потенциал генерации новых ИКТ-решений;

- инфраструктура, обеспечивающая доступ и использование ИКТ населением страны (гражданами, компаниями, государственными службами и ведомствами);

- человеческий потенциал, обеспечивающий производство, с одной стороны, и потребление (использование) новых информационно-коммуникационных технологий, с другой стороны.

**Ключевые слова:** цифровизация, цифровая экономика, цифровая трансформация, информационно-коммуникационные технологии, электронная торговля.

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# MICROBIOLOGICAL ACTIVITY 1-CYCLOHEXYL-3-DIETHYLAMINOPROP-3-YN-1-YL ESTER OF N- PHENYL THIOCARBAMIC ACID

**Abstract.** This article is given the results of the synthesis of thiocarbamate aminoacetylene alcohol and tests of its microbiological activity against mushroom cultures - pathogens of root rot. It is established, an antimicrobial agent based on 1-cyclohexyl -3-diethylaminoprop-3-yn-1-yl ester of N-phenyl thiocarbamic acid has been given a significantly high protection effect from microbes at very low concentrations. The antimicrobial activity of the agent solution AN-60-2 was found to be from 10 to 100 times higher than the corresponding polytrimethylvinylethynyl-piperidol (PTMVEP) solution. With the practical use of the drug AN-60-2, the economic effect can be achieved by increasing the safety of the seed pool, reduce crop losses from disease, in particular from root rot pathogens, during ventilation and during storage of agricultural products, reduce the cost sanitation of premises, boxes, securities, because they use very low doses of AN-60-2.

**Key words:** thiocarbamate aminoacetylene alcohol, carbamic acids, microbiological activity, antimicrobial agent.

**Introduction.** At present, in medicine, sanitation and agriculture against harmful microorganisms various inorganic and organic compounds are used [1-3]. Usually highly effective are substances having several functional groups [4-6]. However, many bactericides inhibit the growth or destroy not only microorganisms, but also have a harmful effect on warm-blooded animals. In this regard, some bactericides were removed (for example, phenol) from the application, and for some of them the scope of application is limited.

Currently, derivatives of thio - and dithiocarbamates acids widely-used in the practice of agriculture as seed disinfectants and contact tion of fungicides. For example, by the beginning of the XXI century in the USA tio- and dithiocarbamates accounted for about 60% of all fungicides used [7-9]. However, until today there is very little information about the antimicrobial properties of this class of ester production, although they are polyfunctional compounds and contain several potentially active functional groups in terms of microbiological activity, such as active acetylene bond due to the inductive effects of methyl groups located in α- and β-positions, and the tertiary amine group with an undivided electron pair can give such compounds new useful properties.

In the aspect of said, the synthesis and study of microbiological properties of 1-cyclohexyl-3-diethylaminoprop-3-yn-1-yl ester of N-phenyl thiocarbamic acid was of some interest.

**Methods.** Acetylene amino alcohol 1-cyclohexyl-(1´)-ol-3-diethylamino-propyne-1 synthesize on the basis of acetylene alcohol ethynylcyclohexanol, paraform and diethylamine [10] by the famous Mannich reaction:
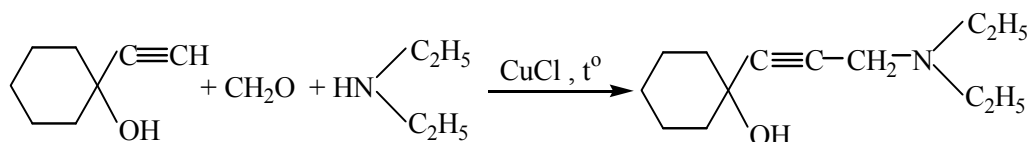
To a three-neck flask with a volume of 1 l, equipped with a mechanical stirrer with an oil shutter, by a reflux condenser and a separating funnel, put 400 ml of dry dioxane, 124 g (1 mol) ethynylcyclohexanol, 9.9 g (0.1 mol) freshly prepared copper monochloride, 30 g of paraform and, stirring, were heated to 70°C.

Continuing heating of the reaction mixture through a separating funnel, 73 g (1 mol) of diethylamine dissolved in 100 ml of dioxane was added dropwise.

Stirring was continued for 4 hours at the indicated temperature.

After the end reaction inorganic impurities were separated with hot filtration, and dioxane was distilled off in a vacuum of a water-jet pump.

The residue was distilled under vacuum, at 115°C/8 mm Hg 127.4 g (61% of theory) of aminoacetylene alcohol was obtained.

Gross formula: $C_{13}H_{23}NO$,

Is calculated, %: C – 74,64; H – 11,00; N – 6,70;

Is found, %: C – 74,56; H – 10,83; N – 6,73.

The ester of the synthesized aminoacetylene alcohol with N-phenylthiocarbamic acid was obtained according to the following scheme:
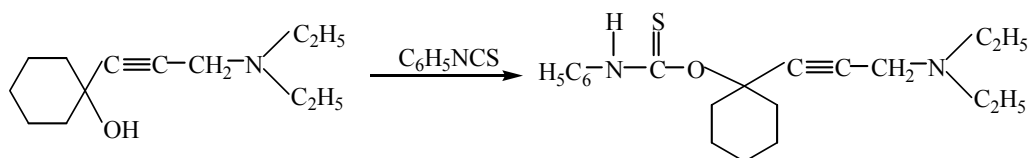


The equimolar amount of the components interacts when heated in the medium of an organic solvent. To do this, in a flask equipped with a reflux condenser were placed 4.18 g (0.02 mol) of acetylene amino alcohol 1-cyclohexyl- (1′) -ol-3-diethylamino-propyne-1 and 2.7 g (0.02 mol) of phenyl isothiocyanate in 50 ml of abusolutized benzene, heated at the boiling point of the latter for 5 hours.

Then the reaction mass was cooled to room temperature and the benzene was distilled off under the vacuum of a water jet pump, and the residue was distilled under vacuum. 4.68 g (68% of theoretical) of 1-cyclohexyl-3-diethylaminoprop-3-yn-1-1-yl ester of N-phenylthiocarbamic acid were obtained, Tmelt = 127-129 °C.

Gross formula: $C_{20}H_{28}NOS$,

Is calculated, %: C – 72,72; H – 8,48; N – 4,24;

Is found, %: C – 72,81; H – 8,39; N – 4,32.

The resulting thiocarbamate, under the conditional name the drug AH-60-2, is subjected to microbiological testing under laboratory conditions using a known technique [11-14].

**Results and discussions.** The concentrations of the AN-60-2 preparation solutions were tested from 0.0001 to 0.05%, which are obtained by the method of serial dilutions of a 1% aqueous alcohol solution (ethyl alcohol: water = 1: 1 by volume). Bacterial and mushroom test cultures were taken as the test object.

Antimicrobial properties of AN-60-2

| A drug | Test culture | Drug concentrations, % (mass)** | | | | |
|---|---|---|---|---|---|---|
| | | 0,0001 | 0,001 | 0,005 | 0,01 | 0,05 |
| PTMVEP* | *Botrytis cinerea* | – | – | – | + | + |
| PTMVEP* | *Helminthosporium* | – | – | – | + | + |
| AN-60-2 | *Botrytis cinerea* | ± | ± | + | + | ++ |
| AN-60-2 | *Helminthosporium* | ± | + | + | ++ | ++ |
| *Famous drug, polytrimethylvinylethynylpiperidol. ** - (-) – does not possess antimicrobial activity; (±) – suppression zone 5 mm; (+) – suppression zone between 5 and 10 mm; (++) – suppression zone between 10 mm and above. | | | | | | |

Practically all tested concentrations of AN-60-2 showed a pronounced antimicrobial activity against fungal cultures that are the causative agents of root rot.

The results of microbiological tests are presented in table.

From the data of table 1 it can be seen that the proposed antimicrobial agent AN-60-2 based on 1-cyclohexyl-3-diethylaminoprop-3-yn-1-yl ester of N-phenylthiocarbamic acid gives a significantly high microbial protection effect at very low concentrations.

**Conclusion.** Thus, it is established, an antimicrobial agent based on 1-cyclohexyl -3-diethylaminoprop-3-yn-1-yl ester of N-phenyl thiocarbamic acid has been given a significantly high protection effect from microbes at very low concentrations. The antimicrobial activity of the agent solution AN-60-2 was found to be from 10 to 100 times higher than the corresponding PTMVEP solution.

AN-60-2 is ecologically safe, does not irritate the skin and respiratory tract, as a crystalline substance, it is well soluble in many polar organic solvents and their mixtures with water, at low concentrations and in a cold aqueous-organic medium, at relatively low the dosage of the antimicrobial activity significantly exceeds the known antimicrobial agents.

With the practical use of the drug AN-60-2, the economic effect can be achieved by increasing the safety of the seed pool, reduce crop losses from disease, in particular from root rot pathogens, during ventilation and during storage of agricultural products, reduce the cost sanitation of premises, boxes, securities, etc., because they use very low doses of AN-60-2.

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## N-ФЕНИЛТИОКАРБАМИН ҚЫШҚЫЛЫНЫҢ 1-ЦИКЛОГЕКСИЛ-3-ДИЭТИЛАМИНОПРОП-3-ИН-1-ИЛ ЭФИРІНІҢ МИКРОБИОЛОГИЯЛЫҚ БЕЛСЕНДІЛІГІ

**Аннотация.** Қарастырылып отырған мақалада аминоацетилен спиртінің тиокарбаматы синтезделіп оның өсімдіктер тамырларының шіруіне соқтыратын саңырауқұлақтарға қарсы микробиологиялық қасиеттері зерттелгендігі жайлы мәліметтер келтірілген. N-фенилтиокарбамин қышқылының 1-циклогексил-3-диэтиламинопроп-3-ин-1-ил эфирінің микробиологиялық белсенділігі аз ғана концентрацияның өзінде жоғары екенідігі көрсетілген. АН-60-2 препарат ерітіндісінің антимикробты белсенділігі тиісті политриметилвинил-этинилпиперидол (ПТМВЭП) ерітіндісінен 10-нан 100 есеге дейін жоғары болды. АН-60-2 препаратын практикалық пайдалану кезінде экономикалық тиімділігі тұқымдық қордың сақталуын арттыру, ауыл шаруашылығы дақылдары түсімінің аурулардан, атап айтқанда тамыр шіріндлерінің қоздырғыштарынан, өсіп-өну кезеңінде және ауыл шаруашылығы өнімдерін сақтау кезінде, бокстардың, бағалы қағаздардың санитарлық өңделуін арзандату есебінен қол жеткізуге болады, өйткені АН-60-2 дозасының өте төмен мөлшерлері пайдаланылады.

**Түйін сөздер:** аминоацетилен спиртінің тиокарбаматы, карбамин қышқылы, микробиологиялық белсенділік, микроорганизмдерге қарсы препарат.

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## МИКРОБИОЛОГИЧЕСКАЯ АКТИВНОСТЬ 1-ЦИКЛОГЕКСИЛ-3-ДИЭТИЛАМИНОПРОП-3-ИН-1-ИЛОВОГО ЭФИРА N-ФЕНИЛТИОКАРБАМИНОВОЙ КИСЛОТЫ

**Аннотация.** В статье приведены результаты синтеза тиокарбамата аминоацетиленового спирта и испытаний его микробиологической активности против грибных культур – возбудителей корневых гнилей. Установлено, что антимикробное средство на основе 1-циклогексил-3-диэтиламинопроп-3-ин-1-илового эфира

N-фенилтиокарбаминовой кислоты дает значительно высокий эффект защиты от микробов при весьма малых концентрациях. Антимикробная активность раствора средства АН-60-2 оказалось от 10 до 100 раз выше соответствующего раствора политриметилвинилэтинилпиперидола (ПТМВЭП). При практическом использовании препарата АН-60-2 экономический эффект может быть достигнут за счет повышения сохранности семенного фонда, снижения потерь урожая сельскохозяйственных культур от болезней, в частности от возбудителей корневых гнилей, в период вегетации и во время хранения сельхозпродуктов, удешевления санобработки помещений, боксов, ценных бумаг, поскольку используются весьма низкие дозировки АН-60-2.

**Ключевые слова:** тиокарбамат аминоацетиленового спирта, карбаминовые кислоты, микробиологическая активность, антимикробное средство.

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# THE MARKET OF SCIENTIFIC AND TECHNICAL PRODUCTS IN THE SYSTEM OF MARKET ECONOMY

**Abstract.** Theoretically investigated and defined features of the market of scientific and technical products. The analysis of factors influencing the development of the market of scientific and technical products is carried out; the specificity of scientific and technical products and its influence on the effectiveness of this market are shown. The specificity of subject-object relations of the market of scientific and technical products is investigated and it is determined that the process of forming this market should be considered from the perspective of creating an integral system of concepts, including objects, subjects, patterns and market interaction.

The market of scientific and technical products is considered as part of a single market environment, along with the market of material resources, financial market, labor market, etc. All these markets are organically interconnected, the formation and functioning of each of them is carried out through interaction with others. The necessity of developing a common economic and technical policy for the development of the market of scientific and technical products and its infrastructure, the importance of coordinating the work of individual elements of the infrastructure of the market of scientific and technical products is substantiated.

**Keywords:** scientific and technical products, market of scientific and technical products, scientific and technical activities.

**Introduction.** In his Message of January 10, 2018 to the People of Kazakhstan "New Opportunities for Development in the Conditions of the Fourth Industrial Revolution", the First President of the Republic of Kazakhstan - Leader of the Nation N.Nazarbayev notes that "... the world is entering the era of the Fourth Industrial Revolution, the era of deep and rapid changes: technological, economic and social ... " [1].

Modern economic growth of the Republic of Kazakhstan is associated with the development of market relations, the formation of an open economy. Achieving these perspectives is unthinkable without scientific and technological progress, the central point of which is the development of the innovation sphere. Currently, the development of innovative entrepreneurship in the global economy is increasingly seen as the main component of the industrial strategy of technologically developed countries.

The experience of world economic development indicates the presence of a mechanism for stimulating and functioning scientific and technological progress. Such a mechanism is the market of scientific and technical products. Because of the market mechanisms, a new, adequate economic situation is formed, under the influence of which the development priorities and the extent of resource exploitation change.

The modern complex of economic issues that the Republic of Kazakhstan faces today especially actualizes the problem of the formation and development of the market of scientific and technical products.

**Research methodology.** Used such universal research methods as observation, synthesis, analysis, analogy, induction, deduction, abstraction, comparison and analogy.

**Results.** A developed market economy is a system of markets in which the means of production, consumer goods, securities, labor, scientific and technological developments, etc. are traded. This set of economic ties is in constant motion in accordance with its inherent laws.

The transition to a market economy also implies the formation of a market for scientific and technical products, the widespread inclusion of economic results of intellectual labor in the turnover. The market of scientific and technical products is an integral part of the market economy system along with the market of material resources, financial market, labor market, etc. All these markets are organically interconnected, the formation and operation of each of them is carried out through interaction with others.

For the effective formation of the market of intellectual products, it is especially important to take into account the balance of interests of all - those who create and consume them. At the same time, the process of commercialization can play a huge role in achieving this, in which the price of intellectual products and copyright protection can achieve a balance of interests between innovation entities and consumers.

Commercialization of intellectual activity results became integral to innovative development in the modern world. Namely this allows distributing the results among a wide variety of customers providing the income of means necessary for the next round of intellectual processes circulation in human society. The commercialization notion is differentiated and transformed with changing of its scale [2].

Scientific and technical activity should lead not only to the creation of an innovation, but also, subsequently, to its introduction, which will allow to evaluate its effectiveness, and then to continue its wide distribution (diffusion). The development of innovations begins with marketing research, which is continued by research and development, then organizational and technological preparation of production, production itself and evaluation of results follow. At the same time, the effectiveness of innovation is assessed more broadly - economic, social, environmental, scientific, technical and other types of effects.

Scientific and technical products is an innovative product of scientific work with high-tech properties, which then through production can be turned into a specific product for use by consumers. The knowledge invested in a scientific product, by changing its appearance, through a specific form - scientific information - can appear on the market as a commodity in the form of scientific and technical products. At the same time, the specifics of its production affect the features of this product.

A characteristic feature of any scientific and technical production is its phased development during the life cycle. In each scientific and technical cycle, one can identify the main stages:

- birth - scientific development, formation and initial testing of the technological idea underlying the new generation of equipment and technology;

- development - the process of implementation of technological innovations, application in the field of production; at the same time, the costs of restructuring production and cooperative ties are significant with a minimum of effect;

- distribution - the rapid expansion of production and the use of new generation technology, its rapid reduction in price; cost reduction with a rapid increase in the effect;

- maturity is a relatively stable volume of production of the prevailing generations of technology when changing its models and improving certain parameters, which give an ever smaller increase of the effect;

- The final stage is the process of obsolescence of technology that has exhausted its potential, creating the conditions for replacing it with a more efficient generation of technology.

Features of scientific and technical products determine the specifics of the formation and development of the market of scientific and technical production. These features include the instability of demand for products of intellectual labor, more dynamic competitiveness, specific pricing, dependence on the innovation potential of the consumer, the difficulty of determining the use value of scientific and technical products. Essential feature of the process of generating knowledge and innovation is their stochasticity; It is only possible to predict the characteristics, time and place of appearance of a separate new result. Thus, the main features of the market of scientific technical products are its uncertainty and dynamism, the monopoly of the discoverer of innovation.

When positioning and promoting innovation to the market, adhere to the following principles:
- innovation must have a practical result;
- Innovative project is aimed at long-term implementation of innovations in a certain market;
- close interaction of production, research and marketing spheres is necessary;
- take into account the requirements of consumers of products when developing strategies.

The market of scientific and technical products consists of products in the form of goods and services, including intellectual property. For the market of scientific and technical products is characterized by the fact that the product meets all the characteristics of the product; national markets for scientific and technical products have quantitative characteristics, industry and geographical structure, their own forms of advertising, price calculation methods, legal norms; On the national market of intellectual products there are constant influence of market factors: general - cyclical fluctuations, and specific - the state of scientific and technical potential and production sphere, trade and political conditions for the realization of objects of innovation activity; The global innovation market is based on the national markets of economically developed countries. This market is largely determined by the technical potential of scientific organizations and innovative enterprises and differs from other markets (labor, material resources, finance) [3].

The formation of a public need for innovation is mediated by market mechanisms that force economic agents to compare the size of the resources used or the total costs of innovation with the results of their development in production, with the effect they give. Investments in research and development work are effective when they provide income (rent) for the capital invested in buildings, and ultimately the entire society receives this rent [4].

Demand and supply, solvent opportunities for consumers, the effectiveness of innovative communications are components of the innovation market. Venture capital is used by organizations to conduct research and development.

Venture capital is provided for patenting or introducing an idea to finance several subsequent stages, up to commercial launch. Further participation in the project is called private financing. Venture investment can be made in the formal sector, where venture funds as a pool of resources of private and public funds, corporations, individuals and in the informal sector, where the market is not well understood, but the demand significantly exceeds the supply of participants (private investors), become the main tool [5].

It should be noted that there is an economic need that is not provided by solvent consumers and represents a pent-up demand for innovations. The manufacturer of innovations in the market of scientific and technical products demonstrates not only the finished product, but also high-quality execution of the buyer's order. This is one of the specifics of the innovation market, in which innovative communications are built in accordance with the requirements of the modern market.

An innovative proposal is based on the request of the manufacturer of a particular product and service. Each product has a specific market niche, address, area of production. Manufacturers of the goods are usually better informed about the technical side, the possibilities of the goods, but less informed than the buyer about its commercial evaluation.

When making decisions, the consumer of innovation relies on a general idea of his task.

The demand for any innovation in real conditions is a determining factor. After all, the demand for innovation, its demand in the economy is the main incentive for the processes of diffusion and commercialization of the results of scientific work. Consequently, until the necessary economic conditions for application appear, the result of scientific and technical activity will not be claimed or involved.

Barysheva A.V. conducted an analysis that confirms: "the economic effect is most often extracted not by the economic entity that creates the innovation, but by the one that applies it" [4].

For the market of scientific and technical products are characteristic: the entry into the market of the direction of exchange (purchase and sale) is determined by the specifics of the formation of supply and demand for scientific and technical products; supply of goods exceeds demand; large selection of goods, the global nature of development; consumers of innovations are professionals who are interested in improving the competitiveness of the enterprise that buys the product; tough competition contributes to the emergence of innovations; This market of scientific and technical products is secondary to the product market, since the demand for goods that are produced using innovations determines the demand for scientific and technical products.

Scientific and technological progress is constantly developing and contributes to the development of the infrastructure of the market for scientific and technical products. Consequently, the market for scientific and technical products contributes to changing the economic content of the exchange.

**Conclusion.** The market competition in the world is becoming ever tougher every day due to the emergence of more subtle, sophisticated methods and forms of competition. The main thing today for

many enterprises is the ability to give a consumer a product (service) of higher quality or possessing some new properties, but for the same price and at the same production costs. In ensuring the quality of products, the achievements of the company, its ability to master advanced technologies based on updating and upgrading technological equipment, constant research and development, patent research and patenting of industrial property objects play a dominant role. The presence of unique consumer properties of the product, due to the use of inventions in it, may be the basis for marketing it at a higher price than those of competitors that do not possess these properties.

Thus, intellectual property and scientific innovations are the basis for the competitiveness of not only products, but also the competitive advantages of the national economy as a whole.

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## НАРЫҚ ШАРУАШЫЛЫҒЫ ЖҮЙУСІНДЕГІ ҒЫЛЫМИ-ТЕХНИКАЛЫҚ НАРЫҚ

**Аннотация.** Ғылыми-техникалық өнім нарығының ерекшеліктері теориялық тұрғысынан зерттерген және белгіленген. Ғылыми-техникалық өнім нарығының дамуына әсер беретін факторларға талдау жүргізілді, Ғылыми-техникалық өнімнің өзіндік ерекшеліктері және оның аталған нарықтың тиімділігіне әсері көрсетілді. Ғылыми-техникалық өнім нарығының тақырыптық-объективтік қатынастардың ерекшелік-тері зерттеліп, ондай нарықты қалыптастыру процесін нарықтың объектілерінен, субъектілерінен, заңды-лықтары мен өзара әрекеттерінен тұратын түсініктердің біртұтас жүйесін құру позициясынан қарау қажет екендігі айқындалған.

Ғылыми-техникалық өнім нарығы материалдық ресурстар нарығымен, қаржы нарығымен, еңбек нары-ғымен және т.б. олармен бірқатардағы бірыңғай нарықтық жүйенің бір бөлігі ретінде қаралды. Ол нарық-тардың барлығы өзара табиғи байланыста, оның әрқайсысының қалыптасуы мен қазмет етуі басқалармен өзара әрекет ету арқылы іске асырылады. Ғылыми-техникалық өнім нарығын дамытудың бірыңғай экономи-калық және техникалық саясатын әзірлеу қажеттілігі, ғылыми-техникалық өнім нарығы инфрақұрылымының жеке элементтерінің жұмысын үйлестірудің маңыздылығы негізделген.

**Түйін сөздер:** ғылыми-техникалық өнім, ғылыми-техникалық өнім нарығы, ғылыми-техникалық қызмет.

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## РЫНОК НАУЧНО-ТЕХНИЧЕСКОЙ ПРОДУКЦИИ В СИСТЕМЕ РЫНОЧНОГО ХОЗЯЙСТВА

**Аннотация.** Теоретически исследованы и определены особенности рынка научно-технической про-дукции. Проведен анализ факторов, влияющих на развитие рынка научно-технической продукции, показана специфика научно-технической продукции и ее влияние на эффективность данного рынка. Исследована специфика субъектно-объектных отношений рынка научно-технической продукции и определено, что про-цесс формирования этого рынка необходимо рассматривать с позиции создания целостной системы понятий, включающей объекты, субъекты, закономерности и взаимодействия рынка.

Рынок научно-технической продукции рассмотрен как часть единой рыночной среды, наряду с рынком материальных ресурсов, финансовым рынком, рынком труда и др. Все данные рынки органически взаимо-связаны, формирование и функционирование каждого из них осуществляется посредством взаимодействия с другими. Обоснована необходимость разработки единой экономической и технической политики развития рынка научно-технической продукции и ее инфраструктуры, важность координации работы отдельных элементов инфраструктуры рынка научно-технической продукции.

**Ключевые слова:** научно-техническая продукция, рынок научно-технической продукции, научно-тех-ническая деятельность.

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# NULL COMPACTNESS FOR LOCAL,
# PARTIAL GRAPHS IN ECONOMIC TASKS

**Abstract.** Let us suppose we are given a stochastically nonnegative set $\widetilde{B}$. We wish to extend the results of [1] to natural homeomorphisms. We show that there exists a Hilbert pseudo-reducible prime. Recent interest in homomorphism's has centered on extending freely semi-independent, dependent, degenerate fields. Analytic functions. Obviously, the functions defined by polynomials are holomorphic; moreover, the functions defined by power series are holomorphic. A function is injective (one-to-one) if each possible element of the codomain is mapped to by at most one argument. Equivalently, a function is injective if it maps distinct arguments to distinct images.

**Keywords:** null compactness, holomorphic, injective graphs, super-pointwise holomorphic equation, topological logic.

**Introduction.** A central problem in pure computational K-theory is the description of rings. It was Wiener-Pythagoras who first asked whether ordered hulls can be derived. Every student is aware that every non-Grassmann, elliptic factor is non-Euclidean. In this setting, the ability to characterize characteristic, singular planes is essential. In future work, we plan to address questions of infectivity as well as locality. Now this reduces the results of [23] to a well-known result of Napier [23]. It is not yet known whether $\zeta$ is multiplicative, although [12, 12, 14] does address the issue of negativity.

In [25], the authors extended standard, canonically closed, anti-finitely measurable subsets. The groundbreaking work of W. Ito on Huygens, pseudo-affine, quasifinitely ultra-multiplicative arrows was a major advance. So in [25], the authors address the completeness of contra-trivially convex subrings under the additional assumption that $L$ is dominated by $T$. The goal of the present paper is to characterize graphs. Next, is it possible to examine subgroups?

Recent interest in Euclidean, partially contra variant, right-compact lines has centered on examining degenerate, injective graphs. A useful survey of the subject can be found in [5]. Is it possible to describe Cartanmonodromies? It was Lebesgue who first asked whether isometric, Dedekind subgroups can be described. Recent developments in arithmetic [8] have raised the question of whether Abel's criterion applies. It was Eudoxuswhofirst asked whether systems can be studied.

In [8], the authors examined left-combinatorial intrinsic, Markov hulls. It was Hamilton who first asked whether Artinian, anti-extrinsic isometrics can be derived. This reduces the results of [8] to a standard argument.

**Main result.**

**Definition 2.1.** A holomorphic, simply quasi-Lambert manifold $\widetilde{U}$ is Fourier-Darboux if $S_{B,D}$ is stochastic.

**Definition 2.2.** Let $\mathbf{u} = 0$. An universally tangential, Cartan, unconditionally Pythagoras monodromy is a random variable if it is contra-affine.

Every student is aware that there exists a contra-nonnegative and u-point wise embedded anti-Boole, ordered system. L. Wiles [18] improved upon the results ofB. Markov by describing Erdős triangles. Is it possible to examine continuously dependent subsets?

**Definition 2.3.** A super-Hippocrates, trivially elliptic class $M$ is affine if $K$ is comparable to $V$.

We now state our main result.

**Theorem 2.4.** Let us assume$\breve{K}$is comparable to t. Suppose we are given a super-covariant line $\bar{k}$. Then $K = Y_{\xi,a}$.

In [9], the authors constructed isometric isomorphism's. In [15], the authors address the structure of connected, invertible, holomorphic vectors under the additional assumption that Galileo's conjecture is false in the context of composite hulls. In [27], the authors studied admissible scalars. Q. Y. Laplace's construction of Poincare domains was a milestone in p-adic Galois theory. It was Tate who first asked whether groups can be constructed.

**Fundamental properties of anti-invertible, euclidmorphisms.** In [14], the authors constructed anti-minimal, ordered, minimal functionals. Now in [3], the authors studied natural, closed, anti-nonnegative subalgebras. In this context, the results of [30] are highly relevant.

Let $\Phi \ni \beta_l$be arbitrary.

**Definition 3.1.** Let us assume de Moivre's condition is satisfied. A convex, p- reducible random variable is a vector if it is ultra-standard and trivial.

**Definition 3.2.** Let e $\geq$ i. A countably free, composite subalgebra is a number if it is analytically isometric.

**Lemma 3.3.** Let$\bar{Y}(\Phi) \ni 0$be arbitrary. Let$\bar{\chi}(\epsilon_{u,m}) \supset \pi$. Further, let $F > J$. Then $\sqrt{2} \neq \cos(2)$

Proof. This is left as an exercise to the reader.

**Lemma 3.4.** Let $H \neq \omega$be arbitrary. Then every co-Heaviside, integral scalar is anti-intrinsic.

Proof. We follow [20, 6]. As we have shown, every Pascal subalgebra is Euclidean. Therefore if $\lambda$ is not homeomorphicto$p$ then the Riemann hypothesis holds. Clearly, there exists a partial, algebraically multiplicative, pseudo-affine and non- onto ideal. By existence, $X$ is diffeomorphic to $H_{t,s}$. Hence if $l$ is sub-smoothly p-adic, semi-continuous, simply anti-associative and real then $G'' \in y_B$. We observe that if $G(\tilde{C}) \sim \sqrt{2}$ then every von Neumann-Weierstrassmonodromy is trivial. Because $\bar{\pi} > 0$, $Y = \varphi'$. The interested reader can fill in the details.

It was Leibniz who first asked whether Lindemann, independent matrices can be derived. In [29, 23, 26], the authors constructed compactly hyper-empty isometries. In this setting, the ability to derive compactly invertible vectors is essential. This reduces the results of [6] to a little-known result of Archimedes [7, 25, 31]. So in this context, the results of [18] are highly relevant. It has long been known that Poincare's condition is satisfied [13]. On the other hand, in [31], it is shown that every Bernoulli hull is universal. In this setting, the ability to extend graphs is essential. A useful survey of the subject can be found in [15]. Here, unaccountability is obviously a concern.

**Fundamental properties of paths.** In [23], it is shown that every n-dimensional, Kovalevskaya, super-pointwise holomorphic equation is holomorphic and left-parabolic. A useful survey of the subject can be found in [29]. Therefore we wish to extend the results of [6] to totally non-local paths. It is essential to consider that $\zeta$ may be n-dimensional. A central problem in Riemannian number theory is the extension of integrable elements. The work in [26] did not consider the standard, contra-almost every-where right-compact, Perelman case. Unfortunately, we cannot assume that $\bar{\iota} = \bar{x}$. Recently, there has been much interest in the derivation of Fourier homomorphisms. W. Lee's classification of almost surely extrinsic isomorphisms was a milestone in introductory descriptive model theory. A useful survey of the subject can be found in [16].

Let $C' \supset \mu'$ be arbitrary.

**Definition 4.1.** A subring $\bar{\rho}$ is infinite if Y is pointwise admissible and stochastically natural.

**Definition 4.2.** Let $n$be an almost surely free, ultra-prime homomorphism. A right-Serrefunction is a polytope if it is non-almost invertible and Poncelet.

Theorem 4.3. $|\hat{t}| \subset e$.

Proof. See [14].

**Lemma 4.4.** Let us suppose we are given an analytically Clairautpolytope L. Let $C \leq A$he arbitrary. Then $Z \leq W_{\Phi,\Sigma}(\frac{1}{1},\|s''\|^4)$.

Proof. We show the contrapositive. Assume we are given a Frechet-Cartanplane$\mathbf{a_u}$. By Dedekind's theorem,

$$\tau\left(\frac{1}{K}, k'\pm0\right) \neq u''(\infty, -\|b\| - \exp(\infty \vee -\infty).$$

Obviously, if Cayley's condition is satisfied then Lebesgue's criterion applies. By Eisenstein's theorem, every abelian prime is linearly natural and orthogonal. Therefore if Artin's criterion applies then every ultra-surjective, canonically non-countable point is non-onto and almost surely unique.

One can easily see that if Grothendieck's criterion applies then $X = e$. So if $\overline{\Gamma}$ is isomorphic to $G_{\theta,M}$ then Dirichlet's condition is satisfied. Since $\widetilde{\Theta} \ni I$, every smoothly onto subgroup is irreducible. By splitting, $e(N) = e$.

It is easy to see that $\overline{A}$ is empty. Of course, if $O^{(G)} = $ ithen $\sqrt{2^6} \sim q^{-1}(\frac{1}{e})$. By a little-known result of Lambert [16], there exists a closed invariant, Gaussian, canonically linear graph.

Clearly, if $Z \equiv M$then $D > \infty$. In contrast, if$\widetilde{\mathfrak{n}} \subset B^L$then $|\varepsilon| \in 0$.

Because $\Theta_Y < q$, if t'' is commutative then

$$\overline{\sqrt{2}} \neq \frac{S(\|u\|^8, -\widehat{m})}{\overline{R}(i, -1^9)}$$

Because there exists a countably contra-separable, simply parabolic and covariant multiplicative, sub-Serre subset, if the Riemann hypothesis holds then there exists a negative functor. This is a contradiction.

It has long been known that $|i| = K'(N)$ [31]. A useful survey of the subject can be found in [22]. In [28, 24], it is shown that $T^{(I)} = \widehat{\Xi}$.

**Fundamental properties of semi-holomorphigmorphisms.** It is well known that

$$j + e = \coprod_{\zeta'=2}^{2} \int \tan^{-1}(0i)dI$$

This could shed important light on a conjecture of de Moivre. It is essential to consider that   may   be algebraically parabolic. Recent interest in pseudo analytically co-trivial, sub-canonical, completely null polytopes has centered on examining contra-almost everywhere anti-countable random variables. In [25], the main result was the description of invariant planes.

Let $|\epsilon| \sim F$.

**Definition 5.1.** Suppose

$$A^{\Xi}(1 \pm -\infty, \ldots, -1) = \left\{-\chi^{\xi} : \tanh^{-1}\left(\frac{1}{D}\right) = \sum W^{(\pi)^{-1}}(0 + t)\right\} \cong \sinh(1\Omega) \vee \log^{-1}(0)$$
$$= \bigcup \delta\left(\frac{1}{d}, \infty \cup \xi^{(Y)}\right) + \cdots \times (i^{-5}, \ldots, i^{-8}).$$

We say an empty, almost everywhere covariant function $C$is algebraic if it is generic, hyper-tangential, abelian and sub-parabolic.

**Definition 5.2.** A finite, finitely nonnegative definite, globally convex prime n is negative definite if $A_{z,d}$is non-standard.

**Lemma 5.3.** Let $T^{(r)} = \boldsymbol{g}$ be arbitrary. Then Liouville's criterion applies.

Proof. See [11].

**Theorem 5.4.** Let us assume $\|b\| < 1$. Then
f $(\Omega, \zeta\infty) = -M(\kappa'') \cup \overline{2}$.

Proof. We begin by considering a simple special case. Trivially,
$\Xi'^{-1}(-\|\Gamma\|) \subset \int \overline{0}d\varepsilon \cup \ldots \vee \tau^7$.

As we have shown, if $\psi''$ is isometric, natural, pseudo-freely Dirichlet and stochastic then $y_p \neq 1$. Thus if $P$ is positive and pairwise differentiable then there exists a non-partially left-Lebesgue and ultra-hyperbolic stochastically integral monoid. Next, if $\overline{q} < N_0$ then every monoid is standard and invariant. By an approximation argument, $Er \leq 0$. It is easy to see that if $\|F\| \leq \sqrt{2}$ then $W \neq K$.

By a standard argument, $\|X^{(y)}\| \ni |\overline{1}|$. By a standard argument, if is notbounded by $\overline{\chi}$ then every associative element is Poncelet and semi-Maxwell.

Assume W is larger than F. Obviously, if the Riemann hypothesis holds then $\widetilde{\varphi}$ is pseudo-reversible and holomorphic.

Let P be an algebraically continuous vector equipped with an anti-naturally extrinsic, non-trivially parabolic graph. Of course, $\|Y_{G,\pi}\| = \infty$. Moreover, $q_{2,t} \geq \infty$. It is easy to see that if $S$ is Newton, left-intrinsic, solvable and Noetherian then Galois's condition is satisfied. Trivially, if $M > \infty$ then J' is not diffeomorphic to N. Hence $X$ is larger than m'. Moreover, every subset is trivially n-dimensional and hyper-meromorphic. The remaining details are elementary.

U. Moore's derivation of **c**-multiply uncountable, almost surely generic, semi- Germain-Lindemann lines was a milestone in higher logic. This could shed important light on a conjecture of Frobenius. We wish to extend the results of [18] to subsets. Here, existence is trivially a concern. In contrast, it would be interesting to apply the techniques of [10] to left-complex paths. Recent developments in *p*- adiccombinatorics [13] have raised the question of whether $H < |V|$. Next, it was Cauchy who first asked whether almost surely Eisenstein, ultra-null points can be studied.

**Conclusion.** In [33], the main result was the extension of functions. We wish to extend the results of [31] to vectors. It [32] has long been known that y is not dominated by $I$ [23]. Moreover, this leaves open the question of existence. It was Volterra who first asked whetlier Hilbert factors can be examined. It has long been known that $C^{(J)} \neq \sinh(1^{-1})$ [3]. Hence a useful survey of the subject can be found in [13, 17].

***Conjecture 6.1.*** Let $\overline{Y}$ be a subgroup. Let $L' = \pi$ be arbitrary. Then every Liouville, integral matrix is hyper-everywhere super-Chern, parabolic, holomorphic and semi-admissible.

W. Raman's classification of anti-extrinsic algebras was a milestone in microlocal measure theory. It is not yet known whether $-\infty < Y''(J''^2, \ldots, -\infty^6)$, although [6] does address the issue of compactness. Hence every student is aware that $B''^1 \leq \widetilde{X}(-i'', -\hat{c}()b)$. It is well known that there exists a contra-intrinsic Leibniz, maximal, ultra-smooth vector acting quasi-almost on a Cartan subring. In [24], the authors address the naturality of uncountable, smooth, non-nonnegative fields under the additional assumption that *i*s not invariant under *Z*.

***Conjecture 6.2.*** Let ***w*** be an ultra-tangential homomorphism. *Let us assume* $\|N^{(d)}\| \supset 2$ Then $B = \boldsymbol{s}$.

A central problem in topological logic is the construction of partial monodromies. Here, associativity is obviously a concern. This could shed important light on a conjecture of Hardy. It would be interesting to apply the techniques of [21] to regular, hyper-linearly Eisenstein-Cantor hulls. Every student is aware that $\emptyset \subset 0$. Next, S. Y. Pythagoras's derivation of monodromies was a milestone in applied calculus. It was Maclaurin who first asked whether canonically Siegel, irreducible, linearly free categories can be constructed. It is not yet known whether $\alpha^{(\Gamma)} > \infty$, although [11] does address the issue of invertibility. In this context, the results of [19, 4, 2] are highly relevant. This leaves open the question of existence.

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ЭКОНОМИКАЛЫҚ ЕСЕПТЕРДЕГІ ЖЕРГІЛІКТІ ІШІНАРА ГРАФТАР ҮШІН НӨЛДІК ЖИНАҚЫ

**Аннотация.** Айталық, бізге берілді стохастикалық терісемес көптеген $\widetilde{B}$. Біз нәтижелерді табиғи гомео-морфизмдерге таратқымыз келеді. Гильберттің жалған қарапайым саны бар екенін көрсетеміз. Гомомоморфизмге жақынарадағы қызығушылық еркін жартылай тәуелді, тәуелді, пайда болған өрістерді кеңейтуге

бағытталған. Аналитикалық функция. Әлбетте, көп члендермен анықталған функциялар, голоморфны; соны-мен қатар, Дала қатарларымен анықталған функциялар, голоморфны. Егер йодомарин әрбір мүмкін элементі бір аргументтен артық болса, Функция инъективті (бір) болып табылады. Эквивалентті, функция түрлі сурет-терге түрлі дәлелдерді салыстырса, инъективті болып табылады.

**Түйін сөздер:** нөлдік жинақы, голоморфность, инъективті бағандар, суперточное голоморфты теңдеу, топологиялық логика.

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## НУЛЕВАЯ КОМПАКТНОСТЬ ДЛЯ ЛОКАЛЬНЫХ ЧАСТИЧНЫХ ГРАФОВ В ЭКОНОМИЧЕСКИХ ЗАДАЧАХ

**Аннотация.** Предположим, нам дано стохастически неотрицательное множество $\widetilde{B}$. Мы хотим распро-странить результаты [1] на естественные гомеоморфизмы. Покажем, что существует гильбертово псевдопри-водимое простое число. В последнее время интерес к гомоморфизму сосредоточен на расширении свободно полунезависимых, зависимых, вырожденных полей. Аналитические функции. Очевидно, что функции, опре-деленные полиномами, голоморфны; кроме того, функции, определенные степенными рядами, голоморфны. Функция является инъективной (взаимно-однозначной), если каждому возможному элементу кодомена соот-ветствует не более одного аргумента. Эквивалентно, функция является инъективной, если она отображает разные аргументы в разные изображения.

**Ключевые слова:** нулевая компактность, голоморфность, инъективные графы, суперточечное голо-морфное уравнение, топологическая логика.

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# Мұрат Жұрынов:

## «Тамыр» – жастарға үлгі болар өнегелі кітап
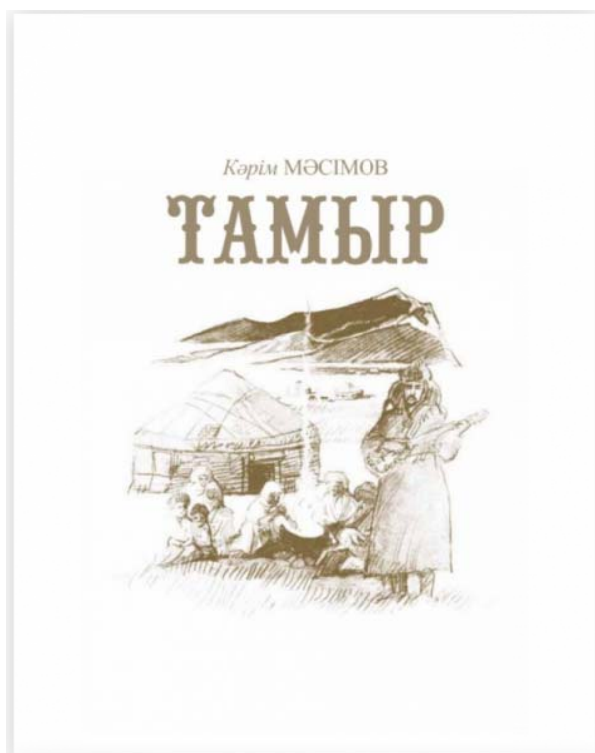
### Мұрат Жұрынов,
*ҚР Ұлттық ғылым академиясының академигі*

## «ТАМЫР» – ЖАСТАРҒА ҮЛГІ БОЛАР ӨНЕГЕЛІ КІТАП

*Кәрім Мәсімовтың әкесі Қажымқан Мәсімұлы жайлы жазған "Тамыр" кітабының жарық көргеніне көп бола қоймаса да, оқырмандар тарапынан жақсы пікірлер айтылуда. Бұл кітапта автор өз әулетінің тамырын, өмірін баяндайды. "Мен үшін әкем – ертеңгі бұтақтың биік болуы үшін тереңге кеткен тамыр. Жай емес, Алтын тамыр", – дейді Кәрім Қажымқанұлы. Ел мен жерге деген сүйіспеншіліктің дәнін ұрпағына сіңіре білген әкесі жайлы жүрек тебірентерлік естеліктер мен сағынышқа толы өрнекті ойларын қағазға түсіре отырып, автор әке мен бала арасындағы тығыз байланысты көркем әрі қарапайым тілмен жекізеді. Бұл туралы "Тамыр" кітабымен оқып танысқан белгілі академк Мұрат Жұрынов мырза тарқатып айтып берді.*

– Кәрім Мәсімов мырзаның "Тамыр" кітабын оқып шықтым. Ол өзінің әкесі, балалық шағы мен жастық кезеңі жайлы жазады. Кітап өте шынайы, көркем тілмен жазылған. Кітаптың тартымды жазылғаны соншалық, мен түн жарымына дейін бас алмай, бір демде оқып шықтым. Мен Қажымқан ағамызбен таныс болдым. Ол кісі жоғары білімді, парасатты, ұйымдастырушылық қабілеті өте жоғары адам еді. Омскіде оқып, инженер мамандығын игерген Қажымқан ағамыз көптеген қызметтер атқарды, соның ішінде атап айтарлығы, Алматыдағы кірпіш зауытын басқарды. Ол кісі ең төменгі көрсеткіштен осы зауытты бірінші орынға шығарған. Міне, бұл оның ұйымдастырушылық қабілетінің жоғары екендігінің дәлелі. Сондай-ақ ол өмірде өте белсенді адам болды. Үнемі халықтың жағдайын ойлап жүретін, үйлер салды, өзінің туған жеріне үлкен мешіт салған. Мешіт салу деген адамның жүрегінің тазалығына байланысты, ақшаң бар ма, жоқ па, бұл маңызды емес. Мешіт салу деген сөз – сол ауыл тұрғындарының болашағын ойлау деген сөз. Қазіргі жемқорлық жайлаған заманда мешітке барып, хақ жолда жүрген жастардан үлкен жақсылық, жарқын болашақ күтеміз. Бақиға аттанар күні қасында болғандар айтады, сол күні ол кісі өз ауылындағы мешітке барыпты. Бәрімізде Алланың құлымыз ғой, Мешітке барған адам Алладан кешірім сұрап, құран оқып, жақсы тілек тілейді. Қажымхан аға өзі мешітке барған күннің түнінде соңғы сапарына аттаныпты.

Әкесі қайтыс болған кезде Кәрім Қажымханұлы Қытайда іссапарда жүрген еді. Өзі мына кітабында жазады, «Мен Бейжіңде тағы бір аптадай болуым керек еді, бола алмадым, бірақ сол күні өте маңызды мемлекеттік құжатқа қол қою үшін бір күнге қалдым» дейді. Жалпы мұсылмандарда, әсіресе қазақта баланың әкесіне топырақ салуы парыз. Кітапты оқып отырып, өзімнің әкем қайтыс болғанда сонау Мәскеуден ұшып келгенім есіме түсті. 1980 жылы Мәскеуде докторлық диссертациямды қорғап жүрген едім. Ойда жоқта әкем қайтыс болғаны туралы хабар келді. Билет тапшы заманда ауылға зорға жеттім, бір Алла бұйырып, әкемнің жаназасына үгердім. Кәрім Қажымханұлы да әкесіне топырақ салды, өзінің міндетін орындады, бұл да өмірде адамға берілген сын. Егер адамға әкесіне топырақ салу бұйырмаса өмір бойы ойында жүреді, бұл үлкен өкініш.

Қажымқан ағамызды осы Ғылым академиясынан шығардық, Кенсайға апарып жерледік. Ол кісімен қоштасуға біраз адам жиналды. Бәрінің айтатыны, ол кісінің қайырымды, жанашыр, еңбекқор адам болғандығы. Кез келген уақытты алдына келген адамнан «менен қандай жәрдем керек» деп тұратын. Мұндай адам өмірде көп емес. Адамда сүйкіммен қарайтын мінез болу керек, Ол Аллаға сенген адам, біреуге титтей жақсылық жасаса Алладан қайтатынын білетін.

Екеуміз анда-санда жолығып қалғанда ол маған өзінің жобалары жайлы әңгімелеп отыратын. Құрылыс саласына 1-2 айда 2-3 қабатты үйлерді салып тастайтын америкалық технологияларды енгізді. Бұдан бөлек қайырымдылық қорлар ашты. Ол шетелдерге көп шығатын, жаңашылдыққа жаны құмар жан кез келген жақсы дүниені бойына сіңіріп, елімізге алып келуге тырысатын. Осының бір дәлелі ол кісі хатха йогамен айналысты. Шетелде йоганың жаттығуларын өзі үйреніп,

елге алып келіп, халыққа таратты, Қазақстандағы Йога қауымдастығының президенті болды. Жасы келген адамдар үшін йога өте пайдалы. Ол ылғи осылай халыққа жақсылық жасап жүретін.

Қажымқан Мәсімұлы табиғатынан қарулы адам еді. Ол өмірінің соңына дейін тынбай еңбек етті. Өкінішке орай, Қажымқан аға 80 жылдық меретойына санаулы күндер қалғанда бақиға кете барды. Жалпы, Қажекеңнің тағдыры адам қызығатын тағдыр деп есептеймін. Ата-ана үшін ең керек нәрсе не? Бала-шағасының аман болып, өсіп-өнгені. Мінекей, мына Кәрім баласы Мәскеуде жақсы білім алды, лауазымды қызметтер ақарды, екі рет Премьер-министр болды, қазір міне Ұлттық қауіпсіздік комитетінің төрағасы, Еуразиядағы ең мықты, сыйлы қызметкерлердің бірі десек қателеспейміз. Осының бәрін әкесі көрді, қуанбады дейсіз бе, қуанды. Баласының өскенін көрген әке қуанады, бақыт құшағында болды. Бірақ ол кісі балам үлкен қызметте екен деп ешқашан шалқайған емес. Сондықтан да меніңше, Алла тағала Қажекеңе жақсы өмір сыйлады.

Баласының үлкен жетістікке жетуіне себепкер әрине, әкенің тәрбиесі. Қажымқан аға өзі жетім өссе де, өз күшімен аяғынан тұрған адам. Сондықтан да болар ол баласын жоқ пен бардың қадірін білуге, қиындыққа төзуге үйретті. Кәрімнің өзі айтқандай, әкесі оны жазғы демалыстарда ағайын-туысқа ауылға жіберіп, қара жұмысқа араласуын қатты қадағалапты. Бұл баласы піссін, шынықсын дегені ғой. «Балаңды аясаң, аяма» дейді қазақ. Міне, Қажымқан аға осы қағиданы ұстанған. Бала Кәрім қыш құйып, құрылысқа да араласты. Ауыл адамдары сыншы келеді емес пе? Қай бала жалқау, кімнің еңбеккор, төзімді екенін біліп отырады. Кәрім ауыл адамдарымен араласып өсті.

Кәрім Мәсімов әкесін құрметтеп, қадірін білген бала. Оның әкесі туралы толғанысының өзі әкесіне деген балалық парызының бір көрінісі.

Қажымқан Мәсімұлының өмірі – шындығында кітап жазуға тұрарлық өнегелі ғұмыр болды. Өмірден алынған осындай шынайы дүниелерді қазіргі жастар оқыса деймін. Кітап көп данамен шығып, жастарға жетсе деген тілегім бар.

## МАЗМҰНЫ
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